

## **Building Regulations Assessment in Terms of Affordability Values. Towards Sustainable Housing Supplying in Palestine**



Mohammed Itma\* , Wasim Salama 

Architectural Engineering Department, An-Najah National University, Nablus P400, Palestine

Corresponding Author Email: [moitma@najah.edu](mailto:moitma@najah.edu)

<https://doi.org/10.18280/ijstdp.180315>

### **ABSTRACT**

**Received:** 24 January 2023

**Accepted:** 20 February 2023

#### **Keywords:**

*affordable housing, housing design, sustainability, building regulations, Palestine*

Achieving a sustainable supply of affordable housing is a strategic aim for the sustainable development of each country. This study highlights the relationship between local building regulations and the sustainable supply of affordable housing in Palestine. To do so, the paper assesses the building regulations in terms of achieving affordability in housing design. Thus, an assessment framework was developed based on learning from traditional design which proved to cover three values of affordability: collectivity, sharing, and diversity, as well as several factors of changes related to each of these values. The research data were collected through a survey of the opinion of 30 experts in the field of designing and building affordable housing in three main Palestinian cities: Nablus, Ramallah, and Jenin. The results showed that the need for values of affordability increases at the urban level compared to the single-building level. The paper's main finding is to establish an approach for a sustainable supply of affordable housing based on collectivity, sharing, and diversity. This approach can be a high-potential step for achieving sustainable development in Palestine. Therefore, several affordability-encouraging suggestions were made for improving the building regulations in Palestine based on the results of the paper.

## **1. INTRODUCTION**

Housing has always been considered one of the most important sectors in the economies of all countries [1], for its broad and intense linkages with other sectors which stimulate economic development in the country as a whole [2]. Moreover, the social and human aspects of the housing sector tend to raise its value since shelter is considered one of the basic and vital needs of the well-being of humans [3]. For this reason, developing the housing sector is an important task to meet the challenges of human settlement [4]. Devise mechanisms and systems by which an adequate and steady flow of long-term financial resources from both the public and private sectors, could be mobilized and channelled into human settlements development and particularly in housing upgrading [5].

Therefore, there is a tendency in several countries around the world to adopt different strategies to develop the housing sector to face the high demand for housing. One of the most important strategies is to encourage the private housing sector to provide the necessary units for limited-income people instead of providing housing directly to these people by governments [6]. This encouragement requires an institutional and legal system that provides the appropriate environment for the private sector to invest in affordable housing. Making housing affordable generally means that the total costs (rents, mortgages, basic utilities, and maintenance) of appropriate housing total should be less than 30% of a household's income [7]. Thus encouraging the private sector to invest in affordable housing is one of the practical solutions to mitigate the housing crisis [8].

In Palestine -and most developing countries-, there is a shortage of affordable housing supply because of the presence of many obstacles. One of the most is the absence of housing strategies and projects that address the needs of the largest population groups, those with limited incomes [9]. The complex political situation and the failure to reach solutions that would enable the Palestinians to control all the lands of the West Bank, and Gaza thus greatly increased the prices of land and the costs of building construction and transportation [10]. Likewise, the lack of qualified financing programs to meet the needs in the housing sector, the absence of programs to finance affordable housing for people with limited income, and the high-interest rate on housing loans make individuals resort to self-financing, which reduces their chances of obtaining suitable housing. As a result of all these obstacles; a lot of Palestinian families cannot afford adequate housing, and because of that they are living now in very crowded conditions and paying high rents [11].

Many scholars studied housing problems in Palestine to understand its contemporary challenges and possible solutions. One study discusses the biggest housing challenge in most cities and villages, which is providing affordable housing. While the population is expanding rapidly, the number of residential units is still not enough to meet the growing needs of the population [12]. Another study tried to understand problems regarding housing in Palestine due to the Israeli occupation, such as difficulties in building permits in some areas, and the separation wall, which has occupied a wide area of Palestinian land and turned right through the middle of Palestinian neighbourhoods [13]. Moreover, there is another study highlighting the empty units for residence in

Palestinian cities, but with a small section of Palestinian families who can afford them: this is due to the costs of the units and the complicated situation of banks' mortgages [14]. Other studies examined the legal problem of loans and the registration of houses in Palestinian land and real estate department. Many lands and units are not registered until now because of ownership diversity, and other complications. This forms a big problem for the housing mortgage in Palestine [15]. So much of the debate on affordable housing in Palestine has centred on the constraints regarding the supply within the political, social and economic challenges that make housing far from affordability.

In that sense, it is important to highlight that the Palestinian housing market depends mainly on the private sector to construct the new housing units needed to meet the increasing demand for housing in Palestine. As public housing does not exist in Palestine, there is a need to activate the role of the private sector in establishing housing for people with limited income [16]. This role will assist without a doubt in the sustainable supply of affordable housing units in the future [17]. However, the private housing sector in Palestine faces many challenges that reduce its ability in providing the Palestinian market with affordable housing units [18]. Apart from the political situation, there are some challenges related to the local housing policies that can be overcome and developed, the current building regulations are one of these challenges [19].

At the time regulations are established to facilitate and regulate the whole building process, excessive and rigorous regulations tend to elevate the building costs and make housing unaffordable [20]. Accordingly, this paper sheds light on the challenges faced by affordable housing projects due to building regulations and tries to develop a theoretical framework for assisting the responsiveness of current building regulations to affordable housing design. Although this issue may be found in many developing countries, Palestinian housing is chosen as a case study because of the complicated and un-updated building regulations. Housing is still controlled by three sets of regulations: Ottoman, Jordanian and Israeli regulations [21].

In that sense, the sustainable supply of affordable housing in Palestine should adopt an innovative approach that reduces the costs of buildings while conserving the qualities of buildings and the relations between them. It is acknowledged that such approaches are the main influential factor to be considered when talking about affordable and social housing [22]. Because affordable housing is not low-cost housing, architects should direct the affordable design to a sustainable approach [23].

Searching for solutions to the current problems, it is supposed that referring to the traditional values of affordability can be a high-potential approach for the sustainable supply of affordable housing in Palestine because traditional concepts were able to provide some values for economic, and environmentally friendly solutions in a simple way [24] moreover, housing supply in the peasant time was a natural and smooth process referring to the cluster type of settlements [25, 26]. Therefore, the main objective of this paper is to explore a relevant approach to a sustainable supply of affordable housing for the future development of Palestine based on learning from traditional concepts. Thus, we will investigate how far traditional concepts could satisfy contemporary users' needs for affordable housing in the present time, and how far these concepts can assist in

achieving future housing sustainability in dense areas. To recommend these concepts for future housing designs, it is assumed that a traditional approach is still a potential approach for enhancing housing affordability until now. The following overview examines the suitability of affordability values of the traditional design for today's problems.

## 2. OVERVIEW OF AFFORDABILITY VALUES IN HOUSING DESIGN

Historically, Palestinian cities planned their residential areas for a sustainable supply of affordable housing around outdoor spaces. Private and public use of spaces in the residential area in form of several rooms and architectural types served many cultural and social activities for all the residents of the neighbourhood [27]. Therefore, sharing public and collective spaces is very important to practice in traditional neighbourhoods for conserving land. Such places are where the congregation's neighbours of all social groups participate in their daily activities [28]. Although traditional housing contains large and small houses, it has the definition of inner places (courtyards) with social justice for all citizens, which has implications for the analysis of the history and culture of the group. And then you can be in cul-de-sacs and courtyards with a variety of residential activities at different times of the day [29]. The neighbourhood planning of Palestine cities used to enhance the mix of use by combining commercial and cultural activities articulated with houses, and fairly distributed spaces like other Arabic cities planning [30]. In the planning and design of traditional residential areas, housing was facilitated as a natural result of the presence of a system that ensures the provision of the residential neighbourhood with the necessary units in a simple manner and without prejudice to the quality of the existing units [31].

The first half of the twentieth century showed a radical change in the concept of housing design in Palestine as well as in most Arab countries. A dispersed type of housing was used instead of cluster organization because of the modernity and supported by the building regulations that supported grid organization instead of organic growth of cities around courtyards [32]. It was the start of adapting individual residential buildings, instead of low-rise dense typologies, which were built in the contemporary parts of the Palestinian cities [33]. Independent typologies continued to grow randomly and fast because of the current building regulations, which encourage stepping back between houses to provide environmental qualities instead of courtyards, which affected the affordability values of contemporary housing by consuming much land, neglecting shared facilities, and generating inadequate densities. Moreover, in the second half of the twentieth century, high-rise apartment buildings became common to provide high density, with a lack of considering collective outdoor spaces and a mix of use areas.

## 3. MATERIALS AND METHODS

The study depended mainly on two different approaches that support each other: a study of a traditional housing example - that represented a state of affordability through history which is the neighbourhood in the old city of Nablus - and a survey that targeted various sectors that could be involved in the housing activities. Concerning the traditional

example, the study depended on observation and analysis of the morphology of the neighbourhood as well as layouts and plans that enriched and validated the results. The observation included site visits of neighbourhoods and main courts in addition to personal meetings with the residents and visitors of the old city of Nablus. This step was important to provide a holistic and updated overview of the current situation and resulted in the conclusion of three main values that enhanced and supported the affordability of traditional housing, these values collectivity, diversity, sharing, and diversity.

### 3.1 The current building regulations

A review of municipal regulations in Palestinian urban and rural areas indicates that four main provisions may affect housing affordability and should have our attention [34]:

1. Environmental and privacy requirements: The environmental requirements of the building codes are limited to specifying the distances that the building must keep away from the land borders, which are usually 4 meters from the sides, sometimes reaching 5 or 7 meters from the street to ensure natural ventilation and solarization of the buildings as well as privacy.

2. Building ratio: on the one hand the building percentage ranges from 36% to 49% of the land on which the residential building is intended to be built. Usually, the closer the land is to the city centres, the higher the permitted building percentage. On the second hand, the floor ratio determines the number of floors based on the total building ratio and ranges between 170%-270%. This ratio governs the required density in each area. The floor ratio usually increases with proximity to the city centre and depends largely on the width of the streets [35].

3. Aesthetic determinants: for example, considering building materials, such as the requirement to provide stone facades in some areas.

4. Technical limitations: that must be available in residential buildings, such as parking lots, elevators for buildings that have more than four floors, and additional staircases.

These provisions are chosen to be evaluated because they may be developed without affecting housing qualities. All of these determinants will be discussed in the questionnaire, and the opinions of the recipients about them and ways of development will be addressed to examine their respondent's affordability values.

### 3.2 The case study and the extraction of the theoretical framework

Table 1 shows a model of the traditional residential neighbourhood built by structures compacted around small spaces, where the design of the buildings depends mainly on the openness of the interior (courtyards). The table also shows a great diversity in the sizes and shapes of the architectural structures that represent housing and other service functions. All of these variables merge into one compact and dense system that encourages diversity and harmony at the same time.

The traditional approach in housing design shows the ability of the compact fabric to provide the requirements approved by modern building regulations, which are the environmental requirements, density, and aesthetic values, with the difference in the technical matters imposed by the era, such as parking lots, for example. This raises questions about the extent to which the traditional approach can be used in organizing the

contemporary residential environment. The following section clarifies the questionnaire that was designed to answer that question.

Based on the previous analysis, three values can be deduced from traditional housing, which first is collectivity: gathering structures in the form of clusters, reducing setbacks to preserve land, and building houses with the least consumption of land, which allows for flexible use of the spaces. The second is Sharing: encouraging sharing spaces between neighbours, as well as some other services, also reduces land consumption for external spaces and services. The third is Diversity: allowing for multiplicity in types, areas, shapes, and materials of all buildings, especially residential buildings. In other words, building regulations should encourage affordable housing design by addressing affordability values: collectivity, sharing, and diversity. Table 1 summarises the theoretical framework for assisting building regulations' responsiveness for affordable housing design by clarifying extracted affordability values and their factor of change.

**Table 1.** Affordability values extracted from traditional housing design

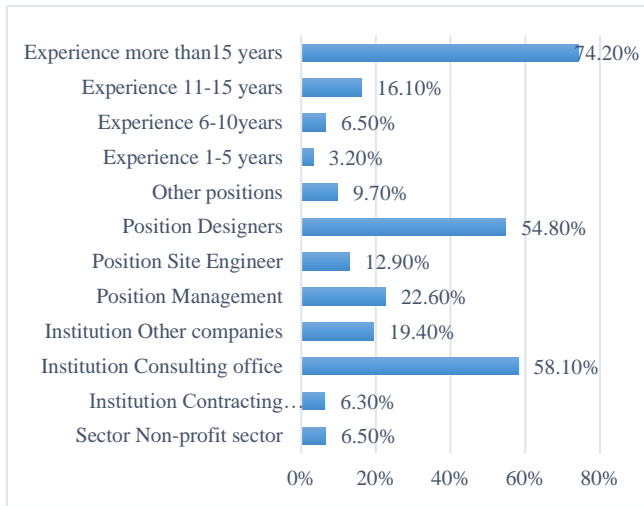
	Collectivity	Sharing	Diversity
Factors of change	Allowing for flexibility in outdoor spaces	Providing public facilities	Diversity of architectural types
	Allowing for gathering units	Encouraging mixed-used	Diversity of building materials
	Densification	Encouraging shared spaces	Diversity of areas and types of units



An example of the traditional quarter (neighbourhood) of Nablus's old city

### 3.3 The survey

Concerning the survey, a sample of 30 persons from various housing sectors was selected, including public, private, and non-profit sectors, including municipalities, governmental institutions, contracting companies, and consulting offices. 74.2% of the sample was from the private sector due to the dominant involvement of that sector in the housing industry. 58.1% of the sample was from the consulting offices also due to the same reason above and the involvement in preparing design and consulting documents. To ensure accurate results, the chosen sample was from three main governors in the West Bank: Nablus, Ramallah, and Jenin. Figure 1 clarifies the characteristics of the chosen sample.



**Figure 1.** Characteristics of the respondents' sample

The main tool for the survey was a questionnaire that explored the responses of the involved parties in various aspects of affordable housing and their relations to local regulations. The questionnaire also tried to extract solutions for developing the current regulations. It explored the experts' responses on the role of the proposed theoretical framework to enhance the development of the current regulations.

The questionnaire was divided into four main categories: the first is the Impact of current building regulations on designing affordable housing with 12 questions about possible limitations of current regulations for designing affordability values. The second is the Impact of current building regulations on the investment in affordable housing with 6 questions including determining these impacts and if their possible solutions are related to building regulations. The third part is possible suitable solutions for developing the current regulations with 10 questions that examine the efficiency of affordability values in solving housing problems in Palestine. The fourth part covered proposed solutions for designing affordable housing in Palestine, with five questions covering proposals for both architectural design and construction methods.

Recipients were asked to fill in the answering sheet using an adequate number to set their agreement from 1 to 5, where 1 is the lowest degree of agreement and 5 is the highest one. Then, the results were calculated in a percentage format for all categories as follows:

Percentage of agreement =  $(\text{Summation of scores for each question}) / (\text{number of recipients} * 5) * 100\%$

## 4. RESULTS

### 4.1 Impact of current building regulations on designing affordable housing

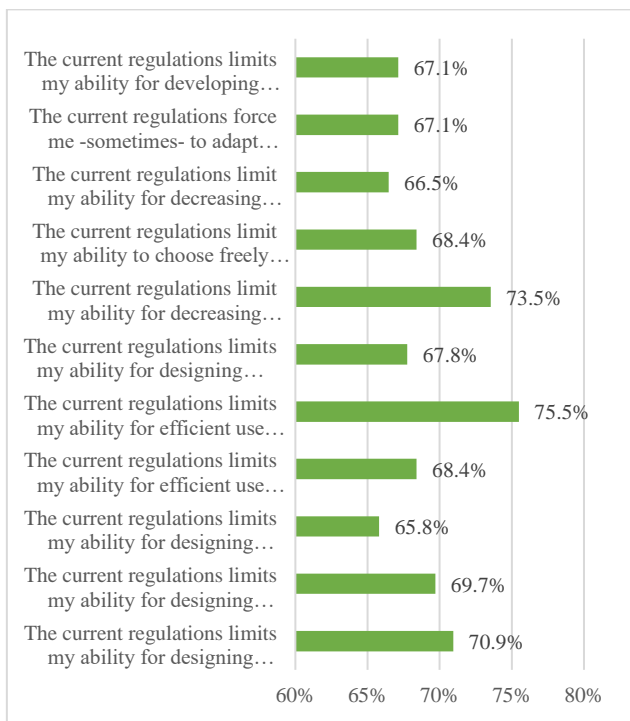
The survey has revealed that the current regulations limit the design of apartments and cottages on some sides like step-back and percentage of the built area, but regulations do not directly require specific areas for each apartment. However, the determination of apartment areas is indirectly controlled by the regulation requirements. For example, it is required to provide one plot of car park for each apartment regardless of its size, which encourages the provision of additional parking spaces in addition to providing a staircase repeater if the number of apartments exceeds 16 apartments regarding the requirements of public safety and defence conditions. To narrow and reduce all these requirements (parking number, and safety staircase), apartments are usually designed in relatively large areas. This fact is going against the need of limited-income people to reduce apartment areas to reduce costs.

Moreover, the current regulations indirectly force the use of expensive building and construction methods sometimes. For example, municipalities make it mandatory to provide parking floors inside the building that have parking lots with correct and smooth movement, this fact encourages the use of non-traditional building systems and becomes a must to determine long spans. Such systems are usually: post-tension, and U-boat construction technology, which was usually used -before 2007- solely in public buildings and not local residential buildings regarding the increase of these technologies on the total cost of the building -almost 10-20%-. This increase will no doubt reflect negatively on the apartment cost.

Figure 3 represents the disability of the current regulations in responding to affordability values. About 67% of the recipients think that regulations limit their ability for developing new building methods and materials that may encourage the diversity of housing types. The results shows also 67% of the recipients think that the current regulations force them some time to adapt expensive building methods and materials -mainly to provide parking floors-, and limit their ability for decreasing operating costs. For example, the condition of having elevators for buildings that have more than 4 floors increases both the initial and running costs of housing. About 68% of recipients sustain that current building regulations limit their ability for choosing adequate building materials. An example is the rule of cladding the exterior facades with stone as a must for all residential buildings in urban areas. Such rules may conserve the identity of the current environment, but do not allow for flexibility with new materials and methods. All these examples and others made the majority of recipients -about 74%- think that building regulations limits their ability for decreasing construction cost.

In terms of designing restrictions, Figure 2 shows that the current regulations restrict the ability to create designs with reasonable costs for the majority of the recipients. About 68% of the sample think that the current regulations limit their ability for designing relatively small flats, mainly because of restrictions on parking blocks. Moreover, about 76% of recipients sustain that current regulations limit their ability for efficient land use in general and efficient use of interior space also as indicated by 68% of the sample. This is mainly due to step-back distances between house units for example it is not possible to design row houses for different owners of the land

even if they want to do that. In addition, the current regulations limit the ability of designers to design a mix of type areas as indicated by 66% of the sample, and about 70% of the sample may have restrictions on mixing uses because of current regulations. These restrictions decrease the ability of designers for planning sustainable areas based on decreasing driving areas and thus decreasing the running costs of residents. For example, the municipalities segregate zones by housing types, like one area for single houses and another area for apartment blocks, and so on. This zoning classification makes it difficult for designers to mix types to control densities, relations with outdoor spaces, and street design. As a result around 71% of recipients is not satisfied with the used typologies in housing design, and think that they can improve them if building regulations are improved. All these factors are affecting the ability for creative solutions in housing design in general which can reflect indirectly on housing affordability. Such restrictions and others make it difficult to insert affordability values in the design.

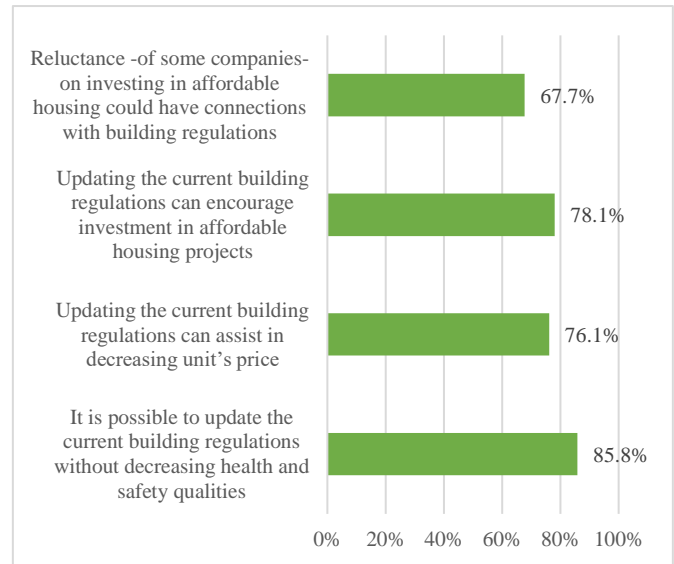


**Figure 2.** The disability of current building regulations for adapting affordability values

#### 4.2 Impact of current building regulations on investment in affordable housing

As was clarified in 4.1., building regulations limit the ability of designers to reduce the total cost of residential units on two levels: the level of building materials and construction methods, and the level of spatial design and planning, both of units and residential areas. This phenomenon helps greatly -in addition to other political and social reasons- in raising the prices of residential apartments dramatically. Figure 3 shows that the reluctance -of some companies- on investing in affordable housing projects could have connections with building regulations according to the point of view of 68% of the sample. This confirms the need to develop the current building legislation to reach a better investment in affordable housing projects from the point of view of most of the respondents in the surveyed sample. Figure 3 also shows that

more than 78% of the sample believe that the development of current laws increases the imposition of investment in housing for people with limited income. Likewise, 76% believe that this will reduce the prices of apartments built under the specified regulations. It is important to note here that the questions that were asked to the recipients may not affect the health or social quality of housing as a condition for developing these regulations. Here it appears that the majority (86%) of the sample believe that preserving these qualities is possible with the development of regulations. On the contrary, it is believed that inserting the values of affordability can contribute to increasing the quality of buildings from the environmental and social aspects while decreasing initial and running costs.



**Figure 3.** The need for involvement of affordability values in the current regulations for enhancing investment in affordable housing projects

#### 4.3 The importance of collectivity, sharing, and diversity

The surveyed sample members were asked about their opinion on the affordability values proposed by the research, to find out to what extent the success of each of these values and their factor of change is expected. Table 2 shows the results of the questionnaire in terms of the importance of these values from the point of view of the recipients.

Table 2 starts with discussing the questions of the sample about the first value: collectivity, by highlighting the three factors of change derived from it, namely: flexibility, gathering, and densification. The results show a high percentage of respondents, 75% expect allowing for flexible areas to succeed in achieving positive results of affordability. This is due to the belief that flexibility in the use of space is a requirement by the limitation of land and its high prices in Palestine. While the percentage decreases when talking about gathering units to 57%, mostly because some respondents believe that it is difficult to implement such a decision in light of the great control of private ownership of land, which leads us to believe that the change in building setbacks and their assembly must be accompanied by legal studies related to private property and the mechanisms for its solution. The percentage rises again to reach 79%, with the agreement to increase the population density in response to the limitation of land and its high prices.

The second part of Table 2 discusses the second value of affordability which is: Sharing by highlighting the three factors of change derived from it, namely: public facilities, the mix of use, and shared spaces. The results show that providing public facilities got a high approval rating of 83%, which indicates the great need for public services in residential areas such as public transportation. As for encouragement mixed-use in the same building, it obtained a good approval rating of 67%. Some recipients may be cautious in approving this item because the Palestinian culture relies on providing great privacy for housing units from public or shared spaces. But - from the researchers' point of view- this matter can be overcome through good design that takes into account privacy and versatility at the same time. Additionally, the factor of encouragement collective spaces also has 67%, which is a good approval rate indicating the importance of social interaction in the Palestinian culture, especially in housing designated for people with limited income.

**Table 2.** The possibility of implementing affordability values for enhancing the built environment

Collectivity	Allow for flexible outdoor spaces: for example encouraging flexible parking areas (Can be used for other purposes at certain times: social interaction for example)	74.8%
	Allow for gathering units: for example, decreasing required setbacks in the outskirts of the city—can be adopted in certain areas-	57.4%
	Densification: Increasing allowed building percentage in the outskirts of the city—can be adopted in certain areas-	79.3%
Sharing	Providing public facilities: for example, public transportation solutions to affordable housing project—such as allocating a bus to transport residents could encourage such projects	82.6%
	Encouraging mixed-used in the same building—can be adopted in certain areas-	66.5%
	Encouraging shared spaces: for example collective parking area (decreasing the number of parking units by sharing them with several buildings)	67.1%
Diversity	Diversity of architectural types: for example allowing for building residential towers —can be adopted in certain areas-	80.0%
	Diversity of building materials: Encouraging affordable building materials and construction methods	86.5%
	Diversity of units 'areas: for example requiring a minimum percentage of affordable units in the housing projects – can be adopted in certain areas-	67.7%
	Diversity of units types: Encouraging mixing of housing types in the same building—can be adopted in certain areas-	72.9%

The last part of table 2 discusses the third value of affordability, which is: diversity, by highlighting the four factors of change that emerge from it: Diversity of architectural types, building materials, areas, and types of residential units. The diversity of architectural types got an approval rate which is relatively high 80%, due to the lack of local experience in diversifying residential building styles that are suitable for low-income projects, such as residential towers. As for the diversity of building materials, this item obtained the highest percentage of approval in this table, 87%, which indicates the conviction of most of the respondents in the great shortage in this field at the local level and at the same time the belief that it is one of the most important factors of affordability that can be improved in the current regulations. moreover, regarding the diversity of units' areas: for example, requiring a minimum percentage of affordable units in the housing projects, the recipients supported this idea well (67%), which indicates the possibility of its application in some areas after studying the demand of the population and the required unit spaces. lastly, diversification in the types of housing units based on the number of rooms has also obtained a relatively high percentage of approval, 73%, emphasizing the diversity in the needs of users and the characteristics of their families.

## 5. DISCUSSION

Any society should improve its practical ways to increase the supply of “affordable housing”, which refers to lower-priced homes located in areas with convenient access to essential services, and activities due to good transport options and accessible land use as indicated by [36]. This importance was discussed in sections 1 and 2 of this paper. Such practical ways typically consist of lower-priced apart lower-precedents, townhouses, duplexes, small-lot single-family and accessory suites located in neighbourhoods with shops, schools, healthcare, and jobs that are easy to reach by walking, bicycling, and public transit. In other words, it is vital and necessary for any society to make housing easy to reach for all social classes, that is called "housing affordability" [37]. Increasing housing affordability is an increasing need in Palestine, because of the shortage of sustainable supply of affordable housing as discussed in section 1 of this study. This increase should help to achieve numerous economic, social and environmental objectives.

Although building regulations have always been established to organize the urban environment and maintain the quality of housing in terms of health and social prosperity. The importance of building regulations lies in encouraging high-quality housing in the city. However, local building regulations for any society may carry some negatives due to the progress of the times and the emergence of new problems that need new solutions [38, 39]. The following is a try to extract solutions from the previous analysis for developing the current regulations.

### 5.1. Extracting solutions for developing the current regulations

1. Encouraging affordable types of housing in future projects. Besides, it should be the main target of the regulations to solve the problem of people with limited income, despite the high prices of building materials and the lack of land with its high prices. This matter requires creating a

balance between the developer's profit and the benefit of the citizen taking into account the laws and regulations.

2. Provide a public transportation network for all neighbourhoods that is suitable for users, with the need to provide basic services such as a medical centre, school, kindergarten, commercial centre, etc.

3. Encouragement of flexible areas requires consideration of privacy and property. It is not possible to benefit from the parking lots, for example, unless they are public facilities, or that usufruct agreements are prepared.

4. Taking into account renewable energy, housing has also become one of the global requirements that must be included in building regulations. Amendment of regulations requires obligating license applicants to provide the necessary conditions.

5. Encouraging modern construction methods: As for the prefabricated units, initially, community awareness is required to accept them as a habitable structure before starting to legislate them.

6. Encouraging saving land: It should be allowed to allocate plots of land less than 500 square meters with goods supported by suitable legal formulas.

7. Encouraging mix of use: use the ground floors for commercial purposes and the upper floors for housing, however, with the increase in demand, the matter needs to stop at it and re-establish criteria for the uses of the ground floor, such as allocating the types of crafts allowed to suit the needs of the population, as for increasing the centenary percentage of building and reducing setbacks.

## 5.2 Validating possible solutions

The role of the proposed theoretical framework in enhancing the current regulations is clarified Figure 4 shows possible solutions proposed by the study for developing the current building regulations: These proposals were polled on the selected sample to determine their priorities in future development and the extent of their expected impact on increasing the demand for investment in housing for people with limited income, and they are arranged according to priority from the point of view of the sample:

1. Flexibility in the use of building materials.
2. Study the building proportions, whether floor or floor proportions.
3. Study building setbacks and the possibility of reducing them in some cases to allow greater flexibility in design and choosing new housing patterns.
4. Study parking laws and the possibility of going to common parking lots in some cases.
5. Study flexibility in civil defence laws so that they do not affect the safety of citizens.

The results show that reducing costs at the residential unit level is easier for designers and investors than reducing costs at a broader level such as a residential area or neighbourhood. This is because the regulations used in construction rarely specify the specifications for the interior finishes of the residential unit, which sometimes encourages investors to use finishes with low-quality specifications to reduce costs. Which

negatively affects the owners in the future by constantly increasing maintenance costs and electricity bills. This led to the belief that the need increases to develop building regulations at both unit and urban unit levels to insure the quality of affordable housing projects.

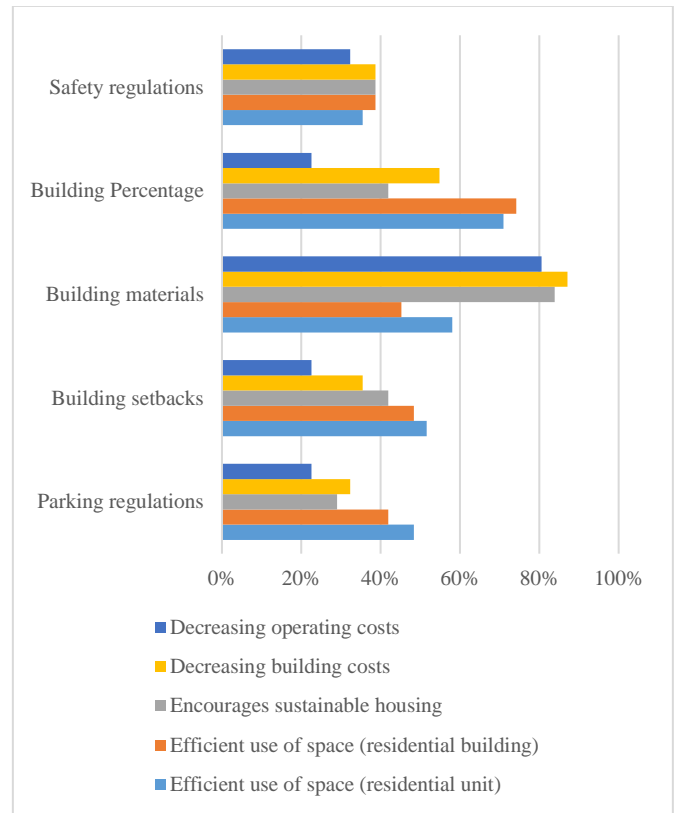


Figure 4. Validating possible solutions for housing affordability

Finally, it should be noted here and based on the general approval of all the previous points, that the inclusion of these ideas in the building regulations should not constitute an obstacle to the development of some other housing projects; for example high-income housing. This is due to the flexibility of these laws to allow the implementation of these points or some of them according to the need of each case. On the other hand, this study is an attempt to develop building regulations according to the current vision of the housing situation in Palestine, and this does not mean that they will not be developed in the future. From the point of view of this research, the development process is permanent and there is a continuous need for updating building regulations everywhere.

## 5.3 Summarizing the findings

Developing the current situation towards a sustainable supply of affordable housing requires:

1. The presence of flexibility in building regulations that allow the inclusion of the values of affordability by designers in their designs, which serves to encourage the production of low-cost housing units. The requirements for the number of car parks, for example, can be reduced and compensated for by public parking, as permitted by the planning of the area, and the encouragement of collective spaces between residential units instead of useless spaces of the setbacks...etc.

2. Finding an upgraded version of the building regulations codes, which allows for reducing construction costs, to be applied to some areas where new development occurs, such a version should encourage the include the values of affordability by designers in their designs, with some restrictions such as inserting cost estimation for the final apartment in the proposed schemes.

Finally, we argue that current building regulations need our attention to increase housing affordability, which includes restrictions on building density and size, restrictions on multi-family housing, generous minimum parking requirements, plus the regulation, taxes, and fee structures that favour fewer, more expensive units. Many of these barriers reflect inaccurate assumptions and outdated policies that should be updated [40].

## 6. CONCLUSION

This study introduces a possible approach for encouraging the private sector to supply affordable housing based on learning from traditional concepts in Palestine. Searching the literature, and analyzing case studies in Nablus' old city have revealed that traditional architecture was able to supply the housing market in the peasant time -before modernity- with economically sustainable housing units in addition to social and environmental sustainability (refer to section 2 of this study). Hence, this study continues to reach the affordability values inherent in the traditional residential areas, which encouraged affordable housing and benefited from them. Those values are to enhance collectivity, sharing, and diversity in the residential areas. Such values can be applied in modern ways in the current era. Whereas, in that era, the building codes were not the way we find them today, but were more flexible and depended mainly on community cooperation and participation between neighbours in the building process. This approach is used to assist the current building regulations because some aspects of regulations stand as an important obstacle to the supply of affordable housing in Palestine. Accordingly, the study tries to examine and update these regulations based on the suggested approach to decrease factors that discourage affordable housing development.

Therefore, an in-depth survey was conducted that covered several experts in the housing sector in Palestine to understand the impact of the Palestinian local building regulations on affordable housing. Many aspects of local regulations push many sides to raise the prices of apartments, which reduces the chances of many segments of the population accessing adequate housing at a reasonable price. The most important of these aspects is the indirect payment for the use of high-priced construction technology and building materials as well as the increase in apartment space by investors to reduce the number of parking spaces required for cars. Nevertheless, the research looks at the importance of the requirements of local building regulations in terms of environmental aspects, such as setbacks, and organizational aspects, such as the presence of private parking spaces for cars. Thus, a balance should be found between fulfilling the regulations that guarantee adequate organizing of residential areas and working to reduce the prices of residential apartments to facilitate access to them by people with limited income. This is done from the point of view of research by inserting affordability values: collectivity, sharing, and diversity in the current regulations.

Finally, this study has discussed one factor in encouraging affordable housing, which is updating the building regulations.

Other factors that increase the affordable housing supply are also recommended to be studied such as housing finance, city planning, and architectural design. As encouraging affordable housing can provide many economic, social, and environmental benefits to the Palestinians. It can also help in improving public health and safety, energy conservation, environmental protection, and public cost savings. As a result, it is recommended to make further studies that support the sustainable development of the housing environment in Palestine.

## References

- [1] Citaristi, I. (2022). United Nations Human Settlements Programme—UN-Habitat. The Europa Directory of International Organizations, Routledge. <http://www.unhabitat.org/offices/geneva/>.
- [2] Ratcliffe, J., Stubbs, M., Keeping, M. (2021). Urban Planning and Real Estate Development. Routledge. <https://doi.org/10.4324/9780429398926>
- [3] Diener, Ed, Oishi, S., Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, 2: 253-260. <https://doi.org/10.1038/s41562-018-0307-6>
- [4] Un-Habitat. (2013). Financing urban shelter: global report on human settlements 2005. Routledge. <https://www.preventionweb.net/publication/financing-urban-shelter-global-report-human-settlements-2005>.
- [5] Okpala, D.C.I. (1994). Financing housing in developing countries: a review of the pitfalls and potentials in the development of formal housing finance systems. *Urban Studies*, 31: 1571-1586. <https://doi.org/10.1080/00420989420081441>
- [6] Gabriela, D., Hartmann, T. (2020). Strategic use of land policy instruments for affordable housing—Coping with social challenges under scarce land conditions in Swiss cities. *Land use policy*, 99: 104993. <https://doi.org/10.1016/j.landusepol.2020.104993>
- [7] Hulchanski, J.D. (1995). The concept of housing affordability: Six contemporary uses of the housing expenditure-to-income ratio. *Housing studies*, 10: 471-491. <https://doi.org/10.1080/02673039508720833>
- [8] Khalifa, A., Alkass, S., Abu Dabous, S. (2020). A review of critical success factors for public–private partnerships in affordable housing. *International Journal of System Assurance Engineering and Management*, 11: 1192-1203. <https://doi.org/10.1007/s13198-020-00976-x>
- [9] Mohammed, M.M., Amirudin, R., Mohamad, I. (2016). Housing delivery problems in developing countries: A case study of Nigeria. *Journal of Facilities Management*. <https://doi.org/10.1108/JFM-12-2015-0037>
- [10] Erika, W., Sowers, J. (2019). Targeting infrastructure and livelihoods in the West Bank and Gaza. *International Affairs*, 95: 319-340. <https://doi.org/10.1093/ia/iiz015>
- [11] Marwan, K. (2021). Measuring multidimensional poverty in Palestine. *Economic Research Forum (ERF)*. <https://EconPapers.repec.org/RePEc:erg:wpaper:1477>.
- [12] Ibrahim, H., Salah, O., Sabri, N. (2009). Housing and Mortgage Loans in Palestine. <https://doi.org/10.1108/IJHMA-11-2020-0135>
- [13] Oded, H. (2022). De-colonising the right to housing, one new city at a time: Seeing housing development from Palestine/Israel. *Urban Studies*, 59: 1676-1693.



- <https://doi.org/10.1177/00420980211056226>
- [14] Mohammad, K.A. (2021). The role of the banking sector in financing the real estate and contracting sector in the Palestinian territories. *International Journal of Housing Markets and Analysis*, 15: 357-374. <https://doi.org/10.1108/IJHMA-11-2020-0135>
- [15] Hilmi, S. (2020). Geopolitical challenges, complexities, and future uncertainties in the Occupied Palestinian Territories: Land and population's perspectives. *New Middle Eastern Studies*, 10. <https://doi.org/10.29311/nmes.v10i1.3639>
- [16] Khalil, E. (2012). The impact of construction sector on Palestinian economy-Case Study:(Gaza Strip). *American Academic & Scholarly Research Journal*, 4. <http://aasrc.org/aasrj/index.php/aasrj/article/view/569>.
- [17] Tsenkova, S., Witwer, M. (2011). Bridging the gap: Policy instruments to encourage private sector provision of affordable rental housing in Alberta. *Canadian Journal of Urban Research*, 20: 52-80. <http://hdl.handle.net/1880/48924>.
- [18] Islam, K.M.A., Barghouthi, O.A. (2018). To What Extent Do the Investment Programs in the Infrastructure Sector Comply with the Determinants of National Competitive Advantage? *International Journal of Small and Medium Enterprises*, 1: 6-10. <https://doi.org/10.46281/ijsmes.v1i1.61>
- [19] Thawaba, S. (2019). Building and planning regulations under Israeli colonial power: A critical study from Palestine. *Planning Perspectives*, 34: 133-146. <https://doi.org/10.1080/02665433.2018.1543611>
- [20] Patel, B., Byahut, S., Bhatha, B. (2018). Building regulations are a barrier to affordable housing in Indian cities: the case of Ahmedabad. *Journal of Housing and the Built Environment*, 33: 175-195. <https://doi.org/10.1007/s10901-017-9552-7>
- [21] Tuffaha, A.B.A. (2009). The Impact of Laws and Regulations on the Built Environment in Palestine (A Case Study of Residential Buildings in Nablus City). Diss. <https://hdl.handle.net/20.500.11888/7426>
- [22] Adabre, M.A. Chan, A.P.C. (2020). Towards a sustainability assessment model for affordable housing projects: The perspective of professionals in Ghana. *Engineering, Construction and Architectural Management*, 27: 2523-2551. <https://doi.org/10.1108/ECAM-08-2019-0432>
- [23] Itma, M.A. (2019). Strategies of adaptability: An approach for affordable housing design. *European Journal of Advances in Engineering Technology*, 6(10): 1-6.
- [24] Hussein, M.H., Barlet, A., Semidor, C. (2010). Socio-environmental dimensions of private outdoor spaces in contemporary palestinian housing. *Open House International*, 35: 67-76. <https://doi.org/10.1108/OHI-02-2010-B0009>
- [25] Itma, M.A.F. (2016). Rethinking of housing settlements in Palestine, learning from mat building. <https://hdl.handle.net/1822/42578>.
- [26] Amad, E.M. (2003). Traditional concepts and new housing design in Palastine. *Open House International*, 28: 58-67. <https://staff.najah.edu/en/publications/3397/>.
- [27] Tawayha, F.A., Braganca, L., Mateus, R. (2019). Contribution of the vernacular architecture to the sustainability: A comparative study between the contemporary areas and the old quarter of a Mediterranean city. *Sustainability*, 11: 896. <https://doi.org/10.3390/su11030896>
- [28] Itma, M., Monna, S. (2022). The Role of Collective Spaces in Achieving Social Sustainability: A Comparative Approach to Enhance Urban Design. *Sustainability*, 14: 8756. <https://doi.org/10.3390/su14148756>
- [29] Itma, M. (2022). Social sustainability assessment of neighborhood design: A comparative study in Nablus City based on multiplicity and singularity. *Journal of Urban Development Management*, 1: 39-49. <https://doi.org/10.56578/judm010105>.
- [30] Hakim, B.S. (2013). *Arabic Islamic Cities Rev: Building and Planning Principles*.
- [31] Elsheshtawy, Y. (2004). *Planning Middle Eastern Cities: An Urban Kaleidoscope*.
- [32] Al-Amad, E.M. (1998). *Continuity And Change in Traditional Domestic Architecture of Palestine: Transformation of Traditional Concepts of House Design in Nablus*. University of Glasgow, United Kingdom.
- [33] Itma, M. (2014). High-density housing in Palestine: learning from traditional typologies. *The Sustainable City IX: Urban Regeneration and Sustainability*, 191: 187. <https://staff.najah.edu/en/publications/7690/>.
- [34] MLG, (2011). *Building and Organization System for Local Authorities No. (6) of 2011*. [https://cisp.cachefly.net/assets/articles/attachments/32604\\_uns\\_report\\_to\\_the\\_ahlc\\_13\\_april\\_2011.pdf](https://cisp.cachefly.net/assets/articles/attachments/32604_uns_report_to_the_ahlc_13_april_2011.pdf).
- [35] MLG. (2016). *Buildings system and regulation of the land outside the boundaries of local bodies*. [https://maqam.najah.edu/media/uploads/2021/08/legislations/F\\_Documents\\_bdde44ce-127d-4f82-bf58-76ff22d24e44.pdf](https://maqam.najah.edu/media/uploads/2021/08/legislations/F_Documents_bdde44ce-127d-4f82-bf58-76ff22d24e44.pdf).
- [36] Isalou, A.A., Litman, T., Shahmoradi, B. (2014). Testing the housing and transportation affordability index in a developing world context: A sustainability comparison of central and suburban districts in Qom, Iran. *Transport policy*, 33: 33-39. <https://doi.org/10.1016/j.tranpol.2014.02.006>
- [37] Mulliner, E., Smallbone, K., Maliene, V. (2013). An assessment of sustainable housing affordability using a multiple criteria decision making method. *Omega*, 41: 270-279. <https://doi.org/10.1016/j.omega.2012.05.002>
- [38] Glaeser, E., Gyourko, J. (2018). The economic implications of housing supply. *Journal of Economic Perspectives*, 32: 3-30. <https://doi.org/10.1257/jep.32.1.3>
- [39] Megahed, N.A., Ehab, M.G. (2021). Indoor Air Quality: Rethinking rules of building design strategies in post-pandemic architecture. *Environmental Research*, 193: 110471. <https://doi.org/10.1016/j.envres.2020.110471>
- [40] Haas, O. (2021). Housing policy, design, and struggle: The colonial production of space of Israel/Palestine, one new city at a time. <http://hdl.handle.net/10315/38439>.

## APPENDIX: THE QUESTIONER

An-Najah National University  
Faculty of Engineering, and IT  
Department of Architecture

### Impacts of Buildings' Regulations on Housing Affordability

Date:

Questionnaire number:

Description:

The Department of Architectural engineering at An-Najah National University is preparing a study about the impact of

buildings' regulations in Palestine on housing Affordability. With the aim for updating these regulations towards sustainable housing supplying.

**Question no.1. General information**

<b>Sector</b>	1.Private sector	2.Public sector	3.Non-profit sector	4.Other	
<b>Institution</b>	1.Consulting office	2.Contracting company	3.Government institution	4.Municipality	5.Other
<b>Specialty:</b>	1.Engineering	2.Social science	3.Finance	4.Law	5.Other
<b>Position Description</b>	1.Designers	2.Site Engineer	3.Management	4.Marketing	5.Other
<b>Experience</b>	1.1-5 years	2.6-10years	3.11-15 years	4.More than15 years	5.Other

\*Note: chose more than one answer were possible

**Question no.2. Impact of current building regulations on designing affordable housing**

	Strongly agree	agree	I don't know	Disagree	Strongly Disagree
The current regulations limits my ability for designing suitable housing typologies					
The current regulations limits my ability for designing mix of use buildings					
The current regulations limits my ability for designing mix of types-buildings					
The current regulations limits my ability for efficient use of space when designing housing units					
The current regulations limits my ability for efficient use of land in housing projects					
The current regulations limits my ability for designing small –adaptable flats					
The current regulations limits my ability for decreasing constructing costs					
The current regulations limits my ability for choosing adequate construction materials					
The current regulations limits my ability for decreasing operating costs					
The current regulations forces me -sometimes- to adapt expensive construction methods/materials					
The current regulations limits my ability for developing new construction methods/ materials					
Other: please specify					
Other: please specify					
Other: please specify					

**Question no.3. Impact of current building regulations on the investment in affordable housing**

	Strongly agree	agree	I don't know	Disagree	Strongly Disagree
I am able to design and implement affordable housing projects despite the current building regulations					
I would like to invest in affordable housing projects despite the current building regulations					
Reluctance -of some companies- on investing in affordable housing could have connections with building regulations					
It is possible to update the current building regulations without decreasing health and safety qualities					

updating the current building regulations can assist in decreasing unit's price					
updating the current building regulations can encourage investing in affordable housing projects					

**Question no.4. Are these solutions suitable for developing the current regulations?**

	Strongly agree	agree	I don't know	Disagree	Strongly Disagree
Encouraging flexible parking area					
Encouraging collective parking area					
Encouraging affordable building material and construction methods					
Requiring a minimum percentage of affordable housing units in the project –can be adopted in certain areas-					
Encouraging mixing of housing types in the same building–can be adopted in certain areas-					
Requiring transportation solutions to the housing project-such as allocate a bus to transport residents					
Encouraging mixing use in the same building–can be adopted in certain areas-					
Increasing allowed building percentage in the outskirts of the city–can be adopted in certain areas-					
Decreasing required setbacks in the outskirts of the city–can be adopted in certain areas-					
Allowing for building residential towers –can be adopted in certain areas-					
Other: please specify					
Other: please specify					
Other: please specify					

**Question no.5. Are these solutions suitable for designing affordable housing in Palestine?**

	Strongly agree	Agree	I don't know	Disagree	Strongly Disagree
Courtyard houses would be a good choice for affordable housing in the outskirts of the city					
High-rise blocks (up to 10 floors) are a good choice for affordable housing in the city districts					
Current housing typologies are suitable for affordable housing design					
Developing sustainable housing types is necessary for affordability					
Precast- prefabricated units					
Other: please specify					
Other: please specify					
Other: please specify					

**Question no.6. Which of these items should be developed for designing suitable affordable housing?**

Target	Parking regulations	Building setbacks	Building materials	Building Percentage	Safety regulations	Other: please specify
Efficient use of space (residential unit)						
Efficient use of space (residential building)						

<b>Encourages sustainable housing</b>						
<b>Decreasing building costs</b>						
<b>Decreasing operating costs</b>						

Question no.1. **What new building regulations do you propose for limiting costs of housing units, and encourage investing in affordable housing?**

Question no.2. **Despite building regulations, what other suggestions do you have for limiting costs of housing units, and encourage investing in affordable housing?**

\*\*\*