

Analysis of Factors Affecting Economic Feasibility of Long-term Public Rental Housing Reconstruction Project

Won Goog Joe, Jae Ho Cho, Bo Sik Son, Myung Jin Chae, Nam Gi Lim and Jae Youl Chun

Graduate Student, Department of Architectural Engineering, Dankook University, Yongin-si, Gyeonggi-do, Korea
Assistant Professor, Department of Architectural Engineering, Dankook University, Yongin-si, Gyeonggi-do, Korea
Professor, Department of Architectural Engineering, Namseoul University, Cheonan-si, Chungcheongnam-do, Korea
Associate Professor, Construction Management, Central Connecticut State University, New Britain, CT, United States
Professor, Department of Architectural Engineering, Tongmyong University, Nam-gu, Busan, Korea
Professor, Department of Architectural Engineering, Dankook University, Yongin-si, Gyeonggi-do, Korea

<https://doi.org/10.5659/AIKAR.2022.24.3.85>

Abstract The public rental housing policy aims to provide the housing to the vulnerable class who do not have enough credit to own houses. The Korean government introduced new policies for housing supply to improve the availability of new houses. However, it is difficult to expand the supply because of the accumulated deficit of public rental housing. In this study, the economic feasibility of long-term public rental housing reconstruction projects was examined to ensure the economic and sustainable growth of public rental housing. The research found that the compensation for the accumulated deficit is needed. Also the research analyzed and identified the factors affecting the economic feasibility of reconstruction projects. The significant factors identified in this research are: the supply price of pre-sale/rental housing in the reconstruction project, total cost of the reconstruction project, and total floor area of the reconstruction project. According to the analysis results, it is necessary to increase the rent of existing long-term public rental housing, expand the government subsidy, increase the supply price of pre-sale/rental housing, and reduce the total project cost. However, there are limitations. For example, the fluctuations of construction market, residents' burden of housing costs, and the limit of the budget of the public housing authority. The increasing total Floor Area Ratio(FAR) limitation of the reconstruction project would be the realistic solution to the problem because it gives incentives to the reconstruction project.

Keywords: Aged Public Rental Housing, Reconstruction, Floor/Area Ratio, Economic Feasibility, Factor Analysis

1. INTRODUCTION

Korea is promoting a public rental housing supply policy to stabilize the housing of the homeless. The government's full-fledged rental housing policy began in 1989 as permanent rental housing, which was supplied to the most economically vulnerable households such as demolished residents. In 1998, a national rental housing supply policy was introduced to expand the target of occupancy to the fourth quintile of income, and a supply plan of 1 million units was established for 10 years. In

2004, in order to solve the problem of the shortage of public rental housing in urban, the method of supplying public rental housing was diversified, including the method of purchasing or renting existing houses. In 2013, Happy Housing Policy was introduced to stabilize housing for young people such as newlyweds and social beginners, expanding the target of moving in to the 5th to 6th quartiles of income, and promoting the use of public land such as railroad land for supply in urban.

In 2020, the Lifetime Housing Policy was announced to solve the problems of public rental housing such as narrow unit household area, low quality, and location outside of the city center. "For Lifetime Housing, it was announced that it would introduce a medium-sized house (60-85 m² for exclusive use) preferred by a family of three to four people, upgrade the housing quality such as finishing materials to the level of public sale housing, and supply it to a location with convenient transportation in the 3rd new city." (Ministry of Land, Infrastructure and Transport press release, 2020).

Policies for public rental housing in Korea have been pursued in the direction of improving location, improving quality, and expanding occupancy targets and inventory. The current inventory of public rental housing is 1,737,078 units (Korean

Corresponding Author : Bo Sik Son
Department of Architectural Engineering, Namseoul University,
Cheonan-si, Chungcheongnam-do, Korea

e-mail : bsson@nsu.ac.kr

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Statistical Information Service).

It is desirable to expand the supply of public rental housing to provide housing stability to the people, but the public rental housing supplier¹ is having difficulty raising funds for construction and is accumulating deficits owing to losses in operation. The scale of loss from operation of public rental housing of LH Corporation—a representative public rental housing business in Korea—increased significantly from KRW 304.1 billion in 2007 to KRW 1.17 trillion in 2016, and the average annual loss for these 10 years was KRW 675.6 billion (Kim & Seon, 2018).

Owing to the aging of the permanent rental housing, which was supplied intensively in the early 1990s, the deficit of business entities is increasing. In addition, there are problems such as inefficient management and operation, along with residents' avoidance and civil complaints from the local community.

The number of long-term public rental housing units supplied before 1993 was 190,077 (Ministry of Land, Infrastructure and Transport, 2021).

In 2021, the government revised laws and regulations to ease the reconstruction process for improving the residential environment of residents through the reconstruction of aging public rental housing and to expand the housing supply for non-homeowners in urban. It was announced that the aging public rental housing would be promoted as a public sale + public rental social-mix complex (Ministry of Land, Infrastructure and Transport, 2020).

The new government, which began in 2022, announced that it will promote the quality improvement of aging public rental housing by reconstructing long-term public rental housing that had been supplied for more than 30 years. In addition, it plans to supply 500,000 units at an annual rate of 100,000 units to enhance the quantity and quality of public rental housing (The 20th Presidential Transition Committee, 2022).

At this point, it is necessary to compensate for the accumulated deficit² of the existing public rental housing so that the deficit of the newly supplied public rental housing does not accumulate again through reconstruction on top of the accumulated deficit of the existing public rental housing.

To ensure the economic sustainability of the public rental housing policy through compensation for the accumulated deficit of long-term public rental housing, this paper proposes a plan to include the compensation for the accumulated deficit of the existing public rental housing in evaluating the economic feasibility of the reconstruction project.

Through a mathematical approach, we analyzed the factors affecting the accumulated deficit of the existing public rental

housing project through the reconstruction project. It is expected that it will be able to support decision-making from an economic viewpoint in promoting the reconstruction project by suggesting factors that can provide realistic alternatives from the perspective of the project entity.

In this study, the following process was conducted to analyze the factors affecting the economic feasibility of the long-term public rental housing reconstruction project.

The process and contents of this study are presented in Figure 1.

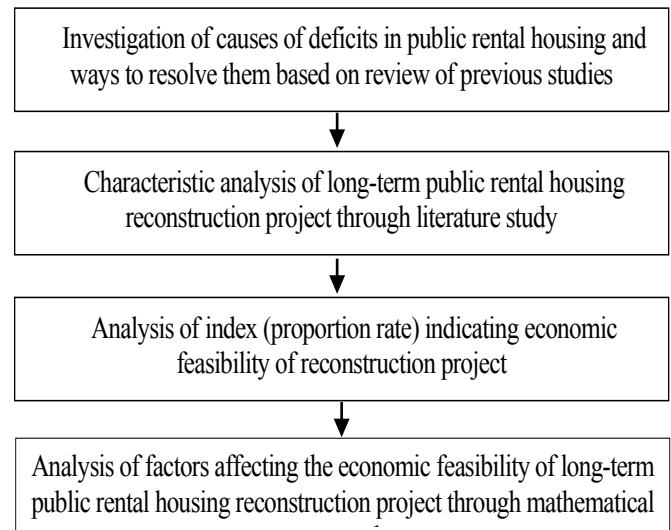


Figure 1. Research process and content

First, by reviewing previous studies, the causes of the public rental housing deficit and the limitations of the deficit resolution plan were examined.

Second, the characteristics of the long-term public rental housing reconstruction project were analyzed through a literature study.

Third, the proportional ratio, which is an indicator of the economic feasibility of the reconstruction project, was considered.

Fourth, through a mathematical approach, we analyzed the factors affecting the compensation of the accumulated deficit of the existing public rental housing project through the long-term public rental housing reconstruction project and suggest an application direction.

2. PRIOR RESEARCH ON LOSS COMPENSATION FOR PUBLIC RENTAL HOUSING

Although most previous studies aimed at improving housing satisfaction or policies and systems in public rental housing, research on loss compensation in public rental housing is also underway.

Kim & Seon (2018) attempted to find effective policy alternatives for securing the continuity of business operators and compensating for losses of public institutions in a study on securing the continuity of the long-term public rental housing

¹ The Special Act on Public Housing stipulates that the supplier of public rental housing is the government, local governments, and public corporations, but as of the end of 2020, 91.7% of the public rental housing in Korea is supplied by public corporations (Korean Statistical Information Service).

² The annual cost of operating a public rental house exceeds the income (rent) and causes a deficit every year. What this deficit accumulates during the period of operating public rental housing is called a cumulative deficit.

project in Korea. To this end, they identified the difference between the financial support for long-term public rental construction costs and the actual burden and presented a plan for realizing financial support. Because the rent for rental housing is set lower than the policy target, it is suggested that the rent be charged at an appropriate level in the case of release (renewal contract). In addition, a cross-compensation plan involving the expansion of public sale housing units was proposed.

Kim (2014) analyzed the status and cost of the rental business balance from a financial viewpoint, targeting local public corporations in Seoul, in a study on improving the deficit balance of public rental housing projects of local public corporations. The objective of this study was to improve the system and suggest alternatives for the sustainable rental housing project. The local public corporation—the subject of the study—has been operating at a loss for the past 10 years, revealing the limits of its rental housing business profit model. To resolve this deficit, the necessity of system improvement was suggested, e.g., increasing the ratio of government support for the aging facility improvement project, reducing the rental business cost through the advancement of the repair and maintenance system, and ensuring stable business profits and applying realistic standards for business costs.

Kim (2020) raised the question of whether the method of cross-compensating for the deficit of the public rental housing project with the sale of land and housing will be effective despite the depletion of available land for development and proposed a plan to increase the rent of rental housing. For the cases of freezing the rent, which is the basic plan; increasing only public and national rental housing; and increasing the “happy housing” in addition to the public and national rental housing, estimates were obtained. According to the estimation results, the basic proposal caused a large loss in sales, while the alternatives caused significantly smaller sales losses. Thus, prior studies on public rental housing have focused only on low rents to enhance the convenience of moving in. Therefore, it was pointed out that the consideration of the profit and loss of the public supplier due to such low rents was insufficient.

Jin (2015) conducted a study on financial support to compensate for operating losses of public rental housing and proposed the application of a Public Service Obligation—a system in which the government compensates for the loss of policy projects for public purposes—to resolve the cumulative operating loss caused by the increase in the inventory of long-term public rental housing.

According to the research on loss compensation for existing public rental housing, three types of loss compensation methods are suggested: rent increase, government financial support, and cross-compensation through the sale of preowned housing or housing land.

Previous studies have a limit that the loss of public rental housing depends on external factors that difficult for business entities to participate in decision-making (e.g., rent increase, which requires an increase in the income of residents, or

expansion of government finances). Additionally, there is a limit to continuously securing new profitable projects during the long-term public rental housing operation period.

Prior research on loss compensation for public rental housing is presented in Table 1

Table 1. Prior research on loss compensation for public rental housing

Researcher(s) and year	Paper title
Kim & Seon, 2018	A Study on the Sustainability of Long-term Public Rental Housing in Korea
Kim, 2014	A Study on Improvement of the Deficit Balance of Public Rental Housing Projects of Local Public Corporations
Kim, 2020	A Simulation About the Impact to Raise the Public Housing Rentals on Supplier's Financial Risk Hedge
Jin, 2015	Fiscal Support on the Operating Losses in the Public Rental Housing

3. LONG-TERM PUBLIC RENTAL HOUSING RECONSTRUCTION PROJECT SYSTEM

The government stated that most of the public rental housing supplied intensively in the early 1990s is now more than 25 years old, causing complaints from local communities and inefficiencies in management and operation due to aging. Considering that it is necessary to improve residential environments through systematic maintenance and to expand the supply of housing for non-homeowners in the city center, the Long-Term Public Rental Housing Resident Quality Improvement Support Act was amended in 2021 to facilitate the long-term public rental housing reconstruction project. According to the revised act, the business entity that owns the entire long-term public rental housing complex can dismantle the long-term public rental housing and welfare service facilities and implement the project of constructing and supplying public housing in accordance with the Special Act on Public Housing.

To prevent damage and protect the rights of occupants of the existing long-term public rental housing, before applying for approval of the business plan for the reconstruction project, the plan should be submitted to the representative meeting of the tenants of the relevant long-term public rental housing. Meanwhile, it should be given compensation for loss of business as a countermeasure for relocation following the reconstruction project, and the expenses necessary for relocating a resident of a residential building and for transporting movable property, such as household items, should be calculated and compensated. In the case of selecting occupants of long-term public rental housing constructed and supplied as a reconstruction project, those who were previously residents of long-term public rental housing to be dismantled because of the reconstruction project are to be selected first. It is obligatory for the project entity of the reconstruction project to supply a number of units exceeding

that of the existing long-term public rental housing as long-term public rental housing after reconstruction. To facilitate the reconstruction project, the building-to-land ratio, floor area ratio, and height restrictions are stipulated to be relaxed to 120/100 of the standard despite the National Land Planning and Utilization Act and Building Act. In consideration of regional characteristics, etc., the building-to-land ratio, floor area ratio, and height restrictions can be strengthened depending on the standards set by local government ordinances.

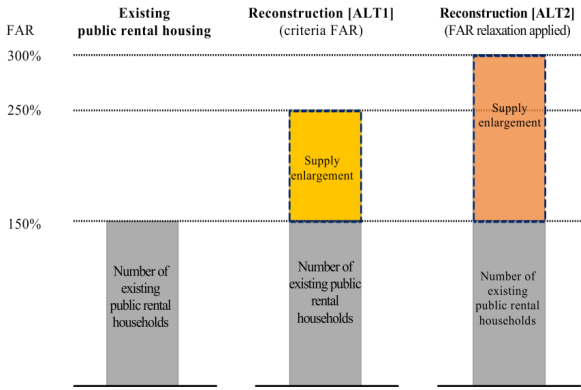


Figure 2. Public rental housing example of reconstruction floor area ratio (case of Existing FAR 150%, Type 2 General Residential Area)

4. INDICATORS OF ECONOMIC FEASIBILITY OF RECONSTRUCTION PROJECT (PROPORTIONAL RATIO)

In general, the proportional ratio is used as an indicator of the economic feasibility of the maintenance project. The proportional ratio is a function of the total sales revenue, total project cost, and value of previous assets, as follows:

$$\text{proportional ratio} = \frac{\text{total sales revenue} - \text{total project cost}}{\text{value of previous assets}} \quad (1)$$

The proportional ratio is calculated by dividing the business profit, which is the difference between the total sales revenue and the total project cost, by the value of the previous assets (existing apartment housing). It plays a role in determining the value of the members' rights. If the proportional ratio is >100%, profit exceeding the value of the previous assets is generated, and if the proportional ratio is <100%, the value of the assets cannot be preserved through the reconstruction project. Thus, the proportional ratio indicates whether it is possible to preserve the value of the previous assets through the reconstruction project. A higher proportional ratio corresponds to higher profits to the members and higher development value.

Houses built through reconstruction are divided into the members' sale units and the general sale units. Therefore, the total sales revenue is divided into the member sales price and the general sales price. The total project cost includes all expenses incurred during the project promotion period, such as the

construction cost, design cost, supervision cost, and incidental cost. The difference between the total sales revenue and the total project cost is the development profit. For the evaluation of previous assets, the cost method, comparison method, and profit method can be used. The value obtained by dividing the development profit by the previous-asset valuation can be defined as the proportional ratio. A ratio of 100% indicates that the previous-asset value and development profit are equal. The ratio can be expressed as follows:

$$\begin{aligned} \text{value of previous assets} &= \text{total sales revenue} \\ &- \text{total project cost}. \quad (2) \end{aligned}$$

Table 2. presents the method for calculating the proportional ratio.

Table 2. Proportional-ratio calculation method

Item	Method
Total sales revenue	(member unit price × member supply area) + (general unit price × general supply area)
Total cost project	Construction cost + design cost + supervision cost + incidental cost, etc. (business promotion cost)
Business profit	Total sales revenue – total project cost
Value of previous assets	Appraisal (cost method, comparison method, profit method)
Proportional ratio	Business profit ÷ value of previous assets

5. ANALYSIS OF ECONOMIC DETERMINANTS OF LONG-TERM PUBLIC RENTAL HOUSING RECONSTRUCTION PROJECT

The objective of this study is to use the aforementioned proportional-ratio formula to examine the factors affecting the compensation of the accumulated deficit of the existing long-term public rental housing through the long-term public rental housing reconstruction project.

The proportional ratio is a function of the total sales revenue (I_T), total project cost (C_T), and value of previous assets (V_A), as follows:

$$f_{\text{proportional ratio}}(I_T, C_T, V_A) = \frac{I_T - C_T}{V_A} \quad (3)$$

First, we consider the total sales revenue (I_T). When the long-term public rental housing is reconstructed, public rental housing and housing for sale are built and supplied. Therefore, the total sales income is divided into public rental housing income (I_R) and sales income (I_S). The public rental housing income is a function of the unit price of public rental housing (P_i) and the total floor area of public rental housing (F_i). The

sales income is a function of the unit price (P_2) and the total floor area of the houses (F_2).

$$I_T = f_{I_T}(I_S, I_R) = f_{I_T}(P_1, P_2, F_1, F_2) \\ = P_1 \times F_1 + P_2 \times F_2 \quad (4)$$

Next, the total project cost (C_T) is divided into the public rental housing project cost (C_R) for the long-term public rental housing reconstruction project and the sale housing project cost (C_S). Considering that public rental housing and housing for sale are built simultaneously on the same lot, it can be assumed that the unit costs (construction cost, land cost, etc.) are identical (C). Therefore, the total project cost (C_T) is a function of the project cost unit price (C), total floor area of the public rental housing (F_1), and total floor area of the sale housing (F_2), as follows:

$$C_T = f_{C_T}(C_S, C_{I_R}) = f_{C_T}(C, F_1, F_2) = C \times (F_1 + F_2) \quad (5)$$

Next, we consider the valuation of the previous assets. The previous assets of the reconstruction project are the houses owned by the members, and the valuation is included the purchase price of the member's existing apartment house (the initial input cost) and increase value. In this study, we do not aim to preserve the asset value increase of existing long-term public rental housing through reconstruction projects. The purpose of this study is to identify the factors affecting the existing long-term public rental housing deficit (Π_1) to be compensated by the reconstruction project. Therefore, the accumulated deficit (investment cost) that cannot be recovered through rent among the expenses incurred in the construction and operation of the existing long-term public rental housing is taken as the previous-asset valuation (V_A).

$$V_A = \Pi_1 \quad (6)$$

The accumulated deficit of the existing long-term public rental housing (P_{j_1}) can be expressed as the difference between the income from rent and government financial subsidies during the project period and the total construction cost incurred during the project period.

$$V_A : \Pi_1 = f_{\Pi_1} \left(\sum_{t=0}^n R_t, \sum_{t=0}^n C_t \right) = \sum_{t=0}^n (R_t - C_t) \quad (7)$$

Considering the aforementioned factors, the factors related to the economic feasibility of the reconstruction project (P_{j_2}) that compensate for the accumulated loss of the existing long-term public rental housing are the existing long-term public rental housing deficit (Π_1), the supply unit price of public rental housing (P_1), the unit price of housing for sale (P_2), the floor area (F_1, F_2), and the unit cost of the reconstruction project (C).

The proportional-ratio can be calculated as follows:

$$f_{Proportion} (P_1, P_2, C, F_1, F_2, \sum_{t=0}^n R_t, \sum_{t=0}^n C_t) \\ = \frac{(P_1 \times F_1 + P_2 \times F_2) - (C \times (F_1 + F_2))}{\sum_{t=0}^n (R_t - C_t)} \quad (8)$$

The effects of the factors on the economic feasibility (proportional ratio exceeds 100%) of the long-term public rental housing reconstruction project (P_{j_2}) are as follows:

1. If either the total revenue of the existing long-term public rental housing increases or the total cost decreases, there is a positive effect.
2. If the price of housing for sale (P_2), rental housing supplied for the reconstruction project (P_1) increases or the cost of the reconstruction project (C) decreases, there is a positive effect.
3. If the total floor area (F) of the rental housing and housing for sale supplied as a reconstruction project increases, there is a positive effect.

Each factor was examined to have a positive effect. First, we analyzed the main factors of the total revenue and cost of the existing long-term public rental housing. The total income of the existing long-term public rental housing consists of tenant rent and government financial support. To increase the total income, it is necessary to increase the rent of tenants or expand the government's financial support. In terms of compensating for the loss of public rental housing, the need to increase rents that are too low to an appropriate level or to make the unit cost of government financial support a reality is justifiable. However, the extent of such increases is limited, considering the housing-cost burden of tenants and the limitation of the government budget. In addition, there is a limit that cannot be adjusted for expenses and income already incurred through the operation.

Next, the supply prices of public rental housing and housing for sale supplied through the reconstruction project were examined.

First, public rental housing supplied as a reconstruction project is directly owned by the public project entity; thus, it should be regarded as being acquired at the construction cost. Regarding housing for sale, considering the unsold risk, it is practically difficult to increase the sale price from a policy perspective, as sale prices exceeding the market price should be avoided. Unsold housing will affect the total housing for sale income or cause a delay in income.

Next, the cost of the reconstruction project was examined. The project cost consists of construction cost, design cost, supervision cost, and incidental cost. It depends on the building construction price, etc. and must be managed appropriately to avoid overspending. However, setting the project cost too low will affect the quality and safety of the building. Because this affects the residential environment along with the risk of unsold

apartment houses, careful consideration is needed to reduce the project cost. In addition, if there is a disagreement between the project entity and the construction company regarding the construction cost, problems such as project delay may occur owing to conflict. Recently, in the largest reconstruction complex in Korea, conflicts arose between the union and construction participants over the cost of construction.

In the case of reconstructing long-term public rental housing, because the number of units supplied as long-term public rental housing for the reconstruction project must exceed the number of units in the existing long-term public rental housing, the total floor area should exceed that of the existing public rental housing.

The long-term public rental housing reconstruction project utilizes the existing long-term public rental housing complex, and the site area is the same as that of the existing public rental housing. The upper limit of the total floor area (F) is determined by multiplying the site area (L) by the floor area ratio (FAR).

$$FAR = \frac{F}{L} \Rightarrow F = Far \times L \quad (9)$$

Therefore, to increase the total floor area, it is essential to increase the floor area ratio. Currently, for the reconstruction of long-term public rental housing, regulations are being prepared to increase the floor area ratio by 20%. It is believed that the most realistic method is to review the compensation for the accumulated deficit of existing public rental housing that can be achieved by increasing the floor area ratio.

Table 3 presents the effects of the aforementioned factors on the economic feasibility of the reconstruction project.

Table 3. Factors affecting the economic feasibility of the reconstruction project

Item	Effect	Considerations
$[Pj_1]$ Total revenue $\sum_{t=0}^n R_t$	The higher the better	Already paid rent cannot be adjusted Resident housing-cost burden Limited government budget
$[Pj_1]$ Total cost $\sum_{t=0}^n C_t$	The lower the better	Non-adjustable input cost
$[Pj_2]$ Unit price (P_1, P_2)	The higher the better	Influenced by the market price High prices increase the risk of unsold housing
$[Pj_2]$ project cost (C)	The lower the better	Construction quality and safety must be considered Low quality increase the risk of unsold housing
$[Pj_2]$ Total Floor area (F)	The larger the better	Possible to use floor area ratio incentive system

5. CONCLUSIONS

Korea is continuing its efforts to supply affordable housing of the people through the policy of expanding the inventory size of public rental housing. The supply of high-quality public rental housing at low rent mitigates the burden of housing costs on the people. However, the suppliers are experiencing difficulties in expanding the supply owing to accumulated deficit, which in public rental housing does not end in financial difficulties for the supply entity but is hindering the sustainability of the housing welfare project. Therefore, authors of this research propose a plan to compensate for the accumulated deficit resulting from the long-term public rental housing operation through a long-term public rental housing reconstruction project. Factors affecting the resolution of the accumulated deficit of existing public rental housing through the reconstruction project were analyzed. The results indicated that the total cost of the existing public rental housing, total income, supply price of sale and/or rental housing for the reconstruction project, reconstruction project cost, and FAR of the reconstruction project had effects. Examining the influencing factors revealed that it is necessary to increase the rent of existing long-term public rental housing, expand government subsidies, increase the supply price, or reduce the cost of housing for sale or rental housing supplied as a reconstruction project. However, there is a limit to relying on external conditions such as the housing-cost burden of residents, the limit of the government’s budget, and changes in the construction/sales market. The FAR of the reconstruction project was identified as the most realistic review factor for preserving the economic feasibility of the project entity because the floor area ratio incentives of the long-term public rental housing reconstruction project can be used within the scope of public urban density management.

This study proposes to include the accumulated deficit of existing long-term public rental housing as a cost factor for the reconstruction project when examining the economic feasibility of the long-term public rental housing reconstruction project. In addition, as a result of analyzing the factors affecting the economic feasibility of long-term public rental housing reconstruction projects, the most realistic economic improvement factor to compensate for the accumulated deficit of existing long-term public rental housing is the total floor area. Therefore, this paper proposes an alternative method of compensating for the accumulated deficit of existing long-term public rental housing by utilizing the total FAR(Floor Area Ratio) within the incentive range.

The limitation of this study is that empirical analyses involving actual cases were not conducted. In future research, through case studies, we will confirm the possibility of compensating for the accumulated deficit of existing public rental housing within the incentive limit for the floor area ratio of the long-term public rental housing reconstruction project under the current system. Additionally, for the initial stage of the reconstruction project, it is necessary to develop a estimation model that can check whether the accumulated deficit of the existing long-term public rental housing project is being preserved.

REFERENCES

- Cho, D. (2013). A study on the change process of rental housing supply policy in Korea. *Space and Society*, 23(4), 58-101.
- Choi, Y. (2019). A study on incentive operation of urban reorganization project [Doctoral thesis, Mokwon University Graduate School].
- Go, J. (2009). Regeneration of old high-rise apartment complexes. *Policy Development Research*, 9, 1-22.
- Im, S. (2016). A study on the public rental housing supply and management system in terms of housing welfare for the underprivileged [Doctoral thesis, Namseoul University Graduate School].
- Jin, M. (2015). A study on financial support to compensate for the loss of public rental housing. *Korea Land and Housing Corporation Land and Housing Research Institute, research support*; 2015-11.
- Jung, C., & Kwon, O. (2009). Effect of floor area ratio on apartment price and business feasibility. *Journal of the Architectural Institute of Korea*, 25(12), 137-144.
- Kim, B., & Ryu, J. (2016). Changes in the path of public rental housing policy in Korea. *Journal of the Korean Contents Association*, 16(9), 170-184.
- Kim, C. (2018). Analysis of apartment price formation considering the interaction between elapsed years and floor area ratio. *Real Estate Analysis*, 4(1), 1-14.
- Kim, C., & Kim, J. (2002). A study on the effect of apartment floor area ratio on housing price. *Land Planning*, 37(4), 123-132.
- Kim, J. (2020). The effect of realizing the rent for public rental housing in Seoul and improving the financial condition of the supplier. *Journal of the Korean Real Estate Society*, 38, 103-124.
- Kim, S. (2014). A study on improvement of the deficit balance of public rental housing projects of local public corporations. *National Assembly Budget Office Budget Policy Research*, 3(1), 263-286.
- Kim, S., & Seon, K. (2018). A study on measures to secure the continuity of the long-term public rental housing project in Korea. *Journal of Urban Administration*, 31(3), 1-28.
- Kim, T. (2004). A study on apartment price changes according to the characteristics of reconstruction. *Korea Real Estate Research Institute Appraisal Research*, 14(2), 179-200.
- Korean Statistical Information Service. (<https://kosis.kr>). "Public rental housing inventory at the end of 2020".
- Lee, S., & Lim, D. (2008). Effect of reconstruction expectations on apartment prices. *Digital Economy Research*, 13, 65-85.
- Ministry of Land, Infrastructure and Transport (2021). Housing Work Handbook. 379-384.
- Ministry of Land, Infrastructure and Transport press release (2020.11.19.). "By the first half of '21, 49,000 units of jeonse-type housing will be intensively supplied nationwide and 24,000 units in the metropolitan area.", p28.
- Shin, H. (2020). A study on housing satisfaction and quality of life of residents of public rental housing [Doctoral thesis, Changwon University Graduate School].
- The 20th Presidential Transition Committee. "Yoon Suk Yeol Government 110 National Tasks"
(Received Jul. 27, 2022/Revised Sep. 14, 2022/Accepted Sep. 27, 2022)