Recommended Strategies Based on The Capability And Purchasing Power of Low-Income Communities (MBR) In Providing MBR Houses In Kartamantul

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Abstract

The housing needs that shape urban spatial structures or the relationships between the three cannot be fully understood without considering the state of housing market prices. The reason is that changes in urban housing market prices no longer depend on the city level, but over time begin to be characterized by urban agglomeration processes. Furthermore, agglomeration dynamics that change urban spatial structure and housing market prices will have an impact on socio-economic disparities and challenges in providing affordable housing for people with low incomes in densely populated urban areas. The aim of this research is to find out whether the MBR housing allocated by the regional government is appropriately located in low-income areas/zones in KARTAMANTUL. The research methods used are web scrapping, mapping and comparative evaluation of housing locations with the distribution of MBR in KARTAMANTUL. The results obtained were to simplify the simulation of affordability and household purchasing power regarding home ownership, the researchers tried to average the income of the two categories of low-income households. Therefore, with an average MBR income limit of Rp. 3,900,000 in DIY, then the ability to repay the house in installments is IDR. 1,170,000/month. Furthermore, regarding house buildings, the criteria for a habitable house is a per capita area of at least 9 m2 per person. With the average number of family members in DIY being 4 people, the house area required per household is 36 m2. The recommendations given are a) 25 year house installments are a payment option that can be used for low-income households in KARTAMANTUL, b) the choice of house locations for MBR is mostly in Bantul Regency and Sleman Regency, both of which have urban status. fringe and urban shadow.

Keywords: *housing, MBR, urban fringe, urban shadow, urban agglomeration*

Background

The housing needs that shape the urban spatial structure or the relationship between the three cannot be fully understood without considering the state of housing market prices (Yang et al., 2020; Li et al., 2021). The reason is that changes in urban housing market prices no longer depend on the city level, but over time begin to be characterized by urban agglomeration processes (Partridge et al., 2009; Liu et al., 2022). Furthermore, A. Nygaard et al. (2021) and Liu et al. (2022) stated that agglomeration dynamics that change urban spatial structure and housing market prices will impact socio-economic disparities and challenges in providing affordable housing for people with low incomes in densely populated urban areas. Thus, in making decisions about affordable housing fulfillment strategies that can produce socially and environmentally sustainable urban transitions or hierarchies, the key is to have a better understanding of agglomeration (A. Nygaard et al., 2021). Therefore, this research will use the concept of urban agglomeration as a basis for dividing urban spatial structures to study the dynamics of housing market prices and also housing/affordable housing development scenarios.

The city of Yogyakarta has a very complex development and development trend and is one of the most frequently visited cities because it has the title of being an educational city, tourist city and cultural city (Devi et al., 2020). This causes the City of Yogyakarta to experience acute land limitations and high land and house prices (Rahardjo & Marhaento, 2018; Kamim et

al., 2019), where the trend of increasing housing prices in the City of Yogyakarta always occurs every quarter of the year (Kamim et al. , 2019). The rapid development of Yogyakarta City has also caused a shift in development boundaries reaching Sleman Regency and Bantul Regency due to urban influence (Artaningtyas et al., 2019; Devi et al., 2020). The city of Yogyakarta has a population that is predominantly young (more than 60% in the age range of 15 to 26 years), thus increasing the need for housing because many young people are getting married and want to have their own home. It is predicted that these demographic changes will lead to even more crucial housing shortages in the future. In the context of rapid urbanization and population growth, demand for housing is increasing, while supply is limited and ownership rates are low. As a result, the housing sector in the City of Yogyakarta faces significant challenges, especially in providing affordable housing for households with low to middle incomes. Marwal & Silva (2023) stated that in facing these population dynamics, housing provision policies must seek a balance with the community's financial capabilities. Therefore, it appears that the challenges are not only related to providing housing, but also include efforts to obtain suitable housing in the desired location, in a more specific sense, namely affordable housing (Mulliner & Algrnas, 2018). The aim of this research is to identify the spatial distribution of housing prices in the spatial pattern structure and MBR housing development scenarios according to the affordability and purchasing power of MBR. This research focuses on the distribution of house prices based on the city structure of Kartamantul and the purchasing power of low-income communities in providing affordable housing (green box). Meanwhile, the other stage is a large research framework to achieve an affordable housing development strategy in the kartamantul agglomeration area, which is previous research (Haryanto, et al, 2023)

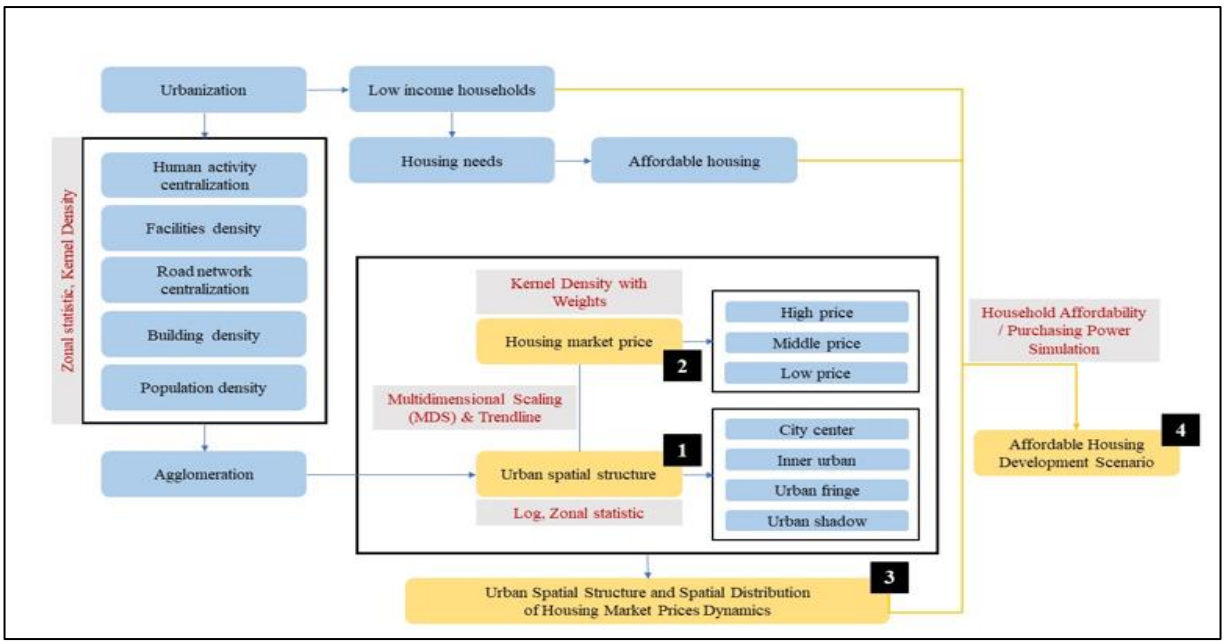

Figure 1. Framework and Scope of Research

Theory Review

Affordable House

The need for adequate housing is an inseparable part of society's needs, and its value for individuals, families, communities and society as a whole is undoubted as part of society's welfare (Opoku & Abdul-Muhmin, 2010; Jun, 2013; Hadj Ali et al., 2023). As a solution to meet these needs, governments in various countries have initiated the provision of

affordable housing for households with insufficient income to buy a decent house directly on the market (Hadj Ali et al., 2023). Providing affordable housing is important because access to safe, decent and affordable housing is a basic right of every individual. However, in many countries, high housing prices and inequalities in access to affordable housing have created significant social and economic disparities between ethnic groups. This situation complicates the city's ability to face the negative impacts of rapid population growth from now to the future (Equere et al., 2020). Ultimately, this can exacerbate poverty, hinder social mobility, and worsen physical and mental health. Therefore, providing affordable housing is important to create a more just and economically sustainable society (Brooks, 2022). Affordable housing is generally most often provided outside the city center, T. Li et al. (2021) in their research concluded that there are many people who choose to move or live to areas outside urban areas to get more spacious and new housing at affordable prices for them. Therefore, household income provides a standard contribution to the purchase of a home at the right price in a desired location, aligning the supply of affordable housing as a priority should be the target (Mohamed Aris et al., 2020).

Housing Market Place

The housing market price was influenced by different factors, it was divided into internal and external indirect factors. The internal factor is land purchase price, while the external one is residents` disposable income (Xin, 2021; Jiang & Qiu, 2021; Jianjun *et all*, 2020). In addition, the land purchase unit price has stronger impact to influence the housing market rather than the resident's disposable income. The eager and needs to house belonging are more significant than the income (Jiang & Qiu, 2021). Factors that driven to land price are land legal certificate (Freehold Title), good accessibility such as near with public facilities, located in the main road, road condition and pavement and government`s policy such as land value capture and land use change policy (Pramana, 2017).

Furthermore, there are demand and supply side that determining house prices. The first factors from demand side are economic growth that affected by income, money circulation, and numbers of unemployment. The rising of income will lead to high speeding money circulation as well as decreasing unemployment that give higher opportunity for buying houses. Second, mortgage availability that effected by interest rates and consumer confidence. Interest rates influence the cost of monthly mortgage payment, the higher the interest the lower people to pay. The lower interest, the higher consumer confidence to buy houses (Pettinger, 2022). Next, in supply side the shortage of supply will pushes up prices as well as geographical factors. People will buy house that from geographical aspect is near with city center, no steep slope, not in disaster prone area, etc (Pettinger, 2022; Pramana, 2017). Sum up, the difference between income as the driven factors and land prices is interested yet challenging to be research further.

Research Methodology

A. Study Location

This study chose Yogyakarta City, Sleman Regency and Bantul as the study area, with special emphasis as the Kartamantul agglomeration area. These three regions are under the administration of the Special Region of Yogyakarta Province (Figure 2). The Kartamantul agglomeration area was obtained from previous research.

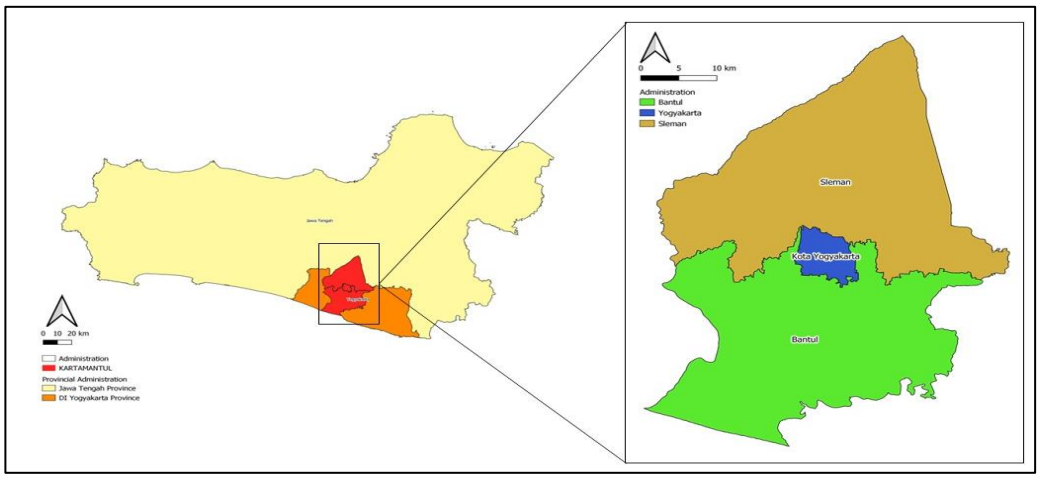

Figure 2. The Location of Research Study

Data Source

As the use of Big Data becomes more widespread and the technologies for collecting, mining, and visualizing such data develop, urban planners and geographers have realized how important Big Data is for studying spatial and temporal behavior in cities (Zhou, 2022). Based on this, this research tries to emphasize the use of Big Data by collecting various digital data sources that are utilized effectively. The research dataset is explained in detail in Table 1.

Table 1. Data Requirements

Data	Source Data	Information
Housing market prices	Online property advertising	▪ Acess data on 4 April 2022 and downloaded https://www.lamudi.co.id, https://www.olx.co.id/items/q-rumah, https://www.rumah.com ▪ web scraping using Instant Data Scraper
Monitoring and Evaluation Study of MBR Housing Development Policy in DIY at 2021	Bureau of Regional Infrastructure Development and Development Financing	-

Source: researcher analysis, 2023

Results And Discussion

Spatial Distribution of Housing Market Prices

The spatial distribution of housing market prices in Kartamantul is monocentric, this can be seen by the division of sub-regions which presents a number of concentric bands (Figure 2). The housing market price distribution pattern shows a single center as the focal point. This single center turns out to have a different structure from the urban structure hierarchy studied previously. Where the single center of Kartamantul housing market prices apparently combines two agglomeration areas around Yogyakarta City, in contrast to the single center of the urban spatial structure hierarchy which only combines Sleman with Yogyakarta City. Then, the sub-regions are divided into several concentric bands around a single center, because there are several areas around that center that have relatively the same housing market prices, thus forming a ring or circle pattern of housing market prices. Researchers try to create a visual distribution of market prices through horizontal transect maps. It can be seen that the city of Yogyakarta has a very

high distribution of housing market prices, so that there is a very large inequality with Sleman and Bantul.

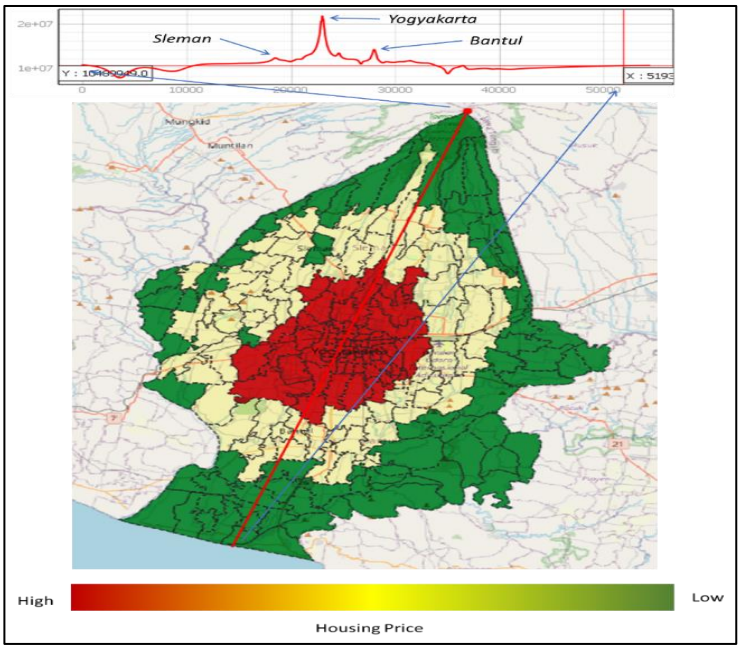

Figure 3. Spatial distribution of housing market prices

However, the distribution of housing market prices is grouped based on their hierarchical structure, you can see the basic statistical results explained in Table 2. From this table it can be seen that the largest disparity in housing market prices as seen from the price range occurs in the city center with the high and medium price categories, namely respectively - each amounting to Rp. 41,669,697 and Rp. 20,444,596. Apart from that, the smallest inequality is found in the urban fringe with the low price category and the urban shadow with the medium price category. Then, looking at the standard deviation value, it can be seen that the data category that is closer to the average price is in the urban fringe with the low price category. This indicates that housing market prices in field conditions have the smallest error.

Table 2. Classification Basic Statistic From Housing Market Prices

Hierarcy Structure	Price Categor y	Minimum Price (Rp.) / m^2	Maximum Price (Rp.) / m^2	Average Price (Rp.) / m^2	Range	Deviation Standar
City Center	High	1.966.667	43.636.364	12.103.556	41.669.697	6.050.542
City Center	Medium	6.764.706	27.209.302	12.562.040	20.444.596	4.663.811
Inner Urban	High	2.666.667	21.666.667	10.710.054	19.000.000	3.525.516
Inner Urban	Medium	3.785.714	23.750.000	10.183.229	19.964.286	3.689.557
Inner Urban	Low	-	-	9.553.646	-	-
Urban Fringe	High	2.375.000	19.487.179	10.263.352	17.112.179	3.313.402
Urban Fringe	Medium	2.729.358	14.444.444	9.278.610	11.715.086	2.949.854
Urban Fringe	Low	3.277.777	3.894.736	3.524.171	616.959	266.737
Urban Shadow	Medium	4.948.980	8.527.778	7.219.161	3.578.798	1.279.173
Urban Shadow	Low	1.966.667	11.877.004	6.921.835	9.910.337	3.809.105

Source: researcher analysis, 2023

Affordable Housing Development Scenario

Low-income people (MBR) are groups of people who have relatively small income or income, who often find it difficult to meet their basic living needs, especially housing. These low income criteria can vary between regions, depending on economic conditions, living standards, and people's ability to meet their basic needs. In 2021, the DI Yogyakarta Provincial Government has prepared a MBR Housing Development Policy Monitoring and Evaluation Study in DIY. Researchers used the results of this study, especially regarding household characteristics that MBR said, the results of this study will ultimately be used in creating affordable housing development scenarios. Based on the results of this study, it was found that MBR in DI Yogyakarta has the following characteristics (Table 3)

Table 3. Characteristics of Low Income Households in Yogyakarta based on monthly expenses and income.

Category	Expenditure	MBR Income Limit
1. Upper (total family members 4 people)	5.600.000	6.000.000
2. Lower (single)	1.400.000	1.800.000
MBR Averege	3.500.000	3.900.000

Source: Bureau of Regional Infrastructure Development and Development Financing, 2021

Furthermore, as a general rule, home expenses should be no more than 30% of monthly income. In this case, the ability to pay home installments should not exceed 30% of monthly income. To make it easier to simulate the affordability and purchasing power of households regarding home ownership, the researchers tried to average the income of the two categories of low-income households. Therefore, with an average MBR income limit of Rp. 3,900,000 in DIY, then the ability to repay the house in installments is IDR. 1,170,000/month. Furthermore, regarding house buildings, the criteria for a habitable house is a per capita area of at least 9 m2 per person. With the average number of family members in DIY being 4 people, the house area required per household is 36 m2. This area is used to determine the average house price per spatial structure category and housing market price category, because the average price described in the previous sub-chapter is the average house market price in m2 units. Table 4 explains the level of affordability and household purchasing power for houses according to the urban spatial structure category and the housing market price category.

Table 4. Affordability and household purchasing power for housing

Urban Stucture	Housing Price Category	Installment period (years)	Ability to pay monthly installments (Rp.)	Ability to pay yearly installments (Rp.)	Affordability / household purchasing power
City Center	High	25	1.402.934	16.835.211	100% Unaffordable
City Center	Medium	25	1.471.310	17.655.725	100% Unaffordable
Inner Urban	High	25	1.330.023	15.960.273	100% Unaffordable
Inner Urban	Medium	25	1.270.816	15.249.794	4% Affordable
Inner Urban	Low	25	1.146.438	13.757.252	0.5% Affordable
Urban Fringe	High	25	1.223.576	14.682.911	100% Unaffordable
Urban Fringe	Medium	25	1.273.704	15.284.448	2% Affordable
Urban Fringe	Low	25	1.215.380	14.584.561	2% Affordable
Urban Shadows	Medium	25	1.191.309	14.295.710	1% Affordable

Urban Stucture	Housing Price Category	Installment period (years)	Ability to pay monthly installments (Rp.)	Ability to pay yearly installments (Rp.)	Affordability / household purchasing power
Urban Shadows	Low	25	1.230.206	14.762.474	6% Affordable

Source: researcher analysis, 2023

In the conclusion, House installments for 25 years are a payment option that can be used for low-income households in Kartamantul. This is because the increase in property prices in Kartamantul makes long-term installment schemes the most affordable scenario. Figure 3 shows the spatial direction of affordable housing development scenarios in the Kartamantul agglomeration area. Several categories of areas that could become affordable housing development areas in the future are inner urban - medium, inner urban - low, urban fringe - medium, urban fringe - low, urban shadows - medium and urban shadows - low.

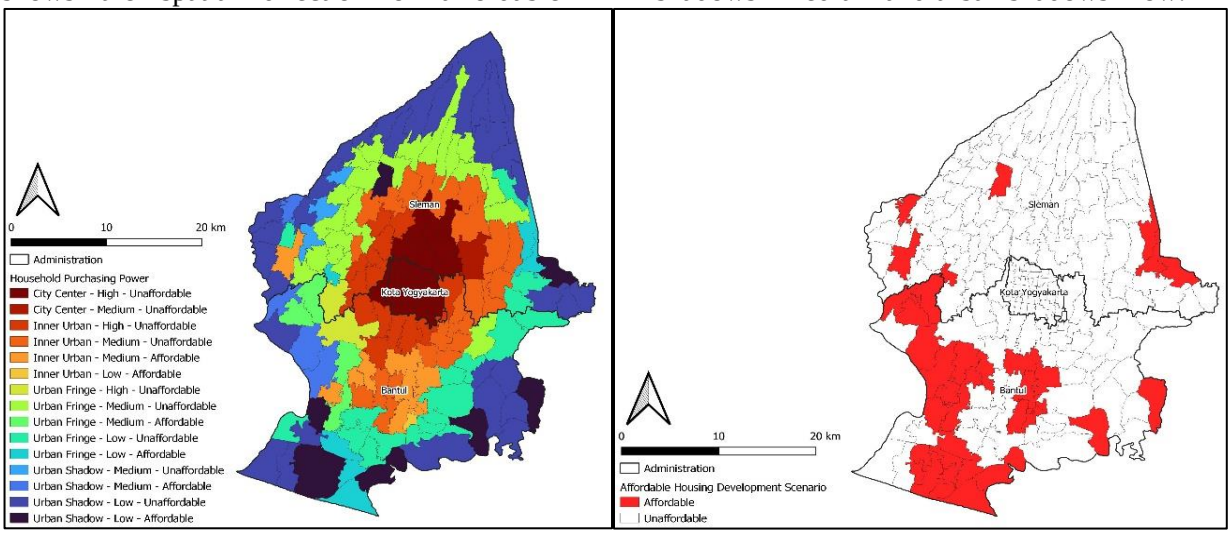

Figure 4. Affordable housing development scenarios

Conclusions and Recommendations

Based on the research results, it can be concluded that

a. The spatial distribution of housing market prices in Kartamantul is monocentric, this can be seen by the division of sub-regions which presents a number of concentric bands
b. The city of Yogyakarta has a very high distribution of housing market prices, so that there is a very large inequality with Sleman and Bantul. It can be seen that the largest disparity in housing market prices, seen from the price range, occurs in the city center with the high and medium price categories, namely Rp. 41,669,697 and Rp. 20,444,596
c. With an average MBR income limit of Rp. 3,900,000 in DIY, then the ability to repay the house in installments is IDR. 1,170,000/month. Furthermore, regarding house buildings, the criteria for a habitable house is a per capita area of at least 9 m2 per person. With the average number of family members in DIY being 4 people, the house area required per household is 36 m2

Next, the recommendations that can be given are:

a. House installments for 25 years is a payment option that can be used for low-income households in Kartamantul
b. The choice of housing locations for MBR is mostly in Bantul Regency and Sleman Regency, where these two locations are in urban fringe and urban shadow status.

Bibliography

A. Nygaard, C., Parkinson, S., & Reynolds, M. (2021). Agglomeration effects and housing market dynamics. In *AHURI Final Report* (Issue 366). Australian Housing and Urban Research Institute Limited. https://doi.org/10.18408/ahuri5122401

Acheampong, R. A., & Asabere, S. B. (2021). Simulating the co-emergence of urban spatial structure and commute patterns in an African metropolis: A geospatial agent-based model. *Habitat International*, *110*(March), 102343. https://doi.org/10.1016/j.habitatint.2021.102343

Afrianto, F., & Graha, D. T. R. (2023). Morfologi Kota Malang: Sebuah Tinjauan dari Nighttime Light Satellite Imagery. *Plano Buana*, *3*(2), 68–76.

Artaningtyas, W. D., Winarti, A. S., & Sodik, J. (2019). Agglomeration and Economic Growth in the Special Region of Yogyakarta (2005-2016). *Eko-Regional Jurnal Pengembangan Ekonomi Wilayah*, *14*(2), 75–84. https://doi.org/10.20884/1.erjpe.2019.14.2.1277

Bajracharya, B., & Hastings, P. (2018). A regional, strategic growth-management approach to urban and Peri-urban development in south east Queensland, Australia. *Journal of Regional and City Planning*, *29*(3), 210–233. https://doi.org/10.5614/jrcp.2018.29.3.3

Brooks, M. M. (2022). Persistent disparities in affordable rental housing among America's ethnoracial groups. *Social Science Research*, *June*, 102828. https://doi.org/10.1016/j.ssresearch.2022.102828

Bureau of Regional Infrastructure Development and Development Financing, D. R. S. (2021). *Study of Monev on MBR Housing Development Policy in DIY*.

Burnett, P. (2016). Land Use Regulations and Regional Economic Development. *Land Economics*, *92*(2), 237–255. https://doi.org/10.3368/le.92.2.237

Carrión-Flores, C., & Irwin, E. G. (2004). Determinants of Residential Land-Use Conversion and Sprawl at the Rural-Urban Fringe. *American Journal of Agricultural Economics*, *86*(4), 889–904. http://www.jstor.org/stable/4492780

Chen, M., Zhang, W., & Lu, D. (2015). Examining spatial pattern and location choice of affordable housing in Beijing, China: Developing a workable assessment framework. *Urban Studies*, *52*(10), 1846–1863. https://doi.org/10.1177/0042098014542133

Chen, Y., Hu, Y., & Lai, L. (2022). Demography-Oriented Urban Spatial Matching of Service Facilities: Case Study of Changchun, China. *Land*, *11*(10). https://doi.org/10.3390/land11101660

Coelho, K., Mahadevia, D., & Williams, G. (2022). Outsiders in the periphery: studies of the peripheralisation of low income housing in Ahmedabad and Chennai, India. *International Journal of Housing Policy*, *22*(4), 543–569. https://doi.org/10.1080/19491247.2020.1785660

Devi, M. K., Gorman, Y. H., & Hidayati, S. R. (2020). Spatial transformation in urban periphery: The case of Yogyakarta. *IOP Conference Series: Earth and Environmental Science*, *592*(1). https://doi.org/10.1088/1755-1315/592/1/012022

Equere, E., Ibem, E., & Alagbe, O. (2020). Towards city resilience: the influence of socio-cultural and economic features of housing on population growth in public residential estates. *Journal of Regional and City Planning*, *31*(2), 164–179. https://doi.org/10.5614/jpwk.2020.31.2.4

Erdem, F., Atun, R., Yigit Avdan, Z., Atila, I., & Avdan, U. (2021). Drought analysis of Van Lake Basin with remote sensing and GIS technologies. *Egyptian Journal of Remote Sensing and Space Science*, *24*(3), 1093–1102. https://doi.org/10.1016/j.ejrs.2021.10.006

Foelske, L., van Riper, C. J., Stewart, W., Ando,

A., Gobster, P., & Hunt, L. (2019). Assessing preferences for growth on the rural-urban fringe using a stated choice analysis. *Landscape and Urban Planning*, *189*(October 2018), 396–407. https://doi.org/10.1016/j.landurbplan.2019.05.016

Hadj Ali, C., Roy, D., Amireche, L., & Antoni, J. P. (2023). Development of a Cellular Automata-based model approach for sustainable planning of affordable housing projects: an application case study in Algiers. *Land Use Policy*, *125*(December 2021). https://doi.org/10.1016/j.landusepol.2022.106468

Higgins, C. D. (2019). A 4D spatio-temporal approach to modelling land value uplift from rapid transit in high density and topographically-rich cities. *Landscape and Urban Planning*, *185*(March 2018), 68–82. https://doi.org/10.1016/j.landurbplan.2018.12.011

Jansen, S. J. T. (2020). Urban, suburban or rural? Understanding preferences for the residential environment. *Journal of Urbanism*, *13*(2), 213–235. https://doi.org/10.1080/17549175.2020.1726797

Jun, M. J. (2013). The effects of housing preference for an apartment on residential location choice in Seoul: A random bidding land use simulation approach. *Land Use Policy*, *35*, 395–405. https://doi.org/10.1016/j.landusepol.2013.06.011

Kamim, A. B. M., Amal, I., & Khandiq, M. R. (2019). Problematika Perumahan Perkotaan di Kota Yogyakarta (Urban Housing Problems in Yogyakarta City). *Jurnal Sosiologi USK (Media Pemikiran & Aplikasi)*, *13*(1), 51. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjcsaHmjMLqAhW8_XMBHUSFDTQQFjABegQIARAB&url=http%3A%2F%2Fjurnal.unsyiah.ac.id%2FJSU%2Farticle%2Fview%2F13494&usg=AOvVaw11NdElsyFVN-OoAsoDmYd9

Li, H., Wei, Y. D., Wu, Y., & Tian, G. (2019). Analyzing housing prices in Shanghai with open data: Amenity, accessibility and urban structure. *Cities*, *91*(October 2018), 165–179. https://doi.org/10.1016/j.cities.2018.11.016

Li, T., Shiran, S. J., & Dodson, J. (2021). Metropolitan migration and spatial housing markets: A geographical study in Melbourne. *Applied Geography*, *129*(March), 102414. https://doi.org/10.1016/j.apgeog.2021.102414

Liu, L., Qiu, L., & Yang, Y. (2022). Urban housing prices within a core urban agglomeration in China. In *SN Business & Economics* (Vol. 2, Issue 11). Springer International Publishing. https://doi.org/10.1007/s43546-022-00351-x

Ma, W., Jiang, G., Zhang, R., Li, Y., & Jiang, X. (2018). Achieving rural spatial restructuring in China: A suitable framework to understand how structural transitions in rural residential land differ across peri-urban interface? *Land Use Policy*, *75*(March), 583–593. https://doi.org/10.1016/j.landusepol.2018.04.02