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Article

# Examination of Changes in Land Use Surrounding Green Open Space Karebosi Field Complex Makassar

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## Abstract

Urban renewal, driven by investments in urban space, has transformed the urban landscape and significantly impacted changes in land use and the physical appearance of the urban environment. Incorporating GOS to change the appearance of cities is an important strategy for urban development, by utilizing them as central points of building orientation. Changes in the land use of GOS into other functions that have a negative impact on the urban environment have been widely studied by researchers, but not much research has been done on changes in land use around GOS which function as the central point of urban orientation. This research will examine changes in land use patterns around the Karebosi Field Complex GOS on a building plot unit scale using a survey research approach with descriptive analysis. The research was conducted in Makassar City, and data analysis was carried out in 2023. The GOS sample was selected through purposive sampling, the Karebosi Field Complex GOS was deliberately chosen as the research subject because of its area and optimal and dynamic activities, as a leading landmark that contributes to Makassar city branding. It was found that changes in land use based on building plot units, some of which have taken place three times, 89 percent of the land plots around GOS have changed function, all land function changes have become land with commercial functions, the two land plot units that have not changed function are Makassar District Court Office and Church Building. Centrifugal force occurs when government building land is pushed away from the city core and replaced by commercial building land as a manifestation of centripetal force which is attracted to enter the city core area and function as a central business district.

**Keywords:** land use change; green open space; urban renewal; centrifugal and centripetal force; city

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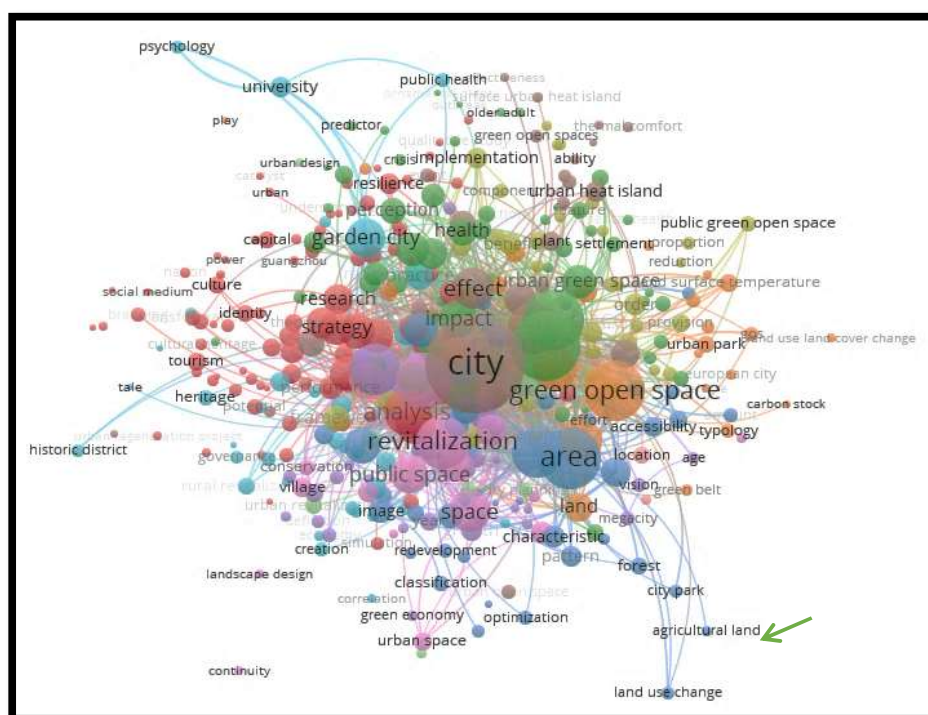
## 1. Introduction

Cities have experienced multidimensional growth since the 20th century due to both local and global dynamics (Bruzzone & Utgés, 2022; Dey et al., 2021). This growth has also led to the rapid evolution of urban development, resulting in consequential land use changes and urban land fragmentation (Nath, 2020). Modern planning and management of urban space is needed to ensure sustainable and compact development of cities (Artmann et al., 2019). Achieving this goal requires the implementation of global and local policies that lead to positive economic, environmental, and social outcomes, all of which contribute to urban sustainability (Bibri, 2020).

Urban renewal, driven by investments in urban spaces, is a manifestation of the evolving urban landscape of cities with significant implications for land use and the physical appearance of the urban environment (Abed, 2020; Abuzayed & Al-Kurdi, 2019). Such developments are primarily driven by economic considerations, reflecting an increasing trend of urban growth. Abbreviations of technical terms used in this text will be explained the first time they are used. Green spaces are used to change the appearance of urban areas and provide competitive, revised, and diversified models for urban development (Lak, 2020). City residents participate in this strategy (Chen, 2020; Arnstein, 2019),

taking into account the age factor (Cheng, 2019), gentrification (Schnake-Mahl, 2020), ecological function optimization (R. Guo, 2019), and violence reduction (Moyer, 2019).

Visually, the grouping of study topics, as shown in Figure 1, shows the density of study topics, which is represented by the size of the circle surrounding the topic. The larger the circle indicates that this topic has been studied by many researchers, and if the circle is small, it means that the topic still has limited research. discussed, which allows research to be conducted as a future study to obtain new findings related to this topic. In Figure 1, you can see the changes in land use represented by the small circle in the lower right corner.



**Figure 1.** Relationship of themes in the study of cities, green open space, and land use change (Source: vosviewer analysis).

The details of the 11 classes of studies on cities and green open spaces as well as changes in land use are shown in Table 1.

**Table 1.** Grouping of topics by class

Clusters	Consep Names	Total
Clusters 1	adoption, analysis, availability, behavior, bibliometric analysis, branding, capital, case, catalyst, characteristics, circular economy, city branding, community, communication, comparative study, comparison, conceptual framework, concern, context, critical review, cultural ecosystem services, cultural heritage, cultural policy, culture, determinant, education, efficiency, empirical study, field, figure, gap, green spaces, Guangzhou, history gardens, identity, industry, influence, influencing factor, innovation, institution, intention, investigation, knowledge, link, management, meaning, methodology, model, nation, open green spaces, outcomes, overtourism, pandemic, participation, path, performance, perspective, post covid, potential, power, promotion, prospect, renewal, research, research agenda, residential area, resilience,	94

	resources, review, role, rural area, scoping review, Shenzhen, simulation, social medium, sport, strategy, student, systematic literature review, technology, theory, tool, tools, tourism, town, transformation, trend, urban, urban green infrastructure, urban green spaces, urban regeneration, urban regeneration project, urban renewal, word.	
Clusters 2	access, association, child, crisis, death, density, difference, distance, district, element, environment, experience, factor, feature, green space, ornamental plant, outbreak, park area, perception, person, physical activity, population, predictor, preference, preservation, qualitative study, quality, resident, risk, sample, settlement, size, soil, spatial distribution, stress, systematic review, tourist, treatment, understanding, urban green space, urban planning, use, women.	62
Clusters 3	accessibility, agricultural land, amount, approach, area, central business district, characteristic, city park, classification, crime, deep learning, distribution, driver, effort, Europe, forest, form, function, GIS, guideline, history, image, land use change, landscape architect, mapping, network, open area, optimization, park, pattern, policy, public open space, race, redevelopment, remote sensing, safety, selection, square, term, type, urban sprawl, user.	43
Clusters 4	Application, barrier, benefit, biodiversity, climate change, climate change adaptation, component, conflict, construction, demand, diversity, ecosystem service, framework, goal, green infrastructure, green roof, home, implementation, improvement, lesson, mitigation, open space planning, order, park space, plan, priority, process, proportion, provision, public, green open space, recovery, recreation, reduction, society, solution, street, tree, urban forest, value, vegetation, water, wellbeing, work	43
Clusters 5	Age, art, artificial intelligence, bag data, comparative analysis, country, definition, development, dimension, economy, food, future, green, green economy, growth, indicator, issue, low, light, megacity, observation, patient, position, relation, response, search, smart city, social capital, social sustainability, source, sustainability, sustainable city, sustainable development, transport, urban development, vision, welwyn garden city, year,	38
Clusters 6	Attitude, Chinese city, community garden, correlation, creation, economic development, evidence, evolution, facility, garden city, gentrification, geography, governance, heritage, historic district, mechanism, mediating role, politic, practice, psychology, public health, regeneration, region, rural revitalization, rural settlement, site, spatial pattern, state, sustainable development, sustainable urban development, tale, transition, university, urban form, urbanization, view.	36
Clusters 7	Adaptation, carbon stock, challenge, change, climate change mitigation, estimation, European city, focus, GIS, green belt, green open space, infrastructure, land, land surface temperature, land use, land use land cover change, leisure, literature review, opportunity, park, part, place, play, relationship, sense, service, set, typology, urban green open space, urban park.	30
Clusters 8	Ability, assessment, building, city, effect, effectiveness, evaluation, event, formation, green city, green open spaces, green synthesis, historical city, lack, landscape architecture, plant, problem, remote sensing data, structure, study, surface urban heat island, technique, thermal comfort, urban area, urban heat island, urban heat island effect, urban open space, utilization	28

Clusters 9	Aesthetic, architecture, case study, concept, condition, conservation, continuity, garden, green area, public space, revitalization, space, urban landscape, village, estimation, European city, focus, green belt, green open space	19
Clusters 10	Agriculture, contribution, gardening, location, system, urban agriculture, urban environment, urban sustainability.	8
Clusters 11	Aspect, city planning, combination, planning, survey, urban design, urban revitalization.	7

Source: vosviewer analysis.

Changes in land function around strategic locations in cities is an urban phenomenon that occurs throughout the world and is the subject of study by urban researchers. The use of physical theories to explain phenomena that occur in urban areas, especially those related to land use changes such as centrifugal and centripetal theories. Centrifugal in urban phenomena is described as a force that attracts residents to the city center, while centripetal is described as a force that pushes residents out of the city center (Grove & Volgmann, 2022), (Dadashpoor & Ahani, 2021), (Schad et al., 2019), (Colby, 2009).

Urban studies from a different perspective see the process of changing land functions in strategic areas of the city as urban regeneration (Lak, 2020), (Senosiain, 2020), (Agirbas, 2020), (Furlan, 2019), which can be implemented in various forms as urban land revitalization. Studies on urban land revitalization in various literature are often presented in different terms, including urban revitalization (Ibrahim, 2023), (Prener, 2020), (Dollah, A.S., et al., 2023), (Y. Li, 2019), (Y. Wang et al., 2018), urban renewal (Rius-Ulldemolins, 2022), (Siwi, 2021), (M. Wang, 2021), urban gentrification (Schnake-Mahl, 2020), (Ehrenfeucht, 2020), (Dillon, 2019), which in its current development includes environmental elements as one of the main considerations in its implementation (Y. Guo, 2020), (Smith, 2020), (J. Li, 2021).

Urban renewal is a manifestation of the development of the lives of city residents, which has experienced an increase, especially from the economic aspect, which is based on investment in urban spaces and has implications for changing the appearance of the city, both in terms of land use and physical appearance (Abed, 2020), (Abuzayed & Al-Kurdi, 2019). The expansion of green open space as an orientation for changing the appearance of the city is one of the strategies in urban development through competitive, revision and diversification models (Lak, 2020), involving the participation of city residents (Chen, 2020), (Arnstein, 2019), paying attention to age factors (Cheng, 2019), gentrification (Schnake-Mahl, 2020), optimizing the ecological function of the area (R. Guo, 2019), and reducing the impact of violence (Moyer, 2019). Green open space is also an urban element that can act as a catalyst to stimulate life in new urban areas and then influence the form, character, and quality of subsequent urban elements where a catalytic chain reaction can occur.

The various processes of urban development that continue to grow, raise the central point of business development in the city center as a result of the concentration of orientation in strategic areas, which is also influenced by the development of globalization (Commission & European, 2018). This creates an area with a concentration of economic growth, physical buildings, and rapid land use changes in the area, with a high level of easily accessible infrastructure (Grove & Volgmann, 2022). This process will also make the value of land in this area expensive (Okamoto & Sato, 2021), so the utilization is maximized through vertical development up and down. Additionally, the distribution of land plot size will be in the form of blocks.

Karebosi Field complex green open space, which is the largest green open space in the city of Makassar (Dollah et al., 2014), (Mahsyar, 2015), (Aidina et al., 2020), with a position at the zero kilometer point and is one of the landmarks of the city of Makassar. easily recognized as city branding (Garcia-Lamarca, 2021), (Lak, 2020), (Molinillo, 2019), (Siregar, 2019), or as a landmark that forms a city image (Hussein, 2020), (Miftahuddin, 2020), (Priporas, 2020), (Filomena, 2019), (Mondschein & Moga, 2018), (Lynch, 1960). Due to its very strategic location as the center of the city, it has become a

point of orientation for various urban activities, especially those related to public services and business. This condition makes the surrounding urban land a target for capital owners to locate there.

The green open space of the Karebosi Field complex and its surroundings is the core area of the city, in the development of urban studies it is known as the Central Business District (CBD) area of Makassar City. The central urban commercial area is often considered as the heart of the city (Yang et al., 2019), or the center of the city's economic and social network that contains a concentration of commercial land uses (Drozd et al., 2012), (Murphy & Vance, 1954). This understanding is also inseparable from rapid economic development and urbanization, which pose urban challenges in the form of limited public resources that promote a shift in the concentration of urban functions from monocentric to polycentric structures and tend to generate more complex urban environments (Huai et al., 2021), (Fosgerau et al., 2018), (Garcia-López & Moreno-Monroy, 2018).

This research examines the changes in land function that occur around the green open space at the Karebosi Field Complex on the four sides of the surrounding road, namely Jalan Jenderal Sudirman on the east side, which in this case is categorized as Area A, Jalan R.A. Kartini on the south side as Area B, Jalan Kajaolaliddo on the west side as Area C, and Jalan Jenderal Ahmad Yani on the north side as Area D, with an observation period from the early 20th century to 2022. The location of the research object is shown in Figure 2.



**Figure 2.** Situation of the research area (source: processed and modified from Google Earth, 2023).

## 2. Research Significance and Objectives

The importance of this research is to provide an understanding of the pattern of changes in land use at the plot scale around the green open space, which is located in the city center and also as the central business district, especially land that uses green open space as an orientation point. Green open space as an urban space with various interesting functions, is a place that is always busy with city residents for various purposes, it can be in the form of recreation, a meeting place for various social activities (Assefa et al., 2021), (Berglihn & Gómez-Baggethun, 2021), (Palliwoda, 2020), (Manikasari, 2019), (Bratman et al., 2019), (Bartasaghi-Koc, 2019), (Ignatieva, 2020), (Venter et al., 2020), as a transit or transition place that provides orientation to the next destination around it. Architecturally, open space as an open space can be a building orientation that makes the appearance of the building more majestic and monumental. Because this strategic function and location attracts other functions to approach it, resulting in changes in land use. Different land functions occur around

the GOS, including office functions, shopping functions, social functions such as hospitals, education, and various other functions. Likewise, in terms of building floor patterns, five floors above or below five floors.

The aim of this research is to examine trends in land use change patterns at the parcel scale around the dominant green open space. So far, research on green open spaces is related to the change of function of green open spaces to other functions that have a negative impact on the urban environment. Thus, this research provides an understanding of the pattern of land use change around green open spaces at a smaller plot scale to be used as material for policy making for urban development, especially in the city center area with green open spaces as the center of orientation.

### 3. Methodology

This research is a survey research with descriptive analysis. The research location is in Makassar City, and data analysis was conducted in 2023. Determination of the GOS sample was carried out using a purposive sampling technique (Campbell, 2020), (Andrade, 2021), (Kissi, 2020), for this reason, the Karebosi Field Complex GOS was deliberately chosen as the object of research, because this GOS is the most extensive and strategic, the most dynamic activity, is located in the central business district area and as a landmark or city branding of the city of Makassar. Observation of land use change from the early 20th century to 2022. Data was collected using observation techniques through direct observation of researchers in the field, as well as through maps via Google search, as well as maps of the city of Makassar, especially around GOS Karebosi Field at relevant city agencies. The map overlap technique was used to determine the location and changes of the observed plots (Martins, 2020), (Rane et al., 2023), (Thin et al., 2023). Interviews were also conducted with resource persons knowledgeable about the land conditions around the Karebosi field complex. Data documentation was carried out in the form of recordings and photographs. In addition, a literature review was conducted as a normative reference and a basis for theoretical analysis, especially those related to land use change and urban green open space.

### 4. Overview of Research Locations

According to the page <https://daenggassing.com>, accessed in September 2023, Karebosi Field, or Koningsplein in Dutch, was at that time part of the firing training grounds for Dutch soldiers, both infantry and artillery. This place is located east of Fort Rotterdam, which was the center of residence and defense for the Dutch troops when they succeeded in conquering the Kingdom of Gowa as the ruler of the region at that time.

After the security conditions could be controlled, the Dutch government began to develop the embryonic expansion of the city of Makassar by developing the Karebosi area and its surroundings following the urban planning pattern of European countries in general with the Axis Style concept and city parks (Dollah, 2023). Several buildings were built, including the Prison Building and Court Building on the north side, the Immanuel Protestant Church and Hotel were built on the west side, the Raad van Justitie was built on the south side, now the Court House, and the Vredenburg Fortress was built on the east side, connected to the hospital, now known as Pelamonia Hospital. Apart from that, several parks were also built, which represent the characteristics of developing cities in the Netherlands and its surroundings, which are happy with parks. Most of this land has changed drastically in function. The picture is shown in Figure 3.



Figure 3. 20th Century Makassar City Map and Modifications. Source: Kitlv in (Kholifah, 2002).

## 5. Research Results

In general, the process of land use change around the green open space of Makassar Karebosi Field Complex from the early 20th century to 2022 is as shown in Table 2.

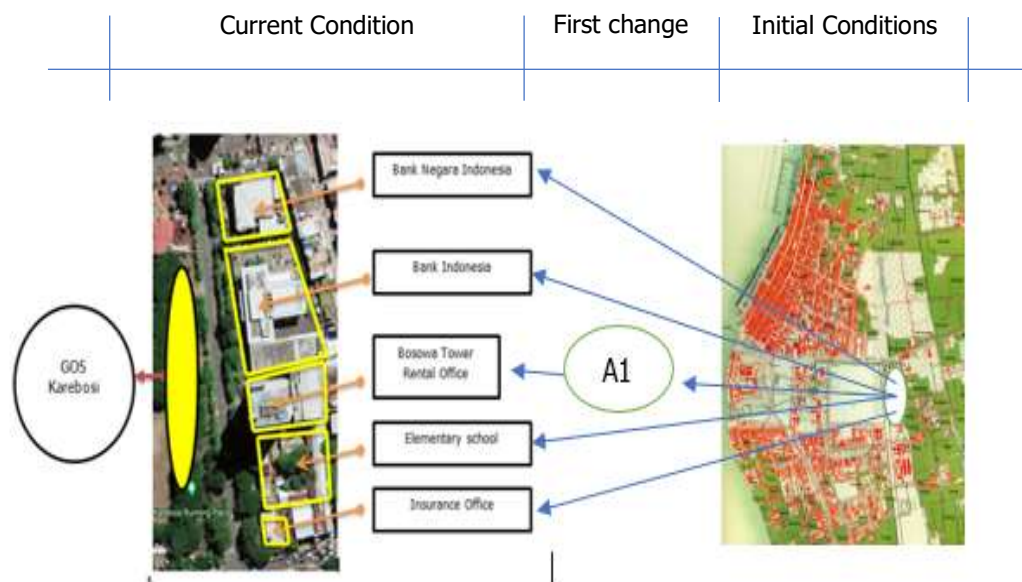
Table 2. The Process of Land Change Around GOS Karebosi from the Early 20th Century – 2022.

No	Region	Initial Conditions	First change	Second change	Information
1	A	Vredenburg Fort and Hospital	Bank Negara Indonesia, Bank Indonesia, Chemical Analysis Building, Elementary School, Office	Bank Negara Indonesia, Bank Indonesia, Bosowa Tower, Elementary School, Office	
2	B	Raad Van Jastitie and Around	Raad Van Jastitie, Housing	Pengadilan Negeri, Bank Mandiri, Hospital, Housing, Maternity Hospital	
3	C	Immanuel Protestant Church and Hotel	Immanuel Protestant Church, Air Force Headquarters, Shops	Immanuel Protestant Church, Athirah Islamic School, Banks, Shops	
4	D	Prison Building and Court Building	Lung Hospital, Prison, Army Headquarters.	Shopping Malls, Shops	

Source: 2023 Observations.

It can be seen in Area A or on the east side of the Karebosi Field Complex, which used to be the site of Fort Vredenburg and has now changed its function to offices and education. If you look more closely from north to south, from Jalan Jenderal Muhammad Yusuf to Jalan Gunung Bawakaraeng, you can see the Bank Negara Indonesia building, the Makassar Regional Representative Bank Indonesia building, the Bosowa Tower Rental Office, a primary school and an insurance office. Specifically for the land occupied by the Bosowa Tower, there was previously a laboratory building, so the land function has changed three times, while the other land has changed only twice, namely

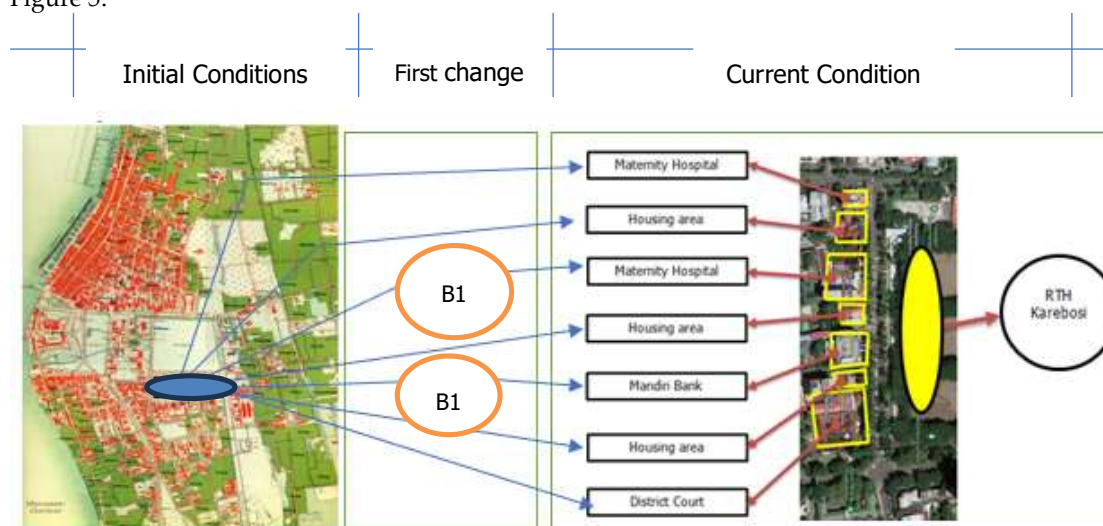
the transition from fortress land to offices and educational buildings. The process of land function change that occurs in area A is a process of concentration of commercial functions that are attracted to the city core, which is known as the centripetal effect (Grove & Volgmann, 2022). Visually as seen in Figure 4.



**Figure 4.** Land Change Process in Area A. (Source: 2023 Survey Results). A1 = First change (Laboratory Building).

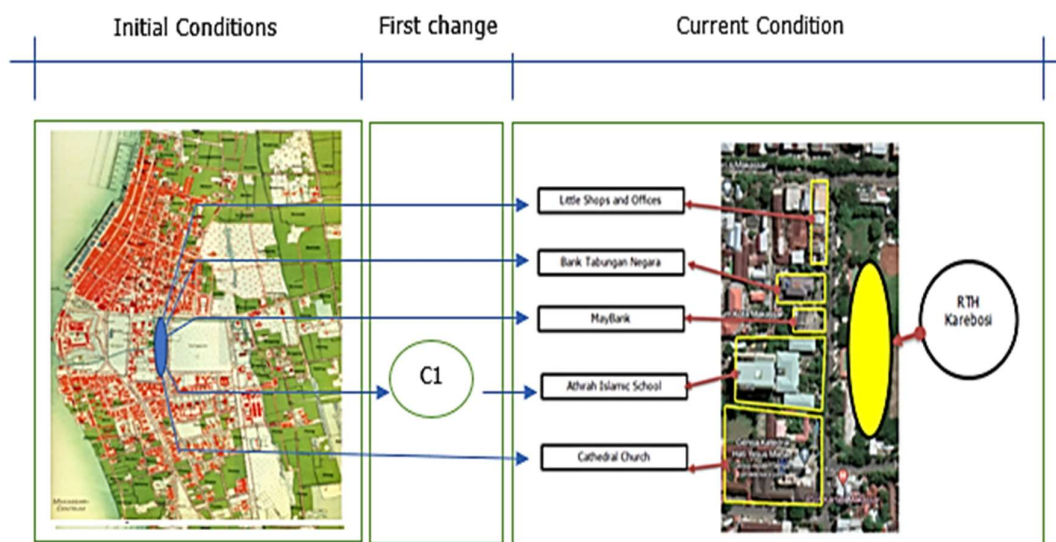
In Area B or on the south side of the Karebosi Field Complex from east to west, except for the Makassar District Court Building which was previously known as Raad Van Jastitie Building, apart from that, it was an elite residential building in its time. The current condition of some of these houses has changed its function to Bank Mandiri, Siti Chadijah Maternity Home, while the Kartini Maternity Home which is located in the west corner, the condition of the land has not changed from the basic form of housing, only in some parts it has been modified to become a maternity hospital.

In this area, there are two areas where fundamental changes in land function have occurred, namely the Bank Mandiri land and the Siti Chadijah Maternity Hospital land. Pictorially as seen in Figure 5.



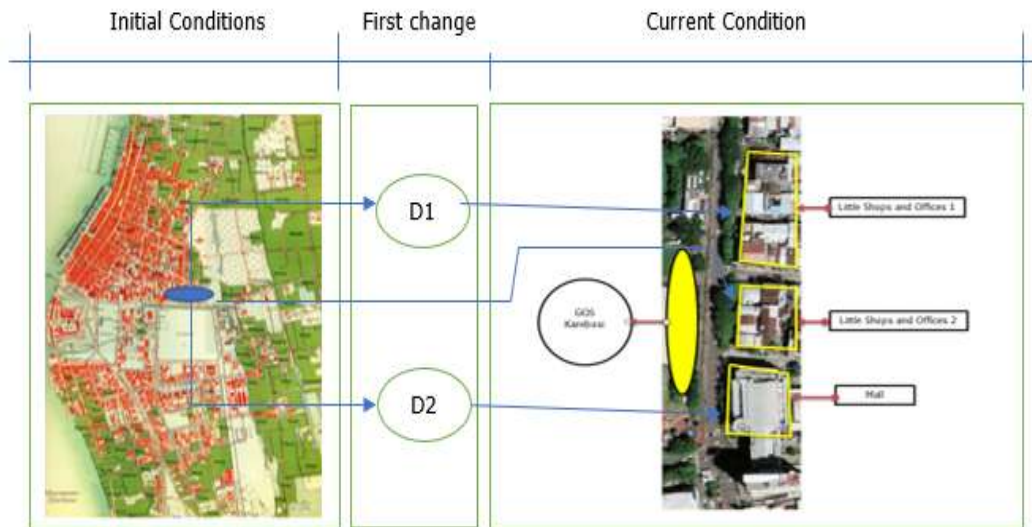
**Figure 5.** Land Change Process in Area B. (Source: 2023 Survey Results). B1 = First change (Housing area).

In area C, or the west side, there were church and hotel buildings at the beginning of the 19th century. In the current conditions, if you look from south to north, the land for the church building is still as before, then the land for the school building, then the land for bank offices, and then the land for shop buildings. The change in land function that occurred here was in the school building, where the building previously stood for the office of the commander of the Indonesian Air Force for the Sulawesi region, so there has been a change in land use three times since the beginning of the 19th century, while for the others only twice. In changing the function of the land from the air force commander's office to land for school buildings, centrifugal forces are at work here, with the air force commander's office being pushed out to the east of the city toward Sultan Hasanuddin Airport, which is also a fighter base. The visual land use conditions in Area C are shown in Figure 6.



**Figure 6.** Land Change Process in Area C. (Source: 2023 Survey Results) C1 = First change (Air Force Office).

In area D, changes in land use have occurred since the early 19th century, where previously stood the prison building and court building, now the land has changed its function to become a multi-story shopping center, meaning more than four floors, and rows of shops. two-story shop. On the land where the multi-story shopping center now stands, land use has changed, starting from the early 19th century in the form of the Prison Building and Court Building complex, then changed to a Lung Hospital and now a shopping center, then the land to the west of the shopping center is in the form of a row of shops, the changes that occurred from the Prison Building and Court Building to become the Commander's Headquarters of the XIV Hasanuddin Regional Military Command and then to a row of shops. The change in land use of the Lung Hospital into a shopping mall and the Commander's Headquarters of Kodam XIV Hasanuddin into a row of shops is a change as explained by the centrifugal theory, where these two buildings are pushed out of the city core. Visually, the current land conditions in Area D are as shown in Figure 7.



**Figure 7.** Land Change Process in Area D. (Source: 2023 Survey Results). D1 = First change (Army Office). D2 = First change (Pulmonary Hospital).

## 6. Conclusion

The ratio of land that has changed function to land that has not changed function based on the observed land is 2:18, which means that 89 percent of the land around the GOS has changed function. The two plots that have not changed function are the Makassar District Court Office and the church building.

All changes in land use will lead to commercial use, and the use of every inch of land will be optimized through multi-story buildings and the use of underground areas. Connectivity between plots of land under the same management will begin to be implemented with underground connecting lines running under the city's main roads.

The centrifugal effect generally occurs in government-owned buildings that are pushed away from the urban core, while the centripetal effect is the attraction of commercial buildings to the area around the GOS.

Further research with a broader scope is needed to gain a more comprehensive understanding, especially of the CBD area around GOS Karebosi.

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