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Unveiling the Complexities of Land Use Transition in Indonesia's New Capital City IKN Nusantara: A Multidimensional Conflict Analysis

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Abstract: The relocation of Indonesia's capital to the IKN (Ibu Kota Negara) Nusantara in East Kalimantan is leading to significant changes in land use, shifting from natural vegetation and agriculture to urban infrastructure. This transition brings about economic diversification and urban expansion, but it also raises concerns about its impact on society, the economy, and the environment. The rapid development affects biodiversity conservation, food security, and the livelihoods of rural and Indigenous communities, leading to conflicts across social and economic dimensions. This research uses qualitative and quantitative data to examine the socio-economic and environmental changes in the IKN Nusantara area from 2003 to 2023. The findings show a notable increase in built-up areas, indicating urbanization and a decrease in agricultural land. The study discusses the implications for local populations and ecosystems, emphasizing the need for inclusive governance, community participation, and conflict resolution. It also proposes a comprehensive policy framework that promotes sustainable land management, recognizes Indigenous and local rights, and fosters inclusive economic growth to respect Indonesia's rich environmental and cultural heritage.

Keywords: IKN Nusantara; urbanization; land use transition



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1. Introduction

Capital cities as planned cities are urban developments conceived and built according to specific designs and intentions rather than evolving organically over time. These cities often serve multiple purposes, such as distributing population more evenly across a country, fostering economic growth in underdeveloped areas, or making a political statement about a nation's future direction [1]. The construction of planned cities often entails considerable land transition, altering the physical and socio-economic landscapes of the regions in which they are located. For example, Brasília, Brazil's capital, was inaugurated in 1960 and was designed to spur economic development in Brazil's interior and alleviate population density along the coastline [2,3]. The city, master-planned by Lúcio Costa and architecturally designed by Oscar Niemeyer, symbolizes Brazil's modern aspirations with its airplane-like layout. Its construction transformed a sparse plateau through extensive deforestation and soil stabilization, laying down a new infrastructure network from scratch. This process mirrors broader impacts often associated with creating planned cities and capital relocations, such as environmental alterations—from local ecosystem disruptions to wildlife displacement—and social changes, including the migration of workers and new community formations [4]. Other examples include Kazakhstan moving its capital from Almaty to Astana (now Nur-Sultan), Myanmar shifting from Yangon to Naypyidaw, and Nigeria transitioning from Lagos to Abuja, highlighting the significant territorial and infrastructure developments involved in such projects. These moves entail land clearing, new infrastructure, and profound ecological and socio-economic challenges. Developing

these new capitals often results in habitat destruction, biodiversity changes, and increased local resource demands, which can marginalize original inhabitants [5–7].

The relocation of Indonesia's capital to IKN (Ibu Kota Negara) Nusantara represents a monumental initiative undertaken by the Indonesian government to transfer the governmental center from Jakarta to East Kalimantan. This project was initiated in response to various challenges faced by Jakarta, including extreme population density, pollution, and high risks of natural disasters. Moreover, this capital relocation is anticipated to facilitate a more equitable distribution of economic growth across Indonesia, reducing regional disparities and stimulating infrastructure development and investment in the new area [8]. However, the transition to IKN Nusantara is full of challenges. One significant impact of this project is the extensive Land use transition near the new IKN location. Lands previously utilized for agriculture, conservation, or as natural habitats will transform the construction of infrastructure, residential zones, and government facilities. Such changes will inevitably affect various aspects, including the socio-economic conditions of the local communities, the availability of natural resources, and the ecological balance, necessitating meticulous planning and management to avert negative impacts. The relocation of the capital to IKN Nusantara and the accompanying Land use transitions engender the potential for multidimensional conflicts. Conflicts may arise from various aspects, such as local community objections to land acquisition, concerns over environmental degradation, and competition over resources. To address these potential conflicts, an inclusive and sustainable approach that considers the interests of all stakeholders is required. The capital relocation must be implemented with a long-term vision that focuses on physical development, social development, and environmental conservation [9].

Land use transition is a critical aspect in the development process of the Nusantara Capital City Area (IKN), involving a significant transition from the original use of land, predominantly forests, and agricultural fields, to urban infrastructure such as government buildings, residential complexes, and various other support facilities. This transition not only alters the landscape and physical structure of the area but also has widespread impacts on the local setting's social, economic, and environmental aspects. The conversion of land serves as a crucial step in establishing the physical foundation of the new IKN, which is intended to support governmental functions and the social life of its community. Within the context of IKN Nusantara, this change in land use is expected to drive economic growth and infrastructure development in East Kalimantan while alleviating the burden on Jakarta as the country's administrative center. However, converting from natural and agricultural areas to urban zones requires careful planning and a sensitive approach to local issues. This is essential to minimize negative impacts, such as loss of natural habitats, reduced agricultural areas that could affect local food security, and disruption to local hydrological systems. Therefore, an integrated approach involving relevant stakeholders, including local communities, government, and the private sector, is crucial [10,11]. The Land use transition process also discusses how sustainable development can be integrated into large-scale projects such as the IKN development. This includes the application of environmentally friendly design principles, biodiversity conservation, and responsible management of natural and social resources. Awareness of the importance of maintaining a balance between development and conservation is critical to ensuring that land use transition meets current needs and considers environmental sustainability and the well-being of future generations. Through a thoughtful and collaborative approach, Land use transition in IKN Nusantara can serve as a model for sustainable and inclusive new city development.

Land use transitions in the vicinity of the IKN Nusantara area have precipitated significant social conflicts, directly impacting the lives of the local populace. The acquisition of land for development often entails disposing of local communities from lands that have been sources of livelihood, access to natural resources, and disconnection from ancestral cultural heritages. This loss engenders deep-seated grievances, sparking resistance against the government and investors. Such conflicts can escalate into broader social issues, disrupt-

ing development processes and leading to social instability if not managed with inclusive and equitable policies. Economic conflicts also emerge as a critical dimension of Land use transitions. Competition for resources and compensation perceived as inadequate by the local communities fosters feelings of injustice and marginalization. While the development of IKN is anticipated to bring prosperity, disparities in the distribution of benefits and employment opportunities often provoke tensions. There needs to be more transparency and community participation in the development process; these economic conflicts can obstruct sustainable and inclusive development objectives, creating divides between beneficiaries and those disadvantaged by the project. Environmental conflict represents another critical aspect arising from Land use transitions. The construction of infrastructure and new settlements in the IKN area threatens nature conservation and biodiversity, damaging ecosystem services that have supported the lives and livelihoods of communities. These conflicts stem from the dichotomy between the necessity for economic development and the imperative to preserve environmental sustainability. Without a balanced approach that prioritizes sustainable development and community involvement in natural resource management, environmental conflicts may complicate the achievement of development goals that are harmonious with nature. This necessitates a nuanced understanding and strategic management of the multi-faceted conflicts induced by land use transitions, ensuring that development initiatives like IKN Nusantara do not merely advance economic objectives but also address social equity and environmental stewardship [12–14].

This research explores the socio-economic and environmental implications of land use transitions in Indonesia's new capital, IKN Nusantara, driven by its relocation. It will address key questions, including the impact of such transitions on local land use patterns, the conflicts they precipitate, and the formulation of policy interventions to resolve these conflicts. Objectives include analyzing the shifts from natural and agricultural lands to urban infrastructures, identifying resultant socio-economic and environmental conflicts, and proposing inclusive and sustainable land management policies. The significance of this study lies in its potential to influence policy-making, ensuring equitable development and environmental conservation. By providing a nuanced understanding of the challenges and opportunities presented by the capital's relocation, this research aims to support the development of IKN Nusantara into a model of sustainable urban planning.

2. Literature Review

The evolution of national capitals across the globe reflects a dynamic interplay of politics, geography, history, culture, and ideology, shaped by both internal dynamics and external forces [15]. Historical events such as World Wars, decolonization, and the collapse of empires have often necessitated the establishment or redefinition of capitals. Architecture and urban planning are pivotal symbols of national aspirations, cultural heritage, and ethnic identities. A notable trend in the relocation of capitals is the move from colonial epicenters to locations that symbolize national unity and independence, distancing them from colonial legacies. This strategic decision reflects broader national development objectives influenced by domestic priorities and external advances in transportation and military technology, which have reduced the need for strategically positioned capitals. Modern examples such as Ankara, Brasília, Putrajaya, and Astana showcase this trend, where unique urban designs and architectural motifs embody national pride and identity, serving as tangible representations of nation-building efforts and cultural legacies [3,5,16]. In emerging countries, planning new cities is increasingly seen as a solution to various urban development challenges, such as overcrowding, resource management, and economic diversification. These new cities are often planned with a focus on sustainability, technological integration, and improved quality of life. For instance, cities like Sejong in South Korea and Diamniadio in Senegal are being developed to ease the pressure on overburdened capitals and to spark economic growth in less-developed regions [17]. However, the transition and transition of land for these new capitals and cities raises significant environmental and social issues. Developing new urban areas typically requires extensive land alteration, including deforestation

and landscape reshaping, which can lead to ecological disruptions, biodiversity loss, and wildlife displacement. Moreover, the social impacts of these developments are profound, involving the displacement of local populations and the inflow of new residents, which can strain local resources and lead to increased living costs, potentially marginalizing original inhabitants [18–22].

Land use is an intricate aspect of resource allocation that involves the equitable distribution of land resources among various functions, such as agriculture, housing, industry, and conservation, with the primary objective of maximizing benefits for humanity while minimizing negative impacts on the environment [23]. Many factors influence land use and management, including socioeconomics, technology, policy, environmental change, and demographics. These factors drive changes in land use patterns over time, leading to land conversion, urban expansion, and ecosystem restoration. Governments, the private sector, and local communities are responsible for making decisions that result in land use transitions, which are influenced by economic needs, government policies, climate change, and technological advances. These factors demonstrate complex interactions between human aspirations and natural resource limits. Therefore, an integrated and sustainable approach must address land use management's social, economic, and environmental aspects. This approach should protect ecologically sensitive areas, promote sustainable agricultural development, and improve urban land use efficiency to balance the development and preservation of natural resources and the environment [19].

Classic urbanization theories posited by scholars such as Burgess and Hoyt suggest that economic forces are primary motivators for urban sprawl and the concentric expansion of cities [24,25]. While rooted in Western industrial contexts, these models apply somewhat to Southeast Asia, where burgeoning urban centers expand into peri-urban and rural areas, driven by similar economic motivations. These Land use transitions involve transforming land from agricultural, forested, or other natural states into urban or industrial developments. This process is driven by economic growth, population pressures, and government policies geared toward modernization and economic diversification. Southeast Asian countries experience some of the fastest urbanization rates in the world, driven by internal migration and demographic changes [26]. Governments in the region often play a significant role in urban development through proactive policies. Developing new cities like IKN Nusantara in Indonesia represents a deliberate governmental effort to redistribute the population and stimulate economic growth in underdeveloped regions. Such projects are not only about creating new urban centers but also about strategic national planning that incorporates infrastructure development to support long-term economic strategies [8]. This high-speed urbanization comes with significant environmental and social impacts. Natural landscapes, particularly forests, and agricultural lands are being converted at an alarming rate to accommodate urban growth, leading to biodiversity loss, increased carbon emissions, and reduced agricultural productivity, which can threaten food security.

The impact of economic globalization and shrinking productive land on Land use transition has been a significant concern. Efforts to conserve forests and increase food production sometimes conflict with global needs for agricultural land. Identifying replacement, rebound, cascade, and remittance effects in the context of economic globalization highlights the need to view Land use transition as part of an open system that interacts with global scale factors, including international trade, technological progress, and migration [27]. Contemporary urbanization, characterized by the expansion of urban land involving the conversion of agricultural land into residential and industrial areas, has fundamentally changed the relationship between cities and the global environment. Innovative energy, transport, and infrastructure management approaches in urban areas that agglomerate population and economic activity can help reduce cities' carbon footprint and improve urban quality of life. Therefore, understanding land use dynamics is critical in planning future green and sustainable cities [28,29].

The interplay between socio-economic factors and environmental policies often drives land use transitions. This process involves transforming land from its natural or previous

anthropogenic condition into different uses such as agriculture, urban development, or commercial activities. This significantly leads to extensive socio-economic conflicts affecting communities, economies, and ecosystems. In Southeast Asia, especially in Indonesia—the largest country in the region in terms of population and land area—rapid economic and population growth has spiked demand for land [26,30,31]. This is evident in the contentious shift from forested lands to palm oil plantations, a significant export yet a cause for massive deforestation, biodiversity loss, and displacement of indigenous peoples, balancing the economic benefits against environmental and social sustainability [32,33]. Moreover, urban expansion in cities like Jakarta necessitates more housing and infrastructure but encroaches on natural and agricultural lands, exacerbating urban issues such as pollution and straining resources, often marginalizing poorer communities [34–36]. This urban sprawl and agricultural conversion illustrate the stark socio-economic disparities driven by an inequitable allocation of resources and economic power, where large entities leverage their influence detrimentally against smallholders and indigenous populations, leading to a spectrum of legal, political, and socio-economic conflicts [37,38].

Galtung [39] delineates conflict as an intrinsic aspect of social interaction, harboring the potential for positive development. The emphasis is on identifying the root causes and dynamics influencing conflicts, transforming conflict into constructive interaction through mediation and diplomacy, culminating in sustained peace and social justice. Conflict is perceived as a broad spectrum, necessitating a diverse array of resolution approaches, including the involvement of third parties in the mediation process [30,40,41]. Social and economic conflicts in Indonesia often stem from exclusive land management issues, inciting injustice against local communities due to agribusiness practices and infrastructure development without adequate compensation or relocation. Irresponsible natural resource exploration adds complexity to conflicts, damaging ecosystems and threatening environmental sustainability, as reflected in the expansion of palm oil plantations that provoke multidimensional conflicts among indigenous communities, corporations, and the government [32]. Economic crises and policy orientations favoring massive investments without considering the needs of local communities exacerbate the situation. Scott (1985) [42] reveals that social conflict can also arise from elite manipulation of land to the detriment of farmer groups, who often respond through forms of resistance, both actively and passively. The economic adaptations farmers undertake, such as livelihood diversification, serve as evidence of resistance against economic dominance by the elite. This situation highlights the importance of integrating social justice with environmental conservation to address conflicts.

Long [43] highlights the crucial role of conflicts and coordination in managing land use changes within regions, emphasizing the dynamic interplay between these mechanisms. Conflicts often arise due to competing demands and interests among land use types, such as agricultural areas, residential zones, industrial sectors, and ecological spaces. This is particularly true when urban expansion encroaches on farmland or natural habitats. These conflicts stem from the dominant morphologies of land use, which dictate how land is distributed and utilized across a region. These morphologies can create disparities in land allocation and tensions between environmental sustainability and economic development, leading to disputes. As urban areas expand, the pressure on land intensifies, and land use policies and priorities must be reassessed. In the case of the IKN Nusantara project, environmental conflict is a significant concern due to the area's rich biodiversity, including protected forests and conservation areas home to many endangered species. Urban expansion may put these natural habitats at risk of degradation or destruction. The model's conflict phase recognizes these risks as urban development interests clash with environmental conservation priorities. Socio-cultural conflict is also a critical aspect to consider in the project's development, as indigenous communities with deep cultural ties to the land call the area home. The relocation of entire communities and the consequent risk of losing their rich cultural heritage significantly trigger social unrest. This unrest often spirals into heated land disputes, particularly in the case of major development initiatives such as IKN

Nusantara, where multiple stakeholders assert their ownership or rights to use the same land parcels.

Over the last decade, Land use transitions in East Kalimantan have varied greatly, with deforestation rates initially at approximately 383,394 km², peaking at 1086.82 km², and then decreasing to 137,588 km² by 2021–2022, likely reflecting the success of conservation efforts and environmental protections. The construction of IKN in this area underscores the need for sustainable practices due to its significant potential environmental impacts, highlighted by the recent deforestation trends and the necessity for careful land management [44,45]. The selection of IKN's location is strategic for spurring economic growth outside Java and shifting Indonesia's geographic focus. However, careful consideration of Kalimantan's environmental importance is also required, as the area is crucial for biodiversity and carbon sequestration. Ensuring sustainability in regional planning and involving local communities is essential to mitigate social tensions between newcomers and indigenous peoples [46]. The increase in deforestation in North Penajam Paser Regency, the site of IKN Nusantara, underscores the need for development that harmonizes economic ambitions with environmental preservation and biodiversity. Development strategies should integrate economic expansion with ecological stewardship, including sustainable forestry, land rehabilitation, and responsible agroforestry while respecting local social and cultural norms to foster a culturally rich and developed urban environment.

Extensive Land use transition can precipitate social and economic conflicts rooted in inequitable resource distribution and irresponsible environmental management. The redirection of land for agribusiness or infrastructure development often overlooks the rights and needs of local communities, leading to injustices and conflicts between indigenous populations, corporations, and governments [47]. A pertinent example of the critical need for sustainable development practices and responsible land management is observed in East Kalimantan. This region has experienced rampant deforestation and is a critical case study. Data from Global Forest Watch indicates that East Kalimantan lost approximately 1.2 million hectares of humid primary forest between 2002 and 2020, representing a significant portion of its total forest cover. This deforestation is primarily driven by logging and the expansion of palm oil plantations, which severely undermine local biodiversity and contribute to greenhouse gas emissions [33,48]. The development of the IKN Nusantara, a new capital city, is poised to transform an additional vast area of East Kalimantan. While promising economic growth and better infrastructure, this project poses potential risks to the surrounding environment and local communities if not managed sustainably. It underscores the importance of adopting sustainable development practices and responsible land management strategies.

3. Methods

This research employs a case study methodology focusing on an in-depth understanding of contemporary phenomena within their natural contexts to address the complexities of Land use transition and its implications following the capital relocation to the IKN Nusantara area [49]. This research seeks to uncover unknown dynamics, explore existing and potential conflicts, and offer policy planning and implementation insights by employing exploratory case studies. Through comprehensive qualitative and quantitative data collection efforts, the study incorporates secondary data, which consists of primary legal materials in the form of relevant legislation and secondary legal materials, including books, scholarly papers, and expert doctrines. This research evaluates the impact of Land use transitions on local communities, identifies key stakeholders, and assesses policy contributions to conflicts.

3.1. Qualitative Analysis

This research utilizes a qualitative socio-economic data analysis approach to gather pertinent documents; a thorough examination of more than 250 documents consisting of government plans, academic research, official statistics, and media reports, which are then

aggregated based on relevant themes to extract valuable insights. The document analysis will focus on a representative sample of local stakeholders, including residents, farmers, and officials, who are affected by the changes in land use. This analysis will involve a deep exploration of the phenomenon of land change, with a multidimensional conflict approach and cross-case comparisons to identify broader themes and variations across different cases in other places and between conflicts around IKN. This case study offers detailed insights into how various community members perceive and are impacted by urbanization and land transition, ultimately effectively informing policy-making, conflict resolution, and community engagement.

3.2. Data Sets

The dataset was obtained from the district's Landsat TM and OLI satellite imagery, covering 2004, 2014, and 2024, accessed on 16 February 2024 through the USGS Earth Explorer (<https://earthexplorer.usgs.gov/>). When acquiring the imagery, the authors considered the influence of solar azimuth, seasonality, and cloud cover. Image processing, spatial analysis, and GIS map creation were conducted using ArcGIS 10.3 software. The resulting maps underwent thorough examination and analysis to study urban growth changes. Table 1 below shows details of the two data sets used, including acquisition dates, image formats, cell sizes, and projections used.

Table 1. Utilized Landsat satellite imageries.

Acquisition Date	Image Format	Cell Size	Projection
27 July 2003	7 ETM+	30	WGS-1984-UTM-Zone-50S
8 August 2023	8–9 OLI TIRS	30	WGS-1984-UTM-Zone-50S

IKN Nusantara is situated in the East Kalimantan province. The site is divided into several areas. As seen in Figure 1, this area is divided into several zones with different functions, including core areas, economic areas, entertainment centers, research and education centers, and administrative centers.

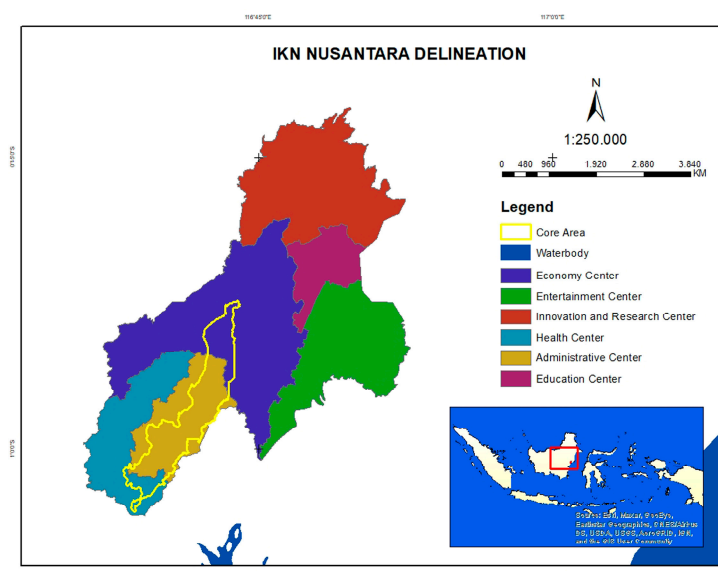


Figure 1. IKN (Ibu Kota Negara) Nusantara delineation.

This figure provides a clear visualization of the new city's governance structure, situated within the geographical context of Indonesia, as shown in the map inset in the bottom right corner. These details are important for understanding how various urban functions will be integrated in long-term development plans.

3.3. Image Processing

The main goal of the image processing was to precisely determine the land use land cover in the study area for the years 2003 and 2023. The images, taken on different dates, showed minimal geometric differences. As a result, additional modifications to the dataset were required, and all images were projected onto the WGS 1984 UTM Zone 50S to remove image distortions. These images underwent a series of primary adjustments and corrections, including georeferencing, band composition, and cropping of areas of interest.

3.4. Land Use and Land Cover Classification

Land cover encompasses the diverse surface elements of the earth, such as vegetation, cultivated lands, and aquatic environments. By examining the transition in land cover, we can gain insight into how the natural terrain has been modified over time to accommodate the growth of residential and commercial zones in a particular region [50,51]. The typical impact of urbanization on land use patterns is the acceleration of human-made land or built-up areas and the reduction of natural lands such as vegetation cover, wetlands, and waterbodies. Land Use and Land Cover (LULC) classification here is conducted to provide a visualization of the patterns of LULC changes for the years 2003, and 2023. The Iso Cluster method, an unsupervised classification technique, was utilized in this study to evaluate changes in land use over time. Its effectiveness in detecting patterns of land use alteration through automatic classification of satellite imagery data into distinct clusters based on statistical variations in pixel values has been demonstrated without prior knowledge of categories. This approach enables identifying and quantifying shifts in land use patterns, providing a comprehensive overview of how land utilization has evolved over specified periods [52,53]. This study used a classification system to categorize the images into five primary classes: wetland, farmland, vegetation, built-up/urban area, and waterbody. The built-up/urban area class was then utilized to investigate the spatial patterns of urban expansion from 2003 to 2023. This approach enabled a better understanding of the growth and changes in land transition over time.

4. Findings

4.1. Land Use Transition and Environmental Conflict

In 2003, before the establishment of IKN Nusantara, land use patterns were significantly influenced by the presence of natural vegetation, with a widespread vegetation cover extending to 1769.05 km² (Figure 2). This area encompassed tropical rainforests, lowland forests, production forests, and other green open spaces which serve as critical indicators of biodiversity and act as native habitats for various species of flora and fauna. Agricultural land covered an area of 569.56 km², playing a pivotal role in the local economy. This land served as a source of livelihood for the local population and supported food needs, both for domestic consumption and as part of agricultural commodity production. Additionally, wetlands were covering 290.52 km². Wetlands represent ecosystems rich in biodiversity and function as essential buffering systems, contributing to air quality regulation and flood mitigation and serving as breeding and development grounds for aquatic species. Bodies of water, encompassing 125.76 km², indicated the presence of rivers, lakes, or reservoirs vital in providing clean water, air transportation routes, and sources of fishing activities. Meanwhile, the developed land area occupied 86.63 km², indicating that 2003 infrastructure development and urban growth were limited. This may reflect a cautious approach to urbanization and infrastructure development, prioritizing the preservation of nature and sustainable land use.

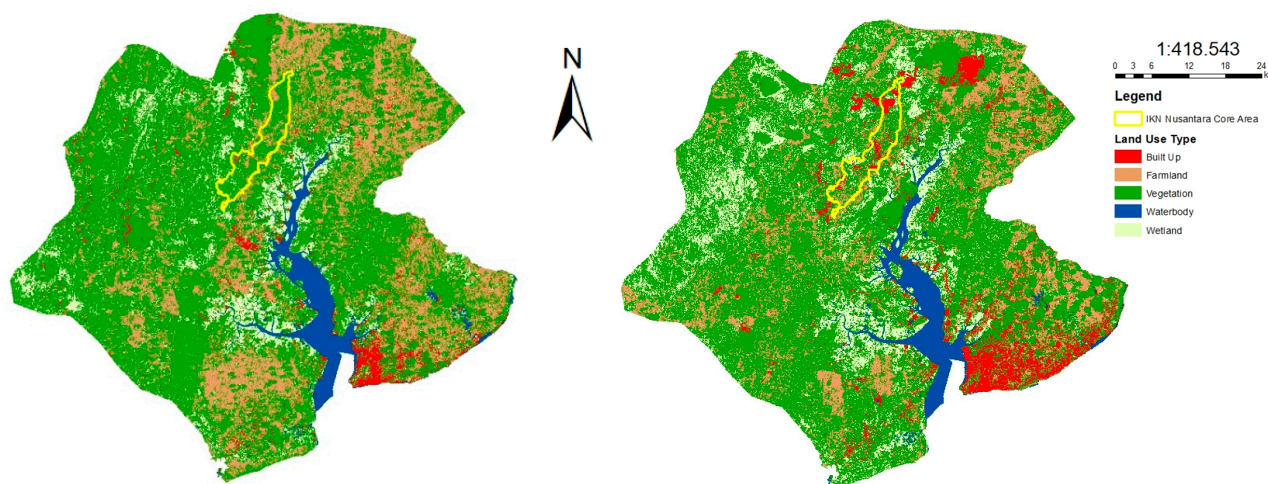


Figure 2. LULC in IKN Nusantara area 2003 and 2023.

In 2023, the utilization of land for vegetation purposes was recorded at approximately 1712.467 km², encompassing areas primarily consisting of forests or other green open spaces (Figure 2). Agricultural land covers an area of 436.105 km², indicating that the agricultural sector continues to contribute to the local economy. Wetlands spanned a significant area as well, totaling 396.500 km². This expanse suggests the presence of crucial ecosystems such as swamps, mangroves, or peatlands that are vital for air quality conservation and biodiversity and act as natural buffers against disasters like floods. Meanwhile, bodies of water covering an area of 125.038 km² represent areas with rivers, lakes, or reservoirs that play a critical role in providing clean water sources and serving as a means for transportation and recreation. Furthermore, the built-up area reached 171.354 km², illustrating the urbanization process.

The temporal analysis result reveals that the IKN (Ibu Kota Negara) area has undergone a significant transition in land use/land cover (LULC), depicting changes in land utilization that reflect a variety of ecological, economic, and social factors. The data presented indicates a complex shift in LULC patterns with broad implications for environmental governance and regional planning. From a hydrological perspective, there has been a marginal decrease in the area of water bodies from 125.76 km² in 2003 to 125.038 km² in 2023. This phenomenon can be attributed to anthropogenic interventions, such as urbanization, which reduces the land area through reclamation, or could also be due to natural hydrological shifts resulting in changes to the extent of water bodies. Vegetation, encompassing forests and other vegetative formations, has decreased, reflecting potential deforestation or land conversion to other uses such as agriculture or urban infrastructure. With a decrease from 1769.05 km² to 1712.467 km², this phenomenon indicates a potential loss of biodiversity and changes in carbon stock and ecosystem services.

Conversely, there has been a significant increase in the wetlands area from 290.52 km² to 396.500 km² (Figure 3). This increase could indicate successful efforts in wetland conservation, responses to changes in rainfall patterns, or ecological restoration initiatives promoting critical peatland rehydration. This change might also indicate shifts in freshwater ecosystem dynamics, positively impacting the conservation of aquatic species and microclimate regulation. Meanwhile, the built-up area reflects the most drastic growth with an expansion from 86.63 km² to 171.354 km², indicative of rapid urbanization. This growth represents a massive infrastructural investment, urban space expansion, and an increased demand for commercial organization and facilities, signifying a regional economic evolution towards urbanization as a primary driver of land change. Ultimately, the decrease in agricultural land from 569.56 km² to 436.105 km² may illustrate an economic transition from the agrarian sector to industry or services or the conversion of agricultural land to urban or vegetative uses triggered by

developmental pressures. This reduction could long-term impact local food security and the social structure of communities dependent on agriculture.

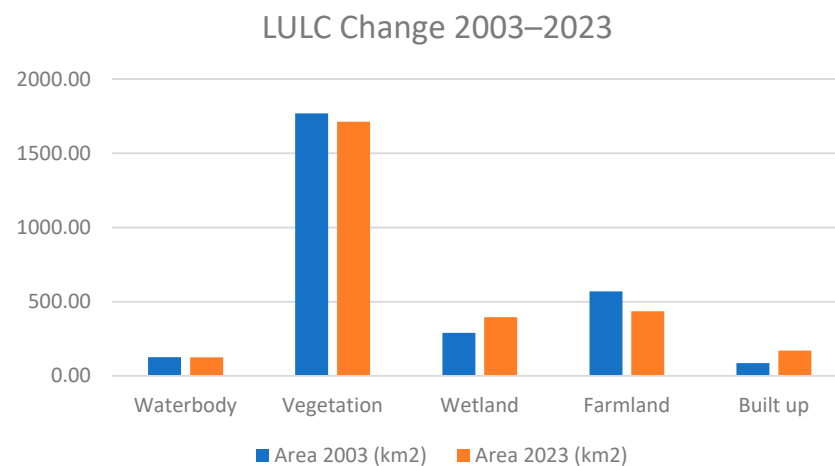


Figure 3. LULC change in IKN Nusantara area 2003–2023.

The findings show a significant change in land use in the IKN area from 2003 to 2023 as seen in Figure 4, explicitly shifting towards developed land use. The increase of 31.09 km² in developed land in areas previously categorized as built-up indicates a process of intensification and densification within an urban context. This suggests the expansion of existing zones, showcasing infrastructure development and population growth within defined urban boundaries. The change from farmland to built-up, covering 37.80 km², represents a notable transition from agricultural land to developed land use. This shift reflects socio-economic conditions where agricultural lands may be sacrificed to support urban expansion or infrastructure development. The loss of agricultural land could significantly impact local food production and farming practices.

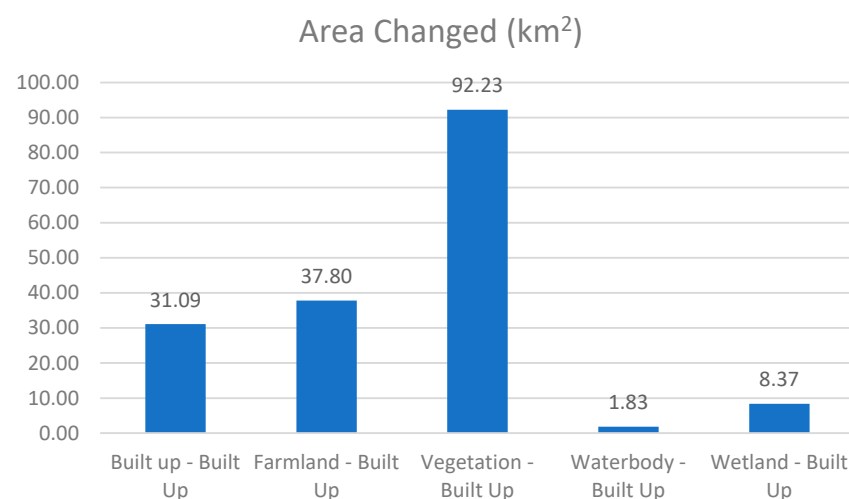


Figure 4. Area changed in IKN Nusantara area 2003–2023.

The most substantial change observed is the conversion of vegetation to built-up, amounting to 92.23 km². This represents a substantial land conservation with vegetation cover to developed land use, which can be associated with deforestation for urban or industrial development. This transition has profound ecological consequences, including reducing ecosystem services, carbon stock, and wildlife habitat. The change from 'waterbody' to built-up is minimal, covering only 1.83 km². Despite its small scale, this change

raises concerns regarding water resource extinction and management, considering that converting water bodies to developed land could affect the quality and quantity of available water resources. Lastly, the transition from ‘wetland’ to built-up, covering 8.37 km², is also noteworthy. Wetlands are crucial ecosystems, providing essential ecological functions such as flood mitigation, pollutant filtration, and biodiversity maintenance. This conversion may indicate developmental pressure on wetlands and raise concerns over the loss of ecological functions they provide.

The cumulative transition of land into built-up areas amounts to 171.33 km², which reflects a predominant trend in the developmental dynamics of the IKN area throughout the evaluated period. Further research is imperative to fully comprehend the ramifications of this transition, which encompasses environmental, economic, and societal impacts. The dramatic alteration of land underscores the necessity for a sustainable development approach that harmonizes growth with conserving natural resources and ecosystems.

The land transition within the IKN Nusantara area is characterized by a significant reconfiguration in land allocation, heralding a new era replete with socio-economic and environmental meanings and challenges. The visible shift on a grand scale from traditional agrarian sectors to urban infrastructure could disrupt Indigenous social systems and local economies, which have historically relied on natural resources and agriculture as the cornerstone of community life. The reduction of agricultural land poses risks to food security and cultural identity, while deforestation due to urban expansion threatens the critical functions of forests as providers of ecosystem services, such as carbon sequestration and climate regulation. Conversely, the loss of wetlands threatens extreme climate events, diminishes biodiversity, and weakens the natural air filtration capacity, potentially culminating in conflicts over water resource usage. This transition also risks engendering tensions among community groups due to the uneven distribution of developmental benefits and borne losses. The diminishing green spaces and water areas jeopardize the quality of life and public health, escalating pollution and reducing access to clean natural resources.

Further, Indonesia’s urbanization has grown significantly, with the urban population increasing from 22.3% in 1980 to 55% in 2013. This is particularly notable in Java, where urban residents constitute 70% of the population compared to 26% in non-Java areas. This surge, propelled by migration and administrative changes, has bolstered cities like Jakarta, Bandung, and Surabaya in population density and economic prominence despite a slowing population growth rate from 2.34% annually during 1970–1980 to 1.37% between 1990–1994. This urban growth, however, comes with environmental costs, as seen in declining Environmental Quality Index (EQI) values due to industrial and vehicular pollution, underscoring the urgency for sustainable urban development [54,55]. Additionally, research by Olivia et al. [56] shows that urban areas are expanding at a rate of 2.0% annually, mainly at the expense of non-agricultural lands, which somewhat alleviates concerns about urbanization encroaching on farmland. Nevertheless, relocating the capital to East Kalimantan presents a direct challenge to environmental sustainability, with significant losses in carbon storage and natural habitats. The scenario calls for a thoughtful approach to urban planning that balances growth with environmental protection, particularly emphasizing the need for initiatives to prevent deforestation and wetland destruction and ensure biodiversity conservation amidst urban expansion.

Primary forest cover is lost in Penajam Paser Utara, East Kalimantan, Indonesia. Between 2001 and 2022, the region experienced a drastic reduction of primary forest from 591,000 hectares—over 98% of its land area—to just 103,000 hectares. This represents a stark decrease in forest area and translates into substantial CO₂ emissions, amounting to 27,000 kT, as forests act as carbon sinks. Figure 5 (<https://www.globalforestwatch.org> accessed on 24 February 2024) details the year-on-year decline of primary forests in Indonesia, highlighting a continuous trend that has substantial implications for biodiversity, climate change mitigation, and the livelihoods of local communities dependent on forest ecosystems.

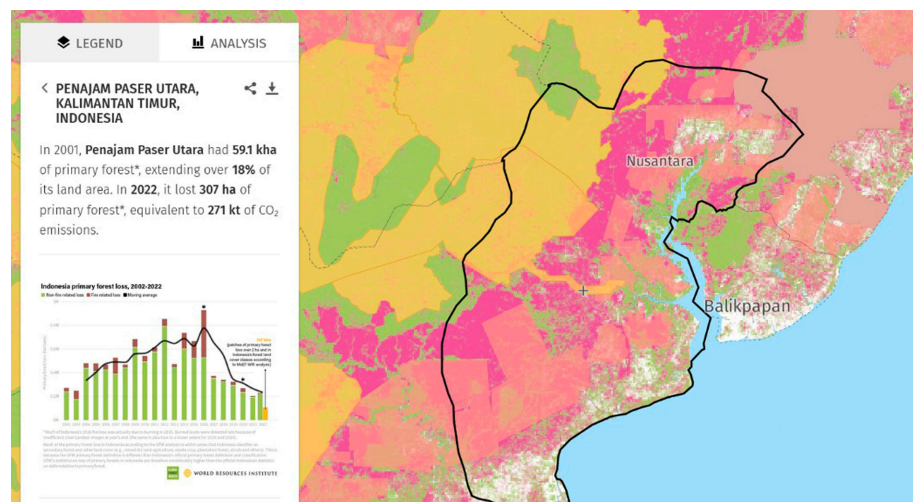


Figure 5. Deforestation in IKN area.

Recent data on deforestation in Indonesia, with a particular emphasis on East Kalimantan and the national total from 2013 to 2022 (Figure 6), reveals informative trends relevant to conservation efforts and natural resource management within the country. East Kalimantan, a province renowned for its extensive tropical rainforests, has experienced fluctuations in deforestation rates over the past decade. In 2013–2014, deforestation in this province was recorded at 383.394 km², significantly increasing to 1009.308 km² in 2014–2015, and peaking in 2015–2016 at 1086.82 km². Following this increase, a downward trend in deforestation was observed in East Kalimantan, with deforestation rates decreasing to 949.818 km² in 2016–2017 and continuing to decline to 137.588 km² in 2021–2022. This decline may reflect the impact of forest conservation policy implementation, enhanced environmental protection efforts, and growing awareness of the importance of forest maintenance for ecological and social sustainability. On a national scale, Indonesia exhibited a similar pattern, with total deforestation reaching its zenith in 2014–2015 at 21,843.630 km² before decreasing. National deforestation figures have gradually reduced year after year, indicating progress in forest management and conservation efforts across Indonesia. The reduction in deforestation in East Kalimantan and nationally signifies a positive step towards more sustainable natural resource management. Nevertheless, it still requires the sustained commitment of all stakeholders to maintain this positive trend [44].



Figure 6. Indonesia's deforestation 2013–2022.

The analysis result reveals a trend of growth in the agriculture, forestry, and fisheries sectors in Pontianak and North Penajam Paser, allowing for several conclusions regarding the potential impact on land use and deforestation around the new capital area (IKN), including Balikpapan and PPU. Consistent growth in these sectors, mainly driven by the increased demand for agricultural and forestry products, could lead to expanding agricultural and forestry lands. In areas experiencing economic growth, such as around the IKN, this may result in the conversion of forest land into agricultural or plantation lands. This increase could also stem from more significant investment in agricultural and forestry technologies, necessitating new land clearing. Without sustainable practices and proper forest management, growth in these sectors could accelerate deforestation. Excessive logging to meet market demands or expanding agricultural areas could reduce forest cover. This often occurs when economic growth is not aligned with solid environmental policies or when land use and forest management enforcement is lacking.

As indicated in Figure 7, the areas near the new capital in Pontianak and Penajam Paser Utara, the growth in the agriculture and forestry sectors carries significant implications for land use. It could engender environmental conflicts in the surrounding areas of Balikpapan and PPU. Expanding these sectors heightens pressures for converting forest lands into agricultural or plantation areas. This land use change not only diminishes primary and secondary forest coverage, which serves crucial carbon sequestration and biodiversity habitat functions, but may instigate conflicts between economic growth interests and environmental conservation. Furthermore, a land conversion often disproportionately benefits large capital owners, negatively impacting local communities and Indigenous peoples reliant on forests for their livelihoods. This scenario exacerbates social inequalities and fosters tensions between agroforestry corporations and local populations. Unchecked agricultural expansion risks soil degradation, loss of fertility, and erosion issues, leading to a decline in overall environmental quality. Unsustainable land management practices near the new capital may introduce complex environmental issues, such as hydrological alteration affecting river systems and groundwater, impacting human water use and aquatic ecosystems. Additionally, such changes may increase carbon emissions due to forest reduction, contravening global and national efforts to mitigate climate change.

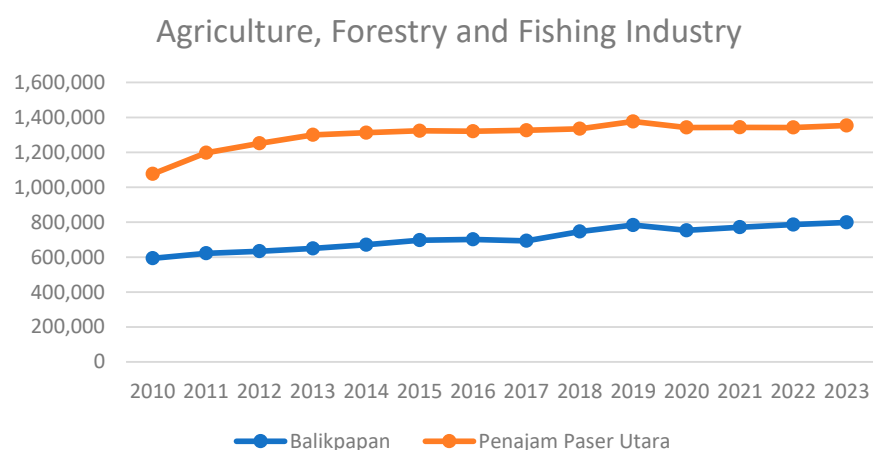


Figure 7. Agriculture, forestry, and fishing industry in IKN area.

Another significant concern is the pressure on the native ecosystems surrounding the new capital area. This area is home to 34 critically endangered species, 105 endangered species, and 301 vulnerable species, highlighting a substantial portion of biodiversity at high risk of extinction [57]. The presence of these threatened and vulnerable species underscores the urgent need for conservation and habitat protection efforts around IKN, including in Balikpapan and Penajam Paser Utara. Ecosystem conflicts in areas like IKN arise from development pressures and economic growth against natural habitats. With species listed

by the IUCN ranging from critically endangered to vulnerable, this area faces significant challenges in balancing human economic needs with biodiversity sustainability. Species such as the proboscis monkey, sun bear, and pangolin, all requiring preserved environments to survive, could be adversely affected by uncontrolled infrastructure development and agricultural expansion. Land-use changes leading to deforestation, habitat fragmentation, and pollution could diminish the quality and quantity of available habitats for flora and fauna, indirectly reducing threatened species populations and accelerating extinction. Particularly in the context of IKN, there is a risk that rapid, unplanned development without adequate ecological planning could exacerbate the situation. The conflict between economic interests and environmental conservation sharpens in high-biodiversity areas like this. Resource extraction activities, construction, and agricultural or plantation development are often seen as economic drivers, yet the long-term consequences of ecosystem degradation demand serious consideration. Such losses impact biodiversity and crucial ecosystem services vital for human welfare, including water filtration, carbon absorption, and erosion control [58,59].

4.2. Socio-Cultural Conflict

Population Exodus to the New Capital and Local Indigenous Communities Displacement.

Urban development, driven by population growth and economic expansion, often leads to the displacement of local indigenous communities, undermining their social cohesion and cultural traditions [60]. Gentrification and the commercialization of cultural sites further exacerbate this issue by erasing indigenous identities and disrupting traditional communal bonds. The consumption of green spaces and the relentless urban spread, facilitated by affordable transportation, disconnect indigenous populations from their natural environments, essential to their cultural and spiritual practices [61,62]. This urban expansion challenges traditional urban planning and necessitates a balanced approach that respects indigenous rights and heritage, ensuring that modern urbanization strategies do not marginalize these communities or sever their connection to ancestral lands [63].

Another concern arising from this exodus is the displacement of local communities, particularly indigenous and marginalized groups. The project will likely require the acquisition of large amounts of land, which could result in the forced displacement of local communities from their homes and ancestral lands [43,62]. This forced displacement could have broad social impacts, including the loss of livelihoods, disruption of social networks, and erosion of cultural practices and traditions. The displacement will disproportionately impact marginalized groups, who may already be marginalized in decision-making processes. Therefore, it is crucial to ensure that these communities are adequately consulted and that their rights and interests are protected in the development process. Another potential social impact of the new capital city project is the change in cultural practices and social dynamics. The construction of the capital could bring significant changes to the area, including changes in economic and social structures, cultural practices, and traditions [46,64]. Mass migration can disrupt social networks as individuals grapple with making new connections and acclimating to unfamiliar environments. The arrival of new residents can impact the customs and culture of surrounding communities. As more people flock to the new capital, cultures and habits will be blended, which could have either positive or negative consequences. Sharing ideas and traditions may foster a more diverse and inclusive society [65]. However, newcomers may need to familiarize themselves with local norms and conventions, which could lead to misunderstandings and tensions between different groups, exacerbating social rifts. Additionally, the influx of new residents may intensify competition for jobs, housing, and other resources, potentially leading to an uptick in crime and other social issues. As some individuals resort to illegal means to satisfy their basic needs, societal unrest and crime rates could increase [46].

In Brazil, urban expansion, especially the shift from tobacco farming to urban development, has dramatically reshaped socio-cultural dynamics, altering the fabric of community

life and cultural identity, particularly in places like Arapiraca. This transition from an agrarian to an urban society has disrupted traditional living methods as people migrate to cities for better opportunities, thus changing community ties and cultural interactions. The rapid urbanization process, fueled by government initiatives, has increased population density and housing issues and led to environmental degradation and heightened social inequalities. This urban growth presents a dual-edged sword of opportunities and socio-environmental challenges, underscoring the importance of inclusive urban planning that addresses the diverse impacts on residents' socio-cultural lives [38,66]. The encroachment of urban areas into traditional agricultural lands disrupts communities' socio-economic and cultural fabric, as Atanur [67] notes, with a significant loss of cultural heritage linked to rural customs. Urbanization's effect on population dynamics and social interactions calls for urban designs that preserve cultural landscapes amidst rapid changes. Aziz et al. [68] highlight the psychological and lifestyle changes due to urbanization, affecting social dynamics and individual well-being. The push towards urbanization also threatens indigenous peoples' cultural and spiritual heritage by disconnecting them from their ancestral lands, leading to economic marginalization and a dilution of cultural identities and community cohesion, as observed by Ashifa [69] and Debele [70]. This necessitates urban planning that safeguards cultural heritage and supports the socio-cultural existence amidst the complexities of urban expansion [71].

The relocation of Indonesia's capital city holds significant potential to generate social and economic conflicts if not adequately managed. This massive exodus involves communities accustomed to Jakarta's living standards, which could lead to imbalances in East Kalimantan. These imbalances are already present and could be exacerbated by the relocation plans. Social conflicts may arise from interactions among diverse, multicultural groups with differences in physical appearance, knowledge, customs, and beliefs [72]. In Indonesia, conflicts arising from cultural differences often become destructive, resulting in clashes among ethnic, religious, racial, or other groups, as seen in the conflicts in West and Central Kalimantan. The tendency to view one's own culture as central and superior can exacerbate these tensions, where the "Us vs Them" phenomenon creates feelings of threat and hostility between groups, even without objective or rational reasons, potentially sparking damaging ethnic conflicts [73,74]. Structurally, only sometimes harmonious inter-ethnic relations can lead to conflicts due to cultural differences. Tensions between migrants and indigenous people, such as between the Dayak and Madura tribes, are often latent and can escalate into open conflicts if not carefully resolved. Besides ethnic conflicts, the capital relocation may also threaten the continuity of local cultures, such as Long Houses, sacred sites, and traditional cultural activities that are not yet fully developed or integrated into the new capital's development plans [9].

Since the designation of Nusantara as Indonesia's new capital city, there has been a significant migration phenomenon (Figure 8) to the surrounding areas, particularly North Penajam Paser and Balikpapan [75]. This migration flow reflects a demographic transition driven by various factors, including improved economic prospects, increased employment opportunities, and infrastructure development associated with the construction of the new capital. The populations in both areas have shown substantial increases, with Balikpapan experiencing an addition of 146,032 individuals and North Penajam Paser increasing by 48,975. The significant migration to areas around Nusantara, especially North Penajam Paser and Balikpapan, has profound implications for the socio-cultural dynamics of these areas. The rapid influx of a large population can pressure local resources, which often need to be prepared for the new wave of inhabitants. Such tension may arise from competition for jobs, land, housing, and limited access to public services. Indigenous populations may feel displaced due to rapid changes in their living areas' economic and social structures.

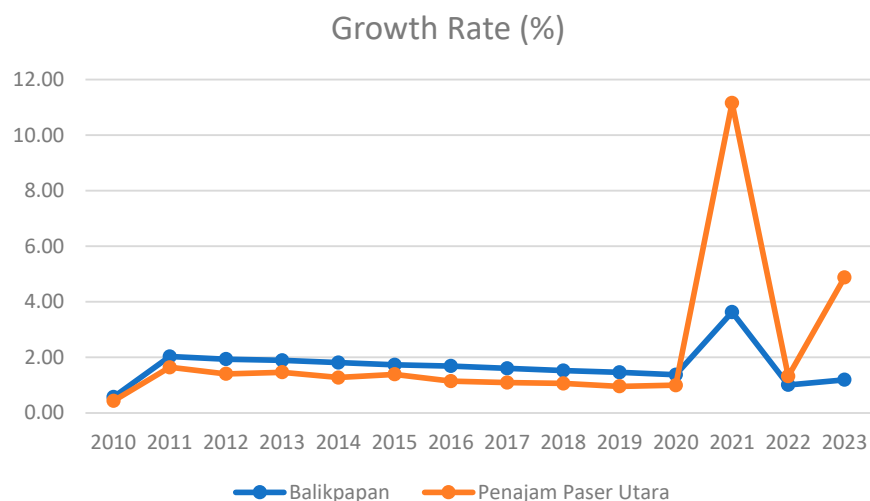


Figure 8. Population growth rate in IKN area.

Culturally, an increased population from diverse backgrounds can precipitate conflicts or friction among different values, customs, and traditions. Newcomers introduce distinct habits, values, and lifestyles, which, if not judiciously managed, can lead to social disharmony [76,77]. For instance, misunderstandings or clashes over space and resource use or disagreements on land management and development may arise. Such tensions can be exacerbated by socio-economic disparities between old and new residents, with indigenous populations potentially feeling displaced from their land and economic opportunities by more resourceful and skilled newcomers. Additionally, a growing population may accentuate imbalances in wealth distribution, access to education, and healthcare services, fostering social dissatisfaction and eroding community cohesion [78,79].

Community concerns regarding the relocation of the national capital to North Penajam Paser in East Kalimantan encompass several critical aspects, including the potential marginalization of local populations, loss of local identity and culture, and impacts on land and livelihoods. These concerns reflect fears of rapid changes and pressures that could erode cultural values and traditions due to modernization. The Bappenas report acknowledges the vulnerability of indigenous communities to swift changes, such as the relocation of capital cities. To address this, it is recommended that economic livelihoods based on forests and natural resources be maintained, ensuring the preservation of community identities and livelihoods and their welfare. On the other hand, positive sentiments have been expressed by the community and traditional leaders in North Penajam Paser, indicating their readiness to face the capital relocation, including anticipating the arrival of new human resources with diverse cultures. This demonstrates the adaptability and openness of the North Penajam Paser community to other cultures, evidenced by the hosting of various cultural events that integrate multiple cultures without erasing their indigenous culture. However, concerns also exist regarding competition and the impact of capital relocation on education. Local communities fear being left behind, particularly as education in East Kalimantan is perceived to be less competitive than Jakarta's educational quality [9].

Relating Indonesia's capital to North Penajam Paser necessitates a sophisticated and holistic approach that conserves indigenous cultures and meets contemporary developmental imperatives. The educational infrastructure in East Kalimantan currently needs to catch up to Jakarta's standards, underscoring the urgent need for substantial investment. With over \$500 million earmarked for enhancing educational facilities, teacher training, and curricular updates, these efforts significantly elevate local educational standards, boosting literacy rates from 85% to 95% over the next ten years [80]. Moreover, economic development strategies are designed to be congruent with cultural preservation, ensuring a sustainable economic foundation that respects local heritage. Promoting eco-tourism,

expected to generate about \$200 million annually and create over 3000 jobs, capitalizes on East Kalimantan's rich biodiversity and scenic beauty in a culturally and environmentally sustainable manner. Additionally, establishing cultural preservation programs and community centers is pivotal; these would safeguard indigenous traditions and serve as community hubs that involve local populations in the capital's relocation process. An allocation of \$50 million over five years to these centers highlights a commitment to inclusive development and local engagement [81,82]. To ensure that the new capital city's growth strategy maximizes social benefits while minimizing environmental harm, it is crucial to integrate economic development and cultural preservation. The plan involves investing \$300 million in green infrastructure to address the negative impacts of rapid urbanization and reduce carbon emissions by 40% by 2040 [81,83,84]. Social equity is a significant factor, and policies will be implemented to prevent displacement without adequate compensation and ensure that local labor forces and businesses benefit from development projects. The government will provide roughly \$150 million in aid to assist about 10,000 households. Local communities will have a say in decision-making to maintain strong governance structures, and legal frameworks will be established to protect land rights. The government will allocate \$20 million each year for legal reforms. To monitor and adapt to the effects of relocation, \$30 million will be invested in research and data collection over five years. Additionally, \$10 million will be set aside for public awareness and education campaigns in the first year to engage over 500,000 residents in the transition process and promote sustainable development [83,85,86].

4.3. Land Disputes

Land tenure conflicts in Indonesia stem from the historical evolution of land rights, transitioning from pre-colonial distributions based on loyalty to the colonial imposition of formal land tenure systems for taxation and labor. The 1870 Agrarian Law and the 1960 Basic Agrarian Law introduced significant changes, including state ownership of unoccupied land and recognition of communal rights, but also allowed land revocation for public interest, often leading to disputes over compensation and land use [87,88]. Modern land tenure conflicts are fueled by land commercialization driven by tourism, agriculture, and urban development, increasing land value and leading to speculative practices. Traditional landholders face challenges from the government and private projects, often needing adequate compensation or legal support. Numerous laws and regulations exacerbate the complexity of these conflicts, making landholder registration and certification difficult and leaving them vulnerable to dispossession [89,90]. Resolving these conflicts requires balancing traditional land rights with development goals and ensuring equitable and transparent legal frameworks that respect historical land tenure systems while supporting Indonesia's growth [91].

The land holds fundamental value as a foundation for human habitation, a source of vital resources, and a key element in global ecological systems, playing a significant role in shaping cultural identities and social structures [92,93]. Rapid urbanization threatens these socio-cultural and ecological equilibriums by igniting land use and distribution conflicts. Modern political theories often neglect the complex interplay between land's universal necessity and its role in forming distinct community identities and ecological sustainability. A holistic approach to territorial rights, recognizing land's multifaceted importance, is crucial for ensuring equitable access and preserving cultural and ecological diversity [29,94,95]. Research by Pratomo et al. [96] and Alamneh et al. [97] underscores the socio-economic challenges urbanization poses, particularly the undermining of property rights and economic stability in peri-urban areas and the adverse impacts on peri-urban farmers in Ethiopia. These insights call for urban policies that consider the socio-economic effects of land expropriation and aim for a balanced urban expansion that safeguards agricultural lands and food security. Further, studies from China and Ethiopia by Weldearegay et al. [98] and Gashu & Bahir [99] highlight the exacerbation of poverty and social dispari-

ties following urban expansion, emphasizing the need for urban planning that addresses the challenges posed by rapid growth and informal settlements.

Setyo Prihatin et al. [13] and Ilyas & Hamzah [100] shed light on the complexities of land ownership conflicts in Indonesia, emphasizing the interaction of legal, socio-economic, and political elements in these disputes. The situation is further complicated by conflicts between local communities, businesses, and government bodies, necessitating multifaceted strategies to navigate land governance challenges. Hariri et al. [101] study in Pakel Village illustrates the tension between historical community land rights and corporate ambitions, highlighting the need for legal systems that protect communal lands, promote transparent land use, and balance economic, social, and environmental interests. The negative impacts of displacing communities, such as income loss, poverty, and environmental harm, stress the importance of holistic urban planning and policies prioritizing vulnerable groups' well-being, ecological preservation, and sustainable growth. Addressing the complexity of land disputes, marked by competing claims and vague legal standards, requires transparent, fair conflict resolution methods that integrate community rights with development and corporate needs, aiming for a harmonious blend of economic advancement, social equity, environmental care, and cultural integrity amidst rapid urban expansion.

The development process of Indonesia's new capital city is a significant initiative that necessitates the active participation of the community in monitoring its execution. The project, spanning an area of 256 hectares in East Kalimantan, is anticipated to impact the land sector substantially. It requires a meticulous land acquisition process involving state-controlled lands and privately owned territories, underscoring the urgent need for a rigorous land acquisition framework. The construction in East Kalimantan, designated as a National Strategic Project, aims to expedite the realization of the capital city. The government must conduct land acquisitions based on valid land status data, ensuring fair and appropriate compensation. With nearly half of the land earmarked for development owned by the community, attention to potential agrarian conflicts during the acquisition process is crucial. The situation in Penajam Paser Utara and Kutai Kartanegara, identified by the Agrarian Reform Consortium as potential conflict hotspots, illustrates that large-scale infrastructure developments in Indonesia have historically led to conflicts. The instances of agrarian conflicts, often triggered by national strategic projects, highlight the importance of thoroughly evaluating how land acquisitions could lead to conflicts if not correctly managed. Therefore, land procurement should be carried out to enhance public welfare and social justice as part of the state's responsibility in promoting broad-based development and societal well-being.

Table 2 classifies land based on its registration status. It shows that a significant % of the land, 57.76%, is categorized as "Unregistered State Land in Other Use Area (APL)." This highlights the prevalence of areas used without formal registration, which could lead to disputes. Additionally, a significant category of "Unregistered State Land in Forest Area" is equally substantial, indicating a potential overlap in land classification that may not have been intentional. The identical percentage figures suggest administrative discrepancies that could exacerbate land conflicts. On the other hand, Table 3 focuses on the ownership aspect. It shows that "Land Controlled by the Community" constitutes 41.32%, reflecting the deep communal ties to the land often unrecognized by formal legal frameworks. The 17.40% of "Uncontrolled Land" sets the stage for conflict where community claims, government interests, and the presence of unclaimed territories intersect. The overlap of unspecified and unregistered lands from Table 2 and the intricate patchwork of ownership in Table 3 underscores the complexity of land tenure systems in East Kalimantan, which are central to the region's agrarian disputes.

Table 2. Land status in East Kalimantan.

Status	Area	%
Unspecified	2518.35	0.97%
Unregistered State Land in Other Use Area (APL)	73,411.04	57.76%
Unregistered State Land in Forest Area	48,677.30	57.76%
Registered Land in Other Use Area (APL)	31,147.18	12.10%
Registered Land in Forest Area	1614.90	0.62%

Table 3. Land ownership status in East Kalimantan.

Status	Area	%
Unspecified	4356.42	
Land Controlled by Legal Entities	96,091.89	1.69%
Land Controlled by the Community	106,340.78	41.32%
Land Controlled by the Government	5790.09	2.25%
Uncontrolled Land	44,789.59	17.40%

Nearly half of the territory designated for the construction of the new capital city is community-owned land, a condition necessitating attention to potential agrarian disputes. According to predictions by the Consortium for Agrarian Reform, the areas of North Penajam Paser and Kutai Kartanegara are likely to experience conflicts due to this development, a situation corroborated by previous national strategic projects across various areas often culminating in contention. The diversity of infrastructure triggering land disputes should serve as a lesson to avoid similar errors in land acquisition for the new capital. Avoiding conflict hinges not solely on the act of land procurement but on implementing fair and accurate procedures, considering that land acquisition for public development is a state responsibility in fostering social welfare and justice, as well as an initial step towards national development that prioritizes the public's welfare.

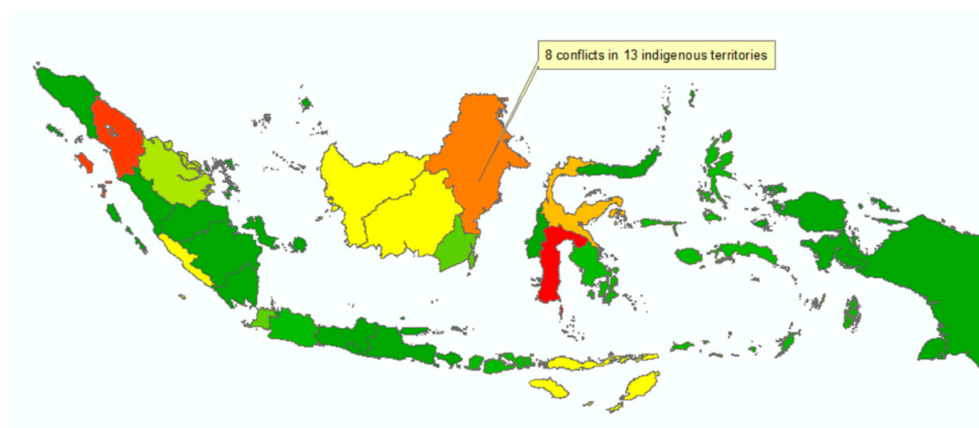
Table 4 above depicts a series of conflicts related to land claims and use in East Kalimantan, covering events from 1975 to 2023. These conflicts mainly involve indigenous communities facing companies from various industrial sectors, such as mining, infrastructure, and plantation. These conflicts reflect broader problems related to agrarian conflict in East Kalimantan, where industrial growth often leads to land and natural resources disputes. In many cases, these conflicts involve legal claims and land rights held by indigenous communities clashing with the interests of large corporations that wish to exploit these areas for economic activities. This conflict trend indicates a tension between economic development and preserving the rights of indigenous communities and the environment.

Over the past few decades, the escalation of land and natural resource-based conflicts in Indonesia has continuously increased. The Agrarian Reform Consortium (2015–2018) recorded as many as 1769 agrarian conflict incidents involving Indigenous communities, farmers, and rural societies, with an annual increase of approximately 13–15%. YLBHI (2018) data indicate 300 cases of structural agrarian conflicts across 16 provinces, covering 488,407.77 hectares. These conflicts are primarily caused by the government issuing concession permits for infrastructure development projects and corporate concessions on community lands. The government has long recognized errors in the management of agrarian resources and natural resources, attempting correction through TAP MPR No—IX of 2001 on agrarian reform and natural resource management. Unfortunately, nearly two decades after the issuance of this decree, its implementation by the government has not been conducted earnestly. As a result, land and natural resource-based conflicts harm the community and lead to ecological damage and state losses.

Table 4. Land tenure conflicts in IKN area.

No	Year	Title	Conflict	Sector
1	2023	The apprehension of several Indigenous Community members from the coal mining site of PT Energi Batu Hitam (EBH)	Manufacture	Mining
2	2023	The Indigenous Community of Balik Seppuku Refuses Displacement	River normalization	Infrastructure
3	2023	PT. WIN has not yet resolved the dispute concerning the encroachment upon land owned by residents of Kerayaan Village, East Kutai	Oil palm plantation	Plantation
4	2021	Agrarian Conflict and the Criminalization of the Indigenous Dayak Marjun Community	Ex-Plantation	Plantation
5	1987	The Conflict between the Community of Kampong Long Isun and PT Kemakmuran Berkah Timber (TBK)	HPH	Production Wood
6	2008	The Conflict Between the Indigenous Muara Tae/Dayak Benuaq Community and PT. Borneo Surya Mining Jaya	Coal	Mining
7	1975	The conflict between PT KEM and the Artisanal and Small-Scale Miners (ASM)	Emas	Mining
8	2014	The Conflict between the Dayak Benuaq Indigenous Community of Muara Tae Village and PT. Munte Waniq Jaya Perkasa	Oil palm plantation	Plantation

The area designated as the site for the new capital city (IKN) is not exempt from land disputes due to differing claims and overlapping permits. At least 13 Indigenous territories in the North Penajam Paser District will be affected by the IKN location (Figure 9). Moreover, large-scale plantation concession permits covering 30,000 hectares overlap with Indigenous community territories. Conflicts between Indigenous communities and corporations over land rights have yet to be resolved, suggesting that the IKN infrastructure development could exacerbate ongoing conflicts.

**Figure 9.** Land conflicts in IKN area.

4.4. Economic Conflict

Over the last five decades, economic disparities within urban areas globally have widened due to unequal distribution of wealth, income, and resources. Globalization, technological progress, policy decisions, and systemic discrimination contribute to varied manifestations of inequality, including disparities in income, wealth, and access to essential services. While economic models suggest market self-correction, real-world complexities often lead to persistent inequalities. Despite the potential of disequilibrium to spur growth, the increasing income gap highlights the urgency for holistic strategies aimed at equitable resource distribution, echoing scholars' calls for more inclusive urban development [102,103].

The World Cities Report 2020 emphasizes the urgent need to address housing crises and transport disparities in urban development, which significantly impact socio-economic conditions and equitable access to opportunities. These issues are exacerbated by affordability challenges, inadequate policies, and the digital marketplace's effects, alongside systemic inequalities related to class, race, ethnicity, and gender, leading to urban segregation. The COVID-19 pandemic has further highlighted these disparities, making local government action in housing and urban planning critical for promoting equitable growth. Transport inequalities, stemming from infrastructural and service discrepancies, obstruct socio-economic advancement and contribute to social fragmentation, underscoring the importance of initiatives like UN Women's for inclusive, safe transport to enhance social inclusion and urban resilience [104,105]. Additionally, the interplay of food scarcity, poverty, and population dynamics, influenced by globalization, trade policies, and climate change, exacerbates economic disparities. Globalization and trade policies can disadvantage developing nations, while climate change impacts food production in poorer areas, deepening global inequalities. Strategic capital city relocations could address these disparities by encouraging regional development and fostering equitable economic distribution, contingent on inclusive and thoughtful planning to prevent worsening or new inequalities [103].

The development of the new capital area, located near Balikpapan and Penajam Paser Utara (PPU), is anticipated to catalyze local economic expansion. However, challenges and socio-economic dynamics may arise as consequences. In Balikpapan, rapid advancements in manufacturing, as evidenced by its increasing contribution to the GRDP (Figure 10), promise employment and investment opportunities. Nevertheless, potential conflicts could emerge if economic growth results are not equitably distributed and this sector monopolizes local resources and labor. The inequality indicated by the Gini ratio might worsen due to the direct impact of economic and population structure changes with the capital's development. Conversely, PPU's progress in agriculture and construction supports the capital's economic advancement (Figure 11). However, there is a necessity for management strategies to ensure that such progress does not lead to further inequalities or competition over resources. This growth must be carefully guided to support the capital's agenda without overburdening local communities and ecosystems, achieving the desired economic growth without compromising social or environmental stability.

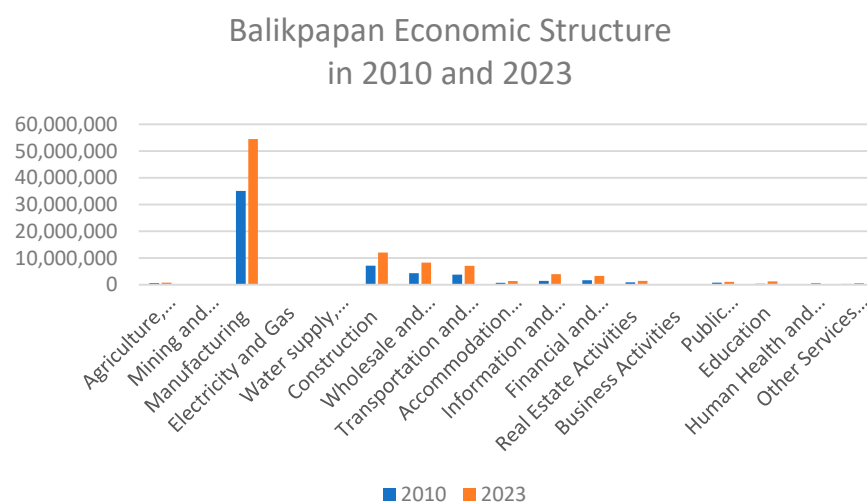


Figure 10. Balikpapan Economic Structure.

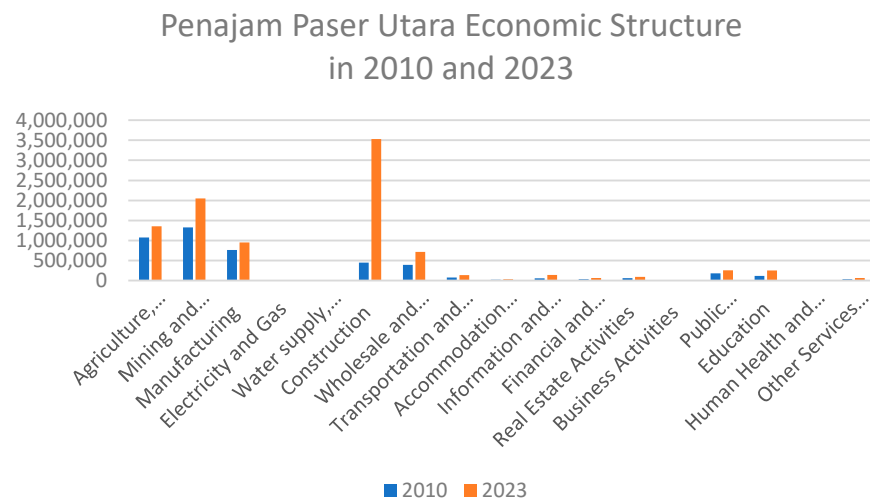


Figure 11. PPU Economic Structure 2013–2022.

The Capital City of Nusantara's (IKN) development in nearby areas such as Balikpapan and PPU presents significant potential for local economic growth. However, it may also lead to economic pressures and conflicts. The rapid expansion of the manufacturing sector in Balikpapan, evidenced by its increasing contribution to the GDP, could attract investment and create new employment opportunities. However, it might also lead to tensions if the industry exhausts local resources or labor without equitable wealth distribution. The stability of the Gini ratio (Figure 12) post-2017 indicates that economic inequality has become a persistent phenomenon, potentially exacerbated by economic and demographic shifts due to IKN's construction. Meanwhile, PPU's growth in the agriculture and construction sectors could contribute to IKN's economy. Yet, careful regulation is required to prevent resource competition or further inequalities.

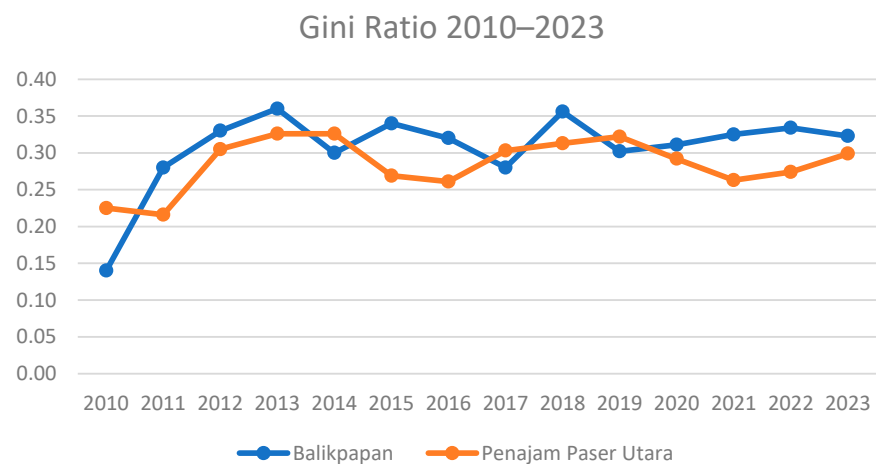


Figure 12. Gini ratio in IKN area 2010–2023; Source: Adapted from BPS (2024).

In addition, economic pressures stemming from inequality also play a role in the IKN area, as evidenced by the Gini ratio. The relationship between economic growth and wealth distribution can be complex, as seen in the fluctuating patterns of the Gini ratio and unemployment rates across different areas. While Balikpapan experienced increased income equality in the early 2010s, this trend may not be sustained, indicating that economic growth has yet to be fully inclusive. Similarly, a decline in unemployment in PPU following 2017 may reflect improvements in the labor market, but it does not necessarily coincide with enhanced income equality. It is crucial to prioritize comprehensive and equitable

economic growth and employment opportunities to avoid any social tensions that may arise during rapid changes. With the development of the new capital, there will be a surge in construction and demographic shifts, which will offer opportunities for specific industries. However, this growth can also lead to increased living costs and instability in the labor market. The development of infrastructure and new residential areas can benefit the construction sector. Still, planning carefully to minimize any negative impacts on the environment and local communities is essential. By balancing economic growth and social development, we can prevent potential conflicts and ensure that the new capital fosters inclusive and sustainable growth throughout the region.

The disproportionate burden significantly impacts unemployment rates in the IKN area, particularly in Balikpapan and Penajam Paser Utara. The graph (Figure 13) elucidates a comprehensive perspective on the labor market dynamics within these areas. In Balikpapan, notable fluctuations are observed, with unemployment peaks reaching approximately 30,000 individuals, contrasting with PPU's relatively stable and significantly lower unemployment figures. This variance may reflect the diverse economic structures of the two areas, with Balikpapan potentially leaning towards an industry-oriented sector and PPU focusing more on the agriculture and forestry sectors. The volatility in Balikpapan's unemployment rates could be attributed to several factors, such as shifts in global economic conditions, commodity price fluctuations, or industrial policy changes. The higher and more volatile unemployment rates indicate potential economic instability, which could heighten the risk of social dissatisfaction and economic conflicts, especially if a portion of the population feels marginalized from the economic benefits generated. Conversely, PPU, with its lower and stable unemployment rates, might face different challenges. Although this stability reflects a more balanced labor market, it suggests that PPU's economy is less dynamic and rapidly evolving than Balikpapan's. This situation could impact PPU's capacity to absorb new labor or provide opportunities for its residents, potentially prompting migration to Balikpapan or other areas in search of employment.

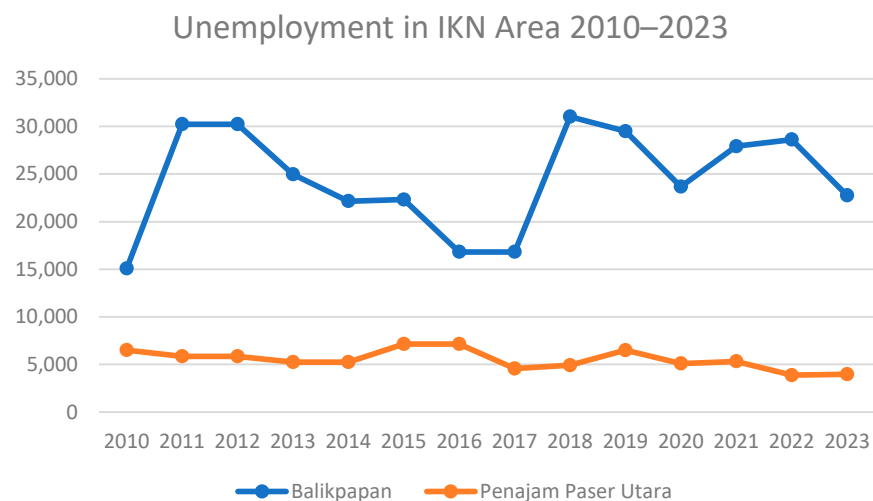


Figure 13. Unemployment in IKN area 2010–2023.

Establishing the new capital brings about high hopes for job creation and investment attraction, which could potentially decrease unemployment rates. However, it is crucial to ensure the proper management of investments and equal distribution of benefits to avoid potential conflicts. The competition for jobs in the area may increase between locals and newcomers, causing social tensions if the former believe they need to receive adequate benefits. The economic pressures and conflicts that may arise from developing a new area can impact local communities differently [106–108]. Balikpapan's data suggests high or fluctuating unemployment levels indicate a mismatch between the available workforce and job opportunities. This economic strain may intensify when the unemployed population

lacks income sources, leading to heightened social anxiety and possible conflicts among individuals vying for limited employment opportunities.

Perceptions of unequal distribution of economic opportunities and development outcomes can fuel economic conflict. If investments in new capital are seen as benefiting only a select few or not benefiting local communities, it can lead to dissatisfaction and feelings of injustice [106]. To prevent social tensions and conflicts, residents need to receive a fair share of growth and opportunities from the development. Uncontrolled growth can strain local infrastructure, including housing, transportation, and public services, leading to declining living standards and increased economic and social pressures. Developing new capital may also result in rapid changes in the labor market, with new industries emerging and old ones disappearing. This can create a skills mismatch, where the local workforce needs more qualifications or training, increasing unemployment and economic stress [109–111].

5. Discussion

5.1. Socio-Economic and Environmental Dynamics of Urbanization in the IKN Nusantara Region

A marginal decrease in the Gini Coefficient, coupled with a steady Gross Domestic Product (GDP) growth, suggests that the areas surrounding the new capital have been relatively successful in dispersing the fruits of economic growth among their population. However, comprehending the nuances of this distribution is critical. While the Gini Coefficient indicates a reduction in income inequality, it does not necessarily reflect the full spectrum of economic disparities that may occur across different sectors or areas. The poverty reduction aligns with these indicators, suggesting that, to a certain extent, the rise in GDP has translated into improved living standards for impoverished communities.

Population growth during this period, a hallmark of developing nations such as Indonesia, must be contextualized within accelerated urbanization, as evidenced by the doubling of developed land's expanse. This reflects a global trend wherein economic opportunities in urban centers draw populations away from rural areas. The ramifications of this shift are multifaceted, touching on social, economic, and environmental aspects. Rural depopulation, a consequence of urban migration, impacts agricultural production and traditional lifestyles. Nonetheless, the gradual elevation in the Human Development Index suggests improvements in overall well-being—including education and health—although these benefits warrant scrutiny to ensure equitable distribution across urban and rural communities. The environmental impact of economic expansion is palpably manifest in land use data and deforestation figures. The marked reduction in agricultural land and vegetation signals potential challenges to biodiversity and the sustainability of agriculture. While deforestation has declined since its apex in 2014–2015, the loss of forest areas remains a significant concern for carbon sequestration, water management, and habitat conservation. An increase in wetland areas may reflect positive conservation efforts or natural adaptation to environmental changes. Nevertheless, the trade-off between ecological protection and land required for development necessitates judicious deliberation.

The socio-cultural implications of Land use transitions are profound, particularly for indigenous and local communities whose lifeways and economic sustenance often clash with national development agendas. Urban expansion and infrastructural developments have prompted community displacements and cultural landscape transitions. While this may pave the way for modernization and economic growth, it raises questions about preserving cultural identity and traditional practices [112,113]. Thus, Indonesia's development narrative strives to balance advancing the economy with environmental stewardship, embracing modernity with safeguarding cultural heritage, and bolstering the national economy with equitable wealth distribution. On the one hand, progress towards a more advanced economy has elevated living standards, as reflected in rising per capita income and declining unemployment rates. However, on the other, it necessitates substantial land transitions with profound implications for the country's ecological future and the well-being of its people. The country's path forward requires a judicious policy synthesis, where

economic ambitions are aligned with the imperatives of preserving natural environments and upholding Indonesian society's social and cultural order [114–116].

The transition of land use from forest and agricultural areas to urban development is a significant driver of socio-economic transition. The expansion of built-up areas in Indonesia, with the conversion of forests and farmland into urban landscapes, alters the area's economic foundation, accelerating the shift from an agrarian economy to one focused on industry and services. This urban-centered economic growth often offers higher income potential and more diverse job opportunities, attracting populations to urban areas. However, this transition can also reduce food security due to decreased arable land, compelling reliance on imported goods, and altering local food systems. This issue transcends economic dimensions, touching upon cultural identity, as agricultural practices are intertwined with the cultural fabric of rural communities.

For Indigenous and local communities, the conversion of ancestral lands for other uses, mainly deforestation, not only disrupts their subsistence but also erodes their cultural heritage and traditional knowledge. Such land appropriation fractures social structures detaches communities from their spiritual sites and erodes cultural practices—including language, rituals, and crafts—crucial for the transmission of cultural identity [48,113,117]. The diminishing access to natural resources increases their vulnerability, as many rely on forests for hunting, gathering, and traditional agriculture—practices that have sustained biodiversity for generations. Urbanization often forces a shift to wage labor, which may be inaccessible or unsuitable for these populations, exacerbating poverty and marginalization [48,118,119]. This scenario calls for policies promoting sustainable land use, ensuring economic development does not come at the cost of environmental degradation and cultural dissolution. This includes recognizing the land rights of Indigenous and local communities and integrating their knowledge and practices into national conservation strategies. It is a plea for development that respects the limits of the natural environment and the rights of its centuries-old stewards.

5.2. Economic Development and Land Use Transition in IKN Nusantara

The growth in GDP signifies a positive trend in economic development, yet the reduction of agricultural land from 569.56 km² in 2003 to 436.105573 km² by 2023 signifies an economy in transition. Correspondingly, doubling built-up areas to 171.354009 km² indicates a shift toward urbanization. This urbanization potentially diversifies employment opportunities, contributing to a significant decrease in unemployment from 30,224 to 22,749. Nonetheless, this raises critical questions regarding the rural workforce's readiness to transition to new urban roles and whether the displaced agrarian communities can reap the benefits of urban employment.

Furthermore, the expansion of wetlands from 290.52 km² to 396.500204 km² may reflect successful environmental conservation efforts, crucial amidst decreasing vegetation cover. While seemingly minimal, the slight reduction in vegetation area from 1769.05 km² to 1712.46704 km² should not be underestimated as it likely signals ongoing deforestation. The consequences of such deforestation are far-reaching, affecting not only environmental aspects such as biodiversity and climate but also socio-economic factors, including job security in the forestry sector and the availability of natural resources vital for many communities' survival and cultural practices.

Moreover, while increases in per capita income and the Human Development Index (HDI) may reflect an improvement in macroeconomic conditions, these indicators do not directly translate into the well-being of agrarian communities and indigenous populations displaced from their lands. The decrease in poverty levels is a positive sign; however, the relationship between this decline and the loss of traditional agricultural lands warrants further scrutiny. It is crucial to explore how socio-economic transitions from land-based traditional industries to an urban, service-oriented economy impact not only the financial but also the social fabric of the nation. For many indigenous communities, land is not merely an income source but a core component of their identity and lifestyle. Hence, land-use changes carry implications for preserving cultural diversity and social cohesion [120,121].

Although socio-economic indicators signal signs of a robust national economy, fundamental shifts in land use and their impacts on food security, employment types, and cultural continuity suggest a more intricate scenario. This complexity demands policies and initiatives sensitive to the needs for economic growth while safeguarding Indonesia's rich environmental and cultural heritage.

5.3. Conflict Resolution

Accelerated economic growth and land use transition necessitate an inclusive and participatory governance approach to ensure the integration of Indigenous communities, local populations, business entities, and civil society groups into decision-making processes. Effective governance is pivotal in identifying and resolving land use conflicts—be it for development or conservation purposes. These conflicts often pertain to land rights and resources, with Indigenous and local communities frequently at the forefront, suffering from loss of access to land and resources that are essential to their identity and livelihoods.

5.3.1. Inclusive Dialogue and Reconciliation

Resolving the tensions that arise from land-use transitions in the Nusantara IKN area necessitates a firm commitment to fostering inclusive political dialogue and engaging in meaningful reconciliation processes. Transitions like the one in the Nusantara IKN area often bring about land rights and usage disputes, creating conflicts between local communities, indigenous populations, and national authorities. To handle these challenges effectively, it is vital to establish communication channels where all stakeholders can voice their concerns and aspirations. Through fostering an inclusive dialogue, the diverse groups impacted by the IKN relocation, including those directly affected by land alterations, local authorities, civil society, and underrepresented groups such as women, youth, and indigenous populations, can articulate their perspectives and requirements. This will result in a more thorough comprehension of how this major transition affects individuals and communities. Reconciliation efforts should prioritize addressing historical grievances and contemporary disputes that may negatively affect regional peace and development. This involves acknowledging past injustices, providing adequate compensation for losses, and ensuring that development benefits are distributed equitably. Furthermore, transparent and impartial legal frameworks must underpin such dialogue and reconciliation, respecting the rights of all parties, particularly those who may be more vulnerable to displacement and other adverse effects, such as the indigenous and local communities. Participating in this process requires patience, a willingness to compromise, and a long-term commitment to sustainable development that prioritizes human well-being and economic growth. Only through such a concerted and inclusive approach can the tensions resulting from land-use changes in the Nusantara IKN area be effectively resolved, paving the way for a peaceful and prosperous future for all who call the region home [122,123]. A dialogue platform should allow for the equitable and safe exchange of perspectives, acknowledge past grievances, and explore pathways toward autonomy and self-management. The facilitation by impartial experts in managing sensitive and complex dialogues is crucial. Integrating traditional conflict resolution methods with contemporary approaches can enhance the credibility and acceptance of these processes. Such an integrated strategy fosters reconciliation and respects cultural heritage while embracing local insights and current best practices to ensure equity and inclusiveness [124].

5.3.2. Human Rights Restoration and Socio-Economic Development

The relocation of a capital city involves extensive land development, which can lead to land rights conflicts, particularly with indigenous populations and local communities. There is an increased risk of human rights violations during land acquisition, resulting in displacement, loss of livelihood, and social upheaval. Therefore, ensuring accountability for human rights violations during this process is crucial to maintaining trust between the government, indigenous populations, and local communities. This approach also helps

prevent any escalation of conflict and ensures a smooth transition to the new capital. Establishing independent bodies to oversee and address human rights infringements during the relocation process is essential [125–127]. These organizations need to be empowered to investigate potential abuses, make necessary adjustments, and respect the rights and traditions of local communities. Another crucial step is aligning national laws with international human rights norms in the context of capital relocation. This alignment ensures that policies governing the relocation process and subsequent development of the new capital align with global human rights standards. By integrating human rights considerations into the planning and implementation phases of the relocation, vulnerable populations' interests are safeguarded. This approach ensures that any grievances related to the land use changes are promptly and fairly addressed, maintaining the rule of law and upholding human rights standards. Such measures bolster confidence in the legal and governmental systems, which are crucial for societal harmony and stability [128,129]. Moreover, addressing the root causes of conflict through socio-economic development is vital. Poverty, unemployment, and inadequate service access often exacerbate land use conflicts. Tailored economic initiatives focusing on inclusion and sustainable development, like job creation and enhancements in infrastructure and services, can elevate living standards and maintain a peaceful milieu respectful of rights [37,130].

5.3.3. Enhancing Public Participation

Amplifying community engagement in development and conservation initiatives in the Nusantara IKN region is critical to ensure that these efforts provide broad benefits and not exclusive advantages to a select few. It is essential to consider the conflict-coordination model [43] when devising development plans, integrating local perspectives and wisdom, especially from those whose livelihoods are closely tied to landscape changes. By doing so, approaches can be tailored to prioritize environmental sustainability and respect the rights of indigenous communities. Recognizing the insights of communities most affected by landscape changes enables the confident creation of thoughtful and sustainable development plans. Such a participatory approach, applied at every stage from planning to implementation, ensures community support and fosters collective responsibility. Active public involvement empowers citizens to provide crucial insights, which is particularly vital when indigenous lands are repurposed. It also facilitates the integration of diverse local perspectives, especially those of indigenous peoples and other stakeholders directly impacted by land changes. By involving these groups in the planning process and decision-making, this model ensures that development plans are environmentally friendly, culturally sensitive, and fair, combining modern techniques with traditional practices and respecting cultural heritage while promoting innovation. It fosters collective ownership and mitigates conflicts by ensuring everyone's voices are heard and considered. Active community participation ensures that projects reflect residents' needs, enhance social justice, and address environmental concerns. This synthesis of the new with the venerable assures collective stewardship over natural resources, entwining environmental preservation with societal progress [131–133]. Fostering community participation further democratizes developmental dividends, enhances social equity, and mitigates conflicts. Seeing their contributions reflected in developmental outcomes, community members are likelier to support and sustain these initiatives. In essence, meaningful community participation in the IKN Nusantara transcends merely providing a platform for voicing opinions; it is about weaving those voices into the tapestry of development that respects the past while innovating for the future [134–137].

5.4. Land Use Policy Implication

Developing new capitals and planned cities in emerging nations like Indonesia, mainly through initiatives like IKN Nusantara, presents complex challenges and opportunities for sustainable development. To mitigate the adverse effects of such extensive urban and regional developments, policymakers must employ comprehensive and integrated strate-

gies that balance economic growth, environmental preservation, and social equity. This begins with rigorous environmental impact assessments (EIA) that should be mandated before any land development to evaluate the effects on local ecosystems, biodiversity, and water resources, helping to minimize ecological disruption and ensure sustainable land use practices. Early identification of potential environmental impacts allows developers to create mitigation strategies that preserve critical habitats and natural resources, which are crucial for maintaining the area's biodiversity and ecological health [138,139]. Moreover, engaging local communities in the planning process is essential; this inclusion guarantees that development projects respect local cultural practices and land rights, which helps prevent displacement and maintains social cohesion. Effective community engagement involves transparent communication and regular consultations, where community feedback is actively solicited and integrated into project designs and operational plans, fostering goodwill and enhancing the social legitimacy of development projects, reducing the likelihood of conflict and resistance [140,141]. These steps are vital for instilling confidence in the sustainability of the development process and ensuring that it benefits all stakeholders involved.

Clear zoning laws and land use regulations must be established to protect critical ecosystems, such as wetlands and forests, from urban encroachment. These laws involve designating conservation zones and implementing green buffers, which integrate ecological spaces within urban areas [142–144]. This enhances urban biodiversity and provides essential ecosystem services such as flood mitigation, air purification, and recreational spaces for urban residents, improving overall quality of life. Nevertheless, it is not just about protecting the environment. It is about creating a sustainable future for newly urbanized areas. Economic diversification should be encouraged by supporting sectors that do not depend heavily on large-scale land alterations, such as technology, services, and eco-tourism. This approach reduces the economic reliance on extractive industries and promotes sustainable job creation [142,145]. By fostering a diverse economic base, regions like East Kalimantan can avoid the pitfalls of economic monocultures, which often lead to environmental degradation and social disparities. This vision of a diverse and sustainable economy should inspire optimism in policymakers and government representatives.

The development of infrastructure promoting sustainable mobility, including public transit systems, biking lanes, and pedestrian pathways, is essential for reducing reliance on private vehicles, decreasing congestion, and lowering pollution levels, thus supporting environmental goals and enhancing urban livability and accessibility [146,147]. Simultaneously, strengthening legal frameworks to protect land rights, particularly for indigenous and local communities, is crucial. This involves recognizing traditional land tenure systems and providing legal support to communities to negotiate fair terms during land acquisitions for public projects, ensuring robust legal standing to prevent exploitative practices, and guaranteeing just compensation [148]. Furthermore, urban greening initiatives that mandate the integration of natural landscapes into city planning, such as green roofs, urban forests, and community gardens, are vital for managing urban heat, improving air quality, and enhancing mental health and social cohesion [149,150]. Adapting infrastructure to be resilient to climate impacts, like building flood defenses and creating water-permeable urban surfaces, is also critical to help cities cope with anticipated increased rainfall and flooding under climate change scenarios, ensuring long-term sustainability [151–153]. To implement these strategies effectively in Indonesia, particularly for the new capital in East Kalimantan, the establishment of a multi-stakeholder task force including government representatives, local community leaders, environmental scientists, and urban planners is recommended to ensure all development actions align with sustainable development goals and oversee the holistic planning and implementation of these processes.

Implementing pilot projects can serve as valuable benchmarks to assess the feasibility of sustainable practices in local contexts. These initiatives provide insights and data that can inform the expansion of successful practices across larger areas. Pilot programs reduce risks and enhance the efficacy of sustainability measures by allowing for iterative

learning and adjustment before full-scale implementation. Collaborating with international development agencies and urban planning experts can provide Indonesia with technical assistance, funding opportunities, and global best practices in sustainable city planning, facilitating knowledge and technology transfer while enhancing local capacities to implement advanced sustainable development strategies [154–156]. To encourage adopting environmentally friendly practices and investment in green infrastructure, financial incentives such as tax breaks, subsidies, or grants can make sustainable options more attractive and viable, accelerating their adoption across the development sector [157,158]. Lastly, continuous monitoring and evaluation should be integrated into all development projects to assess their ongoing impact on the environment and local communities. A data-driven approach can continuously refine policies and practices, ensuring that development remains aligned with sustainability goals over time [159,160].

Indonesia has the opportunity to establish a model for creating new cities that promote economic progress, safeguard its diverse ecological legacy, and cultivate inclusive and thriving communities. Achieving this equilibrium is crucial for cultivating sustainable urban environments that can prosper in the economy, society, and environment for years.

6. Implications for Future Research

The relocation of Indonesia's capital to IKN Nusantara in East Kalimantan represents a significant transition with profound socio-cultural, environmental, and governance implications. Understanding these implications requires detailed research across various dimensions. One critical area involves examining socio-cultural integration and adaptation as the new capital attracts a diverse population. This migration from urban centers like Jakarta to a newly developed area encompasses demographic shifts and significant socio-cultural transitions. The interactions between incoming residents and the Indigenous populations of East Kalimantan are of particular interest. These dynamics challenge social cohesion and the preservation of Indigenous cultures, potentially leading to socio-cultural fragmentation. Therefore, investigating the processes of cultural integration and adaptation and the impacts on local traditions is crucial. Research should focus on how different ethnic and social groups adapt to new environments, how they interact, and the mechanisms through which cultural exchange and conflict occur. Additionally, the potential erasure of local cultures and the displacement of Indigenous communities highlight the need for strategies that not only preserve but also integrate cultural heritage into the new urban landscape.

The environmental impacts of such a grand-scale urbanization project are parallel to socio-cultural challenges. The construction of IKN Nusantara involves transforming large tracts of biodiverse forest lands into urban areas, which raises significant concerns regarding biodiversity conservation, ecosystem disruption, and the sustainability of natural resources. Long-term environmental impact assessments are essential to monitor these changes systematically. Research should aim to quantify the ecological losses and identify mitigation strategies that align with sustainable development goals. This includes studying changes in land use patterns, the resultant loss of habitat for various flora and fauna, and the alteration in the local climate and hydrology due to urban expansion. The aim would be to develop a comprehensive understanding of this new capital development's ecological footprint and propose urban planning solutions that incorporate green spaces, promote biodiversity, and sustainably manage natural resources.

Furthermore, the effectiveness of governance and policy frameworks in guiding and managing the capital relocation process warrants thorough investigation. The policies enacted to facilitate this transition involve complex layers of governance, from local to national levels, requiring an integrated approach to handle the multidimensional challenges such a project poses. Evaluating these policies' effectiveness in real time provides critical feedback for ongoing adjustments and long-term planning. Research in this area should focus on how well these policies address the anticipated socio-economic disruptions, environmental impacts, and cultural shifts. It should also consider the adequacy of conflict

resolution mechanisms to handle land and resource disputes. Moreover, the degree to which these policies promote inclusive development and equitable benefits distribution among all stakeholders, particularly Indigenous populations, is another critical dimension for assessment.

As Indonesia embarks on this ambitious project of relocating its capital to IKN Nusantara, the need for comprehensive research to track and analyze the impacts of this move becomes ever more apparent. This research holds the promise of not only identifying potential challenges but also providing innovative solutions. Studies focusing on the socio-cultural dynamics of migration and integration, the environmental consequences of new urban developments, and the effectiveness of governance structures will provide essential insights. These insights will not only help in mitigating immediate adverse effects but will also guide the development of a more resilient, inclusive, and sustainable urban future for the new capital. This approach not only aligns with the global sustainable development goals but also respects and preserves the rich cultural and ecological heritage of Indonesia.

7. Conclusions

Over the two-decade span from 2003 to 2023, land use transition within the IKN Nusantara area has highlighted the intricate interplay between urban development, environmental conservation, and socio-economic dynamics. This era has witnessed considerable expansion of developed territories, signaling robust urban growth and economic diversification. Nevertheless, these advancements have entailed significant environmental and socio-economic sacrifices. Reducing vegetation and agricultural spaces has raised alarms, threatening biodiversity, disrupting ecosystems, and jeopardizing food security. The conversion of farmlands into urban areas undermines local community sustenance, increasing reliance on food imports and eroding local food sovereignty.

While the expansion of wetland areas in the IKN Nusantara region has been interpreted as a success of conservation efforts, this positive development is consistently overshadowed by the adverse effects of ongoing deforestation and land conversion for urban purposes. Such urbanization leads to extensive habitat destruction and contributes to significant biodiversity loss, disrupting the ecological balance. The situation presents a stark contrast between conservation successes and the ecological degradation brought about by urban expansion. This dichotomy underscores the pressing need for a balanced environmental management strategy that can effectively counteract urban development pressures. Implementing robust protective measures and sustainable land use policies is essential to preserving the gains made in conservation while accommodating the inevitable growth of urban areas. Such management should integrate ecological health with urban planning to ensure that development does not compromise environmental integrity.

The current scenario necessitates the creation of a comprehensive and robust policy framework that prioritizes transparency in land management practices, effectively safeguards the rights of Indigenous and local communities, and stimulates inclusive economic growth. This framework is essential to mediate the often conflicting demands of environmental sustainability and economic development. The intent is to ensure that significant undertakings, such as the IKN Nusantara project, are conducted in a manner that respects and preserves the ecological and cultural fabric of the region. It should facilitate stakeholder engagement, ensuring that all voices, particularly those from underrepresented groups, are heard and considered in the planning and execution phases of development projects. Moreover, the framework should include continuous monitoring and evaluation mechanisms, allowing for adaptive management strategies that respond to environmental impacts and socio-economic changes in real time. Doing so aims to create a balanced development model that harmonizes the need for economic advancement with the imperative to maintain environmental integrity and cultural legacy.

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