



“Forest City” or Forest Under Pressure? Examining IKN’s Green Development Claims through the Lens of Climate Justice

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Abstract

Indonesia’s development of Nusantara, the new capital city (IKN), has been framed as an ambitious model of a green, smart, and forest-oriented city. Its planning discourse emphasizes sustainability, low-carbon development, and the integration of urban infrastructure with existing ecosystems. Yet the rapid transformation of the IKN landscape raises questions about the extent to which green-city narratives correspond with actual ecological change. This article critically examines the relationship between IKN’s development model and climate justice by analyzing changes in vegetation cover, carbon storage, infrastructure expansion, and landscape transformation. Particular attention is given to the tension between the official representation of IKN as a “forest city” and evidence of significant changes in vegetation within and around the core development area. Rather than treating environmental sustainability as a technical planning objective alone, the article approaches IKN through a climate-justice framework that considers who benefits from infrastructure investment, who bears ecological risks, and whose understanding of landscape value is recognized in decision-making. The article argues that a city cannot be considered green solely because of its planning rhetoric or technological ambitions. Green development must also account for ecological integrity, carbon consequences, distributive impacts, and the rights of communities affected by territorial transformation.

[Pembangunan Nusantara, ibu kota baru Indonesia (IKN), telah dibingkai sebagai model ambisius kota hijau, cerdas, dan berorientasi hutan. Wacana perencanaannya menekankan keberlanjutan, pembangunan rendah karbon, dan integrasi infrastruktur perkotaan dengan ekosistem yang ada. Namun, transformasi lanskap IKN yang cepat menimbulkan pertanyaan tentang sejauh mana narasi kota hijau sesuai dengan perubahan ekologis yang sebenarnya. Artikel ini secara kritis mengkaji hubungan antara model pembangunan IKN dan keadilan iklim dengan menganalisis perubahan tutupan vegetasi, penyimpanan karbon, perluasan infrastruktur, dan transformasi lanskap. Perhatian khusus diberikan pada ketegangan antara representasi resmi IKN sebagai "kota hutan" dan bukti perubahan signifikan pada vegetasi di dalam



dan sekitar area pengembangan inti. Alih-alih memperlakukan keberlanjutan lingkungan sebagai tujuan perencanaan teknis semata, artikel ini mendekati IKN melalui kerangka keadilan iklim yang mempertimbangkan siapa yang mendapat manfaat dari investasi infrastruktur, siapa yang menanggung risiko ekologis, dan pemahaman siapa tentang nilai lanskap yang diakui dalam pengambilan keputusan. Artikel ini berpendapat bahwa sebuah kota tidak dapat dianggap hijau hanya karena retorika perencanaannya atau ambisi teknologinya. Pembangunan hijau juga harus mempertimbangkan integritas ekologis, konsekuensi karbon, dampak distribusi, dan hak-hak masyarakat yang terkena dampak transformasi wilayah.]

Keywords: IKN, forest city, climate justice, vegetation change, urban development

Introduction

The development of Nusantara, Indonesia's new capital city in East Kalimantan, represents one of the country's most ambitious experiments in large-scale planned urban transformation. The relocation of the national capital from Jakarta to East Kalimantan has been justified through a combination of economic, demographic, environmental, and strategic considerations, including the need to reduce pressure on Jakarta and promote a more geographically balanced pattern of national development. Yet Nusantara is not presented merely as a new administrative center. Its development has been accompanied by an explicitly environmental vision in which the city is intended to become a sustainable and forest-oriented urban settlement. The concept of the *Forest City* is therefore central to the political and planning narrative surrounding Ibu Kota Nusantara (IKN), positioning the project as an attempt to integrate urban development with forest conservation, ecological restoration, and low-carbon development.

The environmental ambition of IKN is particularly visible in its spatial planning objectives. The official *Nusantara Biodiversity Management Master Plan* identifies the protection, management, restoration, and reclamation of ecosystems as central components of the city's development strategy. The plan establishes a target in which 65 percent of Nusantara is designated as protected area and identifies the rehabilitation of degraded ecosystems as an important component of achieving the Forest City vision (OIKN 2024). The document also acknowledges that tropical rainforest currently constitutes only a relatively limited proportion of the IKN landscape and consequently places substantial emphasis on reforestation and ecological restoration. The stated objective is therefore not simply to preserve an intact pre-existing forest landscape, but to transform a heavily modified landscape into an urban environment in which forest and other ecosystems remain integral to the city's spatial structure.

This distinction is important because the designation of IKN as a “Forest City” represents both a planning objective and an empirical claim that requires evaluation. A green-city label does not in itself demonstrate ecological sustainability. The environmental performance of an urban development must instead be assessed through observable changes in land cover, vegetation, carbon storage, hydrological processes, biodiversity, and ecological connectivity. This is particularly relevant in IKN because urban development necessarily requires roads, government buildings, residential areas, utilities, public facilities, and other forms of infrastructure. The construction of these systems transforms the physical landscape, even when the broader planning framework seeks to compensate for or minimize such transformation through green infrastructure and reforestation. The central analytical question is consequently not whether IKN contains green areas, but whether the ecological functions and carbon values associated with the landscape are maintained or enhanced as urbanization proceeds.

Existing research provides evidence that the IKN landscape has already experienced significant land-use transformation. Syaban and Appiah-Opoku (2024), examining changes between 2003 and 2023, identify a substantial expansion of built-up areas alongside changes in agricultural and natural vegetation. Their study shows that the relocation of the capital has intensified an already complex process of land-use transition in which natural vegetation, agricultural areas, and rural landscapes are increasingly incorporated into urban development. The authors further emphasize that these transformations have implications not only for physical land cover but also for biodiversity conservation, food security, and the livelihoods of rural and Indigenous communities. The findings are significant because they demonstrate that the environmental implications of IKN cannot be assessed exclusively through the intended final configuration of the city; the transition from the existing landscape to the planned urban form is itself an important object of analysis.

The concept of vegetation cover also requires greater analytical precision. Maintaining a certain percentage of vegetated land does not necessarily mean that an equivalent ecological function has been maintained. Mature forest, secondary vegetation, plantations, grasslands, and newly planted trees differ substantially in terms of biomass, carbon storage, biodiversity, habitat quality, soil functions, and hydrological regulation. Consequently, replacing established vegetation with newly planted trees may increase vegetation cover without immediately reproducing the carbon-storage capacity or ecological complexity of the original ecosystem. This temporal dimension is particularly important for IKN because the Forest City vision depends partly on restoration: the transformation of degraded or modified areas into more forest-like ecosystems is expected to contribute to the city’s long-term environmental performance. The sustainability of this approach therefore depends not simply on how much vegetation is planted but on whether restoration produces durable ecological functions over time.

Carbon provides another important dimension of this problem. Forests and other vegetated ecosystems function as carbon reservoirs, meaning that land-use transformation can influence climate mitigation not only through future emissions from urban energy consumption but also through changes in existing carbon stocks. The construction of infrastructure can result in the removal or degradation of vegetation and associated biomass, while the production and transportation of construction materials can create additional emissions. Conversely, restoration and urban vegetation can contribute to carbon sequestration over longer periods. A climate-oriented assessment of IKN must therefore consider both sides of this equation: the emissions and carbon-stock losses associated with landscape transformation and the potential carbon benefits generated by restoration, urban greening, renewable energy, and low-carbon infrastructure. Treating carbon neutrality as a future technological target without accounting for changes in landscape carbon stocks risks presenting an incomplete picture of the climate implications of the project.

The hydrological consequences of land-use transformation provide another indication of why the material landscape matters. The conversion of vegetated land into roads, buildings, and other impervious surfaces can modify runoff patterns, drainage, and watershed response. Evidence from Pemaluan Village illustrates this concern. Handyastono et al. (2025) examined changes in the Pemaluan River catchment associated with IKN development and found an increase in modeled flood-hazard areas between 2019 and 2023. Their analysis suggests that land-cover change associated with the development trajectory of IKN can influence hydrological conditions and flood exposure in surrounding areas. Although the study does not establish that IKN development is the sole cause of flooding, it demonstrates the importance of considering watershed-scale consequences rather than limiting environmental assessment to individual construction sites.

This is particularly relevant because the environmental impacts of urban development are not necessarily confined to the boundaries of the new capital. Rivers, watersheds, wildlife habitats, and ecological corridors operate across administrative and project boundaries. Changes in vegetation or drainage within one part of the landscape can therefore affect communities and ecosystems elsewhere. A narrow project-based assessment may underestimate these cumulative effects because individual roads, buildings, reservoirs, and settlements can appear environmentally manageable when assessed separately while collectively producing substantial changes in landscape structure. The Forest City concept consequently requires an assessment framework capable of evaluating cumulative ecological change at the landscape and watershed scales.

The question of ecological transformation also raises a broader issue concerning the meaning of “green development.” Green urbanism is often associated with technological innovation, energy efficiency, renewable energy, smart infrastructure, compact urban form, and the provision of green spaces. These characteristics can contribute to climate mitigation and urban resilience. However,

they do not automatically resolve the environmental consequences of constructing the city itself. A city designed to be low-carbon in operation may still generate substantial ecological pressures during its construction if its infrastructure requires extensive land transformation or if the carbon and ecological value of affected ecosystems are inadequately incorporated into planning decisions. The environmental credibility of IKN should therefore be evaluated across the entire development trajectory rather than only according to the characteristics of the completed city.

This issue becomes particularly significant when the Forest City narrative is examined through the lens of climate justice. Climate justice extends the analysis of environmental sustainability beyond aggregate environmental outcomes and asks how climate-related benefits, risks, costs, and decision-making power are distributed across different social groups. In the context of IKN, the development of a new capital may generate national benefits through infrastructure investment, administrative modernization, economic activity, and the creation of a new growth center. Yet the environmental consequences of land transformation are experienced most directly by populations living within and around the development area. Farmers, fishers, rural residents, and Indigenous communities may have relationships with land and natural resources that cannot be captured adequately through conventional economic indicators or compensation mechanisms.

The climate-justice question therefore concerns more than whether the new capital will eventually contain a large proportion of green space. It also concerns who benefits from the environmental and economic value created by IKN and who bears the risks associated with its construction. This requires attention to distributive justice, because the benefits and burdens of development may be geographically and socially uneven; procedural justice, because affected communities need meaningful opportunities to participate in decisions that transform their territories; and recognition justice, because different communities may hold distinct cultural, livelihood-based, and ecological understandings of land. These dimensions are particularly important in a project where state-led urban development intersects with existing rural and customary landscapes.

Research on IKN already indicates that land-use transition has social as well as ecological consequences. Syaban and Appiah-Opoku (2024) identify conflicts associated with changes in land use and emphasize the effects of rapid development on rural and Indigenous communities. Their findings suggest that the transformation of the IKN landscape cannot be understood exclusively as a technical process of converting land from one category to another. Land is simultaneously an economic resource, a source of livelihood, a social space, and, for some communities, a component of cultural and territorial identity. The environmental meaning of “green development” therefore depends partly on whether these relationships are recognized within planning and governance processes.

The tension is thus not necessarily between development and environmental protection as mutually exclusive objectives. Rather, the more important question is whether the process through which a green city is constructed is itself consistent with the ecological and social principles that the city claims to embody. IKN may potentially demonstrate that large-scale urban development and ecological restoration can coexist, but this proposition must be tested against measurable changes in vegetation, carbon storage, hydrology, biodiversity, and land use. At the same time, the social distribution of these changes must be considered. A development model cannot be considered climate-just simply because it produces an environmentally attractive urban landscape if the costs of creating that landscape are disproportionately borne by communities whose land and livelihoods are transformed.

Against this background, this article examines the relationship between IKN's Forest City development model and climate justice. It focuses on three interconnected dimensions. First, it examines vegetation and land-cover change to assess the material transformation underlying the Forest City narrative and its implications for carbon storage and ecological integrity. Second, it analyzes infrastructure expansion and associated ecological pressures, particularly changes in landscape structure and hydrological conditions. Third, it examines the climate-justice implications of IKN by considering the distribution of environmental benefits and burdens, community participation, recognition of local and Indigenous interests, and the legal and institutional arrangements governing environmental transformation.

The article argues that the designation of IKN as a "Forest City" should be evaluated as an empirical and political claim rather than accepted solely as a planning aspiration. A genuinely green capital city cannot be defined only by the proportion of land allocated to vegetation, the use of smart technologies, or long-term carbon-neutrality targets. Green development must also account for the ecological condition of the landscapes being transformed, the carbon consequences of vegetation loss and restoration, the cumulative effects of infrastructure expansion, and the distribution of environmental risks. More fundamentally, climate justice requires that the benefits of IKN's green-development agenda do not depend upon the disproportionate transfer of ecological and social costs to communities located at the development frontier. The case of Nusantara therefore provides an important opportunity to examine whether Indonesia's pursuit of a new green capital can reconcile urban modernization with ecological integrity, meaningful participation, and a more equitable distribution of the costs and benefits of climate-oriented development.

Vegetation Change, Carbon Storage, and the Materiality of the "Forest City"

The concept of the *Forest City* places vegetation at the center of IKN's environmental identity. Unlike conventional urban development models in which vegetation is primarily treated as an amenity or recreational element, the IKN model

presents forests and green areas as fundamental components of the city's spatial and ecological structure. The Indonesian government's planning documents emphasize conservation, ecological restoration, connectivity between natural areas, and the maintenance of substantial green and forested areas as part of the city's long-term sustainability strategy (Ibrahim, Baharuddin, and Wance 2023; OIKN 2024). This approach is significant because it recognizes that vegetation can perform multiple urban functions, including carbon sequestration, temperature regulation, water retention, habitat provision, and recreation. Nevertheless, the environmental credibility of the Forest City depends on whether these functions are maintained during the transition from the existing landscape to the planned urban environment.

Available land-cover studies indicate that the IKN landscape has already undergone significant transformation over the past two decades. Syaban and Appiah-Opoku (2024) identified changes in vegetation, agricultural land, and built-up areas between 2003 and 2023, with built-up land expanding substantially during the study period. Their analysis demonstrates that land-use change in IKN is not an entirely new phenomenon associated only with the formal establishment of the new capital; rather, the region has experienced a longer process of landscape transformation involving settlement, agriculture, plantation activity, and infrastructure development. The construction of IKN therefore occurs within an already modified landscape. This is an important qualification to the debate because it means that the environmental question is not simply whether the new capital causes forest loss, but whether its development accelerates, redirects, or potentially reverses existing patterns of landscape degradation.

Remote-sensing research also illustrates the importance of distinguishing between broad land-cover categories and ecological conditions. Rahyotati and Handiani (2024), using Sentinel-2 land-cover data, found that forest remained the dominant land-cover category within the IKN area during the 2019–2022 observation period, accounting for approximately 91 percent of the area, while built-up land represented only a small proportion. At first glance, such findings appear consistent with the Forest City narrative. However, the same study identified the presence of plantations, open land, buildings, and other land-cover categories within the development area. The finding therefore demonstrates that the existence of a large proportion of forest cover does not eliminate the need to examine the spatial distribution, continuity, condition, and type of vegetation. A forest-city assessment based only on aggregate percentages risks overlooking localized but potentially important ecological transformations.

This distinction becomes particularly important when the term “forest” is used as a quantitative planning category. From an ecological perspective, not all forested areas are equivalent. Natural or semi-natural forests can contain complex vertical structures, mature trees, diverse species assemblages, accumulated soil carbon, and ecological relationships that have developed over long periods. Plantation forests, young restoration areas, and urban tree plantings may provide valuable ecosystem

services but generally do not reproduce all of these functions immediately. Consequently, a target based on the percentage of “forest” or “green” area cannot by itself establish that the ecological integrity of the landscape has been preserved. The quality, age, composition, connectivity, and permanence of vegetation must also be considered.

The temporal dimension is particularly important for IKN because the Forest City model relies substantially on restoration. The official biodiversity planning framework identifies degraded forests, former mining areas, shrublands, and other modified landscapes as targets for rehabilitation and ecological improvement (OIKN 2024). This approach has considerable potential because restoration can increase vegetation cover and recover some ecosystem functions while limiting the need for further expansion into intact landscapes. However, restoration is inherently time-dependent. Newly planted trees require years or decades to accumulate biomass, develop complex habitat structures, and establish mature ecological relationships. The carbon benefits of restoration likewise accumulate gradually. Therefore, the short-term removal of established vegetation cannot automatically be offset by the promise of future reforestation. A meaningful climate assessment must distinguish between immediate carbon-stock changes and projected long-term sequestration.

Carbon storage provides a useful lens through which this temporal problem can be examined. When mature vegetation is cleared for roads, buildings, or other infrastructure, the carbon stored in above-ground biomass, below-ground biomass, and soils may be released or become vulnerable to future disturbance. At the same time, construction generates additional emissions through the production of cement, steel, asphalt, and other materials. The environmental performance of IKN therefore cannot be reduced to operational emissions after the city is completed. It must also account for the carbon consequences of constructing the city and transforming the landscape on which it is built. This distinction is consistent with the broader life-cycle approach to urban climate policy, which emphasizes that low operational emissions do not necessarily imply low embodied environmental impacts.

The relationship between vegetation and carbon is further complicated by landscape fragmentation. Even where total forest area remains relatively high, roads and infrastructure can divide previously connected vegetation into smaller patches. Fragmentation can increase edge effects, reduce habitat connectivity, alter microclimatic conditions, and restrict the movement of species. It can also reduce the ecological resilience of remaining forest patches. Ibrahim, Baharuddin, and Wance (2023) note that the Forest City concept incorporates connectivity with nature and wildlife habitat conservation as important planning principles. This indicates that the quality of the forest-city model should be evaluated not only through the amount of vegetation retained but also through whether remaining natural areas remain functionally connected.

The importance of connectivity is particularly apparent when IKN is considered as part of a broader ecological landscape rather than as an isolated administrative territory. Forests surrounding the core development area provide habitat, regulate water systems, and form part of wider ecological networks. Development that preserves isolated patches of vegetation while disrupting connections between them may therefore satisfy a numerical green-space target without maintaining equivalent ecological functionality. A Forest City should consequently be understood as a landscape configuration rather than simply a collection of green spaces. The spatial relationship between forests, rivers, wetlands, agricultural areas, settlements, and infrastructure determines whether ecological functions can persist across the territory.

Land-use change can also influence the capacity of the landscape to regulate water. Vegetation intercepts rainfall, facilitates infiltration, stabilizes soils, and contributes to evapotranspiration. When forest or other permeable surfaces are replaced by roads and buildings, rainfall can move more rapidly across the landscape, increasing runoff and potentially changing the timing and magnitude of river flows. The study by Handyastono et al. (2025) on Pemaluan provides evidence that changes in the catchment associated with IKN development are relevant to flood-hazard patterns. Their findings indicate that areas classified as high flood hazard increased between 2019 and 2023, highlighting the need to consider hydrological consequences as part of the environmental evaluation of urban development.

The hydrological dimension reinforces the argument that vegetation cannot be treated simply as a visual component of a green city. Its ecological functions are embedded in broader landscape processes. Forests, wetlands, rivers, and soil systems interact to regulate water movement and provide ecosystem services that are difficult to reproduce through engineered infrastructure alone. If development replaces these functions with drainage channels, retention structures, or artificial landscaping, the resulting city may remain visually green while its underlying ecological processes have been substantially altered. This does not mean that engineered systems are inherently inappropriate; rather, it suggests that green infrastructure should complement rather than simply substitute for functioning natural systems.

The distinction between ecological restoration and landscaping is therefore critical. Landscaping can create tree-lined streets, parks, gardens, and attractive public spaces, all of which may improve urban comfort and provide social benefits. Ecological restoration, by contrast, seeks to recover ecosystem structure and function. The two may overlap, but they should not be treated as equivalent. A city can contain extensive landscaped areas without possessing the biodiversity, carbon-storage capacity, hydrological functions, or ecological connectivity associated with mature forest ecosystems. For IKN, this distinction matters because the Forest City concept carries a stronger ecological implication than conventional

urban greening. If “forest” becomes primarily a branding device for landscaped urban space, the concept risks losing its ecological substance.

The challenge is further illustrated by the changing land-use dynamics in the wider region surrounding IKN. Kiswanto et al. (2025), examining forestry and agricultural landscapes in Kutai Kartanegara, found substantial spatial variation in forest and agricultural resources and reported declining forest cover in both dryland and wetland areas. Their study emphasizes the importance of integrating forest conservation, food production, and urban development within broader regional land-use planning. This is relevant because IKN does not exist independently of its surrounding landscape. Urban expansion can create indirect pressures on nearby forests and agricultural areas through increased demand for food, housing, transportation, and other resources.

This regional perspective also challenges an assessment approach that focuses exclusively on the administrative boundaries of IKN. If development within the capital is accompanied by the displacement of environmental pressures into surrounding districts, a city could theoretically achieve favorable internal environmental indicators while generating negative externalities elsewhere. Such displacement is particularly relevant to climate and ecological accounting because carbon emissions, habitat fragmentation, and hydrological impacts do not necessarily correspond to administrative boundaries. The environmental performance of IKN should therefore be evaluated at an appropriate landscape scale, including areas functionally connected to the capital through watersheds, ecological corridors, food systems, and transportation networks.

The Forest City model nevertheless contains potentially valuable principles for addressing these problems. The emphasis on restoration, biodiversity management, ecological connectivity, and controlled development provides a conceptual basis for moving beyond conventional urban expansion. The IKN Biodiversity Management Master Plan, for example, explicitly recognizes biodiversity protection and ecosystem restoration as components of the city’s environmental strategy (OIKN 2024). Such commitments create an opportunity to establish measurable ecological targets rather than treating sustainability as a purely symbolic component of urban branding. The effectiveness of the model, however, depends on whether these commitments are translated into transparent indicators, long-term monitoring, and enforceable spatial controls.

This suggests that the most appropriate question is not whether IKN is already a Forest City in a binary sense. Rather, it is whether the development trajectory is moving toward or away from the ecological conditions implied by that concept. Such an assessment requires longitudinal monitoring of vegetation cover, forest fragmentation, carbon stocks, biodiversity, watershed conditions, and land-use conversion. Satellite-based monitoring can provide important evidence of changes in vegetation and built-up areas, but remote sensing should be complemented by field-based ecological assessment. Vegetation indices can identify changes in

greenness, but they cannot alone establish whether a forest has retained its biodiversity, carbon density, or ecological functionality.

A robust evaluation should therefore distinguish at least three dimensions of environmental performance. The first is quantity, referring to the area of forest and other vegetation retained or restored. The second is quality, referring to ecological condition, species composition, biomass, carbon density, and habitat integrity. The third is connectivity, referring to the spatial relationship between forest patches, waterways, and other ecological systems. A development strategy that performs well in the first dimension but poorly in the second and third should not automatically be regarded as environmentally successful. Conversely, a strategy that reduces some existing degradation while restoring degraded areas may produce genuine ecological benefits even if the landscape does not retain the same configuration as before development.

The central implication is that the Forest City concept must be evaluated as a dynamic ecological process rather than a static land-use target. IKN is being constructed on a landscape with a complex history of forest loss, agriculture, plantations, settlements, and infrastructure development. Its sustainability therefore depends on whether new development can be accommodated while improving the ecological condition of the broader landscape. The challenge is especially significant because urban infrastructure is relatively permanent, whereas ecological restoration is gradual and vulnerable to future disturbance. Once mature vegetation has been removed and landscapes fragmented, the ecological functions lost may not be recoverable within the same temporal horizon as the infrastructure investment.

From a climate perspective, this temporal asymmetry makes carbon accounting particularly important. Immediate emissions and carbon-stock losses occur during construction, while the benefits of restoration and urban vegetation accumulate over much longer periods. If these time horizons are treated as equivalent, the climate performance of the project may be overstated. A more rigorous approach would separately account for existing carbon stocks, emissions associated with land conversion and construction, annual sequestration from restoration, and the expected permanence of restored carbon. Such accounting would make it possible to determine whether the Forest City model produces a genuine net climate benefit rather than relying primarily on projected future greening.

The material evidence therefore complicates a simple opposition between “Forest City” and “forest under pressure.” IKN contains substantial forest and vegetation resources, and its planning framework explicitly seeks to protect and restore them. At the same time, infrastructure expansion is transforming portions of the landscape, and existing studies demonstrate measurable changes in land cover and hydrological conditions. The appropriate conclusion is not that the Forest City concept is inherently false, but that its environmental legitimacy remains contingent upon how development affects ecological quantity, quality, connectivity, and

carbon storage over time. The label “Forest City” becomes meaningful only when these dimensions are demonstrably protected or improved.

This leads to a broader understanding of green urban development. Environmental performance should not be measured solely by the appearance of the completed city or by the proportion of land designated as green. It should be assessed through the ecological processes that connect the city to its surrounding landscape and through the long-term trajectory of vegetation, carbon, biodiversity, and water systems. In the case of IKN, the decisive issue is therefore whether urban development can become compatible with ecological restoration rather than simply being accompanied by green landscaping. The distinction matters because a city can be visually green while its ecological foundations are progressively weakened.

The evidence reviewed here establishes the ecological dimension of the Forest City debate, but it also raises a question that cannot be answered through land-cover analysis alone: who experiences the consequences of these landscape transformations? Changes in forests, watersheds, and agricultural areas affect not only ecological indicators but also access to land, livelihoods, cultural practices, and local environmental security. The next section therefore moves from ecological transformation to the social geography of IKN development by examining infrastructure expansion, environmental pressure, and the ways in which these changes intersect with climate justice.

Infrastructure Expansion and Ecological Pressure

The materialization of Nusantara as a new capital necessarily requires extensive infrastructure development. Roads, government complexes, residential areas, public facilities, water systems, energy infrastructure, and transportation networks constitute the physical foundation through which the Forest City concept is expected to operate. From the perspective of urban planning, such infrastructure is indispensable: a capital city cannot function without connectivity, housing, utilities, public services, and administrative facilities. The environmental question, therefore, is not whether infrastructure should be built, but how the construction and spatial organization of infrastructure alter ecological processes. In the case of IKN, this question is particularly important because the city is being constructed within a landscape in which forests, plantations, agricultural areas, rivers, and settlements are spatially interconnected. Infrastructure can consequently generate environmental effects beyond the footprint of individual buildings or roads.

The scale of infrastructure development also demonstrates that IKN should not be understood simply as the construction of a compact urban center. The development trajectory includes extensive transportation and utility networks intended to connect the new capital with Balikpapan and surrounding areas. Government planning for the second stage of development includes additional connectivity infrastructure, public facilities, green open spaces, and the development of the Sepaku area (OIKN 2025a). The official development

framework consequently combines the construction of the administrative core with a broader regional transformation. This distinction matters because the environmental footprint of a city is not determined only by its buildings. Roads, bridges, drainage systems, reservoirs, transmission infrastructure, construction corridors, and supporting settlements can collectively transform a much larger landscape than the final built-up area suggests.

Transportation infrastructure is particularly important because roads can function as both direct and indirect drivers of landscape change. The construction of a road requires vegetation clearance, earthworks, drainage, and changes in slope and soil conditions. Once constructed, roads increase accessibility to previously less accessible areas, potentially stimulating settlement, commercial activity, land speculation, and further land conversion. The environmental footprint of a road is therefore not limited to its paved surface. Its wider influence can extend into adjacent forest and agricultural landscapes through increased human activity and fragmentation. For a forest-oriented city, this creates a fundamental planning challenge: transportation connectivity is necessary for urban functioning, but the same connectivity can increase ecological permeability for people and reduce ecological connectivity for wildlife.

The problem of fragmentation is particularly significant in forest landscapes. A continuous forest ecosystem can be divided into smaller patches when roads and other infrastructure cross previously connected areas. Fragmentation changes the ratio between forest interior and forest edge, increases exposure to human activity, and can affect species movement and habitat suitability. The resulting ecological effects may occur even when the total area classified as forest changes only modestly. This is why the environmental evaluation of IKN should consider the configuration of infrastructure in relation to ecological corridors rather than assessing forest loss solely through aggregate hectares. The IKN Biodiversity Management Master Plan explicitly identifies wildlife corridors and green infrastructure as components of its biodiversity strategy, indicating that the planning framework itself recognizes connectivity as an important ecological concern (OIKN 2025b).

The relationship between infrastructure and water systems provides another important dimension of ecological pressure. Roads and buildings introduce impervious surfaces that alter rainfall infiltration and surface runoff. Construction can also modify drainage channels, compact soil, remove vegetation, and change the elevation and topography of particular sites. These changes can affect the speed at which rainfall reaches rivers and streams and may increase local flood exposure if drainage capacity does not correspond to altered hydrological conditions. In the context of IKN, this issue has particular relevance because the development area contains several watersheds and river systems that interact with surrounding settlements.

Evidence from Pemaluan provides an empirical illustration of this relationship. Handyastono et al. (2025) examined flood hazards in Pemaluan Village using

hydraulic modelling and found that land-cover changes associated with the development of IKN were accompanied by changes in the flood hazard pattern of the Pemaluan River catchment. The study reported that flood-hazard areas increased substantially between 2019 and 2023 and concluded that land-use changes associated with the development trajectory of IKN should be considered in understanding local flood risks (Handyastono et al. 2025). The significance of this finding lies not in establishing a simple causal relationship between every construction activity and flooding, but in demonstrating that urban development can modify watershed conditions in ways that extend beyond construction sites.

This hydrological dimension exposes a potential contradiction within the Forest City model. Forests are not simply areas that can be preserved visually around buildings; they perform hydrological functions through interception, infiltration, evapotranspiration, and soil stabilization. If infrastructure replaces these functions with engineered drainage systems, the city may retain a green appearance while becoming increasingly dependent on artificial mechanisms to manage water. Engineered drainage and retention infrastructure can certainly reduce environmental risks, but they should be considered complementary to the conservation of natural hydrological systems rather than a complete substitute for them. The sustainability of IKN therefore depends partly on whether its infrastructure is designed around existing ecological processes or whether natural systems are progressively modified to accommodate infrastructure.

The development of water infrastructure illustrates this tension. IKN requires reliable water supplies and flood-management systems as part of its urban expansion. The construction of reservoirs, retention ponds, drainage systems, and related infrastructure can provide important climate-adaptation functions. However, these interventions also occupy land and alter hydrological processes. The OIKN's 2025 planning and infrastructure program explicitly includes reservoirs and retention facilities as part of efforts to secure sustainable water availability and improve urban resilience (OIKN 2025c). Such infrastructure should therefore be evaluated according to both its intended climate-adaptation benefits and its ecological implications, including effects on downstream flows, wetlands, aquatic habitats, and surrounding communities.

Infrastructure expansion also produces environmental impacts through construction materials and energy use. Roads, buildings, bridges, and utilities require substantial quantities of cement, steel, aggregates, asphalt, glass, and other materials whose production is associated with greenhouse-gas emissions and resource extraction. These impacts are often geographically separated from the city itself because construction materials may be produced elsewhere and transported into the development area. Consequently, the environmental footprint of IKN cannot be measured only through emissions or land transformation occurring within its administrative boundaries. A comprehensive assessment should incorporate embodied carbon and upstream resource impacts associated with the infrastructure system. This point is particularly relevant to the Forest City concept

because a city may achieve low operational emissions while carrying substantial embodied emissions from the construction of its physical infrastructure.

The construction phase also generates temporary but potentially significant ecological pressures. Heavy machinery, excavation, soil movement, construction traffic, and temporary worker settlements can increase dust, noise, sedimentation, and disturbance. Soil exposure can increase erosion during heavy rainfall, while sediment entering waterways can affect aquatic ecosystems. Construction activity can also create temporary drainage pathways and alter surface-water flows. These pressures may be individually reversible, but their cumulative effects can become significant when construction occurs across multiple sites simultaneously. The scale and duration of IKN development therefore make cumulative environmental monitoring essential.

The environmental consequences of infrastructure are consequently best understood through a landscape approach. A building-level environmental assessment may establish that a particular project complies with applicable standards, but it may not capture the combined effects of multiple projects occupying the same watershed or ecological corridor. The simultaneous construction of roads, government buildings, housing, commercial areas, and utilities can produce cumulative effects that emerge only at a larger spatial scale. Such effects include fragmentation, increased runoff, changes in sediment transport, habitat disturbance, and increased accessibility to previously less-developed areas. The Forest City model therefore requires environmental governance that evaluates the interaction between infrastructure projects rather than treating each project as an isolated intervention.

This issue is particularly important because IKN's development is planned over multiple stages extending toward 2045. The long development horizon creates opportunities for adaptive environmental management but also creates risks of cumulative transformation. An individual project may appear relatively limited when considered in isolation, while the accumulation of infrastructure over two decades could fundamentally alter the structure of the landscape. Long-term planning therefore needs mechanisms that can adjust development trajectories when environmental indicators deteriorate. Vegetation monitoring, biodiversity surveys, hydrological measurements, and carbon accounting should not be conducted only before construction begins; they should continue throughout the development process and inform subsequent planning decisions.

The relationship between infrastructure and ecological pressure is also complicated by the fact that some infrastructure is explicitly designed to produce environmental benefits. Green corridors, ecological restoration areas, public parks, water-retention facilities, renewable-energy systems, and energy-efficient buildings can reduce particular environmental pressures. The IKN Biodiversity Management Master Plan incorporates green infrastructure, wildlife corridors, and ecosystem restoration as part of the city's environmental strategy (OIKN 2025b). This indicates that infrastructure should not automatically be conceptualized as environmentally

destructive. The more useful analytical distinction is between infrastructure that supports ecological functions and infrastructure that displaces or fragments ecological functions. A road crossing a wildlife corridor without adequate mitigation, for example, creates a different ecological outcome from a transportation system deliberately designed to preserve connectivity through wildlife crossings and protected corridors.

This distinction also highlights the importance of spatial planning. The environmental performance of IKN will depend not only on the technologies used to construct individual buildings but on where infrastructure is located relative to forests, rivers, wetlands, agricultural land, and settlements. Strategic spatial planning can reduce ecological pressure by directing development toward already-modified areas and avoiding high-value ecological zones. Conversely, infrastructure that opens previously intact or ecologically important landscapes can create long-term pressures that are difficult to reverse. The principle of avoiding environmentally sensitive areas before attempting to compensate for damage is therefore particularly relevant to the Forest City concept.

A related concern is the possibility of green substitution, in which ecological losses are compensated through the creation of new green areas elsewhere. Such strategies can be useful when ecological impacts cannot be completely avoided, but they should not be interpreted as proof that all forms of ecological loss are interchangeable. A mature forest patch, a newly planted urban park, and a landscaped roadside may all be classified as vegetated land while performing very different ecological functions. If infrastructure development removes ecologically complex areas and replaces them with simplified vegetation, the numerical amount of green space may remain relatively stable while biodiversity, carbon storage, and ecological connectivity decline. Environmental accounting must therefore consider the quality and function of ecosystems rather than treating all vegetation as equivalent.

The issue becomes especially important when considering the relationship between IKN and biodiversity. The Forest City vision explicitly identifies biodiversity conservation as one of its objectives, while the construction of infrastructure inevitably creates potential disturbance for terrestrial and aquatic species. Habitat fragmentation can restrict movement, construction noise can disturb wildlife, and increased human activity can alter species behavior. These impacts may be difficult to capture through conventional urban environmental indicators such as air quality or percentage of green space. Biodiversity monitoring must therefore be integrated into infrastructure planning rather than treated as a separate conservation program operating alongside urban development.

The same principle applies to ecological corridors. The existence of protected forest areas does not necessarily guarantee ecological connectivity if infrastructure divides them into isolated units. Corridors need sufficient width, continuity, and ecological quality to facilitate species movement. They also need to remain protected as infrastructure expands. The incorporation of wildlife corridors into

IKN's biodiversity planning is therefore potentially significant, but its effectiveness will depend on whether these corridors remain functionally connected as additional roads, settlements, and facilities are constructed. The long-term credibility of the Forest City concept will consequently depend partly on whether ecological corridors are treated as development constraints or merely as aesthetic components of urban planning.

The scale of IKN also creates an important distinction between direct and indirect infrastructure impacts. Direct impacts occur where roads, buildings, and utilities physically replace vegetation or modify land. Indirect impacts arise from the increased accessibility and economic activity created by infrastructure. Improved roads can facilitate settlement expansion, commercial development, tourism, resource extraction, and land-value changes beyond the original project footprint. These secondary effects can become more difficult to control because they involve decisions by multiple actors responding to improved connectivity and new economic opportunities. Environmental planning for IKN must therefore consider not only the infrastructure that the state directly constructs but also the land-use changes that infrastructure makes possible.

The regional dimension is especially important because IKN is intended to become a new center of economic activity rather than merely a government enclave. As population, investment, and services increase, demand for housing, food, transportation, construction materials, and water will also increase. These demands can generate environmental pressures outside the core administrative area. For example, increased demand for housing can encourage land conversion around transportation corridors, while increased food demand can place additional pressure on agricultural land and surrounding forests. A city cannot therefore be environmentally sustainable solely within its formal boundaries if its consumption patterns generate substantial ecological pressures in neighboring territories.

The infrastructure challenge consequently reveals a central tension in the Forest City model. The city requires extensive physical connectivity to function, but connectivity can simultaneously increase ecological fragmentation and accelerate land-use change. It requires water infrastructure to improve resilience, but poorly integrated water infrastructure can alter natural hydrological systems. It requires buildings and roads designed according to green standards, but the construction of those structures still generates embodied carbon and material demand. These contradictions do not mean that sustainable infrastructure is impossible. Rather, they demonstrate that infrastructure must be evaluated according to its entire ecological system rather than through the environmental performance of individual technologies.

A more comprehensive evaluation would therefore combine several indicators: changes in impervious surface area, road density, forest fragmentation, watershed characteristics, flood exposure, biodiversity indicators, construction-related carbon emissions, and the spatial distribution of ecological infrastructure. Such indicators could be monitored through a combination of remote sensing, hydrological

modelling, ecological field surveys, and construction data. The objective should not be to prevent all physical transformation, which would be incompatible with the development of a functioning capital city, but to identify thresholds beyond which ecological degradation becomes inconsistent with the Forest City objective.

This approach also supports the principle of adaptive urban development. Rather than assuming that the original master plan will remain environmentally appropriate throughout the entire construction period, IKN should be treated as a long-term experiment in which planning decisions are adjusted according to observed ecological outcomes. If monitoring demonstrates increasing flood exposure, declining vegetation connectivity, or significant biodiversity impacts, subsequent infrastructure planning should be modified accordingly. Such an approach would transform environmental monitoring from a compliance exercise into a mechanism for learning and policy adjustment.

The significance of infrastructure expansion therefore extends beyond the physical construction of Nusantara. It determines the spatial relationship between the city and the ecosystems on which its sustainability depends. A forest city cannot be evaluated only by the amount of forest remaining after roads and buildings are constructed; it must also be evaluated according to whether those infrastructures maintain ecological connectivity, protect watershed functions, reduce embodied emissions, and limit indirect land-use pressures. The environmental quality of IKN will ultimately emerge from the interaction between built and natural systems rather than from either system considered independently.

The evidence suggests that IKN's infrastructure development presents both risks and opportunities. On one hand, roads, buildings, and supporting infrastructure can accelerate landscape transformation, fragmentation, runoff, and resource consumption. On the other hand, the project provides an opportunity to demonstrate how infrastructure can be deliberately designed around ecological systems through green corridors, water-sensitive planning, energy efficiency, restoration, and spatial controls. The outcome is therefore not predetermined by the existence of construction itself. It depends on whether environmental constraints are treated as fundamental parameters of development or as issues to be addressed after infrastructure decisions have already been made.

The central implication is that the “Forest City” concept must extend beyond architectural and technological design to encompass the ecological geography of infrastructure. A genuinely sustainable capital city should not simply place green elements around buildings; it should organize infrastructure in ways that maintain the functions of the wider landscape. This requires cumulative assessment, long-term monitoring, ecological thresholds, and adaptive planning throughout the development period. The success of IKN's green-development model should consequently be measured not only by the efficiency of completed buildings but by whether the infrastructure system allows forests, rivers, biodiversity, and communities to remain functionally connected to the city.

Yet ecological pressure cannot be understood entirely through biophysical indicators. Roads, housing, water infrastructure, and land-use transformation also redistribute access to land, resources, mobility, and economic opportunity. The people living within and around the development area may experience the consequences of infrastructure expansion differently from investors, state institutions, new residents, and the broader population expected to benefit from the new capital. This distributional dimension leads directly to the final substantive question of the article: who benefits from IKN's green development, who bears its environmental costs, and whose rights and knowledge are recognized in decisions concerning the transformation of the landscape? The next section addresses these questions through the framework of climate justice and examines the legal and institutional mechanisms governing participation, land, environmental protection, and community rights.

IKN and Climate Justice: Distribution, Participation, Recognition, and Legal Governance

The ecological consequences of IKN development cannot be separated from the question of how environmental benefits and burdens are distributed. The Forest City narrative presents Nusantara as a national project intended to generate long-term public benefits through sustainable urban development, improved infrastructure, economic growth, and environmental restoration. Yet the benefits of such a project are likely to be distributed across national and regional scales, whereas many of the environmental and social costs associated with land transformation are experienced locally. This spatial asymmetry provides an important starting point for examining IKN through the lens of climate justice. Climate justice is not concerned only with reducing aggregate emissions or increasing environmental efficiency; it also asks who benefits, who bears risks, who participates in decision-making, and whose values and interests are recognized in environmental governance (Schlosberg 2007; Schlosberg and Collins 2014).

From this perspective, the environmental legitimacy of IKN cannot be determined solely by whether the project meets its stated green-development targets. A climate-just development model requires attention to at least three interconnected dimensions: distribution, participation, and recognition. Distributive justice concerns the allocation of environmental benefits and burdens; procedural justice concerns access to information, participation, representation, and decision-making; and recognitional justice concerns whether the identities, histories, knowledge systems, and claims of affected groups are acknowledged (Schlosberg 2007). These dimensions are particularly relevant to IKN because the project involves a major transformation of territory in which state interests, investment priorities, conservation objectives, and existing community relationships with land intersect.

The distributive dimension begins with the fundamental distinction between the scale at which benefits are generated and the scale at which costs are

experienced. IKN is intended to function as a national political and economic center, meaning that its anticipated benefits extend beyond East Kalimantan. Improved administrative infrastructure, new investment, employment opportunities, and the development of a new economic center are framed as national development benefits. Law No. 3 of 2022 explicitly describes Nusantara as a city intended to become a sustainable world city, a future driver of the Indonesian economy, and a symbol of national identity (Republic of Indonesia 2022). The project therefore has a strong public-interest justification. However, public-interest claims do not automatically demonstrate that the distribution of costs is equitable.

Environmental justice scholarship has long emphasized that projects justified in terms of aggregate public benefits may nevertheless impose disproportionate burdens on particular communities (Bullard 2000; Walker 2012). In the IKN context, the relevant burdens include changes in access to land, restrictions on traditional resource use, ecological disturbance, changes in livelihoods, relocation pressures, and the uncertainty associated with land tenure. These burdens are particularly significant where communities depend directly on forests, agricultural land, rivers, and other natural resources. If the benefits of a green capital accrue primarily to national institutions, investors, and future urban residents while local communities absorb the immediate costs of territorial transformation, the project risks reproducing the distributive inequalities that climate justice seeks to address.

Land is therefore central to the distributive question. The acquisition and management of land for IKN are governed by a specialized legal framework. Presidential Regulation No. 65 of 2022 provides mechanisms for land acquisition and management in Nusantara, including forest-area release and land acquisition for public-interest development. The regulation also explicitly states that land acquisition should take into account the interests of existing land-right holders in the IKN area (Republic of Indonesia 2022b). This provision is important because it establishes a legal recognition that the state's development objectives must coexist with existing land rights. However, the existence of such recognition at the normative level does not necessarily guarantee equitable outcomes in practice. The central issue is how rights are identified, valued, compensated, and protected when formal land administration does not fully capture customary or socially embedded relationships with territory.

This problem is particularly acute for Indigenous communities. Indigenous and customary territories may be governed through collective practices, customary institutions, oral histories, and relationships that do not correspond neatly to formal certificates of land ownership. Where legal recognition depends heavily on formal documentation, communities whose claims are based on customary tenure may face structural disadvantages during land acquisition. Syafitri et al. (2024) argue that the legal framework surrounding IKN creates significant concerns for Indigenous communities, particularly because the extension of land rights for business entities can interact with unresolved customary claims and potentially increase pressures

on forests and community livelihoods. Their analysis suggests that the environmental consequences of land governance cannot be separated from the legal status of communities whose relationships with land remain insufficiently recognized.

The issue becomes more complicated because the IKN legal framework grants the Otorita Ibu Kota Nusantara substantial authority over land management. Law No. 21 of 2023, which amended Law No. 3 of 2022, strengthened the institutional authority of the IKN Authority over the preparation, construction, relocation, and administration of Nusantara (Republic of Indonesia 2023). Such institutional concentration can potentially facilitate coordinated planning, but it also creates a governance challenge. A powerful development authority can accelerate decision-making and reduce bureaucratic fragmentation, yet the concentration of authority increases the importance of transparency, accountability, and meaningful public participation. Without strong countervailing mechanisms, administrative efficiency may come at the expense of procedural justice.

The legal controversy surrounding land rights in IKN illustrates this tension. Article 16A of the IKN Law, as amended in 2023, introduced extended periods for certain land rights associated with investment arrangements. The Constitutional Court subsequently reviewed these provisions in Decision No. 185/PUU-XXII/2024 and declared the relevant provisions conditionally unconstitutional, requiring the periods of land rights to be interpreted within specified maximum durations and subject to evaluation (Constitutional Court of the Republic of Indonesia 2024). The decision is significant beyond the technical issue of land-right duration. It demonstrates that the legal architecture of IKN's investment model is not immune from constitutional scrutiny concerning the balance between development, land control, and public interests. It also illustrates that climate justice has an institutional dimension: the protection of future environmental and social interests depends partly on whether legal mechanisms can constrain development arrangements that create long-term consequences.

The relationship between investment facilitation and environmental justice is therefore especially important. IKN has been designed to attract private investment and accelerate economic development. Government regulations provide various forms of investment facilitation, including through Government Regulation No. 12 of 2023, later amended by Government Regulation No. 29 of 2024 (Republic of Indonesia 2023b; Republic of Indonesia 2024). Investment can contribute to infrastructure, employment, and regional economic development, but investment incentives also create the possibility that land and environmental governance will be oriented strongly toward investment certainty. From a climate-justice perspective, investment certainty should not be treated as a substitute for environmental and social certainty. Investors may require clear land rights and predictable regulations, but communities similarly require predictable protection against displacement, loss of livelihood, and ecological degradation.

This is where procedural justice becomes essential. Indonesian environmental law formally provides a substantial basis for public participation. Law No. 32 of 2009 on Environmental Protection and Management recognizes the right of communities to participate in environmental protection and management, including through social monitoring, the provision of suggestions and objections, complaints, and the submission of information (Republic of Indonesia 2009). Article 70 is particularly important because it frames community participation not merely as consultation but as a component of environmental governance. The law also recognizes the importance of local wisdom and community involvement in environmental management.

The implementation of this principle in a mega-project such as IKN, however, raises a more demanding question: what constitutes meaningful participation? Participation can become procedural rather than substantive if communities are informed about decisions that have already been made rather than given a genuine opportunity to influence them. Arnstein's (1969) classic conception of the "ladder of citizen participation" remains relevant here because it distinguishes between symbolic forms of participation and forms that provide citizens with actual influence over decisions. In climate-justice terms, a meeting, consultation, or public hearing does not necessarily establish procedural justice if the underlying distribution of decision-making power remains unchanged.

Research specifically examining IKN has raised concerns in this regard. Halmadinigrat and Firdharizki (2024) argue that the formulation of the IKN legal framework was accompanied by limited public participation and that this has implications for the protection of Indigenous rights in East Kalimantan. Their analysis suggests that the problem is not simply whether communities are consulted during individual development projects, but whether affected groups are able to participate in shaping the broader legal and institutional framework through which their territories are transformed. This distinction is crucial because decisions about spatial planning and institutional design can determine the conditions under which later environmental and land-use decisions are made.

Participation is also closely connected to access to environmental information. A community cannot meaningfully participate in decisions concerning land transformation if it lacks information about development boundaries, environmental assessments, compensation mechanisms, relocation plans, ecological risks, and future land-use scenarios. Environmental governance therefore requires not only formal participation opportunities but also accessible and timely information. PP No. 22 of 2021 establishes a framework for environmental approvals, environmental quality management, monitoring, information systems, supervision, and administrative sanctions (Republic of Indonesia 2021). The legal framework consequently provides institutional tools through which environmental risks can theoretically be identified and controlled before and during development. The critical issue is whether these mechanisms operate transparently and whether affected communities can use them effectively.

Environmental impact assessment is particularly relevant in this context. Large-scale infrastructure and urban development projects can generate cumulative environmental effects that are not adequately captured when each project is considered separately. An environmental approval system can identify direct impacts, mitigation measures, and environmental obligations, but climate justice requires consideration of who is exposed to residual risks and whether affected communities possess sufficient institutional capacity to challenge inadequate assessments. This is particularly important for IKN because multiple infrastructure projects are occurring within a common ecological landscape. Environmental assessment therefore needs to account for cumulative and landscape-level effects rather than merely demonstrating compliance at the project level.

The principle of recognition adds another layer to this analysis. Recognition means more than formally acknowledging that communities exist. It requires recognizing that communities may have legitimate and distinct relationships with land that are not reducible to market value. Fraser (2000) argues that justice requires overcoming patterns of institutionalized misrecognition that place certain groups in subordinate positions. Applied to IKN, this means asking whether customary territories, cultural landscapes, traditional livelihoods, and Indigenous ecological knowledge are treated as legitimate components of territorial governance. If land is understood primarily as a commodity or development asset, the social and cultural values attached to it may disappear from official calculations.

This problem is particularly significant for communities whose livelihoods depend on forests and agricultural landscapes. Niko (2024) documents concerns regarding displacement and changes in livelihood systems among Indigenous communities affected by the IKN project. The analysis highlights that territorial transformation can affect not only physical residence but also access to livelihood resources and established social practices. Relocation, therefore, should not be understood merely as the movement of households from one geographical location to another. It can involve the restructuring of economic relationships, social networks, cultural practices, and access to natural resources. A compensation package that addresses the monetary value of a parcel of land may consequently fail to compensate for the broader social and ecological value of the territory.

This limitation is also reflected in recent legal scholarship on land acquisition in IKN. Permadi, Dungga, and Arshad (2025) find that although Indonesian law provides normative protection for Indigenous rights, implementation continues to face challenges concerning the recognition of land ownership, compensation, relocation, and cultural preservation. They emphasize the need for stronger legal mechanisms to ensure that Indigenous rights are protected during land acquisition processes. Similarly, Al Hidayah, Subroto, and Utomo (2025) identify practical challenges in the application of land regulations to local communities in the IKN area, particularly concerning the relationship between formal land governance and the rights of local and Indigenous populations.

The legal framework for land acquisition illustrates the difference between formal legality and substantive justice. PP No. 39 of 2023, which amended PP No. 19 of 2021, requires land-acquisition planning documents to identify, among other matters, the purpose and benefits of development, the location and area of land required, the general status of land, implementation timelines, estimated land values, and forms of compensation (Republic of Indonesia 2023c). These requirements establish an important procedural structure. Yet the justice of land acquisition cannot be determined solely by whether the correct documents are produced. The more difficult question is whether the valuation of land adequately captures the social, cultural, ecological, and intergenerational dimensions of territory.

This is particularly important because the IKN land regime creates a strong institutional role for the state in managing acquired land. Under Presidential Regulation No. 65 of 2022, land obtained through forest-area release and land acquisition may become state property or assets under the control of the IKN Authority (Republic of Indonesia 2022b). The arrangement provides the government with substantial capacity to organize land for strategic development. From an administrative perspective, this may support coordinated spatial planning. From a climate-justice perspective, however, it creates a corresponding obligation to ensure that centralized control does not weaken the rights and bargaining position of communities affected by land transformation.

The issue is therefore not simply whether the state has legal authority to acquire and manage land. It is whether that authority is exercised according to principles of ecological sustainability, public accountability, and social justice. This distinction is particularly important in IKN because the project is simultaneously a national strategic project, an investment platform, an environmental restoration initiative, and a territorial reorganization process. These objectives may sometimes reinforce one another, but they can also conflict. Accelerating investment may increase pressure for rapid land availability; environmental restoration may restrict certain forms of development; community recognition may complicate standardized land acquisition; and conservation objectives may limit economic uses of land. Climate justice requires these conflicts to be made visible rather than hidden behind the general category of “sustainable development.”

The legal framework also provides an important basis for environmental accountability. Law No. 32 of 2009 establishes environmental rights, obligations, public participation, monitoring, dispute resolution, and sanctions, while PP No. 22 of 2021 provides a more detailed regulatory framework for environmental approvals and environmental management (Republic of Indonesia 2009; Republic of Indonesia 2021). The relevance of these instruments to IKN is substantial because the Forest City claim depends upon enforceable environmental obligations rather than voluntary commitments. If ecological targets are not translated into measurable standards and monitored through effective oversight, the Forest City concept risks becoming primarily discursive.

The relationship between environmental rights and public participation was further strengthened by the Constitutional Court's 2025 decision concerning Article 66 of Law No. 32 of 2009. In Decision No. 119/PUU-XXIII/2025, the Court conditionally interpreted the provision to protect not only victims but also reporters, witnesses, experts, and environmental activists who participate in environmental protection or pursue legal remedies against pollution and environmental damage (Constitutional Court of the Republic of Indonesia 2025). The decision is highly relevant to climate justice because effective participation requires protection against retaliation. Communities and civil-society organizations cannot meaningfully monitor environmental performance if participation creates an unreasonable risk of legal or other forms of retaliation.

This principle is particularly important in a large-scale project with substantial political and economic significance. Environmental criticism of IKN should not automatically be interpreted as opposition to national development. Democratic environmental governance requires space for disagreement, evidence-based criticism, complaints, and legal challenges. Such mechanisms can improve rather than undermine sustainable development by identifying unintended environmental consequences and forcing decision-makers to justify trade-offs. In this sense, procedural justice should be understood as an institutional resource for better environmental governance rather than simply an obstacle to project implementation.

The IKN case also demonstrates why climate justice should be understood across generations. Decisions regarding land use, infrastructure, and investment can have consequences extending far beyond the current generation. The Constitutional Court's intervention concerning extended land-right periods is relevant in this respect because long-duration rights arrangements can constrain future policy choices and influence how land is used for decades. Climate justice therefore includes an intergenerational dimension: present development should not foreclose the ability of future communities to determine how ecological resources and territories are governed (Caney 2010). The principle is particularly significant for a capital city intended to develop over several decades.

The intergenerational issue is also visible in the ecological dimension of the Forest City concept. If mature vegetation is removed today while restoration benefits emerge only decades later, the current generation may receive infrastructure and economic benefits while future generations inherit the consequences of ecological degradation or the costs of restoration. Conversely, if restoration successfully creates resilient forests, future generations may inherit environmental assets that were not available to the current population. Climate justice therefore requires evaluating not only the immediate distribution of costs and benefits but also the temporal distribution of environmental consequences.

At the same time, it would be overly simplistic to portray local communities solely as victims and the state or investors solely as beneficiaries. Communities may have diverse interests, and some may support IKN because of opportunities for

employment, infrastructure, education, health services, or regional economic development. Climate justice does not require rejecting development; rather, it requires ensuring that development does not systematically privilege some groups while marginalizing others. Agyeman, Bullard, and Evans (2003) emphasize that sustainability must be linked to equity and quality of life rather than treated as an exclusively ecological objective. In IKN, this means that the social benefits of development should be evaluated alongside environmental impacts rather than treated as separate policy domains.

This point is important because a narrowly conservationist approach could itself produce injustice. Protecting forests by restricting community access without recognizing customary rights or providing viable livelihood alternatives could impose new burdens on local populations. Similarly, relocating communities in the name of ecological restoration could reproduce the very exclusion that climate justice seeks to overcome. The Forest City model therefore needs to distinguish between conservation of ecosystems and conservation through exclusion. Ecological protection is more likely to be socially legitimate when communities are recognized as rights-bearing actors and, where appropriate, partners in environmental management.

A more just governance model would therefore integrate environmental protection with community-based territorial governance. This could include participatory mapping of customary territories, transparent disclosure of development boundaries, independent monitoring of environmental impacts, culturally appropriate compensation, livelihood restoration, community participation in ecological restoration, and accessible grievance mechanisms. Such measures would move participation beyond consultation toward shared environmental governance. They would also help ensure that local knowledge contributes to decisions concerning forests, water, biodiversity, and land use.

The legal architecture of IKN provides some of the institutional foundations for such an approach, but it also reveals significant tensions. Law No. 3 of 2022 and its 2023 amendment provide the institutional basis for rapid development and give the IKN Authority substantial administrative powers. Presidential Regulation No. 65 of 2022 establishes specialized mechanisms for land acquisition and land management. PP No. 22 of 2021 provides environmental governance mechanisms, while Law No. 32 of 2009 establishes environmental rights and public participation. Together, these instruments create a relatively extensive formal framework. Yet the existence of multiple legal instruments does not automatically guarantee climate justice. The effectiveness of the framework depends on coordination, transparency, recognition of customary rights, institutional accountability, and the capacity of affected communities to exercise their rights.

This distinction between law on the books and law in practice is central to understanding IKN. The research of Syafitri et al. (2024), Halmadiningrat and Firdharizki (2024), Permadi, Dungga, and Arshad (2025), and Al Hidayah, Subroto, and Utomo (2025) collectively indicates that legal recognition of community

interests remains accompanied by practical difficulties involving customary land, participation, compensation, and implementation. These findings suggest that the principal challenge is no longer simply the absence of legal norms. Rather, it concerns whether existing norms can effectively constrain unequal power relations during a large-scale and politically prioritized development process.

The climate-justice implications of IKN therefore extend beyond environmental impact mitigation. They concern the institutional distribution of decision-making power. If decisions concerning land use, infrastructure, environmental standards, and investment are concentrated among state institutions and developers, while affected communities have only limited capacity to influence those decisions, then the development process remains procedurally unequal even if environmental standards are formally satisfied. Conversely, stronger community participation can create mechanisms through which environmental knowledge, livelihood concerns, and customary values enter the planning process before irreversible decisions are made.

The “Forest City” claim should consequently be evaluated through a broader justice framework. A city cannot be considered climate-just merely because it preserves or restores vegetation. Environmental sustainability must be accompanied by equitable access to development benefits, protection against disproportionate environmental burdens, recognition of customary and cultural relationships with land, and meaningful participation in decisions that transform territory. In this sense, climate justice provides a critical test of the Forest City concept because it asks whether ecological modernization is achieved with affected communities rather than at their expense.

The IKN case ultimately demonstrates that ecological sustainability and social justice are not separate dimensions of green urbanism. They are mutually dependent. Forest restoration without community recognition can reproduce exclusion; infrastructure expansion without distributive safeguards can concentrate benefits and localize costs; environmental standards without effective participation can become technocratic compliance; and land acquisition without recognition of customary values can transform legal ownership into social dispossession. Conversely, environmental planning that incorporates community knowledge, protects rights, and distributes benefits more equitably can strengthen the legitimacy and durability of ecological restoration.

The challenge for IKN is therefore to transform its legal and institutional framework from a system primarily designed to enable development into one capable of simultaneously governing the consequences of development. This does not require abandoning the objectives of national development or investment. It requires establishing clear ecological limits, transparent decision-making, meaningful participation, effective recognition of customary rights, and enforceable mechanisms for accountability. Such a model would make the Forest City concept more than a branding strategy: it would connect environmental performance with democratic and distributive principles.

Therefore, the question posed by IKN is not simply whether Indonesia can build a capital city with forests, smart infrastructure, and low-carbon technologies. The deeper question is whether the process of constructing that city can produce a fair relationship between development, ecology, and the people who inhabit the transformed landscape. If the environmental benefits of IKN are nationalized while its ecological and social costs are localized, the Forest City model risks reproducing an unequal form of green development. If, however, ecological restoration, infrastructure planning, land governance, and community rights are integrated within a framework of distributional, procedural, recognitional, and intergenerational justice, IKN could provide a more substantive model of sustainable urban transformation. The credibility of the “Forest City” therefore ultimately depends not only on how green Nusantara looks, but on who has the power to shape it, who benefits from it, and who is protected from the costs of making it green.

Conclusion

The analysis demonstrates that the “Forest City” designation of Nusantara should not be evaluated primarily as a planning label but as an ecological claim that must be tested against the material transformation of the IKN landscape. Existing evidence indicates that vegetation, biomass, land cover, and hydrological conditions have changed alongside infrastructure development, while the Forest City framework simultaneously relies on conservation, restoration, and the maintenance of substantial green areas (Syaban and Appiah-Opoku 2024; Handyastono et al. 2025). The environmental challenge therefore lies in reconciling the physical expansion of a new capital with the ecological functions that the Forest City concept seeks to preserve. Retaining or restoring vegetation is important, but vegetation quantity alone is insufficient to demonstrate ecological sustainability. The quality and maturity of vegetation, carbon-storage capacity, habitat connectivity, watershed functions, and the permanence of restoration must also be considered. IKN should consequently be assessed through a long-term ecological monitoring framework that evaluates not only the eventual appearance of the city but also the environmental trajectory through which it is constructed.

The analysis further demonstrates that the sustainability of IKN cannot be separated from questions of climate justice. The benefits associated with the new capital—including infrastructure, investment, economic opportunities, administrative functions, and the development of a new national growth center—are distributed across broader national and regional scales, while many consequences of land transformation are experienced more directly by communities living within and around the development area. The legal framework provides important instruments for addressing these challenges, including environmental rights and participation under Law No. 32 of 2009, environmental governance under Government Regulation No. 22 of 2021, and specific arrangements for land acquisition and IKN governance under Law No. 3 of 2022

and its subsequent amendment through Law No. 21 of 2023. Nevertheless, the existence of formal legal protections does not automatically ensure substantive justice. The central challenge remains the implementation of distributive, procedural, recognitional, and intergenerational principles in decisions concerning land, infrastructure, environmental protection, and community participation. A genuinely climate-just IKN therefore requires affected communities to be treated not merely as recipients of compensation or participants in consultation, but as rights-bearing actors whose knowledge, livelihoods, territorial relationships, and interests can meaningfully influence development decisions.

IKN represents both an opportunity and a test for Indonesia's model of green urban development. Its Forest City concept could provide an important alternative to conventional urban expansion if ecological restoration, biodiversity protection, low-carbon infrastructure, watershed management, and community participation are treated as substantive constraints on development rather than as compensatory elements added after construction decisions have been made. Conversely, if forest restoration is used primarily to offset ecological transformation, if green space is measured mainly through quantitative targets, or if the social costs of development are concentrated among communities with limited political influence, the Forest City narrative risks becoming a form of green development that reproduces existing inequalities. The central lesson is therefore that a city cannot be considered sustainable merely because it is designed to look green or operate with lower emissions. Its legitimacy depends on whether ecological integrity and social justice are embedded in the process of territorial transformation itself. For IKN, being a genuine Forest City ultimately means demonstrating that the protection of forests, reduction of climate risks, development of infrastructure, and recognition of community rights can be pursued as mutually reinforcing objectives rather than traded against one another.

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