

Socioeconomic Impacts of Coastal Reclamation on Fishing Communities in the Perspective of Sustainable Development: The Case of the Surabaya Waterfront Land Project

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ABSTRACT: Coastal reclamation projects present significant trade-offs between economic development and the socioeconomic well-being of fishing communities. Within a sustainable development framework, this study analyzes the potential socioeconomic impacts of the Surabaya Waterfront Land (SWL) Project a 1,084 hectare coastal reclamation initiative on Surabaya's eastern coast with a projected IDR 72 trillion investment. Employing a descriptive quantitative approach combined with scenario analysis, the study utilizes secondary data from government agencies, policy documents, and media sources. The findings reveal that the SWL project poses considerable risks to at least 1,836 registered fishers and 4,000-8,000 households across 12 coastal villages. Quantitative simulations under four production-loss scenarios (10%, 20%, 30%, and 50%) indicate annual fishery revenue losses ranging from IDR 23.72 billion to IDR 118.59 billion, assuming a fish price of IDR 30,000/kg. Unmitigated, these losses would disproportionately cause declining incomes, ecosystem degradation, and livelihood insecurity, risking SDGs fulfillment. The study concludes that comprehensive environmental/social impact assessments, equitable compensation mechanisms, and participatory planning are urgently required to reconcile economic growth with coastal community protection.

Keywords: *coastal reclamation, fishing communities, socioeconomic impact, sustainable development, Surabaya Waterfront Land*

I. INTRODUCTION

Coastal area development forms part of government efforts to promote economic growth through the optimized utilization of land and marine spaces. One form of such development is coastal reclamation, which aims to create new areas for settlements, trade, industry, and tourism. Reclamation is considered capable of increasing the economic value of an area and expanding development space; however, it also has the potential to alter the characteristics of coastal ecosystems that have ecological and social functions for surrounding communities [1]. The management of coastal areas must fundamentally be conducted in an integrated manner, balancing economic, social, and environmental dimensions, as mandated by Law Number 27 of 2007 as amended by Law Number 1 of 2014 concerning the Management of Coastal Areas and Small Islands [2], [3].

Fishing communities represent the most vulnerable group to coastal environmental changes because their economic activities depend on the availability of fishery resources and the quality of marine ecosystems. Reclamation can cause changes in water hydrodynamics, increased sedimentation, declining water quality, and damage to mangrove habitats, seagrass beds, and coral reefs that serve as spawning and nursery grounds for various fish species. These changes reduce the productivity of capture fisheries, ultimately affecting the income, welfare, and economic resilience of fishing households [4], [5].

The Surabaya Waterfront Land (SWL) Project is one of the planned coastal development initiatives through reclamation directed at supporting urban area development and investment in the City of Surabaya. The development is expected to enhance regional economic competitiveness by providing new spaces for the trade, services, tourism, and settlement sectors. Nevertheless, the reclamation plan has raised concerns regarding potential reductions in fishing grounds, changes in coastal environmental conditions, and the emergence of spatial-use conflicts between development interests and the sustainability of coastal community livelihoods. This situation indicates that coastal development not only generates economic benefits but also potentially incurs social and ecological costs that need to be considered in the policy making process [6].

The perspective of sustainable development emphasizes that development success is not measured solely by economic growth but also by its capacity to

preserve the environment and improve community welfare equitably. This concept was first articulated in the report *Our Common Future*, which defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [7]. This principle was subsequently reinforced through the Sustainable Development Goals (SDGs), particularly Goal 8 on decent work and economic growth, Goal 14 on the conservation of marine ecosystems, and Goal 16 on inclusive governance in the development process [8].

Research on the impacts of coastal reclamation has been conducted extensively; however, most studies remain focused on aspects of environmental change, water hydrodynamics, or spatial changes in coastal areas. Studies that specifically integrate socioeconomic impact analysis on fishing communities with the sustainable development perspective, particularly in the context of the Surabaya Waterfront Land Project, remain relatively limited. This research gap highlights the need for a more comprehensive analysis of the relationship between coastal reclamation, the sustainability of fisher livelihoods, and the achievement of sustainable development principles. The findings are expected to provide a scientific contribution while also serving as a basis for formulating more equitable, participatory, and sustainable coastal development policies.

II. METHOD

This study employs a descriptive quantitative approach to analyze the socioeconomic impacts of coastal reclamation on fishing communities in the Surabaya Waterfront Land (SWL) Project. The quantitative approach is used because the research focuses on measuring the magnitude of economic impacts experienced by fishing communities based on numerical data, while the descriptive method aims to provide a systematic description of the conditions under study based on available data [9], [10].

The data used consists of secondary data obtained through documentation studies and library research. Data were sourced from the Central Bureau of Statistics (BPS), the Surabaya City Food Security and Agriculture Office, government documents, reports from relevant institutions, scholarly articles, books, and legislation related to coastal area management and reclamation. Collected data include the number of fishers, capture fishery production, number of fishing fleets, area of reclamation zones, number of affected fishing households, and information on project investment values. The documentation study technique was selected for its ability to obtain factual data published by official institutions,

while the library research approach was used to strengthen the theoretical foundation of the study [11].

Data analysis was conducted through descriptive quantitative analysis combined with scenario analysis to estimate the magnitude of socioeconomic impacts that may occur if reclamation is implemented. Scenario analysis was performed by constructing several levels of fishery production loss as a basis for estimating potential economic losses for fishing communities. This approach is used to describe various possible conditions that may arise based on assumptions regarding changes in fishery sector productivity due to reclamation, thereby providing an overview of the economic risks faced by coastal communities [12].

The analytical stages began with identifying research variables including capture fishery production, number of fishers, number of affected households, fishing fleets, and average catch prices. Estimations were subsequently made regarding potential production losses and their impacts on fisher income under several scenarios. The estimation results were then analyzed using a sustainable development perspective considering economic, social, and environmental dimensions. This approach is expected to provide an overview of the consequences of implementing the Surabaya Waterfront Land Project on the sustainability of fisher livelihoods while also serving as a basis for formulating more equitable and sustainable coastal development policy recommendations.

Simulation results were derived by applying the assumed fish price of IDR 30,000/kg to calculate revenue losses across all four scenarios (10%, 20%, 30%, and 50% production loss). Per-fisher, per-boat, and per-household losses were computed by dividing total estimated revenue losses by the respective denominators: 1,836 registered fishers, 1,129 boats, and approximately 4,000 affected households.

III. RESULT AND DISCUSSION

Project Overview: Surabaya Waterfront Land

The Surabaya Waterfront Land (SWL) Project was conceived as a major waterfront development on Surabaya's eastern coast, combining existing Kenjeran land areas with marine reclamation. The project aims to transform the city's image, attract investment, develop tourism, and create a new economic hub. However, it has encountered strong opposition from fishing communities, pond farmers, and environmental activists due to its potential for large-scale socio-ecological impacts.

Key project parameters include a reclamation area of approximately 1,084-1,085 hectares to be divided into several artificial blocks or islands (four blocks according to the initial plan) [13], [14], with construction projected to proceed in phases over several decades. The project is listed as a proposed National Strategic Project (PSN), attracting attention and impetus from the central government level. The developer claims an investment value of tens of trillions of rupiah, with proposed functions spanning residential, tourism, trade, maritime facilities, and a zero-emission industrial zone on one of the islands. Repeated opposition actions by fishers, pond farmers, and civil society organizations have included demonstrations, cancellation of Environmental Impact Assessment (AMDAL) socialization events, and appeals to the Regional Legislative Council (DPRD) and City Government, with claims that up to twelve villages and fishing communities are directly affected [15].

Quantitative Data on Fishing Communities and Project Scale

Table 1 presents key quantitative indicators from official government sources and credible media, providing the empirical basis for the impact analysis.

Table 1. Key Quantitative Indicators of the SWL Project and Surabaya Fishing Sector

Indicator	Value / Estimate	Source
Planned marine reclamation area	1,084 hectares	SWL covers reclamation of Surabaya's eastern coast totaling 1,084 ha [14]
Project investment value	± IDR 72 trillion	SWL is projected at an investment value of IDR 72 trillion [15]
Number of fishers in Surabaya	~1,836 persons	Data from the Surabaya Food Security and Agriculture Office, 2023: 1,836 fishers

Indicator	Value / Estimate	Source
		across 20 kelurahan [16]
Marine capture fishery production, Surabaya City	7,905.7 tonnes/year	Annual marine capture fishery production in Surabaya City: 7,905.7 tonnes [17]
Aquaculture production, Surabaya City	8,907.6 tonnes/year	Fish aquaculture production: 8,907.6 tonnes/year [17]
Length of Surabaya coastline	47.8 km	Surabaya's coastal area with 47.8 km of coastline [17]
Number of fishing boats in Surabaya	1,129 boats	From the same data source: 1,129 fishing boats [17]
Number of fishing villages affected	± 12 fishing villages	KNTI and fisher groups report approximately 12 fishing villages will be affected, involving approximately 4,000 households [18]
Number of affected families/coastal residents	~8,000 families / more than 30,000 persons	According to Walhi East Java & FM3 [19]

Source: Compiled from various sources [14]–[19]

Quantitative Impact Analysis

Based on the data presented in Table 1, the following quantitative impact analysis is conducted for the scenario where the SWL project proceeds.

1. Proportion of Fishers Affected, with approximately 1,836 registered fishers in Surabaya and an estimated 4,000 affected households across approximately 12 fishing villages, the project would deprive a substantial proportion of fishers in Surabaya's eastern coastal zone of their fishing grounds, coastal access, and fishing operational routes. If 4,000 households are assumed to average four members each, approximately 16,000 persons from fishing families would be directly affected socioeconomically.
2. Lost Fish Production vs. Local Consumption, Surabaya's annual capture production is approximately 7,905.7 tonnes. If reclamation significantly reduces productive fishing areas even by only 10-20% the potential production loss would be approximately 790-1,580 tonnes per year for capture fisheries in Surabaya alone [17]. While Surabaya's estimated annual fish consumption of approximately 44,673 tonnes means this loss may not appear large in absolute terms relative to total demand, the local effect on fishers in the short term would be significant in terms of income and livelihoods.
3. Recovery Time and Duration of Losses, reclamation and construction will take place over an extended period up to 20 years of project development as documented [14]. During the reclamation and transition period, fishers will experience disruption and potentially temporary or permanent job loss, with income impacts that may be substantial, particularly for those fully dependent on catch fisheries and post-harvest activities.
4. Investment Value vs. Local Economic Benefits, the large investment value (IDR 72 trillion) may benefit developers and investors as well as generate tax and retribution revenues for the government [15]. However, the distribution of benefits to local coastal communities remains unclear the extent of employment guarantees, land lease arrangements, or compensation for affected fishers has not been adequately specified in publicly available project documentation.

Opposition Arguments Based on Data and Analysis

Based on the quantitative indicators above, the following evidence-based arguments for opposing the project can be constructed:

First, the loss of traditional livelihoods: with approximately 1,836 fishers and 4,000 affected households, the project would cause loss of income sources for hundreds to thousands of fishers. In scenarios where capture fish production declines by 10-20%, their incomes would be mathematically disrupted by a comparable percentage, potentially driving local poverty if no clear compensation program is established.

Second, local fish production losses: the estimated loss of 1,000-1,600 tonnes of captured fish per year would reduce both fisher incomes and local fish supply, particularly if the target species in threatened areas are high-value or have long habitat recovery times.

Third, environmental effects reducing future production capacity: damage to mangroves and changes in currents and sedimentation could affect nursery habitats for fish, shrimp, crabs, and other marine biota. This means not only direct production losses but also the loss of natural regeneration potential that sustains long-term production [4], [5].

Fourth, inequitable distribution of benefits: given the project's enormous investment value, benefits are likely to accrue primarily to developers and large capital owners. Small-scale fishing communities may not gain access to new facilities, housing, or business opportunities generated by the project; instead, they bear the greatest costs from the loss of fishing grounds and coastal public space.

Fifth, procedural risks and uncertainty: the AMDAL process remains ongoing, and coastal communities have noted that socialization was conducted without adequate transparency. Lack of clarity in permits and environmental assessments adds to the risk that negative impacts will be overlooked [19].

Sixth, recovery time and costs exceeding compensation: restoration of marine habitats or coastal ecosystems requires years and high costs. Immediate financial compensation cannot replace the long-term losses in biodiversity, local culture, and local food security.

Simulation of Economic Loss Scenarios

To provide a more precise quantitative picture, a simulation was conducted assuming a fish price of IDR 30,000/kg. The results are presented in Table 2.

Table 2. *Simulation of Economic Loss Scenarios Under Varying Levels of Fishery Production Loss (Fish Price = IDR 30,000/kg)*

Loss Scenario	Production Loss	Revenue Loss/Year	Loss per Fisher/Year	Loss per Boat/Year	Loss per Affected HH/Year
10%	790.57 tonnes/year	IDR 23.72 billion	IDR 12,909,000 (~IDR 1.08 million/month)	IDR 20,992,000 (~IDR 1.75 million/month)	IDR 5,929,275 (~IDR 494,106/month)
20%	1,581.14 tonnes/year	IDR 47.43 billion	IDR 25,818,000 (~IDR 2.15 million/month)	IDR 41,984,000 (~IDR 3.50 million/month)	IDR 11,858,550 (~IDR 988,213/month)
30%	2,371.71 tonnes/year	IDR 71.15 billion	IDR 38,727,000 (~IDR 3.23 million/month)	IDR 62,977,000 (~IDR 5.25 million/month)	IDR 17,787,825 (~IDR 1.48 million/month)
50%	3,952.85 tonnes/year	IDR 118.59 billion	IDR 64,606,000 (~IDR 5.38 million/month)	IDR 104,961,000 (~IDR 8.75 million/month)	IDR 29,646,375 (~IDR 2.47 million/month)

Source: Authors' own calculation based on data from [17] and [18]

Table 2 demonstrates that even the moderate scenario (10-20% production loss) results in losses of tens of billions of rupiah per year for the local capture sector in Surabaya. The direct impact on individual fisher incomes amounts to millions of rupiah per year an amount that, while perhaps not large in absolute terms to policymakers, is highly significant for low-income fishing families.

If no compensation or transition program is provided, fishing households will experience significant income declines, triggering economic vulnerability, welfare deterioration, and potential occupational migration. It is critical to note that this simulation only accounts for direct production losses; indirect impacts effects on the supply chain, fish processors, traders, and long-term stock declines due to

habitat destruction are not modeled, meaning actual losses could be considerably larger.

Sustainable Development Perspective

The sustainable development perspective emphasizes that development success must be measured not only by economic growth but also by its capacity to maintain environmental balance and improve community welfare equitably [7], [8]. Assessed against this framework, the SWL project raises significant concerns across all three pillars of sustainable development.

In the economic dimension, while the project promises large scale investment and potential fiscal revenues, the distribution of economic benefits to local fishing communities is unclear and potentially inequitable. In the social dimension, the displacement of fishing livelihoods, reduction of food security, and inadequate community participation in decision-making processes represent serious concerns. In the environmental dimension, the destruction of mangroves, seagrass beds, and coral reef habitats and the consequent loss of ecosystem services that support capture fisheries poses risks to long-term ecological sustainability [1], [4], [5].

Development policies that disregard social and environmental aspects risk generating long-term economic costs that exceed the economic benefits obtained [6]. The SWL project, therefore, requires a comprehensive re-evaluation that genuinely integrates the interests of coastal communities and ecosystem sustainability into its planning and implementation framework.

IV. CONCLUSION

This study demonstrates that the planned coastal reclamation through the Surabaya Waterfront Land (SWL) Project has the potential to generate significant socioeconomic impacts on fishing communities in Surabaya's eastern coastal zone. Reclamation is estimated to reduce access to fishing grounds, alter coastal ecosystem conditions, and decrease the productivity of capture fisheries that constitute the primary livelihood of fishing communities. These findings align with extensive research indicating that changes in coastal zone functions due to reclamation can affect the sustainability of fishery resources and the welfare of ecosystem-dependent communities [4], [5].

The quantitative analysis results show that at a 10% fishery production loss scenario, potential production losses amount to approximately 790.57 tonnes per year with estimated economic losses of IDR 23.72 billion per year. These losses increase proportionally at 20%, 30%, and 50% production loss scenarios, reaching approximately IDR 47.43 billion, IDR 71.15 billion, and IDR 118.59 billion per year respectively. These figures demonstrate that reclamation impacts would not only be felt by fishers as the primary actors in the fishery sector but would also potentially affect the entire fishery economic chain involving fishing households, traders, fish processors, and other coastal economic activities.

The sustainable development perspective affirms that development success cannot be measured solely by investment increases and economic growth but must also be evaluated through the capacity to maintain balance among economic, social, and environmental dimensions [7], [8]. Based on the findings of this study, the implementation of the Surabaya Waterfront Land Project needs to more comprehensively consider the potential impacts on the sustainability of fisher livelihoods and coastal ecosystem conservation. Development policies that disregard social and environmental aspects risk generating long-term economic costs that exceed the economic benefits obtained [6].

This study recommends that the implementation of reclamation projects be preceded by a comprehensive socioeconomic and environmental impact assessment, accompanied by mitigation mechanisms, proportional compensation, and the meaningful involvement of coastal communities in the planning and decision-making process. This approach is expected to achieve coastal area development that not only promotes economic growth but also protects coastal resource sustainability and improves fishing community welfare in accordance with sustainable development principles [2], [8].

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