Implementation Of Manila Bay Sustainable Development Masterplan (Mbsdm) And National Capital Integrated Coastal Development (Ncicd) Program In Mitigation Strategy Of Sea Level Rise In Indonesia And Philippines

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Abstract

This research aims to compare the implementation of two policy projects in cooperation with the Dutch government to address sea level rise in two major cities. Focusing on two projects in the two Southeast Asian capitals of Manila and Jakarta with similar geographical locations, similar problems, and similar foreign cooperation partners, but have different implementations in the two countries. This research uses the theory of Comparative Policy to analyze the comparison of the effectiveness of program implementation in both countries. The method used in data collection is through secondary data, where the author does not directly collect data but through third parties in the form of previous articles and journals. Despite the fact that both projects cooperate with the Netherlands through the Netherlands International Water Ambitions (NIWA), they have different approaches. By involving the private sector in its funding, MBSDM concentrates more on nature-based solutions such as mangrove restoration and coastal ecosystem zoning. NCICD, on the other hand, concentrates on building large infrastructure intended to prevent tidal flooding quickly, such as the Giant Sea Wall, giant dykes and coastal reclamation.

Keywords: Netherlands, Sea Level Rise, MBSDM

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Abstrak

Penelitian ini bertujuan untuk membandingkan implementasi dua proyek kebijakan yang bekerja sama dengan pemerintah Belanda untuk mengatasi kenaikan muka air laut di dua kota besar. Fokus penelitian ini adalah dua proyek di dua ibu kota Asia Tenggara, Manila dan Jakarta, yang memiliki letak geografis yang mirip, permasalahan yang mirip, dan mitra kerja sama luar negeri yang mirip, tetapi implementasinya di kedua negara tersebut berbeda. Penelitian ini menggunakan teori Kebijakan Komparatif untuk menganalisis efektivitas komparatif implementasi program di kedua negara tersebut. Metode yang digunakan dalam pengumpulan data adalah melalui data sekunder, di mana penulis tidak mengumpulkan data secara langsung, tetapi melalui pihak ketiga berupa artikel dan jurnal sebelumnya. Meskipun kedua proyek tersebut bekerja sama dengan Belanda melalui Netherlands International Water Ambitions (NIWA), keduanya memiliki pendekatan yang berbeda. Dengan melibatkan sektor swasta dalam pendanaannya, MBSDM lebih berkonsentrasi pada solusi berbasis alam seperti restorasi mangrove dan zonasi ekosistem pesisir. Di sisi lain, NCICD berkonsentrasi pada pembangunan infrastruktur besar yang dimaksudkan untuk mencegah banjir pasang cepat, seperti Giant Sea Wall, tanggul raksasa, dan reklamasi pantai.
Kata kunci: Belanda, Kenaikan Muka Air Laut, MBSDM

INTRODUCTION

Sea level rise is one of the global threats to the environment. Sea level rise can cause disasters that not only threaten the survival of human life, but also affect marine biota such as coral reefs. Sea level rise poses a particular threat to coastal communities as it can result in shoreline loss, erosion and damage to local infrastructure. Coastal ecosystems that provide habitat for fish and other marine life will also be affected by sea level rise. The volume of sea water that continues to increase every year causes erosion and retreat of the coastline, so that the coastal area is getting smaller. Based on data from *National Oceanic Atmospheric Administration* (NOAA), scientists predict that global sea levels will rise nearly 0.28 meters above 2000 levels by 2050 and above 1 meter by 2100 (Lindsey, 2023) . This significant change in sea level will continue to grow up to 2 meters by 2100 if there is no immediate action to tackle this phenomenon

One of the main factors causing sea level rise is climate change due to global warming, which causes the ice in Antarctica to melt and the volume of sea water to increase. The causes of climate change due to global warming come from natural phenomena, but are mostly man-made. The release of carbon dioxide and nitrogen emissions from burning large amounts of fossil fuels to produce energy such as oil and gas can cause a greenhouse effect that traps sunlight on earth, causing the earth's temperature to rise. Deforestation is another factor causing climate change, as the earth's ability to absorb carbon dioxide becomes more limited. Global warming in February 2023 to January 2024 itself has reached the limit of 1.52C within one year, this is a crucial problem because in the 2015 Paris Agreement the member countries agreed to limit the increase in global temperature at 1.5C (Poynting, 2024) . Significant steps need to be taken to minimize the impact of climate change so that the land will not continue to be eroded by the large volume of sea water. By making policies on reducing emissions and tackling sea level rise at the international and regional levels, it is hoped that it will be possible to reduce the disasters caused by climate change.

The *Paris Agreement* held in 2015 is one form of effort from countries in the world to address climate change and the impacts that can be caused, namely sea level rise. One of the goals of the Paris Agreement is to limit the temperature rise to 1.5C in the long term, so as to reduce the risk of natural disasters. Each country involved in the Paris Agreement is required to implement *Nationally Determined Contributions* (NDCs). NDCs are set by each member country for its own country according to environmental conditions and the ability of a country to reduce carbon emissions (UNFCCC, n.d.) . This makes it easier for developing countries to participate in reducing the impacts of climate change. *The Paris*

Agreement is one of the international legal tools as well as the basis for action to address global climate change.

On a regional scale, the *Association of Southeast Asian Nations* (ASEAN) is continuing efforts on climate change from the Paris Agreement. ASEAN member states are committed to achieving the goals of the Paris Agreement and *the United Nations Framework Convention on Climate Change* (UNFCC) by drafting the ASEAN *Joint Statement on Climate Change*. Based on the document agreed upon in the *ASEAN Joint Statement on Climate Change to the 22nd Conference of the Parties* (COP-22), ASEAN member states took significant action to address climate change issues, one of which was the signing of the 2015 *Paris Agreement* on April 22, 2016 in New York (ASEAN, 2016) . The preparation of this document is a form of commitment of member countries in addressing carbon emissions and supporting climate change control. ASEAN also has an institution that was established with the main focus of addressing climate change issues, namely the ASEAN *Center for Climate Change* (ACCC) in 2023 which develops effective strategies and policies for climate change in the Southeast Asian region. Geographically, Southeast Asia is a tropical and archipelagic region that has a high risk of natural disasters, including sea level rise. Some ASEAN countries that have large cities located on the coast such as Indonesia, Philippines, Thailand are very much at risk of flooding and land subsidence. Therefore, archipelagic countries such as those in the Southeast Asia Region need to take mitigation measures to overcome the phenomenon of increasing sea water volume due to climate change.

Several regions around the world could potentially lose land including Manila and Jakarta. These two ASEAN capitals share a similar geography, being located on the coast and in tropical countries. Sea level rise in coastal Manila increased by 8.4 mm per year from 1901 to 2022, almost three times the rate of sea level rise in Manila of 3.4 mm per year. Based on a report from the *Philippine Climate Change Assessment*, Manila's sea level rose by 2.6 cm. The increase in sea level rise in the Philippines is partly caused by excessive underground extraction. In collaboration with the Dutch Government, the Philippines initiated the *Manila Bay Sustainable Development Masterplan* (MBSDM) program to address the phenomenon of sea level rise along the Manila Bay coast due to climate change and global warming. Philippine President Rodrigo Duterte issued Administrative Order No.16 in February 2019 accelerating the rehabilitation and restoration of coastal ecosystems by establishing the *Manila Bay Task Force* (MBTF) under the leadership of DENR Secretary Roy Cimatu. In addition to foreign cooperation in dealing with the phenomenon of sea level rise, the

Philippine government also planted mangroves to protect the coastline from erosion and as a form of natural prevention.

Meanwhile, sea level rise in Jakarta is based on observation data from 1992-2020 conducted using the Jakarta altimet satellite 1.71 mm per year (Karlina Triana, 2021) . If there is no action in the next few decades, the risk of sinking parts of Jakarta is increasingly real and inevitable. Recognizing this urgency, the governments of both countries are taking intensive steps to reduce the risk of submergence and rising sea levels in their capitals. The cooperation between the Ministry of Public Works and the Ministry of Environment of the Republic of Indonesia and the Ministry of Infrastructure and Environment of the Netherlands resulted in the *National Capital Integrated Coastal Development* (NCICD) program, which is a continuation of the *Jakarta Coastal Development Strategy* (JCDS) program. The NCICD program including the construction of a giant levee in Jakarta is divided into 3 phases.

Based on the explanation of sea level rise experienced by the two cities, the author draws the formulation of the problem How is the comparison of the implementation of the NCICD and MBSDM programs carried out by the governments of Indonesia and the Philippines to overcome sea level rise through cooperation with the Dutch government? The research was conducted with the aim of comparing the implementation of the two policy projects through the cooperation of the Dutch government in its implementation. This research will explain the two countries with similar geographical conditions and challenges in dealing with disaster risks due to sea level rise through coastal development in the country's capital. The author uses policy comparison theory with the *Most Similar Different Outcome* (MSDO) approach to compare policy implementation based on geographical conditions, cooperation partners, strategy design, and infrastructure development of both policy projects.

LITERATURE REVIEW

The theory used in this research is *Comparative Policy* written by Gisele De Meur, Peter Bursens and Alain Gottcheiner in the book *Innovative Comparative Methods for Policy Analysis.* Using the *Most Similar, Different Outcome / Most Different, Similar Outcome* (MSDO/MDSO) approach to compare two countries with the same problem, but different policy making. This approach focuses on identifying key variables that influence policy outcomes. The MSDO/MDSO approach is widely used in policy-making studies of countries in the European Union, namely institutional factors and policy network formation. This approach is suitable for this study because the two countries have similar

geographical locations, social conditions, and the same environmental problem, namely sea level rise. This theory explains the comparison of two countries with the same problems, but have differences in policy making (Pratama, 2020) .

The writing of this study is based on previous research that addresses sea level rise. "Dutch Involvement in International Water Development Projects via Masterplans: Comparative Case Study on Beira, Jakarta, & Manila Bay" written by Froukje Balkestein. This study discusses some of the efforts that have been made by the governments of Indonesia, the Philippines and Mozambique to address the impacts of sea level rise. In her paper, Balkeistein explains that what the two masterplans have in common is that they work together with the Dutch government and the various parties involved, both private companies and the government (Balkestein, 2023) .

RESEARCH METHODS

This research uses descriptive research types to make it easier for the author to explain what he wants to know in the research. According to Ramdhan, descriptive research is research with a method to describe the results of research, and the aim is to provide a descriptive explanation and validation of the phenomenon under study (Ramdhan, 2021) . In this study using secondary data collection techniques means that the author uses intermediary media rather than obtaining data directly from related parties. The author uses literature study, which is a method of collecting data by studying relevant literature theories. The next process after data processing and reference citation is to display data as a result of research, abstract the data to produce complete information, and interpret it to produce conclusions (Darmalaksa, 2020) .

RESULTS AND DISCUSSION

Implementation of the Manila Bay Sustainable Development Masterplan (MBSDM) Program in the Philippines

Sea level rise is a global challenge, especially for island nations. Archipelagic countries have more lowlands, so most of their territory is located on the coast. Archipelagic ASEAN countries such as Indonesia, the Philippines, Malaysia, Brunei and Singapore are at risk of sinking due to sea level rise. Sea level rise can lead to tidal flooding that threatens life on the coast. There is a need to deal intensively with the challenges of sea level rise, before the impacts worsen.

Manila, the capital city of the Philippines, is one of the countries vulnerable to the impacts of sea level rise. Manila's sea level is rising three times

faster than the estimated global sea level rise of 3.4 mm per year. Factors affecting the speed of sea level rise in Manila are both global and local. The global factor that causes sea level rise is the melting of ice in Antarctica due to climate change that causes global warming. This makes countries that have low-lying conditions with archipelagic forms vulnerable to this phenomenon. Local factors that cause rapid sea level rise in Manila include excessive groundwater extraction, deforestation and land reclamation.

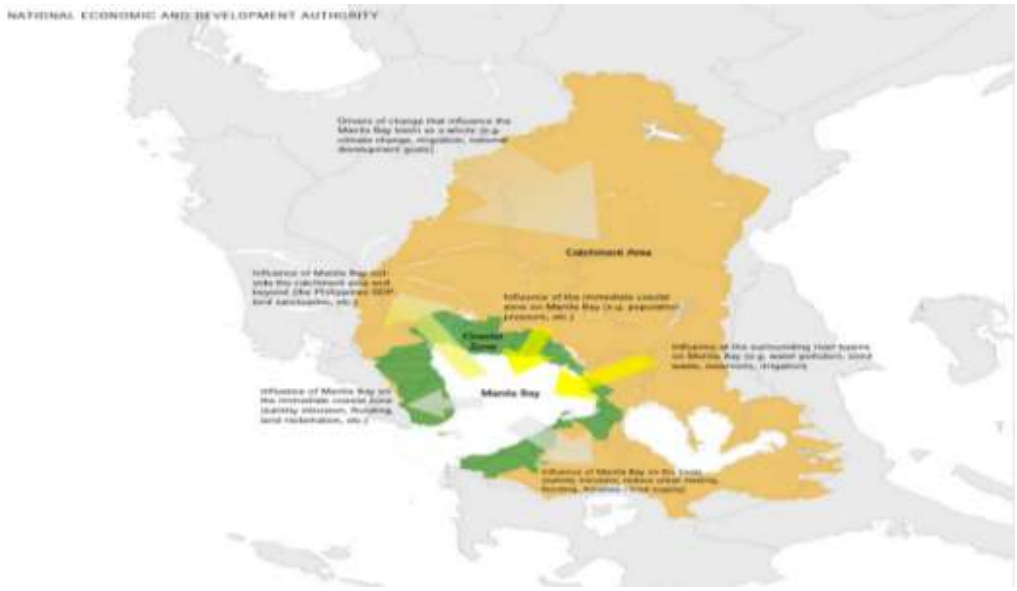

Figure1. Manila Bay

Next to the capital of the Philippines, there is the Manila Bay with an area of 1800 km. The delta region of North Manila Bay is prone to pluvial (rainwater-derived and fluvial (river-derived) flooding (Balkestein, 2023) . Sea level rise that is not addressed intensively will result in flooding. The coastal wetland zone in North Manila consists of four main habitats: fishponds, shallow waterfront, tidal flats and mangroves. Over a period of about 125 years, wetlands have decreased by 71% (Citation Jensen, 2018). The decline of wetlands, which is also a factor in the rapid sea level rise in Manila, is due to human irresponsible land use, water degradation, and irresponsible fishing, making the situation worse.

The Philippine government already has ideas for dealing with the problems that threaten its capital region. The Philippines cooperated with the Dutch government. The cooperation between the Philippine and Dutch governments began with the *Dutch Risk Reduction* (DRR) mission to overcome coastal damage due to typhoons. After the DRR mission in the Philippines, a

meeting was held between the Philippine government and representatives of the Netherlands followed by the Philippine government officially sending a request for cooperation in overcoming rising sea levels in Manila. This cooperation resulted in the Manila Bay Sustainable Development Masterplan (MBSDM). Using a masterplan study is a detailed plan for the long-term development of an urban area. MBSDM aims to protect ecosystems, reduce flood risks, improve water quality, and strategically manage and develop for inclusive growth. Unlike the Manila government's traditional plans for coastal management and development that prioritize public funding, the MBSDM leverages more private sector investment.

The MBSDM project involves several stakeholders, both private and government agencies. *The National Economic and Development Authority* (NEDA) and the Philippine Economic and Social Development Planning and Policy Coordinating Agency are the main parties responsible for the project. Meanwhile. The Netherlands worked with the Dutch Expert Team (DET) from the applied research institute Deltares (Harder, 2019) . The project also involves foreign consultants and expert teams, Philippine civil society, and researchers to support the success of the strategic development plan to prevent flooding due to sea level rise.

The MBSDM project has a contract period of 2018-2020, and by 2040 the plan must have been implemented. The project uses 4 methods for project optimization and inclusiveness. The first method is institutional arrangements, at this stage coordination and involvement of affected institutions during the planning and implementation phases; the second method is an integrated, holistic, and complementary approach to the opportunities and barriers identified for system and policy development and identifying appropriate *Programs, Activities, Projects* (PAPs); the third method aims to establish an MBSDM monitoring system to provide feedback on PAPs and provide appropriate mitigation actions; the fourth method is capacity building on the approaches and tools applied to optimize cooperation between relevant parties (Harder, 2019) .

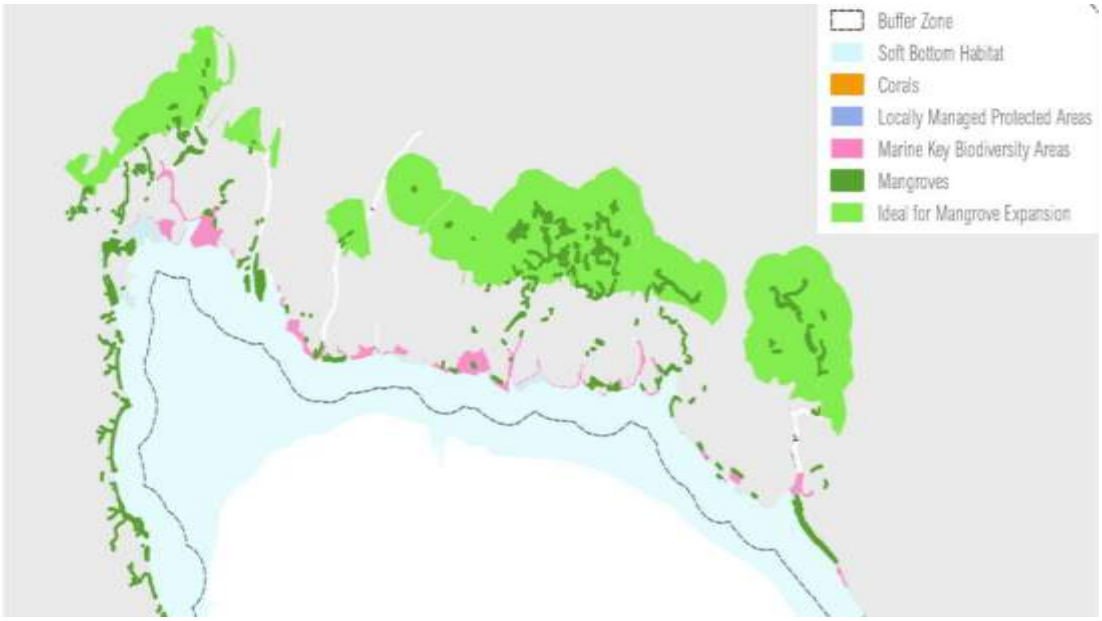

Figure 2. MBSDM project

The follow-on program of the MBSDM project is the Northern Manila Bay Flood Protection Strategy which focuses on four identified topics. The first is *Coastal Line Defense* (CLD), reducing flood risk due to sea level rise, restoring natural habitats and ecosystem protection, and institutional capacity building for MBSDM implementation. The figure shows the zoning considerations to be applied in MBSDM to transform the "monoculture" of fishponds into mixed zoning of aquaculture, fisheries, and mangroves. *Wetlands International Philippines* and *Ecoshape* will support the proposed zoning strategy.

Wetlands International Philippines and *Ecoshape* are leading an initiative to develop the north coast of Manila, specifically the Bulacan region by implementing *Building with Nature* solutions. The proposal includes restoration of natural habitats, creation of mangrove belts, and protection of critical habitats and natural resources to improve the resilience of the safety of the livelihoods of Bulacan's coastal residents (RoyalHaskoning DHV, n.d.) . Manila is implementing Nature Based Solution in dealing with flooding problems due to sea level rise, both in habitat restoration and flood protection.

Implementation of the National Capital Integrated Coastal Development (NCICD) Program in Jakarta

Jakarta is the city with the highest risk of submergence in Indonesia due to sea level rise and land subsidence, especially along the coast of North Jakarta. This certainly raises the anxiety of residents who live in the coastal areas of North

Jakarta with the risk of losing land. According to Robert Nicholls, Director of the Tyndall Climate Change Research Center in the UK, Jakarta has been named the most threatened Asian region with sea level rise of 10 centimeters per year (Setyowibowo, 2021) . The causes of the phenomenon of sea level rise in Jakarta can be seen from several factors, namely due to climate change and infrastructure development. Climate change causes the volume of sea water to increase globally, so the average sea level will rise every year. However, the phenomenon of sea level rise in Jakarta is mostly caused by local factors. Massive infrastructure development in Jakarta as the nation's capital has resulted in soil compaction and a chronic clean water supply crisis, making Jakarta increasingly vulnerable to sea level rise. In addition, 97% of Jakarta is urbanized resulting in reduced water catchment areas and no longer available mangrove forests (Tan, 2023) . The sea level rise crisis that threatens Jakarta's coastal communities should be of concern to the government.

The central government certainly has mitigation ideas in dealing with the challenges of rising sea levels that could cause Jakarta to sink. One of them is to conduct bilateral cooperation with the Dutch government. Indonesia and the Netherlands have a long history, where the Netherlands once colonized Indonesia for approximately 350 years. However, since Indonesia's independence, the Netherlands and Indonesia have established bilateral relations in the social and economic fields. The project that resulted from this bilateral relationship is the *National Capital Integrated Coastal* Development (NCICD). NCICD is a continuation program of the *Jakarta Coastal Development Strategy* (JCDS) which has been started since 2007 by the Ministry of Public Works and the Ministry of Environment of the Republic of Indonesia together with the Dutch Ministry of Infrastructure and Environment (PUPR, 2014) . The central government aligned with the local government through the DKI Jakarta Regional Planning and Development Agency (BAPPEDA) to continue the NCICD project. Involving several ministries including the Coordinating Ministry for Economic Affairs together with the Ministry of PPN or Bappenas together with Bita Bina Company as a stakeholder of the NCICD project (Balkestein, 2023) . The contribution of the Dutch Government in the NCICD project has a special policy, namely the *Netherlands International Water Ambitions* (NIWA) which aims to improve water security and water safety in the world.

The NCICD project, the result of a bilateral relationship between the Indonesian and Dutch governments in 2014, aims to provide long-term flood protection. Coastal development can also create new space in the capital city of Jakarta for more than 1.5 million people by expanding towards the ocean. Not only in the Jakarta area, the coastal development of the NCICD project is also

developing the West Java and Banten areas. Coastal development is expected to be a solution to a number of environmental problems in Indonesia. Development towards the sea is carried out through island reclamation and the provision of seawalls which then create artificial lagoons.

It is planned that this development will form a garuda bird, which is also a symbol of the Republic of Indonesia. The implementation of the NCICD project includes three phases of planning and concept. The first phase of the NCICD project is the construction of coastal sea defenses. In phase A of the project, a sea wall with a length of 32 km was built. Based on a Metro TV interview with Arie Setiadi Moewanto in 2014, the Director of Water Resources Stewardship said that the length of the 32 km embankment is only 8 km which is the responsibility of the government, then the remaining length of the embankment is the responsibility of the private sector (Ministry of PUPR, 2014) . In addition, the revitalization of reservoirs and flood storage pumps is carried out to improve the quality of rivers to prevent flooding due to sea level rise.

The second phase is the construction of the *giant sea wall* and reclamation. Head of DKI Jakarta Natural Resources Agency Yusmada Faizal stated that the coastal embankment on the Jakarta coast was built along 46 km with a length of 13 km already completed, the remaining 33 km will be built by the PUPR Ministry and the DKI Jakarta Provincial Government (Maharani, 2024) . The giant sea wall included in phase B of the NCICD project is located jutting towards the sea, so it is not directly adjacent to the beach or coast. This project was implemented starting in 2018 and the project completion plan is 2022.

The third phase of the NCICD project is a long-term development in the eastern part of Jakarta Bay. Phase C will begin after 2023 and be completed in 2028, focusing on developing a *giant sea wall* outside the eastern part of the Jakarta bay. Ika Agustin, head of the Jakarta SDA Agency, stated in a joint meeting with Commission D of the Jakarta DPRD on Tuesday, July 23, 2024, that the agency had just signed a contract with a third party to build the embankment on April 19, 2024 (Prabowo, 2024) . The construction of phase C, which should have started in 2023, has been delayed, but the Jakarta Provincial Government actually still has time until 2023 as the program completion target from the PUPR Ministry.

Comparison of MBSDM and NCICD Programs

Based on the explanation of the Manila Bay Sustainable Development Masterplan (MBSDM) and National Capital Integrated Coastal Development (NCICD) projects undertaken by the governments of the Philippines and Indonesia in cooperation with the Dutch government, an in-depth comparison of

these two projects can be made using the comparative theory developed by Giselle de Meur. The comparison is conducted using the Most Similar Different Outcome (MSDO) approach, which aims to explain the similarities in conditions between the two Southeast Asian capitals and the differences in the final output of the master plan developed with the Netherlands. Both Indonesia and the Philippines are geographically archipelagic countries consisting of thousands of widely dispersed islands surrounded by water, which makes them at high risk of natural destruction. One of the most serious threats faced is sea level rise, exacerbated by global climate change, as well as the impact of human activities that accelerate environmental degradation, particularly Jakarta with its risk of submergence.

Both the Manila and Jakarta projects are in cooperation with the Dutch government under NIWA, the Netherlands' international water policy instrument. NIWA was developed by four Dutch Ministries - the Ministry of Infrastructure and Water Management, the Ministry of Foreign Affairs, the Ministry of Economic Affairs and Climate Policy, and the Ministry of Agriculture, Nature and Food Quality. NIWA acts as a key supporting instrument in realizing better water and coastal management, by conducting in-depth research on the objects to be built, transferring scientific and technological data for long-term sustainable development, and planning infrastructure development.

Another similarity that can be identified between Manila and Jakarta is that both capitals have similar geographical characteristics, being located in coastal areas directly adjacent to the coastline and having a very high population density. The impact that Manila is experiencing due to this phenomenon is the widening of the coastline due to abrasion and the gradual rise of sea levels. In addition, the city is also experiencing increasingly frequent and severe flooding. Similarly, Jakarta is experiencing falling groundwater levels and flooding. In addition, both Jakarta and Manila are capitals of developing countries, which still have a lot of homework in terms of infrastructure development so there is still a lot of large-scale infrastructure development being carried out. In Jakarta, large-scale infrastructure development such as the construction of toll roads, subways (MRT), and so on causes significant soil compaction, which results in a decrease in groundwater absorption capacity and reduced clean water supply for the community. This directly affects soil quality, leading to gradual land subsidence, while increasing the risk of sea level rise, especially in coastal areas that have already experienced overexploitation of natural resources. In Manila, apart from massive infrastructure development, another cause of sea level rise is excessive groundwater extraction, which gradually weakens the soil structure and accelerates the process of land subsidence. Not only that, another factor that exacerbates this condition is the

deforestation of mangrove forests, which have long been an important part of the coastal ecosystem. The loss of mangroves along the coastline not only accelerates abrasion, but also reduces the ecosystem's natural ability to withstand ocean waves, increasing the risk of tidal flooding and coastal erosion. Furthermore, with the reduction of coastal vegetation, the impacts of climate change are becoming more pronounced, threatening the environmental sustainability and well-being of communities living around Manila's coastal areas.

Based on data obtained from the official website of Deltares, one of the partners in the MBSDM project, this project has very strategic main objectives, namely encouraging inclusive growth, protecting existing ecosystems, reducing the impact of various disasters, and improving water quality in Manila Bay (Deltares, 2018). Planning in the MBSDM project is carried out in an integrated manner by involving all stakeholders in accordance with the main tasks of each responsible party. The project to be carried out in Manila in addition to being nature-based, there is also an artificial solution, namely cleaning the water flow path by dredging, which then the dredging material will be used as a dike (Balkestein, 2023), In addition, the MBSDM project also applies nature-based solutions offered in MBSDM, one of which is replanting mangrove forests around coastal areas to delay and reduce the rate of coastal erosion, which has been getting worse due to abrasion and rising sea levels. Meanwhile, the Jakarta NCICD project focuses more on infrastructure development divided into three phases of work, which aims to protect the city from the threat of tidal flooding and sea level rise. Each phase is designed to create a more effective and sustainable water management system. In planning the implementation of the NCICD project, the government involves all relevant parties, including the private sector and research institutions, to ensure this project runs optimally and is able to realize water security in Jakarta.

There are significant differences in the infrastructure development process in the MBSDM and NCICD projects. The MBSDM-based project proposes handling the problem of sea level rise by planting mangrove forests. The comparison is with the NCICD project which is still in phase B entering phase C which has experienced a slight delay. Phase C, which was originally planned to begin in 2023, was delayed until 2024. The construction of coastal embankments which are an important part of this project was completed in 2020 along the coastal line of Jakarta including as flood protection due to sea level rise. Continued in 2021 for Phase B of the giant sea wall work and the Jakarta bay reclamation plan which was partially completed in 2023. The last phase with a target of finalization in 2030 began in 2024.

CONCLUSIONS

The conclusion of this study highlights the comparison between the Manila Bay Sustainable Development Masterplan (MBSDM) in the Philippines and the National Capital Integrated Coastal Development (NCICD) in Indonesia in dealing with sea level rise. Both cities, Manila and Jakarta, have similar challenges as coastal cities with high population density and risk of tidal flooding and coastal abrasion due to climate change and human activities such as excessive groundwater extraction and mangrove deforestation.

Although both projects work with the *Netherlands* through the *Netherlands International Water Ambitions* (NIWA), they have different approaches. MBSDM focuses more on nature-based solutions, such as mangrove restoration and coastal ecosystem zoning, by involving the private sector in its funding. Meanwhile, the NCICD focuses more on the construction of large infrastructure, such as the Giant Sea Wall, giant dykes, and coastal reclamation, designed as a rapid protection against tidal flooding.

The Most Similar Different Outcome (MSDO) approach in this study shows that MBSDM is more ecologically sustainable but takes longer, while NCICD provides quick protection but has potential environmental and social impacts. Therefore, the combination of these two approaches could be an ideal solution in dealing with sea level rise, not only for Jakarta and Manila, but also for other countries in Southeast Asia that face similar challenges due to climate change.

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