

Integrative Efforts in Handling Plastic Pollution in Jakarta Bay: Social Capital and Movements

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Abstract

Jakarta Bay is the storefront for maritime activities in Indonesia. Littering in Jakarta Bay is a significant problem in the development of Jakarta. Although Jakarta has a large social capital, the actualisation of social capital in solving the waste problem in Jakarta Bay is still not widely known. This study analyses the strategy for implementing social capital for the people of Jakarta in handling plastic waste in Jakarta Bay from the perspective of maritime environmental security. The study used a descriptive qualitative method. Data were collected through observation, interviews and literature studies. Interviews were conducted with the government representatives, seamen and other relevant stakeholders. The results show that the impact of plastic waste in Jakarta Bay has disrupted shipping safety; the implementation of social capital for handling plastic waste in Jakarta Bay is carried out through the Waste Bank, Citizen Relations Management, Joint Responsibility Garbage and Jakarta Recycle Center (Sampah Tanggung Jawab Bersama /Samtama) and Jakarta Recycle programs Center. In handling waste at sea, the Jakarta Government cannot work alone; it needs to collaborate with the surrounding governments, including the governments of Bekasi, Tangerang and Banten Province. The achievement of increasing the participation of social capital and business actors actively reducing environmentally friendly waste and transforming waste into an economical source. Several ways are undertaken, including reducing source waste, optimising the Bantargebang TPST and building an Intermediate Treatment Facility.

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Introduction

Security is one of the most basic human needs after clothing, food and shelter in the hierarchy of needs (Paleri 2008). Maritime security is one part of national security. One of the analytical perspectives of maritime security is maritime security itself. This perspective takes an environmental approach which states that the sea itself must be the goal of security in naval politics, so safeguarding both living and non-biological resources must be one of the primary maritime security considerations (Rahman 2009).

One threat to maritime security is environmental degradation which is a severe threat to the existence of a modern nation-state in the future (Srikanth 2014). The current impact of environmental pollution has reached a critical stage. It has become an important global issue as stated in the Millennium Development Goals (MDGs), namely the plastic waste problem stated in the 4 Life below Water goal. Plastic waste that enters the sea and pollutes the beauty of plastic waste is often eaten by mammals such as dugongs, dolphins and tides. The death of the whale *Physeter Macrocephalus* in Wakatobi waters due to swallowing 5.9 kilograms of plastic waste and the end of 3 turtles due to swallowing plastic waste in November 2018 (CNN Indonesia 2018). Plastic waste in the form of micro, known as microplastics, also impacts health when humans

consume the catches of fishers/farmers. Microplastics with a size of 0.15 mm in fish/shellfish tissue consumed by humans will enter the lungs and human brain tissue (Yee et al. 2021).

In addition to impacting the environment, plastic waste that is difficult to decompose also affects the safety of shipping navigation. Kaptan et al. (2020) presented their research on the Turkey Strait System (TSS), a narrow and dangerous shipping lane connecting the Black Sea and the Aegean Sea, including the Bosphorus, the Dardanelles, the Marmara Sea and the Gulf of Izmit. His research shows that one of the causes of ship accidents is plastic waste, including that which is thrown away by ships crossing the shipping lane. From 2006 to 2017, 187.6 m³ of plastic waste in TSS was generated from passing trading ships.

For ships, plastic waste is often causing ship damage because it clogs the ship's engine cooling system and entangles the propeller (McIlgorm et al. 2011). Plastic waste in the ocean also interferes with submarine navigation. In addition to being wrapped around the submarine's propeller, a large amount of plastic waste will also obstruct the periscope view when the sub is in a deep dive position to the surface. The communication system between submarines and ships on friendly water on the surface using an Extremely Low Frequency (ELF) band of about 1 kHz will be disrupted because the presence of plastic waste obstacles blocks it. Large floating debris will make it difficult for anti-submarine helicopters to detect the shadow of a submarine that is an ambush target. Another disadvantage is that in the monitoring and surveillance system (MSS) using satellite imagery, waste drift camouflages between waste generation as a submarine or vice versa (Interview with Purwito, July 3, 2021). The cost of damage caused by plastic waste in the shipping and fisheries sector, according to insurance statistics, is estimated to be equivalent to 0.28 billion US dollars per year for countries in the Asia Pacific Economic Cooperation region (McIlgorm et al. 2008).

Plastic waste pollution is an urgent issue in urban areas such as Jakarta. As the nation's capital, Jakarta's busy and fast-growing megapolitan city generated around 6,139.33 tons of waste in one day in 2010 (The Environmental Service Jakarta Province Government 2020). With the increasing number of people active in Jakarta, accompanied by changes in people's consumption patterns, the volume of waste and various types of waste, including hazardous waste, also increases. Most of the people of Jakarta still view waste as useless leftovers, not as a resource that needs to be utilised. So, dealing with waste still relies on the end-of-pipe approach, namely, waste is collected, transported, and disposed of to the final waste processing site. The awareness and behaviour of Jakarta residents in throwing garbage in the trash and maintaining the cleanliness and beauty of the city are not yet fully visible. On the other hand, the availability of land that is increasingly difficult and limited in waste management is not by environmentally sound waste management methods and techniques. This situation encourages the Jakarta Province Government to seek solutions for environmentally friendly waste management.

The proportion of unmanaged municipal waste in Jakarta is 26.0%, the top rank in Indonesia for unmanaged waste (Shuker and Cadman 2018). As much as 23 tons of garbage per day leaks into the Jakarta Bay waters. Plastic is the most common type of waste entering Jakarta Bay, with an abundance of 59% or 37% by weight of the total waste collected (Cordova and Nurhati 2019). It was stated by Cordova and Nurhati (2019) that of the complete plastic waste in 9 river estuaries in Jakarta Bay, most of it is dominated by Styrofoam which is widely used as food packaging ready for delivery. Styrofoam comes from styrene granules, which are processed using benzene, which includes substances that can cause many diseases (Cordova 2013).

The handling of plastic waste in Jakarta Bay has been handled and is the responsibility of the local government. Even though in terms of government administration, Jakarta Bay is part of three provincial governments, namely Jakarta Province, West Java Province and Banten Province. The Jakarta Provincial Government has the most significant part of the water area in the Jakarta Bay area, where one of its administrative areas is included in the Thousand Islands Regency. Therefore, the Jakarta Provincial Government has a more significant task in dealing with plastic waste in Jakarta Bay. Their role is considered less effective in implementing and managing plastic waste from the perspective of maritime environmental security. How do the government

recommend maritime stakeholders improve the security of the marine environment based on social capital?

Method

The research method used in this paper is a qualitative research approach. In this study, a qualitative research approach provides an overview of the existing situation and conditions regarding the actualisation of the social capital of the Jakarta community in dealing with plastic pollution from the perspective of maritime environmental security (Arikunto 2006).

The research was carried out in Jakarta by visiting the offices of government agencies related to research, namely the Jakarta Provincial Environment Service, the Director-General of Pollution and Environmental Damage Control at the Ministry of Environment and Forestry, and the Deputy for Coordination of Environmental and Forestry Management at the Coordinating Ministry for Maritime Affairs and Investment. In addition, interviews were also conducted with actors or users in the field, such as the Master Pilot (Pandu) who serves scouting at the Tanjung Priok Port, Jakarta, the Commander of the Navy Ship (KRI), the captain of the Pelra ship serving Muara Baru - Seribu Islands and fisherman farmers cultivating shellfish. Jakarta Bay greenery in Marunda.

The research was carried out during the period November 2020 to January 2021. The research data collectors used interview, observation, and literature studies techniques. While the data analysis techniques include data condensation, data presentation (data display) and conclusion drawing/verification (Miles, Huberman, Saldana 2014).

Impacts of Plastic Waste on the Bay

Economic activities and development in the Greater Jakarta area have encouraged environmental pollution, which is still a severe problem for the City of Jakarta. Poor handling of waste impacts the environment, causing various issues ranging from health problems and flood disasters to maritime security. Waste production in Jakarta continues to increase every year. The National Waste Management Information System (SIPSN) of the Ministry of Environment and Forestry recorded that the daily waste generation in five Jakarta areas in 2019 reached 5,502.87 tons per day or 2,08546.37 tons per year in 2020 and the daily waste generation increased to 8,369.35 tons or 3,054,812.22 tons per year. This condition causes Jakarta Province in 2020 to be the 4th largest waste producer after East Java with a total pile of 5,489,166.98 tons, West Java at 4,944,439.73 tons and Central Java at 3,513,644.39 tons. However, when compared of the population and area, Jakarta Province is in the highest rank regarding the number of waste heaps.

Currently, waste management is still carried out with a collect-transport-disposal pattern, while with the condition of the Bantar Gebang Integrated Waste Garbage Point (TPST), which is currently almost reaching its maximum capacity, a waste management strategy that is oriented toward reducing the waste sent to the Bantar Gebang TPST is needed. This is done to extend the operational life of the Bantar Gebang TPST. Another strategy the Jakarta Government takes is to carry out community-based waste management. Based on the existing evaluation, this program was quite successful in efforts to reduce waste entering the Bantar Gebang TPST; it was noted that the average amount of debris entering the TPST in 2019 was around 6.7 thousand tons per day or decreased by about 11 per cent from 2018.

According to Cordova and Nurhati (2019), based on the data collected, plastic is the most dominant waste that enters Jakarta Bay, which is around 37% of the total sample weight collected, which is 8.32 tons from June 2015 to June 2016. The plastic waste was found in Tangerang waters, which is 28% of the collected waste's total weight, about 2.15 tons. Meanwhile, the waste collected in the waters of Jakarta is 50% of the total 3.56 tons of garbage piled. Meanwhile, in the eastern

region of Bekasi waters, the weight of plastic waste collected was 33% of the complete accumulated waste, which was 2.61 tons.

In the context of the issue of pollution in this area, wind and current factors play an essential role in the mechanism for spreading contaminants each season. When the west season arrives, heavy rainfall affects the volume of freshwater that enters the coast carrying pollutants such as garbage from the Jakarta, Bogor, Tangerang, Bekasi areas. As a result of this monsoon, sea currents influenced by the monsoon system push water masses that carry waste drift material from the west and east, causing Jakarta Bay to become a "trap place" for waste contaminants in this area. This causes garbage originating from outside Jakarta Bay, at certain seasons, to fill the beaches along the coast of Jakarta's Pantura (Rositasari et al. 2017).

The results of interviews with fisherman farmers who cultivate green mussels in Marunda showed the impact caused by plastic pollution certainly affects the disrupted food chain cycle, especially the microplastic and nano plastic cycles contained in the bodies of fish and shellfish caught around Jakarta Bay and the surrounding area, affecting human health who eats it. Green mussel farmers in Jakarta Bay also suffer losses because their crops cannot be sold; even if they sell, the price will fall due to the heavy metal content and high microplastics and nanoplastics.

Plastic waste in Jakarta Bay also disrupts foreign ships docked at Tanjung Priok Port's shipping activities. Plastic waste often sticks to the right and left sides of the hull when it is going to dock at Pertamina Port near Bogasari because of the flow of garbage from the river near Bogasari, especially at low tide. There is a garbage cleaning ship around the Tanjung Priok port pool, but only the middle of the collection is cleaned while the edges are not touched. The source of garbage is not only from the sea; besides Tanjung Priok in Ancol, there is the Jabat River which also carries much junk into Jakarta Bay. It could be because the current was forced to take the shipment of debris into the port pool at high tide. The existence of plastic waste in Jakarta Bay is also due to the indiscipline of Indonesian-flagged ships, which he knows firsthand, to dispose of waste in the inlet of the Tanjung Priok port.

Meanwhile, for Navy ships, the impact of plastic waste on ship engines, plastic waste often enters the Sea east channel, which causes the machine to heat up because the cooling water does not flow smoothly. This seathast is located in the ship's keel, where plastic waste can quickly enter. Plastic waste in the form of ropes and trost ropes dumped in grooves and ponds often causes coiling in the propeller and causes the propeller not to rotate; the propeller stops.

The captain of the people's shipping ship that serves Muara Angke Jakarta to the Thousand Islands also complained about plastic waste. Plastic waste often binds to the propellers causing the rotation not to run normally. To overcome this, the crew at least 2 x once a week clean the plastic waste that binds the propeller. Plastics that are difficult to clean include rope and trost rope. Meanwhile, non-mining plastic waste is often found entering the intake cooler channel causing the cooling water channel. According to him, plastic waste is as harmful as when the engine is exposed to oil. Plastic waste will generally increase in number, especially during the flood season and when the south (east) season arrives.

Social Capital in Handling Plastic Pollution in Jakarta Bay

The Jakarta Provincial Government to involve the social capital of the people of Jakarta to overcome the waste problem is currently being carried out through the Establishment of Waste Banks in All Citizens Associations, Citizen Relations Management, Joint Responsibility Garbage and Jakarta Recycle Center (Sampah Tanggung Jawab Bersama/ Samtama). In the context of this research, what is meant by the actualisation of community social capital is the use of existing social capital in realising a mutual agreement/desire at present, namely in dealing with the problem of plastic waste, which is currently a central issue in the discussion of environmental problems.

As said by Field (2010) that the typology of social capital is composed of the presence of binders and adhesives (bonding), bridging, hooks, connections and networks (linking). Bonding

social capital refers to community norms, values and practices that contribute to social cohesion and community identity. Bridging social capital is defined as interaction and collaboration between various communities that can be used to expand the knowledge base and community assets. Social capital linking refers to connections made across government scales. This social capital enables communities to connect with actors with power and authority, allowing communities to gain access to resources and a stronger position and voice in governance processes.

Suryanggono (2013) states that the Indonesian people have relatively good social capital, one of which is community participation, namely the willingness to donate. Globally, Indonesia has the fifth-highest level of social capital in the world, with the highest social and civic involvement in the world in 2019 (Brien et al. 2019). This figure is, of course, a capital in solving problems in Indonesia and handling complicated waste like in Jakarta. Barnes et al. (2015) mention that social capital can solve problems in the ecosystem. Operationalisation of social capital within the framework of ecosystem services and in solving environmental issues involve flexible agreements resulting in adaptive natural resource management. In their research, pretty and Pretty (2001) found that community groups in various places from Kenya to the United States have utilised local social capital to deal with environmental problems and maintain critical environmental services collectively.

Social capital is part of social life through networks, norms, and beliefs that encourage people to act together to achieve common goals. Garbage is a common problem for all Jakarta residents with limited land. If all residents of Jakarta agree on this, the more people there will be and the more common values they have, the more social capital they will have. Social capital is needed to create the kind of moral community that cannot be obtained, as in the case of other forms of human capital. Acquiring social capital requires getting used to a community's ethical norms and, in that context, simultaneously adopting virtues such as loyalty, honesty, and dependability. Social capital is more based on the general social good, a melting pot of trust and an essential factor for a country's economic health, which relies on cultural roots (Fukuyama 1996). Social capital is the collective energy of the community (or nation) to overcome common problems and is a source of motivation to achieve economic progress for the community or country. Thus, if the social capital owned by the community is in good condition and properly utilised, then in the context of waste management in Jakarta, apart from overcoming environmental problems in Jakarta, it can also achieve economic progress for the people of Jakarta. Including plastic waste that enters the waters of Jakarta Bay.

The harmful impact of plastic waste pollution in the sea in Jakarta Bay has been felt by many shellfish farmers, trap fishers and captured fishers. According to Joko Rianto Budi Hartono, an official at the Jakarta Provincial Environmental Service, garbage not only hinders river flow, silting up in lakes but also the aesthetics of the city. In addition to the drastic decline in the catch, the selling price of the catch has also decreased because the shells/crabs/fish have been contaminated, so if they are eaten, consumers are poisoned and dizzy. Seafood restaurants/stalls also prefer the same catch from other areas. Therefore, the Jakarta Government makes every effort to reduce the impact through various programs involving the social capital of the people in Jakarta.

Social capital has a role and function as, among others, a tool to resolve conflicts that exist in society; make a separate contribution to the occurrence of social integration; form social solidarity of the community with the pillar of volunteerism; build community participation; as a pillar of democracy; and become a bargaining chip for the government (Coleman 1998)

As explained by Field (2010) that the strength of community social capital based on its typology consists of: binding, adhesive (bonding social capital), connector, bridging (bridging social capital) and hook, connection and network (linking social capital). Based on this typology, Fidel (2010) identifies the involvement of Jakarta's social capital in handling waste problems, such as managing garbage banks in the form of Citizen Relationship Management (CRM), Shared Responsibility Garbage (Samtama) and Jakarta Recycle Center. This activity represents the social capital bonding characterized by a strong bond due to the social glue in a social system, the social glue in the form

of values, culture, perceptions and traditions or customs. This social capital works more internally, and the solidarity builds social cohesion that is more micro and communal; as a result, the more exclusive relationships (Woolcock, 2002).

The bonding type of social capital also manifests in sympathy, a sense of obligation, trust, reciprocity and mutual recognition of cultural values they believe in. The rule of law is a rule or mutual agreement in society; this form of government can be formal with clear sanctions such as the rule of law. In addition, there are also non-formal sanctions in the form of exclusion, disrespect, and even being considered non-existent in a community environment. This creates fear in every community member who does not carry out part of their responsibilities (Damsar and Indriyani 2009).

Implementing the waste bank program in Jakarta takes the form of concern for waste problems. The similarity of backgrounds shows bonding aspects. The population density in Jakarta is very high, namely 16,704 people per km², so in general, Jakarta residents live close together, and their homes do not have a yard. In general, Jakarta residents live close together and their homes do not have a yard where they usually bury their trash. Even though the production of waste continues to increase every day due to the increasing number of residents and the demands of a metropolitan lifestyle that is accustomed to eating packaged foods. The Covid-19 outbreak has also increased the waste of food packaging waste ordered online and the waste of disposable masks.

Meanwhile, land for burying or burning waste is minimal. The Jakarta government only relies on the Bantar Gebang TPA in Bekasi to accommodate waste. Garbage also becomes a common enemy if organic waste accumulates in one location. In addition to reducing the aesthetics of the environment, the smell of rotting garbage interferes with breathing and comfort and is more dangerous as a source of disease. The impact is not only on residents close to landfills but also the residents around them. One way to overcome this problem is through the Waste Bank. Waste is a shared responsibility, managed by the community and facilitated by the provincial government. The benefits are also for the community, both the environmental benefits of being clean, beautiful and healthy and economic benefits because waste is also a business opportunity. They are related to the Jakarta Provincial Government Program through the Zero Waste movement, which is a movement to minimise waste generated by residents through 3R (Reduce, Reuse, Recycle). The implementation of Regional Regulation number 142/2019 concerning the prohibition of the use of single-use plastic bags is also well adhered to by the residents of Jakarta. Likewise, when residents are asked to be involved in a river clean-up, lake clean, or beach clean-up events, public interest, institutions, NGOs, and private companies when invited are very enthusiastic.

According to Joko Rianto Budi Hartono, an official at the Jakarta Provincial Environmental Service. Implementing the Waste Bank in Jakarta has generally been successful in reducing waste. Through the Waste Banks spread across Jakarta, the amount of waste that is reduced reaches 21 tons/day, of which 30% of the waste is plastic-type waste (Antaraneews.com 2021). Agree with Joko Rianto Budi Hartono (personal communication, 2021) that the success of the Waste Bank program in dealing with waste problems in Jakarta, where the community is the leading actor, shows that social capital is a critical component in collaborative environmental management (Plummer and Gibbon 2006; Pretty 2003). Community-based collaborative resource management has increased social capital at the community level and fostered external links to formal institutions such as local government (Wagner and Fernandez-Gimenez 2008).

On the other hand, the population of Jakarta is mostly the lower middle class. This group, in general, still face economic pressure amid the high cost of living in the Jakarta Metropolitan City. Turning waste into a business area that helps the family's economy is one way to overcome the problem of family needs. Therefore, the Waste Bank is an alternative to gain income. Research conducted by Wardhani (2004) in Banjarsari Village, South Jakarta, shows how the Waste Bank has contributed significantly to overcoming the waste problem and providing economic and environmental benefits for residents in the area. Another research is by Buswijaya and Asriwandari (2019) in Tampan Pekanbaru District, Riau, which states that the element of social capital has

succeeded in reducing environmental impacts through the formation of a waste bank; the three social capitals are networks, norms and trust. Bonding Social Capital, in this case, is the norm that must be obeyed by the customer, namely the setting of a different waste price and the withdrawal of savings, which can only be done once every six months.

However, any religion in Indonesia always teaches that humans live clean, prohibiting evil actions/deeds that pollute/are sinful to live beings and inanimate objects on earth where humans stand. Religious people are required to obey the teachings of their religion. In religion, the emergence of social capital bonding is known as a feature of sacred society where certain dogmas dominate and maintain a totalitarian, hierarchical and closed society structure. Values guide interaction patterns and norms favour certain archival and feudal levels. Therefore, the success of the Waste Bank cannot be separated from the religious criteria adopted by Jakarta residents, who are generally religious. The role of religious leaders is an integral part of the success of the Waste Bank program in Jakarta.

Furthermore, the people of Jakarta are a heterogeneous society consisting of various ethnic groups and religions from all parts of the Republic of Indonesia. However, in the bonding aspect, the people of Jakarta, in dealing with the waste problem, have the same perception. The research results by La Ola et al. (2018) discuss the strength of the bonding aspect in maintaining the coastal environment, where the area is inhabited by two tribes and does not become an obstacle to preserving the environment. The role of the social context of the relationship between the two ethnic groups, namely the historical elements of building the relationship between the two parties, differences and similarities in livelihoods, and the types of exchange and trust that underlie these relationships.

Bridging social capital is the relationship between the characteristics of different individuals, including people from other communities, cultures, religions, or socioeconomic backgrounds (Woolcock 1998). Bridging social capital is a bridge that connects bonding groups, but the characteristics of the community in bridging social capital tend to be heterogeneous with weak ties (Coffe and Geys 2007). However, this bond allows for a more comprehensive exchange of information and valuable resources for helping individuals or communities move forward (de Souza Briggs 1998). At the same time, social capital linking refers to social ties between individuals or communities with power sources and is very useful for long-term development in dealing with poverty and marginalised communities (Woolcock and Narayan 2000). The form of bridging social capital in implementing the waste bank program is the network formed between customers, unit waste banks, central waste banks, and the recycling industry.

Based on the results of a study by Wardhani (2014) and Buswijaya and Asriwandari (2019) shows that the success of the Waste Bank program is more successful at running well at the level of the lower middle class (poor) group compared to the upper-middle. Woolcock and Narayan (2000) reveal this because poor communities generally have high bonding social capital but are weak in bridging it, so they do not produce profitable collective action. The poor and middle class have significant challenges in transforming bonding bonds into bridging bonds for profit without eliminating bonding bonds' positive aspects (stocks). Therefore, the role of the Provincial Government of Jakarta in bridging these obstacles is the network formed between customers, ranging from unit waste banks, central waste banks, and the recycling industry. Build cooperation between the TPST institution and community groups such as Karang Taruna, community groups in each kelurahan such as the PKK women's group and the recitation group. The cooperation is established because of the standard rules that must be adhered to so that communication or coordination is established between the groups to achieve the one expected goal.

According to Collier (1998), the involvement of social capital in overcoming problems in society will have economic advantages; namely, it can reduce asymmetric information with the flow of information from non-poor households to poor households, reduce opportunistic behaviour with coordination and shared responsibility among group members, and give rise to collective action.

Social capital linking is a bond of social capital that reaches people who are very different, even outside their community. This form usually provides access to organisations or systems to help communities obtain resources for change (Woolcock, 2002). This social capital bond is often associated with organisations such as the government, banks, or funding institutions within or outside the community. In this group, trust in the leader will significantly affect the interactions. Leadership trust is indicated by leaders who listen to needs, pay attention, and are committed to the community. This social linking capital can be seen in the waste bank program in the form of a collaborative network between the West Jakarta Administration of the Environment Agency, a bottled mineral water company (PT. Danone) and national banks (BNI and Bank Indonesia), a collaboration between TPS Terpadu and community groups. Organisations and government apparatus in establishing agreements and cooperation. In the linking aspect, the Jakarta Government can also directly reduce poverty and unemployment rates. According to Nasution (2016), poverty alleviation is not related to bonding social capital but is more related to bridging aspects and linking aspects influenced by income and education (Nasution 2017).

Empowering Local Community: Movements to Change

Some actions linked with social capital are implemented in the four waste management programs summarised in Table 1. According to Table 1, The Citizen Relations Management application is an integrated system for monitoring the follow-up of public complaints. It can be done quickly and easily by utilising information and communication technology. This application also facilitates internal coordination within the Jakarta Provincial Government. It integrates complaints from all channels owned by the Jakarta Provincial Government, technology-based such as Qlue, Facebook, Twitter, e-mail, SMS and manual ones such as complaint posts in sub-districts, sub-districts and city halls. The Citizen Relationship Management application is used to monitor the extent of follow-up on public complaints by local government officials. With this concept, the use of information and communication technology can make the government more open, transparent, able to develop participatory democracy and build a network of activists to increase productivity and service to the community collectively and individually. Social capital in the bonding aspect can be seen in the citizen relationship management program as social participation practices in supervising waste management. Residents report through the application, then the Regional Work Unit (SKPD) / Regional Apparatus Work Unit (UKPD) / Regional Owned Enterprises BUMD) respond and complete the residents' reports.

Table 1. Social Capital has been shown in the four waste management programs in Jakarta

Garbage Programme	Handling	Social Madals		
		Bonding	Bridging	Linking
Garbage Bank		√	√	√
Citizen Management	Relationship	√	-	√
Samtama		√	-	√
Jakarta Recycle Center		√	-	√

Residents are obliged to cooperate with the government in dealing with waste, reporting it to appointed officers based on an agreement. The sense of obligation to protect the environment is the norm individuals adopt in groups for the common good. According to Putnam (1995), social capital is not limited to interaction relationships that involve certain people's behaviour factors but can also involve individuals in groups that form a social network. The substantive influence of social capital also fosters environmental knowledge and pro-environmental attitudes (Castaneda et al. 2012).

In their research, Rahman (2009) revealed the success of empowering social capital in preserving the Muara Kaman Nature Reserve, Sedulang Village, East Kutai Regency. The strategy used is to mobilise social capital to conserve planting land and reforest forests in the buffer zone because the source of life for the people of Sedulang Village is dependent on the Muara Kaman Sedulang Nature Reserve.

Meanwhile, social linking capital can be seen in the Citizen Relationship Management program's communication and information networks between SKPD, UKPD, BUMD, city administration and the Jakarta provincial government. The Citizen Relationship Management application directly connects the information network to the community.

Another program is Samtama (Shared Responsibility Garbage), a movement that started from the community's initiation in reducing waste through processing waste directly from the source. At first, the Samtama movement consisted of only 22 RWs who became the pioneers; it is hoped that all RWs will follow this movement in Jakarta. The social capital of bonding waste in the Samtama program is in the form of joint action through sorting waste, especially organic waste (food waste) and non-organic waste (metal, plastic, rubber) at the source, namely Temporary Waste Disposal Sites in each RW. Meanwhile, social linking capital can be seen in the Samtama program as a network between representatives of the Jakarta Environmental Service and residents of 22 RWs at the pilot project location.

Meanwhile, the community have also formed a program called the Jakarta Recycle Center Program, which is in the form of joint action. There is no bridging social capital visible in the Jakarta Recycle Center. Social capital linking at the Jakarta Recycle Center can be seen in the collaboration network between the Jakarta Provincial government and private business entities to help sort waste to residents from social to technical aspects. The Jakarta Provincial Government is also cooperating with the City Government of Osaka, Japan, regarding waste management, especially for reprocessing plastic waste through recycling.

Social Capital of the Jakarta's Community in Supporting Maritime Security

Environment Maritime security can be divided into several clusters based on security issues. One of the maritime security clusters is maritime environmental security. In marine ecological protection, the issue problem of marine environmental pollution. Plastic is a type of marine pollutant that is difficult to decompose. Unlike organic waste, plastic waste takes a very long time to decompose. The length of time for decomposition coupled with poor management of waste processing causes plastic waste to accumulate and eventually end up in the sea. As explained earlier, handling marine plastic waste in Jakarta Bay from the government's perspective is the responsibility of the Coordinating Ministry for Maritime Affairs and Investments. The Ministry of Environment and Forestry, and the Jakarta Environmental Service. At a tactical level, the Jakarta Environmental Service is the frontline government actor in handling plastic waste in Jakarta Bay. The involvement of community social capital in handling waste (including plastic waste) by the DKI Provincial Government is realised in the Waste Bank, Citizen Relationship Management, Samtama, and Jakarta Recycle Center programs. Handling plastic waste in Jakarta Bay, as stated by Joko Rianto Budi Hartono during an interview, that in handling plastic waste, the Provincial Government, through the Sanitation Department, is specifically tasked with tackling all piles of plastic waste both on land, rivers and lakes. However, for handling waste in Jakarta Bay, the Jakarta Provincial Government does not have a ship; it is still handed over to companies around the coast of Jakarta Bay. Besides that, incidentally at certain events such as Diving Clean Action by inviting the private sector, holding an event to clean up trash in the sea. The Jakarta government also invites plastic-producing companies through Corporate Social Responsibility (CSR) to participate in overcoming the problem of plastic waste in Jakarta Bay by providing incentives to community groups who use plastic to resell to plastic recycling companies. The theory of Social Capital agrees with what Burt (1992) said, the involvement of social capital in development (in this case, waste management)

becomes a vital force not only for economic life but also for every other aspect of social existence. Parameters of social capital such as resource capabilities, associations, relationships or networks, multilevel actors, and social agendas are the keys to how social capital can be utilised optimally. In other words, the concept of social capital is suitable as a perspective to explain the process of handling plastic waste in the sea.

Jakarta represents Indonesia, where there is Tanjung Priok Port, the largest international port in Indonesia. To enter the Port of Tanjung Priok trade fleets from abroad through Jakarta Bay. Therefore, the face of the Indonesian sea for the first time was in Jakarta Bay. Plastic waste floating in the waters of Jakarta Bay is often the cause of ship damage because it clogs the ship's engine cooling system and entangles the propeller (McIlgorm et al. 2008). In peacetime, when there is goodwill for foreign warships to Jakarta, plastic waste will interfere with the navigation of ships on water and submarines. Suppose this happens in a warship training area. In that case, large amounts of plastic waste, besides being wrapped around the submarine's propeller, also obstruct the periscope's view when the sub is in a deep dive position to the surface. The communication system between submarines and ships on friendly water on the surface using an Extremely Low Frequency (ELF) band of about 1 kHz will be disrupted because plastic waste obstacles block it. The large amounts of floating debris will make it difficult for anti-submarine helicopters to detect the shadow of a submarine that is an ambush target. Another disadvantage is that in the monitoring and surveillance system (MSS) using satellite imagery, waste drift camouflages between waste generation as a submarine or vice versa (Interview with Purwito, July 3, 2021). That the cost of damage caused by plastic waste in the shipping and fisheries sector refers to insurance statistics which is estimated to be equivalent to 0.28 billion US dollars per year for countries in the Asia Pacific Economic Cooperation region (McIlgorm et al. 2008)

The waste problem in Jakarta Bay has not been handled regarding maritime activities, especially shipping, fisheries and port sectors, and the marine industry. The issue of plastic waste in the sea is very different from taking plastic waste on land. Several administrative areas directly connect the marine environment so that plastic waste that enters Jakarta Bay can come from areas around Jakarta. One of the characteristics of the marine environment is controlled by tides, ocean currents and surface winds. Plastic waste material that is washed away will be carried away with the current. The distribution of drifting plastic waste will determine the prevailing current dynamics. This is what Dida Migfar Ridha, Director of Pollution and Damage Control of Coastal and Marine, Ministry of Environment and Forestry, said. Joint handling is needed for waste in the sea because the waste drifting is transboundary.

Ridha noted that, specifically in Jakarta alone, there are 20 spots where large amounts of garbage often occur in Jakarta Bay. Therefore, the need for a high role of capital. This, of course, is very heavy if it is imposed on the Jakarta Government alone; it requires the participation of the private sector combined with social capital to become a prominent force in handling waste in Jakarta Bay. The responsibility of the government, through the Coordinating Ministry for Maritime Affairs and Investment, is to tighten regulations regarding the obligation of ships to dispose of waste at port reception facilities, non-government actors to play a role in waste management by providing information related to the distribution of waste in the marine and coastal environment. If collaboration is formed between the government and these institutions, the decision-making process will work more effectively because it will increase the amount of incoming information. The people of Jakarta are generally concerned about waste. This initiative can be implemented well because community participation in waste reduction in Jakarta is already strong. Although it still needs encouragement and guidance from the government. The role of community leaders, religious leaders and cultural leaders is very decisive in cultivating waste management warriors, as stated by Rofi Alhanif, Assistant Deputy for Waste and Waste Management, Environmental and Forestry Management Coordination Sector RI Ministry of Maritime Affairs and Fisheries.

Conclusion

The impact of plastic waste drifting in the waters of Jakarta Bay is detrimental in all aspects of life, from environmental aspects, fisheries economy, health and maritime security aspects. In the interest of maritime security, plastic waste drifts in the waters of Jakarta Bay in the form of plastic ropes and trost ropes are often wrapped around the ship's propeller, decreasing its function. Plastic waste floats on the surface, and usually enters the intake system of the cooling water channel (cooler), which is often known by the term on ships as the Seacheast, causing blockages in the cooling system, causing the engine to heat up and eventually the engine can explode, very dangerous if it happens on a warship carrying large amounts of ammunition.

The actualisation of Jakarta's social capital in handling plastic waste in Jakarta Bay is implemented through the Waste Bank, Citizen Relations Management, Samtama programs and the Jakarta Recycle Center. The actualisation can be divided into three according to its nature: social capital bonding, bridging and linking.

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