



Assessing the Outcomes of Circular Economy and Waste Management Partnerships between Indonesia and Denmark

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Abstract

In the pursuit of sustainable environmental solutions, the bilateral collaboration between Indonesia and Denmark has emerged as a focal point of study, particularly within the spheres of the circular economy and waste management. This research, anchored in a qualitative descriptive methodology, delves deep into the intricacies of this partnership, shedding light on its commendable strides in fostering the exchange of best practices and pioneering waste reduction techniques, notably waste incineration. The collaboration, rooted in a shared commitment to environmental sustainability, has not only aimed at diminishing the adverse environmental repercussions of waste but has also sought to catalyze opportunities for both nations to achieve their waste management objectives more efficiently. However, the journey has not been devoid of challenges. A significant impediment identified is Indonesia's constrained reservoir of expert resources, which has had tangible repercussions on the effective implementation and scaling of circular economy initiatives. This limitation underscores a broader challenge faced by many emerging nations, emphasizing the critical need for capacity building and resource augmentation. The research's implications are manifold, extending beyond policy formulation to influence practitioners and academics in the environmental and sustainable development sectors. By offering a nuanced perspective on the dynamics of international collaborations, the study underscores the potential and challenges of such partnerships in addressing pressing global environmental issues, thereby serving as a beacon for similar endeavors in other developing contexts.

Keywords: *Circular Economy, Impact Evaluation, Technology Implementation, Waste Management*

1. Introduction

In the study of International Political Economy, cooperation is an effort made by several people or groups to achieve a common goal, cooperation is also an interaction that is very important for human life because humans are social creatures who need each other, cooperation can occur when individuals The individuals concerned have the same interests and awareness to work together to achieve common goals and interests[1].



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Especially in foreign aid cooperation, which is the transfer of resources from developed countries to underdeveloped countries, either through bilateral donors or multilateral donors, which usually also requires foreign aid to be subject to certain limitations reflecting the various motives of the first donors. how sincere they are towards the development and welfare of developing countries with the exploitation of one party and both are sincere towards the development and welfare of developing countries in synergy with each other. This is also included in sources of foreign aid, namely bilateral assistance provided from the government of a donor country to a recipient country is called bilateral assistance. Basically a one to one relationship between two countries. it depends on the political and economic relations of the two countries plus the wishes of the donor country.

The waste problem in Indonesia has become an emergency since 2010, there have been 275 million tonnes of waste produced throughout the world, around 4.8-12.7 million tonnes of which is wasted and pollutes the sea. Indonesia has a coastal population of 187.2 million which annually produces 3.22 million tons of waste that is not properly managed. Around 0.48-1.29 million tons of this waste is thought to pollute the ocean. The beverage industry in Indonesia is one of the sectors with the fastest growth. Another threat is the wave of plastic imports that is likely to come from other countries. Other countries in the Southeast Asia region, including Indonesia, receive an abundance of waste from countries that previously exported to China. This resulted in the volume of waste imports in Indonesia in 2018 reaching 320 thousand tons, an increase of up to 150% from the previous year.

The lack of waste incineration processing is the cause of the continued increase in solid and liquid waste, made even worse by the presence of Indonesian plastic waste that is targeting other countries, where on the edge of a beach in Phuket, Thailand, you can see a lot of rubbish scattered around, not only plastic sandals, but also plastic sandals. As a result, Indonesia is overloaded with waste, resulting in a lack of storage for final waste processing. Plus, there is the proliferation of imports and exports from other countries which contain hazardous waste, which shows that there are 49 containers of waste from Europe and the US, especially France, Germany, Hong Kong, Australia and Canada, which enter the port freely. Which turns out to be the reason why there is demand from industry in Indonesia which makes the production of external waste into raw materials[2]–[4].

Therefore, the government is actively carrying out strategic efforts to reduce and handle waste, thus making an international agreement with Denmark, which is one of the countries with progress in waste recycling because Denmark has committed to developing a sustainable transition in the Circular Economy and waste processing management. Looking at this collaborative process, Indonesia's efforts in recycling waste, this research will analyze "How to Evaluate the Impact of Indonesia-Denmark Collaboration in Circular Economy and Waste Management 2018-2019?"

2. Research Method

In conducting the research "Evaluating the Impact of Indonesia-Denmark Collaboration in the Circular Economy and Waste Management (2018-2019)", the research method used was descriptive, namely presenting the information contained in the variables which are the main problem in this research. The data collection method for this research is literature study from various sources that have been selected such as books, magazines, documents, journal articles, newspapers, and data from official websites to obtain primary data, as well as conducting interviews to obtain appropriate data and facts.

2.1 Literature Review

The theory used by researchers is Holsti bilateral cooperation. That a bilateral cooperation "Part of two interests, values or goals meet each other and can produce something, be promoted or fulfilled by all parties, the hope that the policy decided helps the country to achieve its interests and values and the official or unofficial rules regarding

transactions in future actions undertaken to carry out objectives or transactions between states to fulfill their agreements.”

Holsti's theory of bilateral cooperation will be implemented with the concept of rules of principle which is a conceptual framework for cooperation in reciprocal relations between the two parties involved, and the main actor in implementing this relationship is the state with the motive of maintaining national interests, maintaining peace and improve economic prosperity. To build strong partnerships with its external environment[5], creating friendly relations. In general, cooperation encourages competition in achieving goals and increasing productivity, and creates synergy so that operational costs will become lower, which causes competitive ability to increase and to establish harmonious relationships between parties and increase the sense of solidarity[6].

In this research "Evaluating the Impact of Indonesia-Denmark Collaboration in Circular Economy and Waste Management (2018-2019)", Indonesia uses bilateral cooperation with the Perwita and Yani concept by implementing a bilateral pattern, a reciprocal relationship between the two parties involved, to maintain economic interests and welfare of society. Based on this theory and concept, to achieve its economic interests, Indonesia collaborates with several project management implementations with Denmark. This is what makes this research able to be analyzed using the Holsti bilateral theory which is applied through the Perwita and Yani concepts.

3. Findings

In the current global environmental development, the world is also facing a waste crisis where waste production continues to increase and will reach 2.2 billion tons per year in 2025. UNEP program news states that currently the world's waste volume has reached 1.3 billion tons per year in general. The threat of poor waste management occurs in low-income countries where waste collection is less than 50%. It will take another year and a half for nature to replenish and regrow what the inhabitants of the planet consume in one year. Despite making great strides in resource efficiency, this is not enough to stop the damage to our planet. We need new ways of thinking and new economic models. So the need for a waste incineration strategy with recycling through a Circular Economy[7]–[9] is an acceleration of the transition to the development of a more sustainable society, where recirculated materials and products are used to exploit their full potential and waste is minimized, which transition will have significant potential for the environment and the economy[10], [11].

The increase in waste production has caused environmental problems along with the increase in urban population. Meanwhile, land for final disposal sites (TPA) for waste is also increasingly limited. This condition worsens when waste management in each region is still less effective, efficient and environmentally sound and is not well coordinated. If waste management has not been implemented properly, it will become a source of problems, both social and environmental, that arise in society. The emergence of various diseases due to water, soil and air pollution is only a small part of the consequences of poor waste management.

By using fewer materials and increasing recycling rates, companies can capture more value. The increasing influence of sustainability in supply chain management practices and operations can be attributed to the fact that stakeholders in organizations are required to promote strong economic performance and be responsible for environmental and social performance. The UN World Commission defines sustainable development as a trajectory in which future generations achieve the same level of prosperity as current generations. It also means adapting industrial processes to energy consumption and material use, waste prevention, recycling and reducing hazardous chemicals. Recycling is one of the most important parts of the Circular Economy concept. sharing economy concepts, such as apartment rental (Airbnb) and shared car use by utilizing the digital economy, and collaborative

models play an active role in supporting the Circular Economy by extending the duration of the product so that its use is well optimized.

Incorporating circular economy into product policy, product design is critical to CE because it is the selection in the design phase of materials and chemicals that determines the lifetime of the product, and whether components and materials can be reused with high value. 80% of the environmental burden of a product is decided in this design phase[12], [13]. Circular solution design is about maximizing the value of materials, products and services through a focus on limiting material consumption and waste, increasing service life and making repair and recycling easier. In addition, the Ellen Mac Arthur Foundation, Sistemis and SUN Institute have identified four overarching policy issues that can catalyze action in all of the ten investment themes namely, First, determine direction and demonstrate commitment, one of the success factors for the clean energy revolution is clarity of direction such as providing strategy, public investment, or agreement trading. Second, removing policy barriers, many of the themes identified require legislative change to investment at scale; most often, this consists of removing policy obstacles. Furthermore, these barriers currently exist to managing consumer health but in the context of business adoption of CE innovation, these risks can be controlled[14], [15]. For example, quality and safety standards may be established for remanufacturing parts or food proteins. Depending on the specific legislation, changes may be required at EU or Member State level.

Third, creating platforms for dialogue, cooperation and awareness creation successful examples of circular economy business models demonstrate the need for many stakeholders along the value chain to change (part of) the way they run their business models. The public sector can play an active role by organizing platforms with the right set of players to facilitate discussions. A successful example is the European Resource Efficiency Platform established 2012-2014 which serves as an effective mechanism for gathering information from relevant stakeholders, as well as developing solutions. So, similar platforms can be set up for mobility, food and environmental buildings so this should be done for themes where the public sector plays a big role so that there is no opportunity for the private sector to take the lead.

Four, the focus of public procurement, public circular economy investment, and financial support towards ten themes several investment themes require technological innovation, in addition to innovation funding, the public sector has supported lower risk investment on a larger scale with a primary focus on infrastructure. For example, the European Investment Bank (EIB) has invested €14.5 billion over the last two years through its European Fund for Strategic Investments mostly in infrastructure projects, but less than 10% of this will be circular economy-related investments. As the circular investment themes in this report have large infrastructure components, allocating budget within existing funds to them will shift investment towards circular opportunities while providing new growth opportunities for those funds, but also, at the same time, shift investment towards circular opportunities[16], [17]. Investment funds at the member country level could well provide an additional supply of public capital for theme investments. Finally, reforms to the existing subsidy framework should be considered, especially in the area of shifting linear agricultural practices towards more circular ones, while fiscal incentives should also be aimed at circular business models.

Fifth, monitoring in monitoring the effectiveness of CE (Circular Economy) is important to have indicators such as resource and raw material indicators whose aim is to report progress in implementing the action plan five years after adoption. Waste management at the source also supports further waste management because in the end it will reduce the generation of waste disposed of in landfills. The principle of reduction in waste management consists of limiting waste generation, sorting waste and recycling waste. Meanwhile, the handling principles in waste management include waste reuse, waste processing and waste collection. In waste management, there is also the polluter pays principle, namely that everyone is responsible for the waste produced.

So there is a need for a strategy that refers to national policy regulations which are guided by the Presidential Regulation of the Republic of Indonesia number 97 of 2017, namely the target of reducing and handling household waste and household-like waste in 2017-2015. What is meant by reducing waste is in accordance with article 3 paragraph 2, namely, limiting, recycling and reusing waste and waste similar to household waste.

Waste Reduction:

- 1) Limiting waste generation is carried out by:
 - Avoid using single-use items and/or packaging
 - Use items or packaging that can be reused
 - c) Use items or packaging that are easily decomposed by natural processes
 - Using reusable shopping bags when shopping and
 - Do not buy goods in small packages (sachets), but goods that can be refilled (refill). In accordance with the national strategy policy regarding cooperation between Indonesia and Denmark, an implementation agreement and support for actions, namely EPR (Extended Producer Responsibility), best practices for producer responsibility or other SUP for reducing, reusing or recycling plastic, were formed. Members of the Indonesian Packaging and Recycling Alliance for a Sustainable Environment (PRAISE) will be consulted (Danone, Tetrapak, Coca Cola, Unilever, Nestle, Indofood).

- 2) Waste Recycling Waste recycling is done by utilizing waste into useful items after going through a processing process first, such as:
 - Turn organic waste into compost
 - Food waste becomes animal feed
 - Plastic waste becomes ecobricks, and
 - Inorganic waste becomes craft products

In line with the Indonesia Danish partnership agenda, the Indonesian government has set a target to improve the handling of solid waste from households, including cities, industry in accordance with presidential decree 97/2017 as stated in Jakstranas (National Strategy Policy). And in Project management which is distributed in the Waste Banks program. One of the implementation targets of Jakstranas is to reduce solid waste to landfills by 30% by 2025.

Database system integration between waste bank data and Adipura data via SIPSN and the need to develop online waste bank data collection[18]–[20]. The need for waste bank data has been conveyed to the waste data team. The development of the unit waste bank (BSU) and Main Waste Bank (BSI) programs will follow the concept of the LHK regulation on BSI which is a revision of Minister of Environment Regulation number 13/2012 concerning guidelines for implementing 3R through waste banks. Currently, the revision of the LHK regulation regarding BSI is still ongoing. Building capacity in the management of selected waste banks and communication to improve the flow of materials through waste banks. Analysis/clarification of needs by the Ministry of Environment and Forestry and existing best practices for recording and distributing waste banks. It is important to explain the need and what the data will be used for. Development of a draft digital platform for waste banks (stakeholders must be included) Guidelines / templates for how cities should collect data from waste banks, An annual reporting system is developed to report from all local governments about the performance of waste banks to the Ministry of Environment and Forestry. Increased capacity and communication to increase recycling at the Waste Bank. It is important to convey information from the Ministry of Environment and Forestry to local governments to waste bank managers and ultimately to residents. The conclusion is an overview of the Ministry of Environment and Forestry's main task in terms of communication, namely ensuring that resources are used optimally and that the main tasks are completed. Clarification of the extent to which ministerial decisions are revised, the results can be input for the revision process or input to set strategies for implementation.

The online reporting system will make it easier for local governments to report data from waste banks, to know which data they are expected to provide and provide it in the form requested by the Ministry of Environment and Forestry. This will give the Ministry of Environment and Forestry a better national picture of waste banks. Database harmonization will also make it easier to report the impact of waste banks.

The main source of national data on waste banks comes from information provided by local governments to the Ministry of Environment and Forestry. Analyze synergies between waste banks and TPS3R to assess possibilities for integration. Guidance for cities on new revised regulations on waste banks and data submission. Stakeholders must be involved. Based on the responsibilities of the Ministry of Environment and Forestry, one of the following two things can be initiated a) Carrying out a national campaign to citizens about the new revised regulations on waste banks (social media, including videos), stakeholders must be involved. b) Start a process where the Ministry of Environment and Forestry helps cities on what and how they can communicate with residents. Testing guidelines for city and national campaigns. These guidelines are aimed at cities and depending on the content ways to test them should be worked out. For national-scale campaigns, testing can be carried out on selected waste banks. And develop an interactive map showing where to find the nearest waste bank and perhaps information about the waste bank, what can be sent, when it is open, and so on. If this activity is initiated, it is important to clarify the objectives (why it should be carried out) and how it will be updated Preparation for synergy between the Waste bank and TPS.

The more waste from households is separated, collected and recycled, the less waste is sent to landfill. Description of the differences between waste banks, TPS and TPS3R, including ownership. The descriptions are created to have a common baseline and should be used when defining possible solutions.

3) Waste Management

- Waste sorting is carried out by separating and grouping waste according to the type of waste,
- Waste containing B3 and LB3
- Waste that is easily decomposed
- Reusable trash
- Recyclable waste and
- Other waste (residue)

Waste that has been grouped can be used and reprocessed to make compost, household-scale biogas, recycled crafts, or deposited in a waste bank. Meanwhile, waste that cannot be reused is disposed of at the nearest TPST to be processed at the landfill. Waste management aims to preserve the function of the environment and public health and turn waste into a resource. The implementation has been made from bilateral cooperation between the two countries with efforts carried out by the Ministry of the Environment, namely the Organic Waste program. Building on exchange visits and feasibility studies for organic treatment facilities and aiming to increase organic waste recycling in Indonesia, activities for 2019 were held detailed to move forward on 4-6 selected municipal capacities to plan and propose efficient organic waste treatment facilities and quality. In the process, the selected cities aim to describe their needs, demands and capacities and ultimately to propose organic waste management projects to potential financiers and investors[21]. So, a team was formed to investigate some of Indonesia's well-established biowaste challenges for a new proposal learning facility.

Apart from that, Waste Data aims to ensure that relevant waste data is available to provide information to decision makers about waste generation and waste processing in Indonesia for policy and investment decisions that help implement and monitor Jakstranas. Where, G2G will be involved in dialogue about the input and dissemination of regulations regarding current waste data, followed by G2G involvement in waste surveys in certain cities

and training local authorities on how to obtain meaningful waste data from surveys. Currently, what has been initiated includes the creation of government regulations (permen), surveys to review waste generation and training so that sustainable development can be implemented.

4. Conclusion

Circular Economy and Waste Processing Management can be said to have played a role in reducing and handling waste with systematic, comprehensive and sustainable activities, everyone is responsible for the waste they produce, as an implementation of Circular Economy and Waste Management Indonesia and Denmark hold several programs, namely organic waste, waste bank, waste data and producer responsibility for waste.

Through these programs, Indonesia is able to synergize in reducing waste in waste processing with mechanisms formed through strategies to achieve targets that transition to a sustainable economy with the potential for efficiency by developing and exporting new technology. Management projects have been carried out well so far. However, this activity is less effective because expert resources are minimal so the process takes longer.

This implementation must also be in synergy and supported by policy factors that develop the involvement of all stakeholders, especially the community, in implementing the Circular Economy to ensure a closed loop process with a simplified circular process to minimize the amount of waste that converts waste at one end of the value chain into input at the other end.

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