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Conditions of Poor Waste Pickers in the Plastic Waste Supply Chain in The Implementation of Circular Economy at Mahija Parahita Nusantara Foundation

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Abstract

This Research explores the conditions of waste pickers (pemulung) face within the plastic waste supply chain under the circular economy framework in Yayasan Mahija Parahita Nusantara. The research focuses on understanding how waste pickers contribute to circular waste management and how structural poverty affects the waste pickers' well-being. This research used a qualitative descriptive approach with in-depth interviews, observations and document study with purposely selected informants, including waste pickers, middlemen, and program managers. Findings reveal the community segment as the primary source of household waste; it still lacks consistent waste separation practices, limiting the quality of recyclable input. Waste pickers, in the second segment, face multiple vulnerabilities including lack of legal identity, unstable housing and low bargaining power. Another condition was waste pickers do not have direct access to industry due to limited volume and should pass the long chain through various chains from small traders, medium traders, large traders and industry. Despite their contribution, they remain marginalised, earning only IDR 2500-6500/kg depending on waste conditions. Middlemen dominate the third segment, setting the prices and often benefiting from informal loyalty systems with waste pickers, while gaining significantly higher margins by reselling to large buyers. And the last segment, industry receives to process the plastic but remains disconnected from the social realities of upstream actors. This study highlights the need for a more inclusive business that improves equity and economic justice across all supply chain segments, especially for waste pickers and other informal workers.

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Keywords: Waste Pickers, Supply Chain, Plastic Waste, Middleman, Poverty

INTRODUCTION

According to the United Nations Development Program, the circular economy model is built to involve all goods and services that can be reused, remanufactured, recycled, or reused and continue to be used in the economic cycle for as long as possible(Alisjahbana & Murniningtyas, 2018). In a circular economy, the value of a product can be maintained throughout its life cycle, resulting in a longer service life for the product. Circular economy model is a principal that implemented to support waste management. Improvement in waste management by environmental cadre need by building awareness of waste problems and various parties in waste management (Almayra and Machdum , 2025). The implementation of the circular economy is what prompted the Mahija Parahita Nusantara Foundation to create a waste management program so that the plastic produced in the production process by Coca Cola Euro Pacific and PT Dynapack can be reused as a material for further packaging production. The concept of a circular economy is one option that can be applied by cities in an effort to integrate the informal sector. This concept is expected to improve the welfare of waste pickers and the contribution of waste pickers to the environment.

Waste pickers are considered a strong community to be a practical mediator who must be included in the circular economy structure to strengthen the formation of a circular economy in developing countries(Fuss et al., 2021). Various programs have been carried out by the Mahija Parahita Nusantara Foundation. However, field conditions faced by waste pickers and outside the program intervention often hinder waste pickers activities. This is related to the daily activities of waste pickers while working which are outside the monitoring of this foundation. Waste picker roles are crucial in waste management. Waste pickers help to create a circular economy by recovering materials, which reduces resource consumption and promotes maximum reuse and recycling. The waste pickers contribute greatly to the waste supply chain but are often not formally recognised by the national waste management system. Another condition, waste pickers face various social problems from poverty, limited access to social protection and problems in the supply chain. Waste pickers are one of the groups that have a role in supporting the plastic waste supply chain in implementing a circular economy. However, waste pickers must face various conditions of price instability, low bargaining power and dependence on middlemen or traders, which cause structural poverty for waste pickers. The supply chain in plastic waste management involves various actors, from household waste producers, waste pickers as waste collectors,

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middlemen consisting of small and large traders and also contribute to the recycling industry by processing materials. However, waste pickers are typically at the lowest level of the supply chain with limited access to price information, legal protection and added value from the materials they collect (Jayawati et al., 2021). Research by WIEGO (2020) shows that the structure of dependence on middlemen also exacerbates the socio-economic vulnerability of waste pickers.

Waste pickers activities cannot be separated from supply chain activities or waste supply chains. This activity is an activity of collecting valuable waste to be collected again with the aim that the waste can be managed again by recyclers and waste pickers to get income based on the amount of waste that has been collected. The supply chain is identified as the main unit in moving towards a circular economy which includes collaboration between customers, suppliers and other stakeholders to maintain the materials/products used, components and materials in circulation (Jayawati et al., 2021). In this case, the waste that enters the supply chain is waste that can be reprocessed and traded. The results of this sale are the main source of income for waste pickers. However, in the supply chain process, waste pickers are faced with various conditions and problems that often harm waste pickers. One of the problems faced by waste pickers is the very low sales value of the results of scavenging. This condition is caused by the presence of middlemen who often give prices that are very low from the normal selling price. Middleman are part of the supply chain, acting as intermediaries who collect waste from pickers and sell it to waste recycling centre. Waste pickers will sell the results of collecting to middlemen. In a study conducted by Gendis and Chaerul, (2011), waste pickers s in Bandung City were 10.1 kg/day, the average selling price of waste pickers s to middlemen for plastic bottles was an average of IDR 2,700 per kilogram, while the selling price of middlemen to the collecting center reached IDR 6,000 per kilogram. This shows a fairly high price difference. Based on this price, the price difference obtained by waste pickers is significant with a comparison of the selling value of waste pickers with the selling value of middlemen being 9:20 with a profit difference of up to IDR 33,330. This price difference is caused by middlemen who give prices that are unreasonable and below the normal average selling price. However, due to the limitations of waste pickers in getting access to sales to other middlemen, waste pickers are forced to continue to sell to the same middleman. This often results in waste pickers earning very little, making it hard for them to afford daily necessities and keeping them in poverty. Erpinda (2023) in her research stated that one of the factors that plays an important role in the circular economy is the distribution channel of recycled materials. Jaya and Machdum (2022) in their research state a policy to support the informal sector in their case as a waste bank, need to strengthen the institutional capacity and knowledge with the principles

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of circular economy and increase the capacity of informal sectors. This affects the average income of waste pickers which continues to decline due to the decrease in the value of waste collected through a long supply chain. Policy planner often ignore social and ecological goals with tendency to focus their attention on improving technical quality (Halimah & Machdum, 2023).Based on the problems above, this study aims to examine the implementation of the circular economy principle in the supply chain aspect involving the role of waste pickers. This research aims to understand the challenging conditions faced by impoverished waste pickers within this supply chain, particularly as it relates to the application of circular economy principles at The Mahija Parahita Nusantara Foundation.

The Mahija Parahita Nusantara Foundation is one of the foundations that has taken the initiative to help integrate waste pickers into a more inclusive and sustainable plastic supply chain. This foundation carries out various community empowerment programs, intending to improve the welfare of informal workers and strengthen the recycling plastic waste collection system. This study aims to describe the conditions of poor waste pickers in the plastic waste supply chain in the implementation of a circular economy at the Mahija Parahita Nusantara Foundation and to identify the challenges they face in carrying out their roles. The circular economy on the waste pickers side is carried out by implementing a supply chain of materials from waste pickers to be sold to middlemen at the collecting centre. After going through the middleman, the materials are sold back to the recycling center and reused by the industry. Once recycled, the material is reused by the industry as a product. To overcome this waste problem, the principle of the circular economy is restarted from the beginning, so that it is hoped that no waste is wasted and the material can be used as much as possible.

Implementation of the application of the circular economy related to waste pickers faces several conditions. The problem of waste pickers' poverty causes waste pickers to depend on the work done by collecting waste that still has value for resale. However, in this collection process, waste pickers face limited access to direct sales to industry, so they have to go through a long supply chain through middlemen at the collecting centre. Moreover, the middlemen passed through can exceed 1 or 2 parties, so that the selling value obtained is getting lower. Another problem faced by waste pickers is the limited volume of waste obtained. Direct sales to large middlemen require a large volume. This makes waste pickers have to sell to small middlemen because the volume of waste obtained is also small. This supply chain causes the sales value received by waste pickers to be smaller because of the service fees taken by the middlemen. This research addresses the significant challenge waste pickers face in the supply chain persistently

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low and declining income, largely due to their limited ability to sell directly to the recycling industry. By shedding light on these issues, this study aims to lay the groundwork for developing more inclusive and empowering policies and interventions for waste pickers.

OVERVIEW OF POVERTY

The poverty condition of waste pickers is one of the implications of ineffective and unfair supply chain conditions. The emergence of poverty among waste pickers is due to the limited access of waste pickers to get a suitable price for the sale of scavenging results, which are part of the plastic waste supply chain. On the issue of waste pickers, the waste pickers group is one of the vulnerable and poor groups because they have limited access conditions and are vulnerable in facing economic and social crises. According to the United Nations Development Programme states that vulnerable groups refer to segments of the population characterised by conditions that lead to poverty. According to Selo Soemardjan (1980), the social structure of society that hinders the utilisation of income sources that are available causes a group of people to experience poverty. According to the World Development Report (2002), poverty is understood as a multifaceted issue, extending beyond simple income deficiency to encompass various dimensions. This requires the real causes of poverty to help provide explanations and enlighten the perspective of the causes of poverty (Sameti & Haghighi, 2019). Three main factors shape the understanding of the causes of poverty: factors from individual humans, cultural and environmental factors, and structural conditions in society.

This study will examine structural poverty as one of the conditions affecting waste pickers. Several theorists on structural poverty contend that its roots lie in the broader socio-economic system. Bradshaw (2006) and Addae (2019) propose that individual limited access to resources and opportunities for income and well-being are directly linked to the economic system, political conditions and broader social issues. Sameti and Haghighi (2019)argue that poverty stems from “stronger social and economic structures” and capitalism itself, even when individuals exert significant effort through hard work, skills and competence. This perspective highlights that individuals can experience poverty and be left behind, regardless of their personal competence. The theory further asserts that within a competitive, market-driven economic system, disparities in talent, skills, and initial capital, which directly influence individual productivity, are a root cause of poverty. According to Davis and Moore in Sameti and Haghighi (2019), suggest that societal roles requiring specialised talents and extensive training warrant greater rewards. Hurst cited by Sameti and Haghighi (2019), argues further emphasises that competition for employment often

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revolves around income, with income inequality being a primary driver of poverty. He suggests that in a competitive environment, individual ability, effort, and training determine one's success for the positions. According to Grusky as cited by Sameti (2019), argues that individuals are compensated based on their contributions to society. He highlights the importance of education, training, skills and intelligence as key components of productivity, asserting that greater job contributions lead to greater rewards. Social constructionists such as Fischer argue that inequality is not inherent but rather a deliberate outcome, created and maintained through social institutions and policies (Sameti & Haghighi, 2019). Furthermore, she stated "certain demographic characteristics, including race, gender, vocational disability, family size and structure, place of residence, and age, are important factors that can increase or decrease the risk of poverty" (Sameti & Haghighi, 2019). Generally, poverty rates are higher among single-parent households, women, minority groups, and families with many children. With specific reference to rural poverty, Richardson and London in Sameti (2019) argued, "the link between poverty and structural inequality is not accidental but deeply structural and causal". To solve the problem, Richardson and London in Addae (2019) strongly suggest "the first thing to do is to break down these barriers and then build the rural economy". However, Abdulai and Shamshiry in Addae (2019) have explained "combating structural poverty only aims to strengthen the capacity of the poor to meet their living needs, but not to turn them into passive and permanent beneficiaries of assistance programs". Abdulai and Shamshiry in Addae (2019) believe "the theory of structural poverty is rooted in Marxist doctrine, which states that the existence of a low-income class is a creation of the capitalist economic system, or the bourgeoisie, as a strategy to dominate". This perspective necessitates government intervention to ensure a fair and equitable playing field for wealth acquisition and redistribution.

The poverty that occurs among waste pickers also refers to the principle of social justice. Social justice in a structural perspective sees oppression and injustice as problems that lie in the social structure (Jim Ife, 2013). This perspective is called "blaming the system", attributes poverty to broader societal issues like patriarchy, capitalism, institutional racism, and unequal income distribution, emphasising that oppression or structural disadvantage are the core problems requiring resolution. The structural perspective requires changes in individuals and organisations that have power so that they can change the basic structure of oppression and injustice.

OVERVIEW OF WASTE PICKERS

Waste pickers are individuals who collect and sort waste to find materials that can be

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recycled or reused. Waste pickers, in the term waste pickers refer to individuals who collect waste dumped in public places such as streets and parks (Hayami et al., 2006). They are the poorest group in the urban informal sector and struggle to meet their daily needs. According to Azhari (2009), waste pickers belong to a social group whose livelihood involves collecting discarded or used items from the community. Waste pickers transport used goods taken from the streets, landfills, markets, shops, terminals, stations, airports, tourist attractions, places of worship, schools, campuses, and cemeteries. To avoid unemployment, some people choose to become waste pickers (Hafiza & Mawarpury, 2019). Because waste pickers do not have other jobs, this unskilled job is in the last poverty caste. Waste pickers have a valuable contribution to society by converting unused waste into productive resources and helping to clean up the city (Hayami et al., 2006). Waste pickers play an important role in the city's waste management system, contributing to environmental and economic sustainability by providing raw materials for the recycling industry (Dias, 2016). By collecting and providing raw materials for the recycling industry, waste pickers contribute to reducing the use of new resources and extending the life of existing products. Dias also mentioned that waste pickers in the term waste pickers often work informally and are not recognized in the official system but provide significant benefits to society and the environment. Thus, waste pickers not only play a role in waste management, but also in creating jobs and increasing income for themselves and their communities.

Waste pickers represent a particularly susceptible group to poverty, facing highly intricate and varied impoverished conditions (Morais et al., 2022). Income and resource instability, as well as the inability to access health, education, and sanitation services are signs of extreme poverty experienced by waste pickers. Marello in Jandira Morais et al. mentioned that waste pickers experience social stigma and discrimination that make it difficult for them to improve their standard of living and develop their businesses. Several factors that cause waste pickers to experience poverty include unstable income, limited access to basic services, social stigma, poor working conditions, limited capital and technology and external factors such as the political and economic situation (Morais et al., 2022).

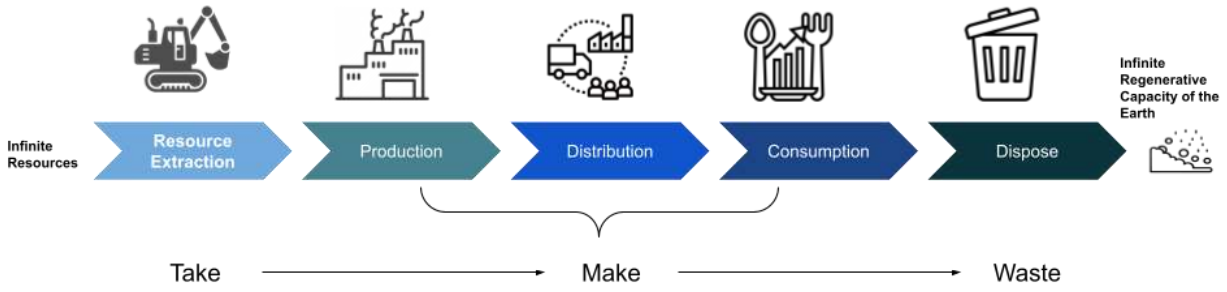
CIRCULAR ECONOMY

Since the beginning of large-scale industrial development, the linear economic model has been used by the industry, and known as the "circular economy" is one of the principles born to overcome the challenges of the linear economic process. According to the United Nations Development Program, the circular economic model applies the principle of "take-make-dispose",

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which means that the manufacture of products (producers) uses resources and utilizes them as product materials that can be used by consumers and other producers.

Figure 1. Linear Economy Framework

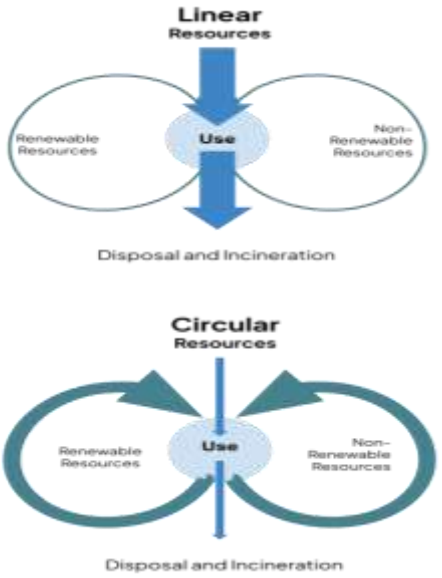


Source: Wautelet (2018, p. 18)

By using sustainable models, various alternative economic systems have been initiated, one of which is the circular economy system. The sustainability and circular economy paradigms serve to balance economic, social and environmental interests. According to the United Nations Environment Programme, the circular economy aims to reduce the flow of materials and energy used by the previously linear production-consumption system of society. Sustainable development is realized by high-value material cycles and the formation of a cooperative system between producers, consumers and other community actors. The United Nations Environment Programme states that the circular economy is an economy that can reduce waste production and resource consumption and can recycle and reuse waste from production, distribution and consumption processes to increase production efficiency, introducing new business models as an integrated circulation system in which the repair and regeneration activities of a product are carried out.

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Figure 2. Comparison of Linear Economic Systems and Circular Economic Systems



Source : Potting, et al (2017, p. 9)

One of the principles that supports sustainable development is the circular economy. UNDP says that the circular economy can help in sustainable development because it has long-term development goals, holding back or reducing the rate of significant use of natural resources. According to UNDP, the circular economy can also help address environmental issues by looking at social and economic aspects because both are integrated and create a value system that is beneficial to the business sector, society and the country. According to UNDP, economic actions can occur at all levels, namely macro, meso, and micro. To achieve optimal implementation of the circular economy, macro-level indicators help in policy decision-making related to the economy, trade, and environment; national development and environmental strategies and action plans; and national waste renewal and management. At the micro level, the relationship between business and customers directly consists of thinking about design and products that use the principle of circular material inputs, sharing models, services as products, product life extension, and resource recovery.

The principle of a circular economy involves the supply chain in a circular economy, especially at the meso level, which aims to reduce waste and maximize resources. A supply chain or supply chain is a set of actions involved in the process of changing materials and distributing

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goods from natural raw materials to finished products to end consumers (Sariyun, 2013). Supply chain management is an idea or mechanism that aims to increase the total productivity of a company. Scarlat and Dalleman inMorais et al., (2022) mention several applications of the supply chain in a circular economy, namely collection, recycling, distribution, sale and return to the system for reuse by the industry. This process cannot be separated from the role of waste pickers. Waste pickers play a role in the supply chain of materials that can be reprocessed. The activities of waste pickers in sorting waste can reduce the volume of waste at each stage of the operational process of waste management that can be recycled and reused in the recycling chain and supply chain (Awopetu et al., 2014). This supply chain is one of the factors that influences the implementation of the principle of a circular economy. Waste pickers are a strong party to be a practical mediator who must be included in the circular economic structure to strengthen the formation of a circular economy in developing countries (Fuss et al., 2021).

FINDINGS AND DISCUSSIONS

This study found the role of waste pickers in the supply chain in the circular economy model, especially at the stage of collecting plastic waste. In the supply chain of waste, especially plastic, there are four main segments, namely the household and community segments, the waste pickers segment, the middleman segment, namely small traders and large traders and the industrial segment.

Waste Pickers in The Waste Supply Chain at The Community Segment

The community segment is where waste pickers initiate the resource of waste, collecting discarded materials that form the base of the informal recycling supply chain. Their interactions and methods in this segment are foundational to the livelihood and flow of the materials.

A Waste Pickers collecting waste from community Members at Events

The findings indicate that waste pickers strategically target large public events, such as “JIS” or Jakarta International Stadium, as one of the stadiums that was used as a place to build a big event in Jakarta. This place is targeted by the waste picker for collecting valuable waste, particularly plastic bottles. This opportunistic approach demonstrated informal work and aligning with the descriptions of waste pickers as individuals who actively seek out and recover resources from urban waste streams (Hayami, 2006). Their activity at these events is a direct contribution to the circular economy by diverting significant quantities of post-consumer plastics from landfills.

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However, the necessity to work late hours, "until 3.am", often under competitive and unregulated conditions, reflects the demanding and precarious nature of their work, a common characteristic for those in poverty (Morais, et al. 2022).

B Waste Pickers Collecting Waste from Community Members in Offices Areas

The diversification of collection sites to include offices areas, markets and schools. Access to these areas, particularly offices, may involve informal negotiations and permissions as suggested by the *pelapak* as a individual that sells products on their marketplace. This informality while providing access, underscores their lack of formal recognitions and rights within broader municipal waste management systems (Dias, 2016). Such informality can contribute to their vulnerability and insecurity, key aspects of the poverty experienced by this group.

Waste Pickers in The Waste Supply Chain within the Waste Picker Segment

This segment delves into the internal world of waste pickers, examining their social organisations, operational methods, economic realities, and living conditions that correlate with their role in the supply chain

A Waste Pickers Joining Organizations or *Paguyuban* (Waste Picker Associations)

The existence of *paguyuban* or informal associations, where members can help each other, highlights the importance of social capital for marginalized groups. These associations function as a support system and a form of risk mitigation, reflecting community-based coping mechanisms often found among those in vulnerable economic positions.

B Operational Needs of The Waste Pickers

Waste pickers do the side jobs to earn additional income because income from waste picking is insufficient is a direct manifestation of their poverty and economic insecurity. Their struggle to meet basic needs aligns with the multidimensional nature of poverty, extending beyond income to include overall financial insecurity. Another operation to become a waste picker is sacks and carts that are required as the capital of working. Furthermore, the rudimentary nature of their tools limits their operational scale and efficiency, contributing to the cycle of low productivity and low income that characterize poverty. Another need was the place to hoard the waste. The necessity of finding space, often rented or informally occupied to store collected waste before sale. Thus, can entail costs and insecurity of tenure, especially for informal arrangements,

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adding another layer of vulnerability to their operations. Based on Richardson and London in Sameti (2019) This lack of secure, affordable operational space can be seen as a structural impediment, as per structural space can be seen as a structural impediment, as per structural poverty theories. The operational needs are used for food expenses. They use income to allocate the food expenses. This focus on immediate subsistence leaves little capacity for savings, investment in health or education or upgrading their works.

C The value of Waste that Sold by The Waste Pickers.

The practices surrounding the sale of waste are critical to the economic returns to waste pickers and reflect their understanding of market dynamics within their limited agency, a key aspect of their contribution to the circular economy's goal of resource value maximization. *Gabruk* was one form of the waste that was undifferentiated, mixed waste and sold for quick cash. While these expenditures transactions, it fetches lower prices, meaning the waste picker forgoes potential income that could be gained from sorting and cleaning. In other conditions, some waste pickers sell in larger volumes. This could improve their bargaining positions, but the capacity to accumulate is limited by storage and immediate financial needs, which make a challenging situation for those in poverty. Some waste pickers also sell waste in clean, separated and crushed conditions of the waste. This represents a direct contribution to value addition to the supply chain. This aligns with circular economy principles of enhancing material quality for recycling (UNEP) and demonstrates their role in improving the efficiency of the recycling supply chain. However, the extent to which these increased values are passed back to them is a critical question related to fair benefit distribution in the circular economy. In every waste sale, the business uses receipts in some transactions to show the transparency prices. This can be a small step towards more accountable trading relationships, which is often lacking in informal sector dealings. The findings show that plastic bottles are the most obtained waste. The consistent finding that plastic bottles are a primary target positions waste pickers as key players in the plastic circular economy supply chain, a sector often targeted by corporate and governmental CE initiatives. On the other hand, the waste that is collected as a "value" and can be resold. This act of transforming "waste" into "resources" is the very essence of their contribution to resource recovery and the circular economy (Hayami, 2006).

D **Waste Picker's Waste Collection System**

The system of collection employed by waste pickers is adapted to their circumstance and

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the nature of informal work. First, the working time was used at night to find waste. This may offer advantages but also exposes them to risk, reflecting poor working conditions often associated with marginalized informal workers and poverty. Second, even though plastic bottles were the most collected and valuable waste, the waste pickers collect other types of waste and diverse material beyond plastic as a strategy to maximize earnings. To achieve better unit prices, the waste picker also accumulates the waste until a large amount before selling. This practice of holding the material aims to achieve better unit prices, but delays income, which can be challenging for those with immediate daily needs, a direct consequence of their poverty. To accumulate this, the waste is collected for 3 days then sold. The clear distinctions that the waste pickers' roles is collection and sale of raw materials defines their r specific roles at the beginning of the supply chain as the providers of raw secondary materials. Circular economy models recognize different specialized roles within the ecosystem (UNDP, 2024).

E **Variations of Waste Picker's Living Locations**

The living conditions of waste pickers are intrinsically linked to their livelihood and reflect their socio-economic status. Choices of location are driven by proximity to waste sources and the presence of established waste picker communities, which offer social capital. Some of them live with the boss of a middleman (*bos pelapak* in Bahasa Indonesia) that signifies a patron-client relationship, which while providing some security, can also be a feature of structural dependency as per structural poverty theories.

F **Condition of Middleman for Waste Sales**

The act of selling collected material routes waste pickers to various types of middlemen. Sales are made to local collectors with whom they have regular sales, to those encountered opportunistically, or for larger collectors or " *bos besar*". This varied sales structure indicates an often-fragmented initial supply chain. Their reliance on smaller, local collectors who accept diverse materials suggest a trade-off between accessibility and potentially lower prices, a consequence of limited mobility, information and capital, characteristic disadvantage for those in poverty within a competitive masker system (Hurst, 2004).

Waste Pickers at the Middleman Segment

Interaction with the middleman (pelapak) is a critical phase that significantly determines the economic value received by waste pickers and is often characterized by power asymmetries,

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central to understanding their poverty within the supply chain.

Variations in The Price of Waste Sold by Waste Pickers to Middleman

The price waste pickers receive for the materials exhibits considerable variations. For mixed waste (*gabruk*), the price ranges from IDR 1,300 to IDR 2,500 per kilogram. The price often follows the standard set by the regular collectors. Higher value is assigned to specific commodities like iron and cleaned plastic bottles (IDR 5.300-6,500/kg). A crucial finding is the price discrepancy where collectors reportedly sell cleaned PET to *"bos besar"* for around up from IDR 7,000/kg. This gap highlights a significant portion of the material's value being captured by intermediaries, rather than primary collectors, This aligns with the problem statement in the proposal regarding low prices received by waste pickers (Gending and Chaerul, 2011) and can be interpreted through structural poverty theories, where economic systems may inherently disadvantage those with less capital and bargaining power (Sameti et al., 2012).

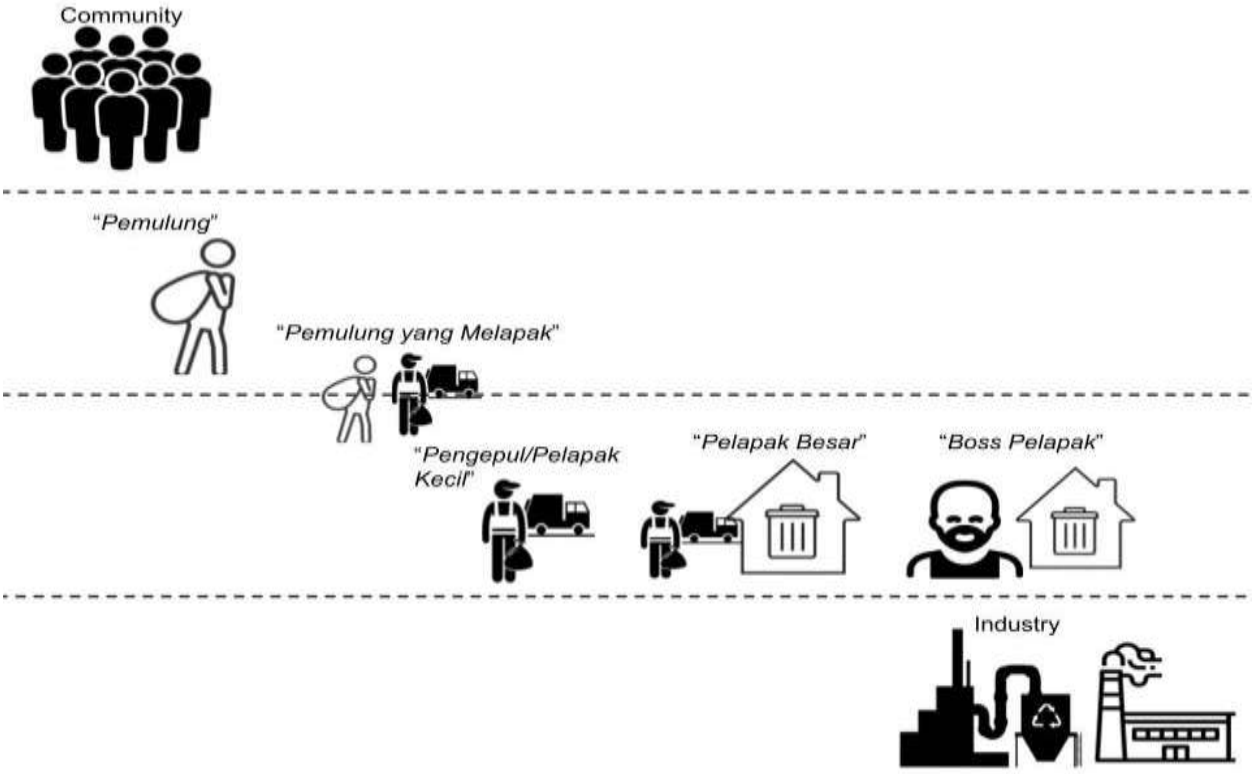
The Relationship between Waste Pickers and Collectors (*Pelapak*).

The relationship between waste pickers and *Pelapak* is multifaceted, blending economic transactions with social ties. Many waste pickers rely on *pelapak langganan* or regular patrons for loans and assistance in time of need, some *pelapak* provide essential support like work capitals and use the member system of the waste picker for an exclusive selling arrangement. While offering a degree of security and reflecting pro-social behaviour by some *pelapak*, these patron-client dynamics also foster dependency and limit the waste pickers autonomy and market options, a characteristic of structural poverty where opportunities outside these established ties are limited. Price information is often controlled by the *pelapak* and waste pickers exhibit strong loyalty to their patrons, often due to trusts, convenience or lack of viable alternatives. The conditions where *pelapak* may not accept small quantities of waste further constraints waste pickers. This power imbalance is a key feature of structural inequality as described in social justice perspectives (Jim Ife, 2013).

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Figure 3. Variety Terms of Waste Supply Chain in Indonesia



Source: Research Documentation (2025)

Waste Pickers at the Industrial Segment

While not directly engaging with the industrial segment, waste pickers are the foundational link supplying the raw materials that fuel the recycling industry, thus playing an undeniable role in the broader circular economy framework.

A **Choose to work as both waste pickers and *pelapak* to sell directly to the industry**

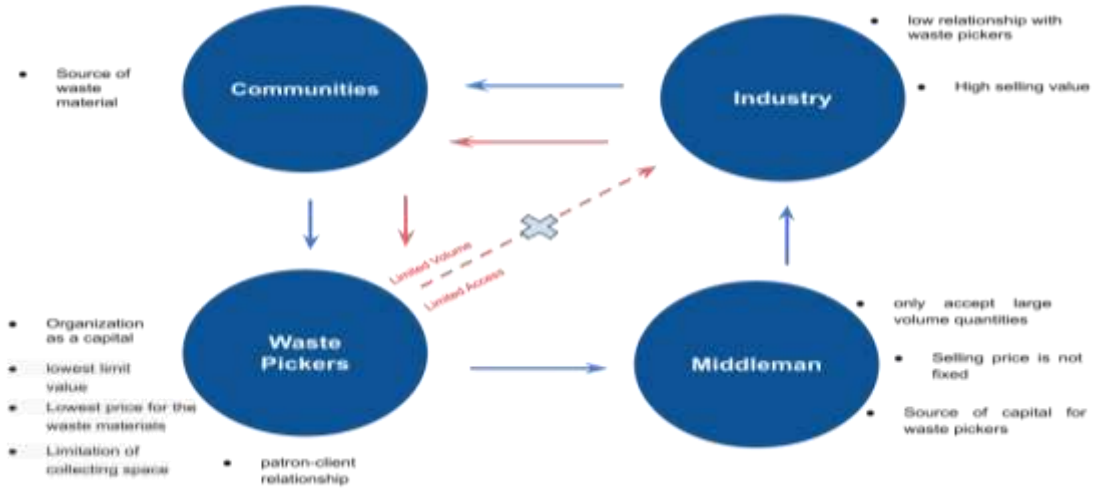
The findings confirm that waste pickers typically do not sell their collected materials directly to industrial recycling facilities, Instead, their access to this end of the supply chain is mediated through layers of middleman-*pelapak* and *bos besar* who aggregate and channel the materials onward. This structural position in the apply chain is a significant factor contributing to their limited economic agency, aligning with structural poverty concepts (Selo Soemardjan, 1980). and complexities of CE supply chains (Sariyun, 2013).

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B Collectors Gaining More Profit if Selling Directly to The Industry

The Middleman who has established direct links with the recycling industry achieve higher profit margins. This situation underscores the issue of inequitable value distribution within the supply chain. This points to a critical need for interventions that improve the waste picker's integration and bargaining power within the CE supply chain, aligning with the broader objectives of sustainable developments and poverty reduction. The role of yayasan Mahija Parahita Nusantara became crucial in addressing these structural imbalances and empowering waste pickers. Through this Foundation, waste pickers receive empowering programs in education, health and advocacy. Education programs are provided in the form of scholarships and school access. This foundation also provides the health program through free health check-ups. This foundation also provides the advocacy for making formal identity. The advocacy assistance also forms the Responsible Sourcing Initiative as program to advocate the waste pickers in inclusive and fair-price work environment. Through this foundation, waste pickers receive assistance programs in education, health and advocacy. Educational assistance includes scholarships and access to schools. In health aspect, this foundation provides the free health check-ups and in advocacy, this foundation assist in obtaining the formal identity cards as know *Kartu Tanda Penduduk (KTP).* Mahija Parahita Nusantara Foundation also offers advocacy assistance through its Responsible Sourcing Initiative Program. This program advocates for waste pickers to wok in a fair and inclusive environment, and to receive fair prices for their effort.

Figure 4. Condition of Poor Waste Pickers in supply chain of waste



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Based on research that has been conducted, in the household and community segments, waste pickers collect waste from various strategic locations such as highways, markets, offices and public areas. The volume of waste increases significantly when there are public activities. The large activities become one of the sources of plastic waste for waste pickers. However, most of the waste is collected in a mixed condition *(gabruk)* because waste pickers do not choose to sort the collected waste and choose to sell the waste that is sold directly. In addition, waste pickers' access to the source of waste is often uncertain, depending on the permission of the security officers on duty.

In the waste pickers segment, the work pattern generally lasts from the afternoon to early morning. They work using sacks and *gerobak* as the capital. The waste collected is waste that can be resold and is generally in the form of plastic bottles, cardboard, metal and glass. The sales strategy varies depending on the desires and abilities of the waste pickers. For waste pickers who sell in the form of *gabruk*, waste pickers can sell it for IDR 2,500 per kilogram. While for waste pickers who have sorted and cleaned plastic bottles, sales can reach IDR 6,500 per kilogram. Waste pickers who choose to clean plastic bottles and sort bottle materials get a higher selling value to sell to traders. Waste pickers collect plastic waste for 3-4 days so that more waste is collected because traders do not accept small amounts of waste. However, price differences and price fluctuations often occur, especially during the holiday season or holidays. This condition shows the desire of waste pickers to get money quickly. This can be influenced by the mindset and lack of understanding to get bigger results in doing business. Here, the study also shows the urgency to immediately meet the needs on the same day so that they are forced to sell garbage in the form of *gabruk* to get fast-cash.

The middleman segment is a link between waste pickers and the industrial sector. The relationship between waste pickers and middlemen in scavenging work is patron-client, namely waste pickers who choose to remain loyal to certain traders even though the price changes because of social ties and assistance received, namely, housing assistance. Traders also provide cart capital or loans for waste pickers who need them. Small-scale waste pickers do not have direct access to industry due to limited volume. This causes waste pickers who are unable to meet large volumes of prices to pass through various chains from small traders, medium traders, large traders and industry. This depends on the conditions faced by waste pickers. Generally, industry only accepts large traders with large volumes of waste. Waste pickers do not know the flow of waste that has been collected for sale because the next transaction is carried out by the middleman. In addition to the findings on the condition of waste pickers in the supply chain per segment, this

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study found the identification of challenges faced by waste pickers. The biggest challenge faced by waste pickers is the lack of legal identity and administrative documents, namely KTP, which has implications for other access such as access to BPJS health, public services and social assistance. Challenges on the streets experienced by waste pickers also include raids and evictions by officers such as Satpol PP, especially when working in public areas. Another challenge is dependence on traders, so that the bargaining position of waste pickers is low. Changes in the price of waste faced by waste pickers cause waste pickers to not have enough income to meet their daily needs. On the other hand, waste pickers have a low willingness and ability to process the waste they get, to have a higher selling value, so that they still get low incomes and are trapped in poverty.

Figure 5. Poverty Cycle of Waste Pickers



Source: Research Documentation (2025)

CONCLUSION

This study shows that waste pickers play a role in the plastic waste supply chain, especially in the early stages of collecting waste materials. However, there are still several social problems. In addition, waste pickers face complex structural challenges. Thus, for the circular economy to be implemented properly, improvements are needed in the supply chain, which is one part of this model. Structural and inclusive interventions involving policies in terms of pricing, identity and integrated systems are needed so that the problem of structural poverty of waste pickers can be overcome and the circular economy model can provide benefits not only for the environment but also for informal groups that play a role

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