BASELINE-ENDLINE SURVEYS ON KNOWLEDGE, AWARENESS AND BEHAVIOR OF BENEFICIARIES AT TEGALSARI FISHING PORT

GLOSSARY

Waste reduction
Activities to limit waste generation, waste reuse and waste recycling which also include setting targets for gradual waste reduction within a certain period of time, applying environmentally friendly technology, reusing and recycling and marketing recycled products

Waste handling
Waste sorting activities in the form of grouping and separating waste according to the type, quantity and / or nature of waste, collection in the form of picking and transferring waste from the source of waste to temporary shelters, transportation from sources of waste and / from temporary shelters to the final processing place, processing by changing the characteristics, composition and amount of waste, and final processing with the safe return of processed waste

Beneficiaries
A number of people in the port who have certain criteria for receiving benefits from the implementation of the program

Waste reduction with 3R
Waste hierarchy concept that classifies waste management strategies in order of preventing or limiting the use of products with plastic packaging, waste reuse and waste recycling

ACRONYMS AND ABBREVIATIONS

3R	Reduce-Reuse-Recycle
ABK	Fishing Crews
B3	Hazardous and Toxic Materials
KUB	Group Of Joint Ventures
PKL	Street Trading
PPP	Fishing Port
P2SDKP	Supervision and Control of Marine and Fishery Resources
TPI	Fish Auction Place
MSMEs	Micro, Small and Medium Enterprises
UPT	Technical Implementation Unit
UPTD	Technical Implementation Unit

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SUMMARY

The beneficiaries of the Clean Fishing Port Pilot Program at the Tegalsari Fishing Port play an important role in implementing and improving waste management at one of the largest ports in Central Java Province, PPP Tegalsari. To support the realisation of improving the waste management system in the port, the active role of beneficiaries needs to be encouraged and maximised. Environmentally sound waste management behaviour is closely related to the knowledge and awareness of beneficiaries on the procedures for handling and reducing waste in PPP Tegalsari. Initial identification related to the level of knowledge, awareness and behaviour of beneficiaries' waste management is important to be carried out through a baseline survey / pilot study to find out the initial condition of these indicators before an intervention is carried out to increase knowledge, awareness and environmentally sound behaviour of waste management in PPP Tegalsari.

This baseline and endline surveys applied quantitative method with non-experimental designs, namely surveys. The questionnaire is a tool used to assess the beneficiaries' knowledge and awareness of waste issues and waste management independently and integrated in the Tegalsari PPP as well as the beneficiaries' behaviour based on waste handling and reduction. Beneficiaries who participated in the baseline survey, sample selection with a combination of purposive-cluster sampling from groups of fishermen, cleaners, fish traders, MSMEs and UPI with the main criteria, namely (1) carrying out daily activities at PPP Tegalsari; (2) willing to participate in the Clean Fishing Port Pilot Program till in a year.

A total of n = 52 beneficiaries from industrial and commercial sectors were involved in baseline and endline surveys. Broadly speaking, beneficiaries had low knowledge, awareness and behaviour of the basic concepts of waste and port waste management before the intervention, but experienced significant changes after implementation of programs. Beneficiaries had low knowledge in three indicators in the baseline survey, regarding waste categorization (19.2%), types of waste based on the nature (21.2%) and the definition of 3R (15.4%). The provision of interventions increased the knowledge regarding waste categorization on 63.5% of beneficiaries. Most of the people had a high knowledge of the definition of sorting, sorting tasks and the early stages of waste handling since the baseline survey and more people had high knowledge in the endline survey. However, still less than half of the number of beneficiaries knew about the type of waste by its nature/characteristics (40.4%) and the definition of 3R (15.4%) even though interventions had been given. Beneficiaries had low awareness in two areas in the baseline survey about waste processing and reducing the use of single-use plastics, but had good awareness in four areas related to the economic value of waste, disposal of waste, disease from waste and hygiene responsibility. Program interventions through outreach and murals increased beneficiaries' awareness of waste handling to 57.7. Awareness of the replacement of single-use plastics was the only indicator with the number of beneficiaries less than 1/2. Beneficiaries misconducted four indicators in the baseline survey relating to waste sorting (26.9%), reducing single-use plastic use (23.1%), subscribing with plastic waste pickers (44.2%) and subscribing with cleaners (15.4%). The most significant change was seen in sorting, where more beneficiaries sorted waste after the program interventions were given. The other three indicators above, however, were still carried out by less than 50% of beneficiaries by the end of the study. Notwithstanding, most of the beneficiaries had good behaviour, in both surveys, related to the disposal of waste in the space provided as well as the contribution of self-cleaning of the environment.

The programs implemented by DFW Indonesia, in collaboration with port management authorities and other parties, encourage the improvement of knowledge, awareness and behaviour of beneficiaries in handling and reducing waste. Interventions must be consistently provided in the future and reach more people at the port to ensure the achievement of sustainable development goals. The local governments of Tegal and Central Java Province are encouraged to synergize with the authorities in the port to support sustainable waste handling and reduction. Other parties such as waste banks, TPST, TPS 3R, waste collectors, environmental communities and others are expected to take part in providing understanding to waste producers at ports so that they can participate in managing their waste from source.

1. INTRODUCTION

I.1 Background

Waste is the main environmental problem faced by the Tegalsari Fishing Port. Attention to the problem was conveyed by the Indonesian Fishermen's Association of Tegal City in local media and national media, that the poor waste management system and the habit of the community in disposing of waste in the dock area continuously resulted in the accumulation of large amounts of waste at various strategic points of the port industry and commercial. The results of the Rapid Assessment activity also showed that the waste management system at PPP Tegalsari was not running optimally due to these two factors, namely the absence of synergy between the community and port authorities as well as the habit of disposing of waste in any place by fishermen, stall traders, fish buyers and other parties to drainage, roads in and out of port, docks and other areas in the fishing port area.

Gardner (2014) defines habit as an internal and external phenomenon triggered by signals based on a response stimulus. Habits develop from repetitive behaviours (Lally et al., 2010). The Theory of The Habit Loop developed by Duhigg (2016) states that habits are formed from (1) reminders / trigger signals to start behaviour automatically, (2) routines / behaviours of the individual himself and (3) rewards / benefits obtained. When the reward shows positive things, the individual will do the same in the future when the reminder appears, and together it will cultivate a habit. One of the trigger signals that appear is influenced by consciousness. Covey (1988) states that habits are also related to knowledge, skills and desires. Proper community empowerment in these three domains where individuals can effectively solve problems, maximise opportunities, and continue to learn and integrate other principles in the growth spiral will encourage the formation of synergy and proactive habits of the inner community. Gardner and Rebar (2019) add that habits are determined by impulsive processes, and can also be generated by cognitive effort, awareness, control and intentions of a person. Based on the statement above, knowledge, awareness and behaviour play an important role in determining better community habits in managing waste in a sustainable and sustainable manner in the port area. Therefore, the initial and final assessment of the three variables through baseline and endline surveys is important to carry out in order to determine the level of knowledge, awareness and behaviour of the community before the program intervention and after the program intervention is given.

I.2   Aim of the Study

The aim of the baseline survey is to measure the level of knowledge, awareness and behaviour of beneficiaries towards waste conditions and waste management at the Tegalsari Fishing Port before program interventions are carried out, while the purpose of the endline survey is to measure the level of knowledge, awareness and behaviour of beneficiaries towards waste conditions and waste management at the Tegalsari Fishing Port after program intervention.

The benefit of both surveys is to provide data and information about the initial picture / existing condition as well as the final picture of knowledge, awareness and behaviour of the beneficiaries of the program in waste management at PPP Tegalsari. Another benefit of implementing the two surveys is that they provide information about the significance of the implementation of the program to increase knowledge and awareness of changes in the behaviour of beneficiaries.

I.3   Scope of the study

The scope of this activity includes knowledge, awareness and behaviour with sub-indicators of the type of waste group, parties responsible for waste management, waste status and community contributions in handling and reducing waste, especially plastic waste.

I.4   Methods

Baseline and endline survey activities used quantitative designs with non-experimental methods, namely surveys (before-and-after studies). The before and after studies of the target population before the intervention is introduced and they study it when the intervention has been successful. The purpose of this study is to find out the cause-effect relationship of a phenomenon. Experimental studies are before and after studies. In the before and after studies researchers had two contacts with the population and studied the degree of change in the situation (Ranjit, 2011).
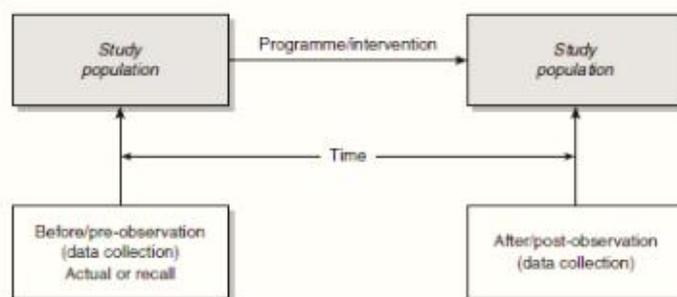
Figure 1. Before-and-after studies design (baseline/end-line survey)1

The targets of these surveys are the beneficiaries of the program which include modern and traditional industry players, stall, fishermen and cleaners. Sample selection is based on the non-probability sampling technique method using purposive sampling with certain considerations (Sugiyono, 2015) such as samples taken from beneficiaries who are considered to be able to

represent the opinions of other beneficiaries in the same job, can be reached and are willing to participate in baseline survey activities and end-line surveys.

The selection of purposive sampling methods in baseline / initial surveys aims to contribute to a better understanding of the theoretical framework (Bernard et al, 2002). Therefore, the procedure for collecting data and selecting samples appropriately is important to carry out. The purposive sampling technique, also called assessment sampling, is a determined choice of beneficiaries with certain criteria. Purposive sampling is a non-random sampling technique that requires an underlying theory or a special number of beneficiaries. Furthermore, assessment indicators and samples are developed to provide information related to the issue sought.

The baseline survey activity was carried out at one of the largest Fishing Ports in Central Java, namely the Tegalsari PPP in Tegal City for three days starting from June 17, 2021 to June 19, 2021. This baseline survey activity is a series of rapid assessment activities carried out earlier. This activity uses questionnaires with closed questions to collect quantitative data for statistical analysis. The use of closed-ended questions helps to quickly enter and analyse data by using the code specified before the interview is conducted (Kostyk, 2019) The questionnaire consists of three parts that assess three indicators, namely knowledge, awareness and behaviour. The first part assesses the beneficiaries' knowledge of the type of waste, waste management efforts in the area which includes waste handling and reduction, and parties involved in waste management, the second part assesses awareness with the same sub-indicators as knowledge and the third part assesses the behaviour of beneficiaries in waste management in the Tegalsari PPP area with each assessment indicator having seven questions. Questions related to knowledge are in the form of multiple choices where there is only one correct answer and the rest are false answers, while for questions related to awareness and behaviour, the question form is formulated according to a likert scale with five levels of answer choices, namely Strongly Agree (SS), Agree (S), Neutral (N), Disagree (TS), Strongly Disagree (STS) with a range of values of 0 to 4. For positive statements, SS has a value of 4, S has a value of 3, N has a value of 2, TS has a value of 1 and STJ has a value of 0, on the contrary for a negative statement the value of 4 is given to STS and so on until a value of 0 is given to the answer SS. Calculation with a likert scale using the following formula:

The likert scale was first developed by Rensis Likert (1932) to measure people's behaviour (Nasir, 1999). The total score of the likert scale is the summation of the scores of each part of the assessment indicator which is interpreted as the position / point of view of the beneficiaries. Statements related to awareness and behaviour are formulated based on highly approved and

highly disapproved judgments of beneficiaries. The likert scale has a high reliability and provides several alternative responses (Nasir, 1999).

There are two variables tested in the data analysis, namely independent variables and dependent variables. Independent variables or free variables cause changes in dependent variables in this study, namely gender / gender, employment status and length of work, while dependent variables / bound variables are variables that are described or influenced by free variables (Sugiyono, 2011). The independent variables in the data analysis carried out are the variables of gender / gender, employment status and length of work in the port area, while the dependent variables include knowledge and awareness of waste and waste management and waste management behaviour at PPP Tegalsari which are then grouped into knowledge levels, levels of awareness and behaviour.

The tool used to test the correlation and influence of each variable in this activity is SPSS. The normality test is the initial stage of data analysis which aims to see the distribution of data, which then helps in determining the right test for the type of data owned. This test compares the distribution of empirical data that has been collected with the expected normal distribution. Since this test tests the difference in values, the expected α is > 0.05 to get no difference from the two data / normal data. The proper normality test used in this data analysis is a test that does not require a large number of samples, because the number of samples in this activity is only 26 people. Therefore, the right test choice used for these criteria is the Shapiro Wilk Test. This test has accuracy and is effectively used with a small amount of < 50 people (Shapiro et al., 1968; Elliott and Woodward, 2007). Shapiro Wilk Test requirements include: (1) interval or ratio data scales, (2) single/ungrouped data, (3) data from random samples (Shapiro and Wilk, 1965). The Shapiro-Wilk test provides higher accuracy compared to the Kolmogorov-Smirnov test even after the Lilliefors correction (Steinskog et al, 2007). The ability to detect The accuracy of the sample is the most important measure of the normality test value (Thode, 2002). Shapiro Wilk's normality test on this activity showed significance or Sig values. < 0.05 which means that the data is not normally distributed, instead Sig. > 0.05 indicates normally distributed data. Based on Shapiro Wilk's normality test, it is known that the data collected in baseline survey activities are not normally distributed, indicated by Sig. < 0.05 on each variable tested. Seeing this, the right statistical test for advanced data analysis is a non-parametric statistical test. This test does not require a normal distribution as a preliminary assumption in data analysis, so it can be used in data analysis in this activity.

Next, the relationships between variables were analysed using the Pearson Correlation test. This test aims to measure the correlation used to measure the strength and direction of the linear relationship of two variables with the magnitude of the relationship ranging from $0 - 1$. The number 0 indicates. A significance value close to the number 1 indicates that the relationship between the two variables tested is getting stronger, while a significance value close to the number 0 indicates that the relationship between the two variables is getting weaker. The table below shows the strength of the variable relationship based on the Pearson correlation test.

Table 1 Pearson Correlation Value Range1

Range of values	Correlation strength
0	No correlation
$0,10 - 0,25$	Negligible correlation
$0,26 - 0,50$	Weak correlation
$0,51 - 0,75$	Moderate correlation
$0,76 - 1,00$	Strong correlation
> 1	Very strong correlation

Chegg. Pearson Correlation Coefficient (PCC), 2019

2. BASELINE AND ENDLINE SURVEY RESULTS AND DISCUSSIONS

II.1 Socio-Demographics

A total of 52 beneficiaries participated in the baseline and endline survey activities, which came from the group of cleaners, business people (MSMEs) and fishing industry players (fishermen, fish dryers and fish traders). Group selection based on (1) working area; and (2) activities at the port; and (3) exposure to waste issues and waste management. Beneficiaries are selected and grouped by work so that there are representatives from each waste-producing group at the port to know the knowledge, awareness and behaviour towards waste reduction and handling at the port.

As many as 61.5% of the beneficiaries are male and work as fishermen, and the cleaners of PPP Tegalsari and TPI Jongor. The professions of traditional fish traders and fish dryers are entirely carried out by women. MSME workers, namely stall traders and UPI, have a composition of men and women. On contrary with the above jobs that are done separately by the male and female groups, MSME and UPI activists have a combination of both genders with a ratio of 2:1 and 3:3 respectively.

Low education levels, ranging from elementary to high school levels, are owned by 82.7% of the beneficiaries of the Clean Fishing Port Pilot Program at PPP Tegalsari. The rest did not attend formal education at school. Most of the beneficiaries were elementary school (36.5%) and high school (30.8%) graduates and junior high school graduates had the least number of 15.4%. Most of the beneficiaries who completed high school education worked as Cleaning staffs, while the beneficiaries who completed education below the high school level mostly worked as fishermen.

All beneficiaries are included in the productive age for work (18 – 62 years). The Ministry of Health of the Republic of Indonesia (2009) in Swandari et al., (2017) divided the age classification into nine classes. beneficiaries of the baseline and endline surveys entered into five age groups, namely the late adolescent group (17 – 25 years), the early adult group (26-35 years), the late adult group (36 – 45 years), the early elderly group (46 – 55 years) and the late elderly group (56-65 years). The early adult group had the highest age composition at 28.8%, followed by the early adult group at 23.1% and the early elderly group at 21.2%. The age groups of late teens and late seniors are filled by the least number of beneficiaries.

Beneficiaries have a duration of work that varies from 1 to 25 years. The low duration of work, which is < 8 years, is owned by 48.1% of beneficiaries. A total of 15 people and 12 people have worked for 9 – 16 years and 17 – 25 years in the port.

II.2   Beneficiaries Knowledge

Beneficiaries' knowledge is measured based on six question indicators which include the grouping of waste by nature / characteristics, types of waste that are generally known to the community, the definition of waste sorting and the party in charge of sorting waste and the definition of waste reduction through reduce, reuse and recycle . Related knowledge needs to be measured in order to determine the level of beneficiaries' knowledge of the basics of waste and the status of potential waste reduction and handling status at the port.

The assessment of knowledge about (1i) waste grouping, (2) the type of waste and (3) the definition has a low score before the intervention is given, which means the beneficiaries knowledge of all three indicators is low. Inversely proportional, quite many of beneficiaries know about the definition of waste sorting, the task of sorting and the initial stage in waste handling. Indicators with good knowledge categories since the beginning of the program experienced a significant increase in the number of beneficiaries, while indicators with poor knowledge in the baseline survey decreased and more and more beneficiaries had good knowledge.

An increase in beneficiaries' knowledge is visible in all assessment indicators. The highest increase was seen in the knowledge of 3R-based waste reduction, which was 38.5%, where there were an additional 20 beneficiaries who knew about the abbreviation of 3R. Five other assessment indicators increased from 19.2% to 32.7%. The addition of the least number of beneficiaries with good knowledge can be seen in the assessment of the type of waste, which is 10 people. There were 40.4% of beneficiaries with knowledge of sorting at the end of the program, the lowest compared to other indicators. Knowledge about waste grouping, parties who carry out waste sorting, the initial stage of waste handling and the definition of sorting are known by > 33 people, with the majority of beneficiaries knowing about waste sorting, which is 86.5%.

The difference between the knowledge of the beneficiaries before and after the administration of the intervention shows a significant difference. There were at least 10 people (19.2%) who had good knowledge when the baseline survey was carried out, while at least 21 people (40.4%) had good knowledge when the endline survey was conducted. This indicates that the provision of knowledge-building program interventions has a positive impact on knowledge in terms of fundamental information about waste and waste management at the port.

II.2.1   Basic Concepts of Waste

II.2.1.1   *Waste Grouping*

Graph 1 shows the results of the baseline and endline survey of beneficiaries' knowledge of waste groupings based on their nature/characteristics. There is a change in the knowledge trend of beneficiaries of low knowledge in the initial survey and high knowledge in the final survey.
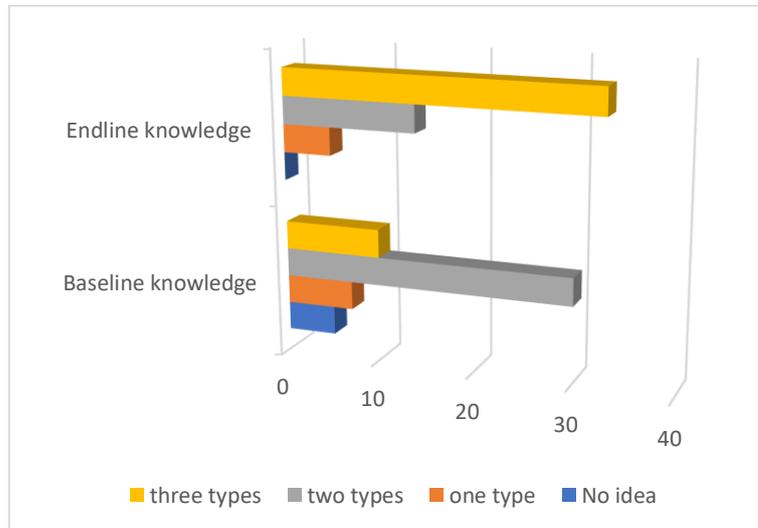
Graph 1. Knowledge: Waste Grouping by Trait/Characteristic1

The results of the baseline survey show that most beneficiaries are only familiar with organic and inorganic waste (57.7%), not with B3 waste. MSME actors are the parties who give the most correct answers that the three classes of waste based on their properties / characteristics are organic, inorganic and B3 with a percentage of 33.3%. In contrast, none of the Modern UPI actors answered the related questions correctly. Another group gave the wrong answer (>70%), that B3 waste is not one of the properties of waste. This type of B3 waste is even claimed by the majority of beneficiaries not to be generated at the port.

Law No. 32/2009 stipulates that hazardous and toxic material waste is a residue of business and/or activity containing B3 including substances, energy, and/or other components that due to their nature, concentration, and/or quantity, either directly or indirectly, can pollute and/or damage the environment, and/or endanger the environment, health, and the survival of humans and other living things (Permen LH No. P.12/MENLHK/SETJEN/PLB.3/5/2020). The statement that B3 waste is not generated at the port is entirely erroneous because the waste is found from industrial and commercial activities. Fish Auction Place (TPI) cleaning staff Jongor, MSME and UPI actors produce B3 waste from floor cleaning liquid and/or glass cleaner. The use of detergents, air fresheners, bleach clothes, batteries and so on by fish dryers and the use of wood

shiners, adhesive glues and oils by fishermen also resulted in the B3 waste category. All beneficiaries of the male generated cigarette butts which are hazardous and toxic materials.

PP No. 101/2014 explains that B3 waste based on its source is distinguished into three classes, namely B3 waste (1) from non-specific sources, (2) from expired B3, spilled B3, B3 that does not meet the specifications of the product to be disposed of, and former B3 packaging and (3) from specific sources. B3 waste generated in the port area is classified as waste from specific sources with special management. The condition where the beneficiaries produce B3 waste but do not know that the waste is B3 waste hinders the implementation of comprehensive waste management. The absence of supporting facilities for storing, collecting, transporting, processing and/or stockpiling at ports also aggravates these conditions (PP No. 101/2014; Minister of Environment and Forestry Regulation No. P.18 / MENLHK / SETJEN / KUM.1 / 8/2020).

In contrast to the above findings, the results of the endline survey, shown in Graph 1, show an increase in beneficiaries' knowledge of B3 waste by 44.3%. Most beneficiaries know that there are three classes of waste based on its properties/ characteristics, namely organic waste, inorganic waste and B3 waste. Beneficiaries learned that most of the hazardous and toxic material waste at the port was generated from the rest of fishing operations, TPI floor cleaning fluids and stall vendors such as vessel oil waste, deodorizing/scale liquid waste and used cooking oil waste. Beneficiaries know that battery waste is also an example of B3 waste, but the amount is more limited compared to the three wastes above. This type of waste is known to be directly disposed of into the sea, flowing into drainage or flowing into rivers. However, from the statement, it is known that there are still many types of B3 waste that are unknown to the beneficiaries such as detergent liquid waste, cans or plastic leftover air fresheners, bathroom cleaning liquids, adhesive glues and wood shins.

The lack of knowledge of some groups of beneficiaries regarding the type of B3 waste, although interventions have been given due mainly to the lack of attention to other issues outside the work area of each party. Except for the cleaners of UPT PPP Tegalsari, MSME actors and fishermen, other beneficiaries do not attach importance to the problem of B3 waste because these types of waste are claimed not to be produced in their respective scopes of work. Although the provision of related information has been provided through repeated socialisation, the party's knowledge of the type of B3 waste is not widely good enough. Heilman et al., (1985) and Stuss and Benson (1986) on neuropsychology found that indifferent or *anosodiaphoria* is a condition in which there is complete knowledge in a person but a lack of attention about the

existence and implications of the problem triggers a momentary focus or direction of attention to one or more self-constituents. This condition is then believed to encourage beneficiaries who claim to have no interest in B3 waste, not knowing more about the issues raised.

Nonetheless, overall beneficiaries' knowledge has increased significantly at the end of the program compared to at the beginning of the program before the intervention was administered. The number of beneficiaries who think that there are only two groups of waste, turns into knowing three groups of waste based on their nature/characteristics. The groups of organic waste known by the beneficiaries both in the baseline survey and in the endline survey are fish laundry residues, food, leaves, fruit / vegetable skins, cardboard and paper and inorganic waste including used fish plastic, crackles, food and beverage packaging, iron, glass and cans.

II.2.1.2 Types of Waste by Nature

Graph 2 shows the beneficiaries' knowledge of the nature of the waste, at the beginning and at the end of the Clean Fishing Port Pilot program at PPP Tegalsari.
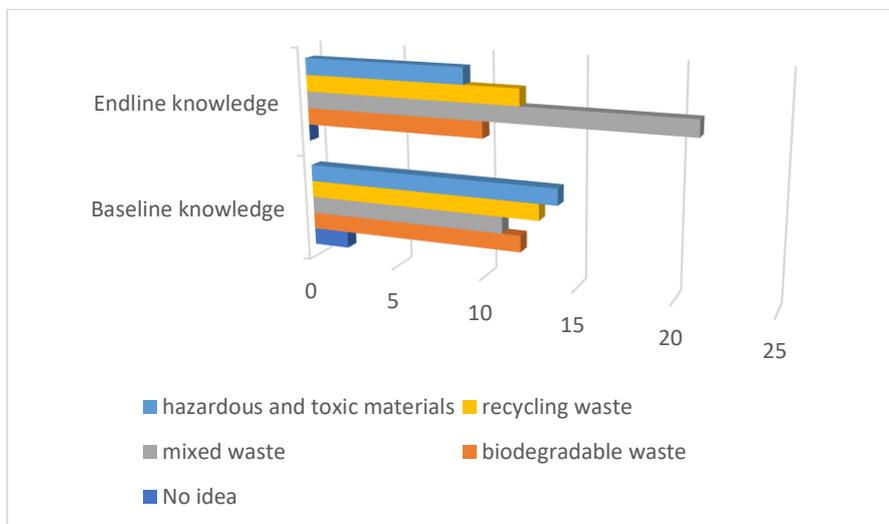
Graph 2. Knowledge: The Nature of Waste2

The first measurement showed that four answer choices namely "waste containing hazardous and toxic materials", "recycled waste", and "easily biodegradable waste" were chosen by almost the same number of beneficiaries. However, the first option of occupying is chosen by the most beneficiaries with a percentage of 26.9%. For the correct answer i.e., "mixed waste" was only chosen by less than 21.2% of beneficiaries. The fish dryer group has a fairly good knowledge compared to other beneficiaries, where four out of seven people (57.1%) answered correctly related questions, on the contrary, only < 25% of cleaners, MSME actors, UPI and fishermen chose the correct answer that "mixed waste is not a type of waste". To make matters worse, none of the fish traders gave the correct answer to the given question.

The waste produced at the Tegalsari Fishing Port is included in the waste of a type of household waste. The waste, based on PP No. 81/2012, is household waste from commercial areas, industrial estates, special areas, social facilities, public facilities, and/or other facilities. Related regulations also explain that B3 waste, easily biodegradable waste, recyclable waste and other waste (residues) are types of waste based on their properties/characteristics. There are no categories of mixed waste in all the rules governing waste management.

The addition of 10 beneficiaries (19.2%) answered correctly the question about the type of waste in the final measurement, which makes 40.4% of the number of beneficiaries have good knowledge. Most groups of port cleaners and fish dryers know about the nature of the waste with percentages of 80% and 71.4%, respectively. Half of MSME actors have good knowledge, while only less than 1/4 of the number of beneficiaries from fish trader groups, UPI and fishermen who have good knowledge of related questions. More and more beneficiaries are aware that mixed waste is not a grouping based on the nature/characteristics of waste, but a combination of organic, inorganic and B3 waste. After the provision of intervention, similar to knowledge question No.1, the beneficiaries learned that there was waste in class B3 produced by fishermen, TPI Jongor cleaners and stall vendors and other parties. Types of "easily biodegradable waste" or commonly known as organic waste such as food waste, drinks and fish washing residues as well as types of recycled waste such as fish plastic are also increasingly known by beneficiaries as a type of waste produced at the port.

However, from these answers, it is known that the beneficiaries' knowledge is still limited that mixed waste only consists of three types of waste, while residual waste, namely waste that cannot be recycled and/or has an unknown value. The lack of an answer option for "residual waste" as a type of waste based on its properties/characteristics is assumed to be related to the beneficiaries' answer. Although in the stage of socialisation of waste and its governance at the port of related information is given, the provision of limited options for questions no. 1 and no. 2 can create confusion for beneficiaries to choose the correct answer. Residual waste is not included as an answer to the two questions above in accordance with the main types of waste mentioned in PP No. 81/2012 concerning Management of Household Waste and Similar Household Waste.

The above conditions are closely related to the framing effect or commonly called the framing effect. This effect affects the decision-making of the description of the action, probability and outcome. Tversky and Kahneman (1981) and Levin et al., (2002) mention that the framing effect is a powerful phenomenon that influences target decisions. However, Maheswaran and Meyers-

Levy (1990) explain that one aspect i.e., the involvement of individuals in one topic affects the magnitude of the framing effect. individuals who are deeply involved with a particular topic have a greater motivation to pay attention to and process information that stands out than individuals with low engagement (Petty, 1983). Thus, it is reasonable to expect that people who obtain higher scores in engagement inventory are less susceptible to the framing effect (Cheng and Wu, 2010). The framing in this survey was adapted to the context of the participants, personal frames of reference, theoretical frameworks, and feasibility according to the study of Higgs and Llewellyn (1998).

There are still more people answer wrong on topics about the nature of litter even though interventions had been given. One of them is caused by the lack of awareness and behaviour of sorting waste from sources in the port. Mixed waste is chosen as one type of waste by beneficiaries because it often witnesses that waste is always mixed in one container. This prompted most beneficiaries to conclude that mixed waste is one of the properties of waste. Beneficiaries' knowledge of the nature of the waste was also found to be related to the behaviour of cleaning the community's environment within the port independently, the result of Pearson's correlation test. The two variables are known to have a weak strength relationship indicated by $\rho = 0.33$. This indicates that if the beneficiaries have low knowledge about the nature of the waste, then the relevant individuals disorderly conducted waste handling in their respective environments independently.

II.2.2   Waste Management Concepts

II.2.2.1 Definition of Waste Sorting

Graph 3 shows that the difference in beneficiaries' answers about waste sorting at the beginning and at the end of the survey. The beneficiaries have known the meaning of sorting waste, both before and after the program intervention is given.
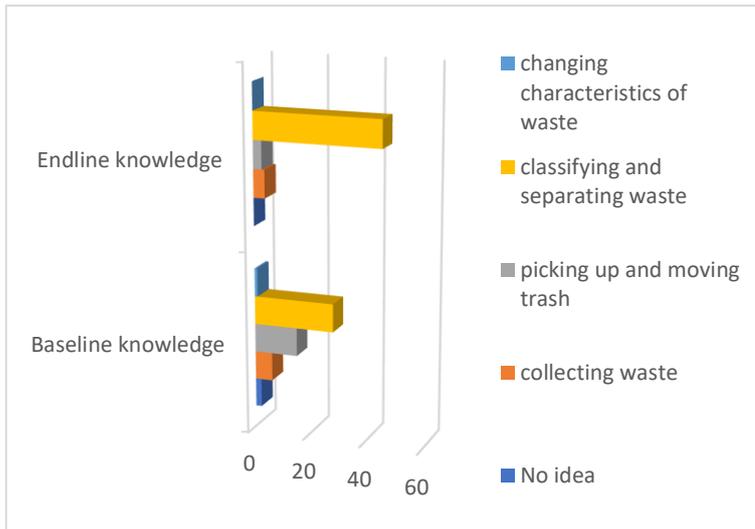
Graph 3. Knowledge: Definition of Sorting3

The definition of waste sorting is known to quite many parties in the port such as both from the UPT PPP Tegalsari and UPTD TPI Port cleaners, fish traders, fish dryers, MSME actors and fishermen both at the beginning and at the end of the program. This is because the beneficiaries' groups are familiar with waste sorting activities, especially from the observation of waste collection groups around their work areas. Waste scavenger activities include grouping inorganic waste and separating by type / characteristic of waste mainly for plastic which is the definition of sorting waste. UPT PPP Tegalsari cleaning staff knows about waste sorting because of one colleague who worked as a plastic waste collector. However, in contrast to the five groups above, none of the UPI actors gave the correct answer to the question of waste sorting. The answer that many choose is "the activity of picking up and moving waste from the source to the garbage shelter". This is assumed because the relevant parties do not pay much attention to the correct answer because the answer choice options are too long, causing a framing effect. Besides, although waste sorting facilities are still very limited at the port, because beneficiaries are often exposed to waste sorting activities outside and inside the port and voluntarily donate fish plastic waste to related parties, most beneficiaries know the definition of waste sorting.

The increase in knowledge about waste sorting at the end of the program is driven by the need for clean and healthy sanitation of the port environment. The mural campaign media contains a message about the benefits of sorting waste for the environment, the social and economic life of workers at port and on fishing vessels. The education in conjunction with the workshop on handling marine debris is believed to have a positive impact on increasing the knowledge of all groups of beneficiaries.

PP No. 81/2012 defines waste sorting as part of the handling of waste along with the collection, transportation, processing and final processing of waste. In the relevant regulations, sorting is

divided into five types of waste consisting of easily biodegradable waste, reusable waste, recyclable waste, B3 waste and other waste / residues. TPST or integrated waste processing plant and TPS 3R are two facilities that encourage the implementation of waste sorting and other activities within the scope of waste handling.

Waste sorting, based on Pearson's correlation analysis, is known to have a positive relationship with the awareness variables of disposing of waste in its place and waste disposal behaviour, with ρ i.e., 0.32 and 0.38, respectively. Both relationships have a weak nature. The relationship between variables indicates that the higher the beneficiaries' knowledge of sorting, the more likely it is to be aware and behavioural to dispose of waste in the space provided. Conversely, the lower the knowledge of waste sorting, the worse the awareness and behaviour of related parties in waste disposal.

II.2.2.2 Waste Sorting Task

Graph 4 shows the difference in beneficiaries answers about waste sorting tasks at the beginning and at the end of the survey. The beneficiaries have known the meaning of sorting waste, both before and after the program intervention is given.
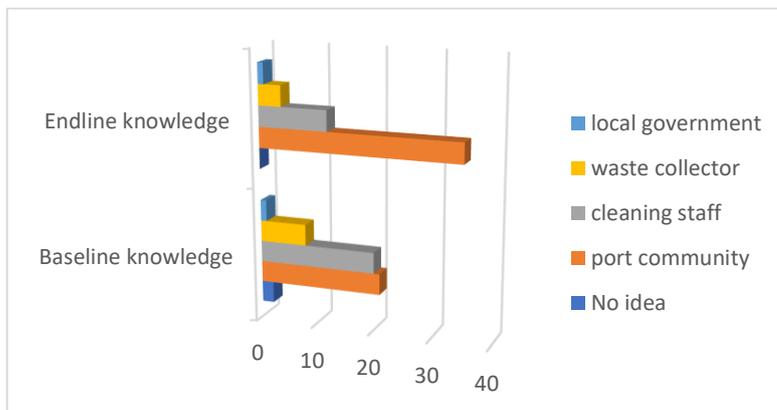
Graph 4. Knowledge: Waste Sorting Task

In relation to the party responsible for handling waste, most of the beneficiaries at the beginning of the program assumed that the cleaners were obliged to carry out a series of waste sorting with the task of collecting waste from the source. Although when viewed from one side, the beneficiaries know that waste producers, namely the community, are the parties responsible for sorting waste, but broadly speaking, this task is more charged to the cleaners. Payments made daily by beneficiaries are expected to transfer cleaning duties to cleaning staffs so that their basic work is not disrupted. PP No. 81/2012 confirms that sorting is the duty of every waste producer or in other words sorting is carried out by everyone from the source by providing waste sorting facilities provided by managers of commercial estates and industrial estates (Law No.

18/2008). Waste handling based on the Law and PP is still difficult to perceiveas a result of the absence of waste sorting facilities in the Tegalsari PPP area.

Economic and environmental losses arise due to the absence of waste sorting in the port area. Economic losses are obtained as a result of the transportation of non-residual waste to TPS and landfills. The transportation of a high amount of waste to the landfill shortens the life or service life of the landfill so that the opening of new land with the same function cannot be avoided. The budget for the allocation of additional land is large enough to cause losses to the APBD. Environmental losses are not carried out by waste sorting, namely the entry of pollutants into the water. Mixing the waste into one container results in the bin not being able to effectively hold the waste at one time. The accumulation of waste near waterways and water bodies makes it easier for polluters to enter the sea with the help of wind and currents. Although research from Rania et al., (2019) found that waste from the Muarareja Tegal landfill has the potential to produce refuse derived fuel as fuel for pyrolysis of waste generation incinerators (PLTSa) at the Muarareja landfill, Tegal Regency and studies from Samsinar and Anwar (2017) show that a waste power plant with a capacity of 115 KW can be built from related landfill waste. However, a more detailed analysis of environmental and socioeconomic factors regarding the presence of affected flora and fauna, the influence of emission discharges and the output of PLTSa (Thohiroh and Mardiati, 2017) was not included in the advanced stages of the two studies.

The low knowledge of beneficiaries is partly due to the absence of waste handling facilities in the port area. Beneficiaries very rarely see commercial and industrial actors sorting waste, so relevant parties perceive that the task is mainly held by the port management authority. Kustantya and Anwar (2013) posit that knowledge is the result of sensing of an object. The result of a sense of curiosity through sensory processes, especially in the eyes and ears towards certain objects forms knowledge, according to Afnis (2018). The lack of sensing of the beneficiaries both through the eyes and ears is then believed to result in low knowledge of the perpetrators in charge of sorting waste.

The knowledge of the beneficiaries as seen from the results of the endline survey has shifted well, which means that related parties have known that the responsibility for handling waste in the early stages, namely the sorting of waste from sources, must be carried out by the community to facilitate the waste processing stage. Beneficiaries know that the cleaning staff's job is to focus on handling waste. However, in the early stages the community needs to participate in sorting waste on their own, because the main task of the cleaners lies in the efforts of sweeping roads, collecting waste from the source to the TPS (UPT PPP Tegalsari and UPTD TPI

Pelabuhan) and transporting waste from the TPS to the landfill (DLH Tegal City). Beneficiaries' awareness that the absence of efforts to sort waste from sources makes it difficult to process waste more optimally. For example, the separation of plastic waste mixed with food waste and fish washing waste takes a long time and extra effort. Not to mention considering the aspects of decreasing the selling value of plastics due to contamination of oil, oil and other waste. This awareness has a positive relationship with the knowledge that the community is the initial party who is obliged to carry out waste sorting.

II.2.2.3 Early Stage of Waste Handling

Graph 5 illustrates the beneficiaries' answers about the early stages of waste handling in the two surveys. There was a change in the trend of low knowledge to high knowledge after the administration of intervention.
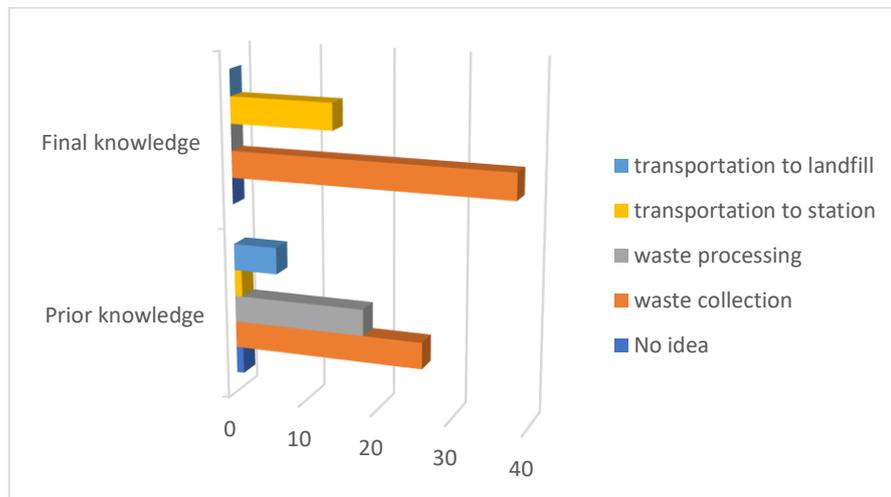
Graph 5. Knowledge: Early Stage of Waste Handling

Waste handling is known by the majority of beneficiaries, seen as the results of baseline and endline surveys, mainly related to the initial stage. Directly proportional to the argument why the beneficiaries know about sorting, collecting waste from the source is also familiar with the daily activities of the beneficiaries. Waste is generated from the rest of the daily activities of community elements in the area accommodated from the moment the waste is produced so that it is not scattered and mixed with business products or the work environment. Although the number of waste collection facilities was still limited at the time the baseline survey was conducted, the beneficiaries knew that the waste collection was the initial stage of handling waste in the port area.

Waste storage, explained in Permen PU No. 03 / PRT / M / 2013, is an activity to temporarily collect waste before waste is collected, moved, transported, processed, and carried out the final processing of waste in landfills. The main objectives of the activity are twofold, namely (1) to

avoid scattered garbage so that it does not have a bad impact on health, environmental cleanliness, and aesthetics and (2) to facilitate the collection and transportation of waste so as not to endanger related officers. Despite various regulations (Law No. 18/2008; PP No. 81/2012; Presidential Regulation of the Republic of Indonesia No. 97/2017) does not include waste storage as an initial stage in handling waste but through waste sorting, efforts to accommodate waste are included in the form of waste handling listed in The Minister of Public Works Regulation No. 03 / PRT / M / 2013 concerning the Implementation of Infrastructure and Waste Facilities in Handling Household Waste and Similar Household Waste. Article 16 of the relevant regulations stipulates that area-scale waste storage facilities are needed to support the implementation of waste sorting, where related facilities must be provided by the managers of residential areas, commercial areas, industrial estates, special areas, public facilities, social facilities, and other facilities.

The beneficiary's knowledge of waste management is believed to encourage good behavior in disposing of waste in the space provided. This statement was supported by Riswan et al., (2011), which found that knowledge has an influence on community waste management behavior. Despite this, research from Wibowo (2009) opposes the above statement that knowledge does not always contribute positively to behavior change so that good knowledge does not necessarily guarantee good behavior. This happens because good behavior is not only determined by good knowledge but there are other factors that also influence such as predispositions such as habits, attitudes (Green, 1980) and behavior of community leaders (Setyowati and Mulasari, 2013).

Increasing knowledge about waste management corrects the misconception that 3R-based waste processing and transportation of waste to landfill is not the initial stage of waste handling. The increase in knowledge occurred in all groups of beneficiaries, including in the group of fish traders and fish dryers. Almost all beneficiaries from the group of cleaners, fish traders, MSME and UPI actors as well as fishermen know that there are efforts to handle waste and efforts to reduce waste in regional waste. Especially for handling efforts, related parties know that the initial stage for handling waste generated from the source lies in waste collection efforts, followed by waste sorting until it ends at the final processing of waste in the landfill. The increase in knowledge is driven by the provision of continuous socialisation about the stages of implementing waste handling in the area which is conveyed through voice over media. In addition, workshops are also held so that information about procedures and parties that need to be involved in regional waste management can be received by all parties. Notoatmodjo (2010)

explained that the more information obtained by humans, the wider the knowledge possessed, or in other words environmental factors, can through the media can affect knowledge.

II.2.2.4 3R Definition

Graph 6 shows the difference in beneficiary answers about the definition of 3R in regional waste reduction, obtained from the results of baseline and endline surveys. There was a positive trend change in beneficiary knowledge of the 3R after the provision of program interventions.
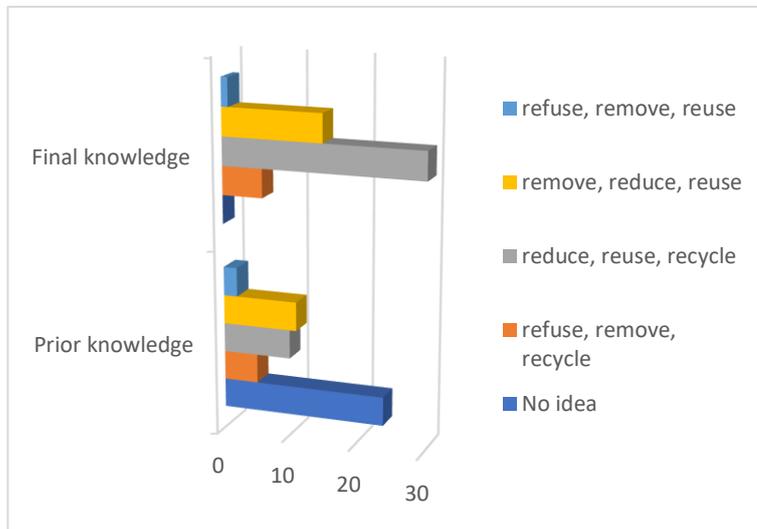
Graph 6. Knowledge: 3R Definition

The principle of 3R-based waste reduction is not widely known by beneficiaries before the provision of program interventions for various reasons, namely: (1) lack of socialisation and advice from related parties, (2) the nature of being indifferent to the waste problem; (3) the assumption that it is not required by parties outside the cleaning staff; and (4) lack of participation in waste reduction efforts. The lack of socialisation and appeals from local governments, port authorities, and from the environmental community on the implementation of the 3R to reduce port-based waste contributes to the lack of knowledge of beneficiary groups regarding related aspects. The limited number and capacity of UPT PPP Tegalsari and UPTD TPI Port workers in providing education to waste producing units resulted in the low availability of socialisation at the port. In addition, the dynamic and congested port conditions of commercial and industrial activities make it difficult to provide socialisation to all elements of society in the port which are dominated by business actors. This is different from households because of different activities, so that socialization are required a special approach at PPP Tegalsari.

The lack of information about waste problems and waste management at the port is a driving factor for the low knowledge of related parties. There have been many studies that have shown that there is a positive relationship between the dissemination of information and knowledge

(Lippitt, 1967; Dix, 1993; Offsey, 1997; Hayduk, 1998; Yang and Lan, 2009; Islam, 2010; Abdullah and Nasionalita, 2016; Suwaryo and Yuwono, 2017; Shahputra and Taher, 2017; Adil et al, 2021).

In relation to the provision of advisories, UPT PPP Tegalsari does not have the power to influence the implementation of waste reduction with the 3R principle, especially in terms of limiting waste generation. The statement is reflected in another case, where fishermen only pay a mooring fee (including the cost of cleaning the pond) for three days despite being in the port pond for weeks or months. Especially when it raises the issue of the use of plastic as the main commodity of the port. Plastic fish wrapping is used by fishermen during the fishing period so that the quality of the catch can be maintained for a long time. Plastic is also used by MSMEs as packaging for food and beverage products because it is practical and has a relatively cheap price. The absence of alternatives to plastic substitutes that meet all the conditions needed by businesses at port also makes it difficult to limit the use of single-use products. The punitive system approach said by the relevant authorities was not appropriately implemented in the Tegalsari PPP seeing the characteristics of workers who are strong and difficult to accept change accompanied by a high need for plastics. Social conflicts will arise as a result of the implementation of the wrong system at port which is believed to give rise to estrangement of relations between the government and business actors for a long time.

The unconcerned nature of the result of low awareness, prior to the administration of the intervention, which is considered not to affect the work of the beneficiaries has an impact on low knowledge regarding the 3R. Community elements in the port focus on their respective activities, except for the managing authority which is directly related to hygiene, or does not pay more attention related to the meaning of reduce, reuse and recycle. Daily work that is considered sufficient to take up time from morning to evening does not leave time and energy for beneficiaries to understand things outside of their basic work, especially the waste problem. This relates to the assumption that the cleaners are in charge of reducing waste in the port with the 3R system. Beneficiaries are unaware that waste restrictions and waste reuse should be implemented by all parties in the port area, rather than simply imposing on the port management authority. The lack of awareness of the beneficiaries has a negative impact on the wrongdoing of waste reduction. Most beneficiaries do not reduce waste generated from the source or do not process and reuse waste so that the use value of waste can be obtained.

Waste reduction with the 3R principle is stipulated in Law No.18/2008. Business actors are required to use production materials that cause as little waste as possible, can be reused, recycled and/or easily decomposed by natural processes (Article 20(3)). The provision was

passed in 2008, but there was no meaningful implementation at the port. Business actors do not prioritise waste reduction efforts, which is shown by the rampant use of plastic in UPI. The Traditional Waste Management Unit does not select the production materials caught by fishermen with considerations on minimising the use of single-use plastics, even though all local fishermen use single-use plastics in large quantities in one fishing operation. the beneficiaries of UPI also do not innovate for the replacement of single-use plastics that cannot be reused when damaged. This indicates that waste reduction with the 3R principle is still difficult to implement in port due to the high need for plastics and the absence of other alternatives to related products. PP No. 27 of 2020 explains that the Waste Processing Plant with the 3R principle or abbreviated as TPS 3R is a place for the implementation of waste collection, sorting, reuse and recycling activities. The absence of these facilities at the Tegalsari Fishing Port has resulted in a suboptimal reduction of waste by all elements of the community at the port.

The provision of program interventions at the port by involving all elements of the community provides positive changes to the knowledge of the 3R. To overcome the four factors that contribute to the low knowledge of beneficiaries, DFW Indonesia coordinates with UPT PPP Tegalsari to carry out socialisation on handling and reducing land and sea-based waste at port. Due to the lack of capacity of port cleaners in terms of knowledge about the 3R, related organisations provide socialisation not only to business actors at the port but also to relevant agencies in need, so that the information can also be disseminated to other community groups at the port. With regard to restrictions on the use of single-use plastics or the reuse of waste, the advisory is believed not to be under the scope of DFW Indonesia but rather the duties and municipalities and/or provincial governments. To address the problem of dynamic environment and busy port activity, the selection of representatives is considered appropriately in order to involve the right people who have a strong interest in the waste problem. These aspects that are included with the humanist approach are important keys that are believed to ensure the sustainability of the program.

The caring nature of the community is formed from the improved awareness of beneficiaries that waste reduction with the 3R principle is important to be carried out in order to protect the environment, economy and social society, in accordance with the concept of sustainable development. Beneficiaries know that socio-economic improvements that are not offset by environmental aspects will have adverse impacts in the long term in the future, which has been seen in the present. Fishermen mainly realise that the quality of the catch decreases as can be seen from the plastic content in the body of fish caught and consumed in the sea. Plastic waste is often found in fishing gear, which is netted at the same time as fish. This raise concerns that

the quality of the environment also needs to be considered in working so that it does not have a negative impact on the final food chain in humans. Apart from fishermen, fish traders and UPI emphasised the importance of involving environmental issues in the work of each element of the community in the port. This good awareness also changes the perspective of beneficiaries that knowledge about waste reduction with the 3R principle needs to be improved so that it will change the paradigm that cleaners must handle and reduce waste at the port alone or be involved in everything in the waste management of the area without the help of other parties.

There is a correlation between knowledge of the 3Rs and the variable (1) awareness of waste disposal with $\rho = 0.28$; (ii) the behaviour of using a shopping cart with $\rho = 0.35$; (2) the behaviour of cleaning the environment independently with $\rho = 0.31$; and (3) the behaviour of subscribing with plastic collectors with $\rho = -0.48$. The relationship between knowledge of the 3R and all variables has a unidirectional relationship with the strength of the weak relationship, while the relationship between knowledge of the 3R and variables (iv) has a non-unidirectional relationship with the strength of the medium relationship. The higher the knowledge about the 3R, the better the awareness of disposing of waste, the behaviour of using shopping carts and the behaviour of cleaning the environment. However, for relationships (iv) it is different. The higher the knowledge of the 3Rs, the worse the beneficiaries' behaviour to subscribe to the plastic waste collector group.

Based on the results of Pearson's correlation analysis, sex is known to have a relationship with knowledge of the 3R ($\alpha = 0.04$; $\rho = 0.285$) and knowledge of the number of classes of waste according to its properties/characteristics ($\alpha = 0.03$; $\rho = -0.403$). This indicates that female beneficiaries are more aware of the abbreviation of 3R compared to men, while male beneficiaries have higher knowledge than men in terms of the number of waste groups. Education also has a unidirectional relationship with knowledge of the nature/characteristics of waste ($\alpha = 0.04$; $\rho = 0.290$). The higher the education, the better the relevant party's knowledge about the type of waste based on its nature/characteristics ($\alpha = 0.03$; $\rho = 0.0290$). Finally, the work has a reciprocal relationship with knowledge of the definition of sorting $\alpha = 0.03$; $\rho = 0.300$), which means that cleaners, fish traders and UPI know more about sorting than other groups.

II.2.3 Comparison Between the Conclusions of Baseline and Endline Knowledge

An increase in beneficiaries' knowledge is visible in all assessment indicators. The highest increase was seen in the knowledge of 3R-based waste reduction, which was 38.5%, where there were an additional 20 beneficiaries who knew about the abbreviation of 3R. Five other

assessment indicators increased from 19.2% to 32.7%. The addition of the least number of beneficiaries with good knowledge can be seen in the assessment of the type of waste, which is 10 people. There were 40.4% of beneficiaries with knowledge of sorting at the end of the program, the lowest compared to other indicators. Knowledge about waste grouping, parties who carry out waste sorting, the initial stage of waste handling and the definition of sorting are known by > 33 people, with the majority of beneficiaries knowing about waste sorting, which is 86.5%.

The difference between the knowledge of the beneficiaries before and after the administration of the intervention shows a significant difference. There were at least 10 people (19.2%) who had good knowledge when the baseline survey was carried out, while at least 21 people (40.4%) had good knowledge when the endline survey was conducted. This indicates that the provision of knowledge-building program interventions has a positive impact on beneficiaries' knowledge in terms of fundamental information about port waste status and waste management.
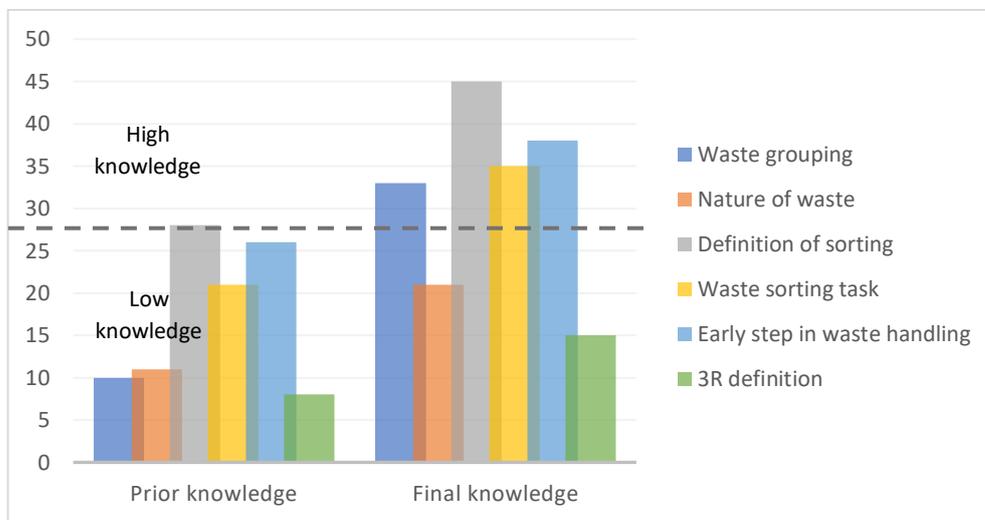
Graph 7. Baseline and Endline Survey Results of Knowledge Indicators4

A 50% increase in beneficiaries' knowledge was seen at the end of the program as measured in the Endline Survey. In the early stages, prior to the implementation of the program intervention, only about seven beneficiaries had good knowledge of waste aspects and port-based waste management, while the rest had less knowledge. After the program intervention, more beneficiaries have good knowledge, inversely proportional to the baseline survey results. About 65% of the 52 beneficiaries have good knowledge of the indicators of the questions given. Graph 8 shows the comparison and change in the level of knowledge of beneficiaries before and after the administration of program interventions.
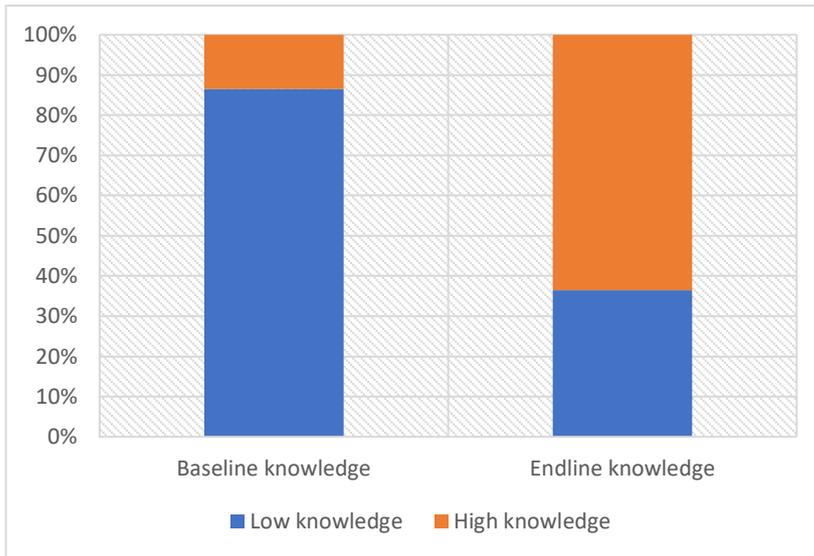
Graph 8. Baseline and Endline Survey Results on Beneficiaries Knowledge
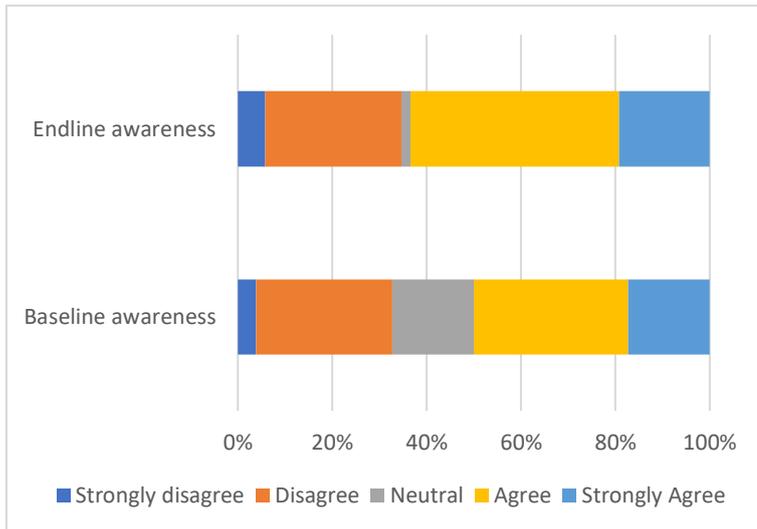
II.3   Beneficiaries Awareness

Beneficiaries' awareness is measured by awareness of the economic value of waste, waste disposal in the space provided, diseases that can arise to humans sourced from waste, waste processing, the use of shopping baskets/bags and port hygiene responsibilities. The six indicators will give rise to indications of awareness of waste problems and waste management problems in the Tegalsari Fishing Port area.

Awareness assessments on (1) how to process plastic waste, (2) using shopping carts/bags and (iii) port hygiene responsibilities show low scores before interventions are given, meaning beneficiaries' awareness of all three indicators is low. In contrast, many beneficiaries realised that waste can provide economic value, give rise to disease and must be disposed of in the space provided since the beginning of the program. Increased awareness is seen in all six assessment indicators, of which more than 50% of the beneficiaries give the right answer. Indicators with a high good awareness category since the beginning of the program experienced a significant increase in the number of beneficiaries, while indicators with poor awareness in the baseline survey also decreased and more and more beneficiaries had good awareness.

II.3.1   Waste Concepts

II.3.1.1   The Economic Value of Waste

Graph 9 shows beneficiary statements indicating awareness of the economic value that can be derived from waste from baseline surveys and endline surveys. The beneficiaries have a good awareness of the topic in question even before the intervention is given.

Graph 9. Awareness: The economic value of waste

The majority of beneficiaries have a good awareness that waste has economic value if handled properly, but can cause disease if not treated immediately. Fishermen (46.4%), PPP Tegalsari cleaners and TPI Jongor (45.7%), fish traders (45.1%) and UPI actors have a good awareness of the economic value of waste. Related parties obtain information from direct or indirect interactions with groups of waste pickers who collect and transport plastic fish waste and nets in the dock area, mooring pool, Jongor TPI and the road to Block E. The Modern Fish Processing Unit has officers who work closely with waste collectors for the collection and transportation of waste to the off-port processing industry on a regular basis. The officers concerned then benefit economically from the transaction. In addition to plastic waste, UPI Modern also has cooperation with the fish waste processing industry in the port area. However, the difference is that UPI does not make a profit from the cooperation. In other words, the company focuses on reducing fish processing waste rather than making a profit. Apart from these two wastes, oil and/or cooking oil waste is claimed to have collectors make purchases from subscriptions in the port area.

Although the beneficiaries do not know the procedures for processing waste, the final result of processed products and the economic benefit (Rp) from waste at the beginning of the program, most beneficiaries are aware that plastic waste wrapping fish, fish laundry waste, oil waste and/or cooking oil have economic value. However, beneficiaries only know that there are only four types of waste that can provide economic value.

After the intervention is given, the beneficiaries consciousness undergoes positive changes. More and more beneficiaries are aware that the four types of waste mentioned at the beginning have a selling point with the added awareness that plastic drinking bottles and cups, glass

drinking bottles and cups, iron, cardboard, sacks and food organic waste also have the economic value of selling waste. The Waste Bank directly explains the types of waste that can be processed, and all elements of the community in Tegal City can enter the waste and immediately get an account book along with the balance after becoming a customer at the Dewi Sinta Main Waste Bank, which in a certain amount can be exchanged for gold. Apart from the workshop involving the Waste Bank, the mural also provides illustrations of the economic benefits that can be obtained from the Waste Bank. The figure below shows education about the economic value of selling waste in the Waste Bank.

Figure 2. Education on Obtaining Economic Value from Waste through Waste Banks

Apart from one institution, beneficiaries also understood that economic benefits from waste can be obtained from cooperation with TPST. The process of recycling waste starting from the collection of raw materials by the scavenger/collector group to producing products that can be sold to the market at a fairly high price has also been realised by the community.

Studies from Nugraha et al., (2007), Asdiantri (2016), Maulidah (2017), Dai and Pakaya (2021) and Magetsari et al., (2022) show that waste has economic value through recycling. The second study indicates that the potential economic value of Pontianak City housing is 163,632,081 / day and the third study shows that waste generation of 1,288 tons / year can provide economic benefits of 203,124,534 / year. Broadly speaking, all studies show that waste has great economic value when processed properly. Looking at these statistics and comparing with the volume of plastic waste produced in Tegalsari PPP, the processing of plastic waste and fish washing residues in the port area for a year will have the potential to generate a fairly high economic value. However, further research is needed to provide an overview of the annual profit from processing all types of waste in Tegalsari PPP.

Pearson's correlation analysis showed that awareness that waste has a potential economic value had a positive correlation in the same direction as the awareness that waste could cause disease with α counting $0.01 < \alpha$ table 0.05 and ρ counting $0.309 > \rho$ table 0.2681. The relationship between the two variables is weak, in the range of $0.2 - 0.5$. This means that beneficiaries who

have the awareness that waste has potential economic value also realised that waste can carry disease if not handled properly. Conversely, beneficiaries who are unaware that waste has economic value are also unaware that disease can arise from waste.

II.3.1.2   Diseases from Waste
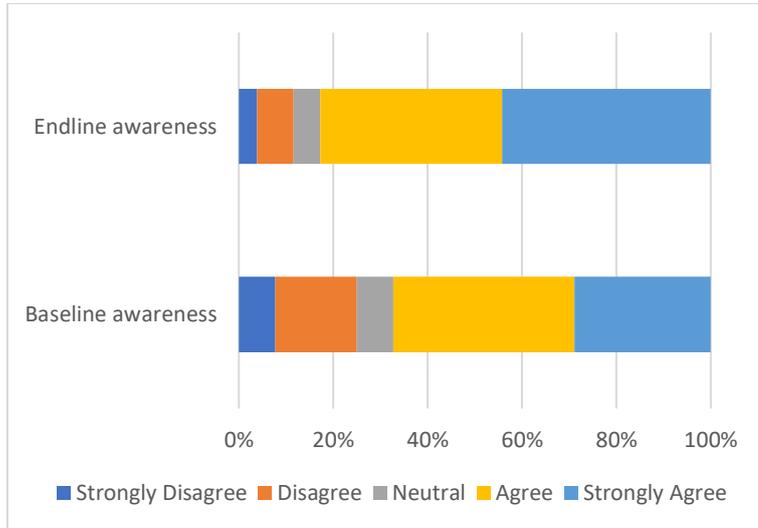
Graph 10. Awareness: Diseases from waste5   6

Based on the second awareness indicator, except for the stall merchant group, the other five groups of beneficiaries have a good awareness that waste can cause disease. This is claimed to be the result of waste accumulation, thus providing a breeding medium for disease vector diseases, especially for flies, rats and cockroaches. The three vectors are claimed to be easy to find in the port in almost all beneficiary work areas. This then prompted the relevant parties to assume that the condition was motivated by poor sanitation at the port. Although the Tegalsari Port Health Chief claimed that there were no reports of vector-based diseases at the port, the relevant parties also stated that vector-based diseases were mostly reported in hospitals outside the port. This is because the MPA only receives complaints from capture fisheries industry players or fishermen.

More and more people discerned that the accumulation of waste at strategic points in the port can cause health problems in humans, which is the result of an endline survey. The parties are representatives of all beneficiary groups. Related parties stated that diarrheal diseases were found in the port, which more or less the beneficiaries blamed on the waste that became the breeding grounds of flies and cockroaches. Aside from the disease, dengue fever and malaria were reported in the deck. It is also associated with poor waste management at the port.

Zoonotic diseases are diseases that are transmitted from animals to humans and vice versa in the form of bacteria, viruses and parasites. Transmission of the disease can be directly, indirectly

and ingestion. Direct transmission is a condition where humans have physical contact with disease vectors, while indirect transmission is a condition where humans touch contaminated objects. Transmission through consumption can be through the medium of transmission of food and beverage diseases such as milk, meat, eggs, vegetables and fruits (Murdiati et al., 2006).

International Health Regulations (2015) and Permenkes No. 44/2012 require that healthy ports must be free from the presence of infectious vectors. The presence of disease vectors such as insects and rodents indicate that the port is not a healthy port. Vector control is mandatory to reduce public health risks. To comprehend a healthy port, one of the programs held is environmental supervision and implementation of environmental media consisting of water, air, soil, food and vectors.

Studies on waste and disease in ports mostly focus on vessel (Siregar, 2009; Nirvana and Isaac, 2010; Hidayatsyah, 2012; Thohir et al., 2018; Azwar et al., 2021). One study by Sari et al., (2020) identified ectoparasites in mice, but not in humans. This study then provides information about the awareness of waste producers in the port that waste can carry disease if not handled properly.

II.3.2   Waste Management Concepts

II.3.2.1   Waste Disposal

Graph 11 shows the beneficiaries' answers to waste disposal indicators in baseline and endline surveys. Beneficiaries have a fairly good awareness in the early stages of handling waste in the port area, including before the provision of intervention.
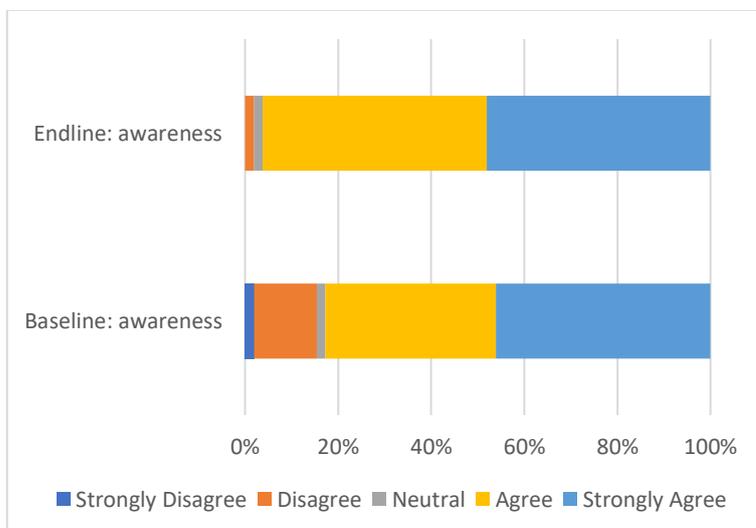
Graph 9. Awareness: Waste disposal

Beneficiaries ascertained that waste must be disposed of in a place that has been provided, be it in individual containers and/or communal containers in the area. The group of PPP Tegalsari

cleaning staffs (41.9%), fish dryers (31.3%), MSME actors (19.5%) and UPI actors (12.5%) had good awareness of disposing of waste, compared to two other groups of beneficiaries. Related parties recognised that consumption waste and commercial and industrial businesses must be disposed of in their place so that there is no accumulation of waste at various points in the area. This good awareness is motivated by the dirty condition of the port, which is clearly visible on the roads and commercial and industrial areas within the area, claimed by the cleaners of the port authority and UPI. The large amount of waste that is mountainous and accumulates at the strategic point of the port where fisheries activities are centred makes the community aware of the importance of having awareness of disposing of waste in its place, both before and after the program intervention.

Waste that is not disposed of properly is said by MSMEs to interfere with the buying and selling process because the business environment that does not attach importance to sanitation has a negative impression in the eyes of buyers. However, those with low awareness in waste disposal such as fishermen and fish traders see that the accumulation of waste in the port is a natural thing to happen, before the collection of waste is carried out by the cleaners of the port authority. The low awareness of beneficiaries on the importance of disposing of waste in the space provided is also due to the limited supporting facilities for waste storage. Correlations between the limitations of supporting facilities are known to affect behaviour (Feyisetan et al., 1997; Raharjo and Indarjo, 2014; Heta et al., 2016; Nurdiana, 2016; Purba and Khairunnisa, 2018; Apriluana et al., 2016; Pasaribu, 2021) where behaviour is indirectly influenced by beneficiary groups awareness.

Kahfi (2017) stated that waste accumulation is a common environmental problem in Indonesia even at the household level in transfer station (TPS) and landfills. This condition also occurred in the Tegalsari Fishing Port area where waste accumulation was found outside the waste container on the side of the main road of the port in the UPI area. Factors that affect the accumulation of waste are (a) the limited capacity of the TPS / TPA; (b) the distance of the landfill and the source of the waste is relatively long; (c) inadequate waste hauling facilities; (d) the remaining waste at the polling station becomes a pile of waste; (e) suboptimal waste treatment technology; (f) the absence of temporary waste storage sites and (vii) the lack of socialisation and government support regarding waste management and reduction (SF, 2008). The first, third, fourth, fifth and last factors are the factors that drive the presence of piles of waste in the port.

The implementation of regular socialisation by involving all beneficiaries, driven by the need for a comfortable and clean work environment helps to increase awareness of all beneficiary

groups, especially fishermen and fish traders. Both groups understood that the disposal of waste in the space provided is important because a clean environment creates a conducive situation to improve the performance of capture fisheries industry players. The absence of waste accumulation at the port makes it easier to transport supplies to fishing vessels that are ready to carry out fishing operations.

Studies from Arida (2010), Analisa and Raharjo (2011), Gardijoto et al., (2014), Feel et al., (2018) confirmed that a clean environment will maintain and/or improve worker performance. A clean work environment will create a healthy surrounding situation and workers are more motivated to work (Gardijoto et al., 2014). Therefore, improving the cleanliness of the port environment is recognised by beneficiaries to improve the performance of vessel crews, captains and vessel agents.

In contrast to the three awareness assessment indicators above, the baseline and endline survey results showed different results in terms of plastic waste processing, the use of shopping carts/bags and hygiene responsibilities.

II.3.2.2 Plastic Waste Processing

Figure 12 shows the beneficiaries' answers to indicators of plastic waste treatment at the port, in the initial and final surveys. There has been a significant change in the trend for the processing of plastic waste, which is shown from the results of the endline survey.
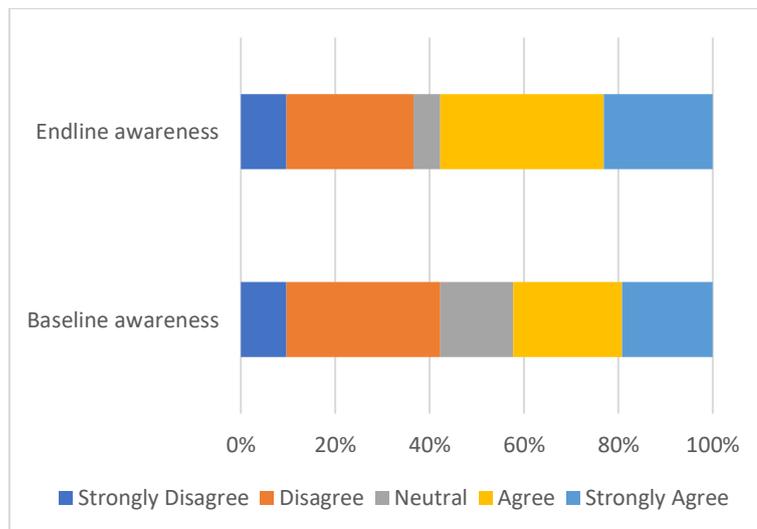
Graph 10. Awareness: Plastic waste processing

Only less than half of the total beneficiaries were aware of the plastic waste treatment procedures in the initial survey, indicated by the high number of disagreement and strongly

disagreed answers of 42.3%. MSME actors and Modern UPI actors are two groups of beneficiaries who have good awareness to process plastic waste at the port. The lack of participation in carrying out waste processing and the assumption that basic work is more important than waste-related work are the main factors contributing to the low awareness of waste processing. Plastic waste processing is not commonly carried out at PPP Tegalsari because of the low technical knowledge of plastic waste processing and the beneficiaries' busyness of their respective tasks carried out starting from dawn / morning until late evening. Fishermen, for example, claim to be unable to carry out waste processing with heavy tasks, so that time outside of work as much as possible is used to rest and spend time with family. The fish dryer is also busy carrying out work from morning to evening and ensures that the processed fishery products are guaranteed quality.

Although limited, there are preparations for plastic carried out by beneficiaries. Trash cans from used fish containers and baskets/bags are the only processed plastic waste products found in the port area. However, there are still many types of waste that are not processed or just left on the side of the road. Waste disposal is due to certain types of waste that do not sell well when sold. Apart from these two types, it is difficult to find other products from the processing of plastic waste. Straw waste, food and beverage packaging and other consumption have no further processing and are directly transported to the landfill.

The provision of interventions increases the awareness as well as knowledge and skills of beneficiaries in processing waste produced by themselves independently. Beneficiaries noticed that awareness of waste processing will form the right waste processing behaviour so that the economic value of waste is not simply wasted to the TPS. Although the skill of beneficiaries in making crafts with high selling value in the market is still low, increasing awareness of the importance of waste processing is an important benchmark in encouraging the implementation of systematic port waste reduction.

Waste Bank, TPST and TPS 3R are three institutions that process almost all types of waste. However, there is no cooperation between the waste pickers and the three institutions. Scavengers usually put waste in one group of collectors. The distribution of plastic waste directly to recipient groups helps reduce plastic waste and improve the economy of local communities. However, such processing keeps secret the amount and net profit that can be obtained. Processing through three institutions managed by DLH Tegal City provides an overview of waste that has been successfully managed not only plastic waste from food and beverage packaging, but also cardboard and sacks.

Tegal City has 21 units of Waste Banks in 2021 and one main waste bank, namely the Dewi Sinta Waste Bank. A total of 300 kg of waste was successfully processed by the main waste bank, 15.8% of the total waste managed in the same year. The total waste that has been successfully processed by all waste banks is 1,892 kg / year (DLH Tegal City, 2021). Waste banks accept cleaned waste from all households in Tegal City at varying prices, depending on market prices and generally more profitable compared to independent collection groups. Permen LH No. 13/2012 explains the guidelines for the implementation of waste reduction with the 3R principle through the Waste Bank Furthermore, Tegal City has three TPST units. Unlike the Waste Bank which still provides exceptions to colour bucket waste, TPST accepts almost all types of waste. TPST has a lawn chopping machine. TPST synergises with DLH Tegal City where related institutions sell fertiliser to DLH for use in city parks. Finally, TPS 3R processes all types of waste except for hardwood and glass. Among the three waste processing agencies, TPS 3R is the best option that can help reduce Tegal city waste significantly. The predatory machine used in Tegal City can process about one ton of waste per day and produce briquettes to replace the use of coal. However, the disadvantage of the 3R TPS is that it produces emissions from engine combustion so that air quality measurements around the waste treatment site are needed.

II.3.2.3   Shopping Bag Usage

Graph 11 shows beneficiary statements indicating awareness of the use of plastic bags when shopping, based on baseline and endline surveys. Beneficiaries have poor awareness of minimising the use of crackle when shopping both before and after the administration of the intervention, although there was an increase in awareness in the final survey.
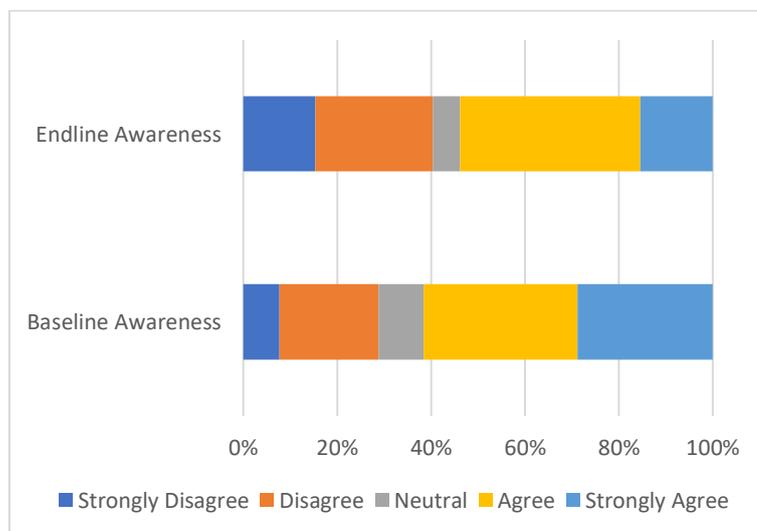
Graph 11. Awareness: Use of Plastic Bags

Most beneficiaries are unaware that the use of single-use plastic bags needs to be replaced with other, more environmentally friendly options, including multi-use shopping carts/bags. The

agreed and strongly agreed answers were given by the majority of beneficiaries at the beginning of the survey with percentages of 25% and 15.4%, respectively. Awareness of the reduction in the use of crackle with low shopping carts/bags is motivated by (1i) a lack of understanding of the importance of replacing plastic and (2) the high need for plastic use in the daily lives of all beneficiaries both for shopping for food, beverages and other primary needs. Shopping carts/bags instead of plastic, claimed by baseline surveys, are not appropriate for fish because they do not accommodate the needs of plastics with leak-resistant properties. Shopping carts/bags should also always be washed after use, unlike plastic which can be directly thrown away. Plastic is said to be able to meet all requirements as the material most needed by beneficiaries because it is cheap and lightweight and has good durability. Such low awareness resulted in a large number of single-use plastic bags found in the port.

None of the beneficiary groups has a high awareness of reducing the use of plastic bags. Fish traders explained that although they generally use plastic buckets to pick up, plastic is still commonly used to store and/or wrap marine catches. Fish buyers also rarely carry shopping carts/bags because they are considered troublesome. Except for people who take large quantities of fish, they usually carry their own plastic buckets. This encourages fishmongers, along with stall vendors, to meet market demand. Another group as users of plastic bags at the port confirmed that plastic is needed to make it easier to carry goods. The use of the shopping cart/bag itself is said to be difficult to do because it must always be carried when shopping. Shopping carts/bags also have a relatively higher price than plastic crackles, which can be directly obtained at the seller. These awareness's then contribute to the beneficiaries 'behaviour in using plastic crackles.

After the awarding of workshops and murals on the impact of plastic waste in the ocean (Figure 3), awareness increased little by little. The number of beneficiaries who appreciated that replacing plastic bags is a necessity to protect the environment and marine life increased, although not more than those who did not have an understanding of the importance of replacing single-use plastics with shopping carts/bags. Stall traders stated that there were calls to reduce the use of shopping crackles from the local government, but most parties stated that related regulations did not yet exist in Tegal City. To raise awareness of replacing crackles with shopping carts/bags at the port is believed to take a long time because it is difficult to change the way people think about the convenience provided by plastic.

Figure 3. Mural on the Impact of Plastic Waste on the Marine Environment

Research from Furqan (2021) shows that people's legal awareness in fulfilling the policy of limiting the use of plastic shopping bags in shopping centers is still lacking. This is said to be caused by the lack of strict sanctions even though in every related administrative rule there are legal rules of sanctions. Safitri et al., (2018) in Yulyanti and Shauki (2020) explained that consumer awareness is still low in limiting the use of plastic bags, where only 8.7% of consumers always carry their own shopping bags. The problem of limiting the use of plastic is still difficult to overcome by people in Indonesia, so the formation of awareness accompanied by a change in behaviour to the use of shopping carts/bags needs to be emphasised.

The Indonesian government has set a national target of reducing waste by 30% by 2025 (Presidential Regulation 97/2017), one of which is through the producer roadmap regulated in the Minister of Environment and Forestry Regulation No.75/MENLHK/SETJEN/KUM.1/10/2019. The roadmap for waste reduction by producers is implemented to achieve the waste reduction target of 30% compared to the amount of waste generation in 2029. Pasar Rakyat is one of the producers who must be responsible for waste reduction. The PPP Tegalsari port area has a people's market, which is built and managed by the local government, the private sector, state-owned enterprises and port enterprises, including cooperation with the private sector with places, businesses in the form of shops, kiosks, los and tents owned /managed by small, medium, non-governmental traders or cooperatives with small-scale businesses, small capital and with the process of buying and selling merchandise through bargaining (Article 1 (5). Minister of Environment and Forestry Regulation No.75/MENLHK/SETJEN/KUM.1/10/2019). To contribute to these provisions, the people's market at the port must encourage the use, packaging of products, and/or containers that are easily decomposed by natural processes and that cause as little waste as possible; and/or not using products, product packaging, and/or containers that are difficult to decompose by natural processes.

II.3.2.4   Cleanliness Responsibility

Below graph shows the beneficiaries answer to the port cleanliness responsibility indicator obtained from the initial and final surveys of the program. The beneficiaries have a fairly good awareness of the topics raised, including in the time before the intervention is given.
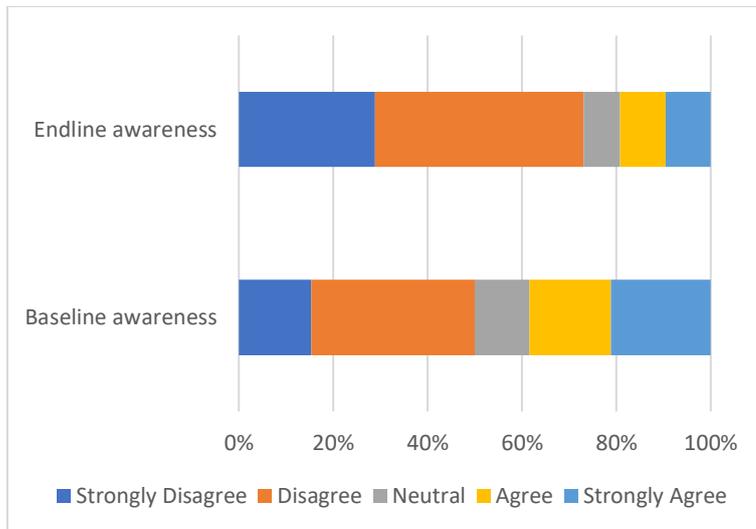
Graph 12. Awareness: Cleanliness Responsibility

The beneficiaries state that the cleanliness of the port environment is a common task, whereby one party should not impose on the other party. Port management authorities, especially, should not be allowed to work alone in ensuring that all port areas are clean every day. The beneficiaries discerned that the port environment measuring 17.2 ha could not be completed by only a total of 14 Tegalsari PPP cleaners and port TPI. All parties must take part in jointly protecting everyone's workplace environment, both on land and at sea. The efforts mentioned with the responsibility of the beneficiaries in maintaining the cleanliness of the port are disposing of waste in the space provided, processing waste, sorting waste and reducing waste periodically. On the contrary, beneficiaries who disagree that all parties need to guarantee the cleanliness of the port, do not have good awareness.

All the cleaners of PPP Tegalsari and TPI Jongor and UPI perpetrators opposed the port cleanliness statement is only the duty of the port authority. Cleaning staffs say it's hard to clear a port if it relies on just one party. Moreover, the cleaners face the problem of limited numbers and means of transportation. Therefore, the participation of business and commercial actors is strongly encouraged so that waste management at the port can run sustainably. The UPI agreed to the cleaning staff's statement and added that they were aware that the participation of various parties was needed to support better waste handling at the port. On this awareness, coupled with the condition of communal containers of waste in the fish processing area, all relevant parties carry out waste collection from each processing unit to be taken to the port TPS.

Unlike the two groups above, the other four groups have low awareness regarding hygiene responsibility indicators at the port. The group was unaware that although they made payments for the cleaning of the port environment and the collection and transportation of waste to the landfill, they were also obliged to take part in the efforts to handle the area's waste, especially in the stage of landfilling and sorting waste. Due to the lack of awareness, it has a negative impact on the formation of the behaviour of related parties in handling and reducing waste.

Pearson's correlation analysis showed that there was a correlation between the hygiene responsibility awareness variable and the waste disposal behaviour variable in its place (α count 0.00 < α table 0.05) and the moderate relationship strength of ρ count 0.46 > ρ table 0.27. This indicates that the higher the awareness about the party responsible for cleanliness at the port, the better thebehaviour in disposing of waste in the space provided, and vice versa.

The increasing awareness of the person in charge of cleanliness at the port is driven by an increase in awareness of the importance of the participation of various parties in the implementation of waste management at the port, the implementation of voice overs and stakeholder discussion forums, namely workshops, FGDs and the Clean Port Movement, which insisted the collective efforts of stakeholders or stakeholder engagement to support efforts to reduce and handle waste. The dirty condition of the port before the implementation of the Clean Fishing Port Pilot Program at PPP Tegalsari became a reference for various parties to improve. Seeing that it is difficult for cleaning staffs to clean themselves, especially in the high season of vessel, motivating various parties to help clean the port. The daily screening of the appeal through voice over at the port is also believed to help make the community aware of the importance of the involvement of all parties in managing waste. The Problem Analysis FGD, which is coupled with the discussion of Solution Recommendations and the Role of Engagement, as well as workshops are also known to increase the responsibilities of various parties. This is justified by the beneficiaries of MSMEs. The Joint Clean Port Movement, in addition to involving all parties in the port area, also encourages the involvement of community communities, environmental activists and students throughout Tegal City. This activity is believed to increase awareness and participation of related parties to jointly ensure a clean port environment.

Beneficiaries who have good awareness at the end of the program explained that the task of hygiene is not the responsibility of one agency, but rather a collaborative responsibility between government agencies, commercial and industrial business actors and other related parties. All groups of beneficiaries affirmed that without the support of all parties, area-based waste management will not run optimally. If the community has a low awareness of the participation

of various parties, then misbehaviour would also be formed, which results in the Tegalsari PPP will be filled with waste. Although there are cleaners from the two port management authorities, if awareness is low and impropriety behaviour, it will not create a clean fishing port in PPP Tegalsari due to limited manpower and the number of cleaners. Related agencies cannot carry out one function alone but require the participation of the community so that the vision of PPP Tegalsari to become a clean, comfortable and safe fishing port can be achieved.

The beneficiaries refused that the duty of cleaning was held by only one party, namely the cleaning staff. This is because synergy between parties inside and outside the port is needed to support systematic and comprehensive waste management (Law No. 18/2008). Beneficiaries believe that all waste-producing units in the port area must take part in handling and reducing waste. Parties who disagree with the above statement believe that the cleanliness of the port is the main task of the cleaners because payments have been made every day. The payment of IDR 2,000 from fish traders and MSMEs and the prepayment by UPI along with the land lease are intended by the relevant beneficiaries so that the cleanliness of the port is maintained and the waste-producing unit does not need to pay attention to the cleanliness of the port.

Fishing ports must pay attention to social, economic and environmental aspects in their management. The combination of these three aspects is a linear environmental-based waste management approach model with the concept of sustainable development. The Ecoport concept prioritises ecological integrity that must be applied at fishing ports and involves various parties in pro-environmental programs or maintaining the environmental cleanliness of the port area (DKP, 2017). Although payments have been made by waste producing units, all relevant parties are obliged to participate in guaranteeing on the basis of the principle of awareness, namely waste management, the Government and local governments encourage everyone to have an attitude, concern, and awareness to reduce and handle the waste produced (Law No. 18/2008).

Pearson's correlation analysis examines the relationship between the variables of consciousness and other variables within the scope of knowledge, awareness and behaviour of the beneficiaries. The results of the related correlation analysis showed that the beneficiary's awareness in disposing of waste had a positive relationship in the same direction as the variable (a) waste disposal behaviour ($\rho = 0.47$); (b) awareness of diseases from waste ($\rho = 0.45$); and (c) awareness of the processing of plastic waste ($\rho = 0.46$) with a degree of strength that is moderate. This indicates that the higher the beneficiaries' awareness that waste must be disposed of in its place, the higher the awareness that waste can carry disease and plastic waste

can be processed in a certain way. Awareness of good waste disposal also has a correlation with waste disposal behaviour and vice versa.

II.3.3   Comparison Between the Conclusions of Baseline and Endline Awareness

Overall, beneficiaries' awareness at the beginning and at the end of the program showed quite a significant difference. At least 15 people (28.8%) had good knowledge when the baseline survey was carried out, while at the time of the endline survey there were at least 21 people (40.4%) who had knowledge. Awareness of disposing of waste in its place and awareness of the dangers of waste piles if not handled immediately are owned by 92.1% and 82.7% of beneficiaries. The importance of replacing single-use shopping plastic bags with baskets/bags occupies the last position of awareness both before and after the program intervention. Graph 13 shows a comparison of beneficiaries' awareness from baseline and endline surveys.
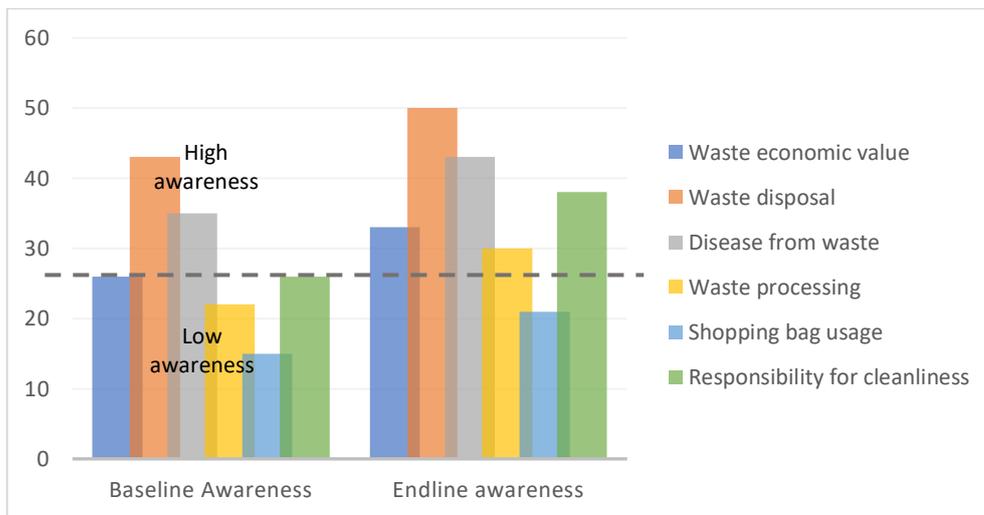
Graph 13. Baseline and Endline Survey Results on Awareness Indicators

Summing up from all the assessment indicators, the final awareness of the beneficiaries increased by 23.1% compared to the initial awareness. Prior to the intervention, less than 50% of the beneficiaries had good awareness of the handling and reduction of waste. However, after providing education, socialisation, around 60% of the beneficiaries have good knowledge of five indicators, namely awareness of the economic value of waste, diseases from waste, waste disposal, plastic waste processing, and hygiene responsibility. One indicator regarding the use of shopping carts still requires follow-up. This achievement can be said to be quite significant for the implementation of the one-year program, although it requires continuous education. The graph below provides an overview of the differences in beneficiaries' awareness in baseline and endline surveys.
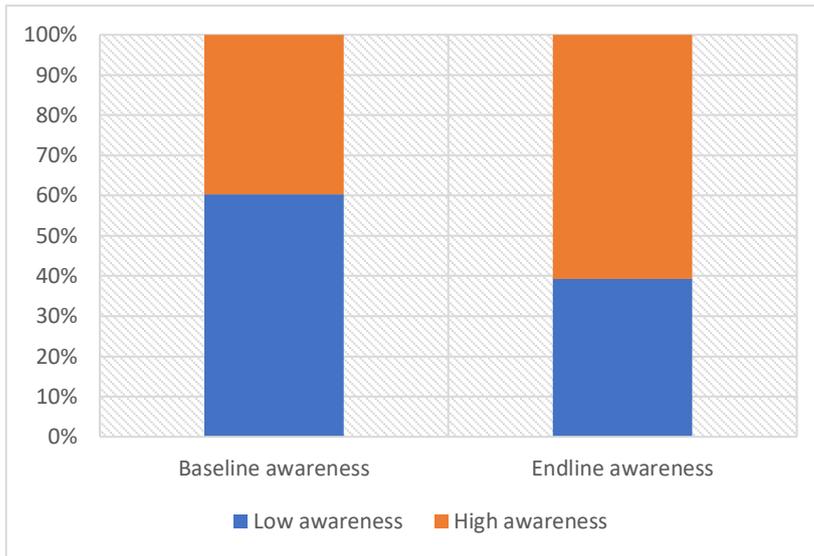
Graph 14. Baseline and Endline Survey Results on Program Awareness

II.4   Beneficiaries Behaviour

The behaviour of beneficiaries in managing waste is measured based on waste handling indicators which include waste sorting, garbage disposal in the space provided, subscribing with cleaners for waste collection to the TPS and reducing waste, namely limiting the use of shopping bags and subscribing to waste pickers. The assessment will show trends in beneficiary groups behaviour in handling and reducing waste both before and after the program intervention.

An assessment of the beneficiaries' behavioural indicators in terms of (1) sorting waste (2) using shopping carts/bags and (3) subscribing with plastic collectors showed a low score before the intervention was given. This is indicated by the high number of answer choices agreeing and strongly agreeing to statements (1) and (2) and answer choices disagreeing and strongly disagreeing for statements (3). This means that many beneficiaries misconducted handling and reducing waste activities. An increase in good behaviour was seen in all assessment indicators after the intervention was administered. More than 50% of the beneficiary group gives the right answers to all behavioural indicators. Indicators that have many beneficiaries behaving well before the activity begins such as (1) disposing of waste in its place, (2) cleaning the environment itself in the early stages of handling waste and (3) subscribing with cleaners for waste collection experience an increase in the number of people with the same behaviour; and indicators with more beneficiaries behaving unfavourably experience the addition of people with a change in behaviour for the better.

The most significant behavioural change was seen in the behaviour of sorting waste from sources, namely 46.1%, while changes in other indicators ranged from 1.9% to 25%. The addition of five people and 12 recipients who routinely carry out garbage disposal in their place and the

use of shopping carts/bags when shopping. The indicator of subscribing with janitors as well as cleaning the environment itself undergoes the least changes.

The disposal of waste in its place and the cleaning of the environment of each work independently was carried out by the majority of beneficiaries both before (78.8%) and after the program intervention (88.5%), while the behaviour of subscribing with cleaners was rarely found at the port i.e., only eight people in the preliminary survey and 15 people in the final survey. Three indicators of beneficiary behaviour that were not widely implemented by beneficiaries (< 14 people) before the intervention were subscription behaviour with cleaners, behaviour of using single-use shopping plastic bags and waste sorting behaviour

II.4.1   Waste Handling

II.4.1.1   *Waste Disposal*

Graph 15 shows the beneficiary's answers in terms of waste disposal behaviour at the port, obtained from baseline surveys and endline surveys. Beneficiaries have a good awareness of the related topic even before the intervention is administered and experience an increase in numbers at the end of the program.
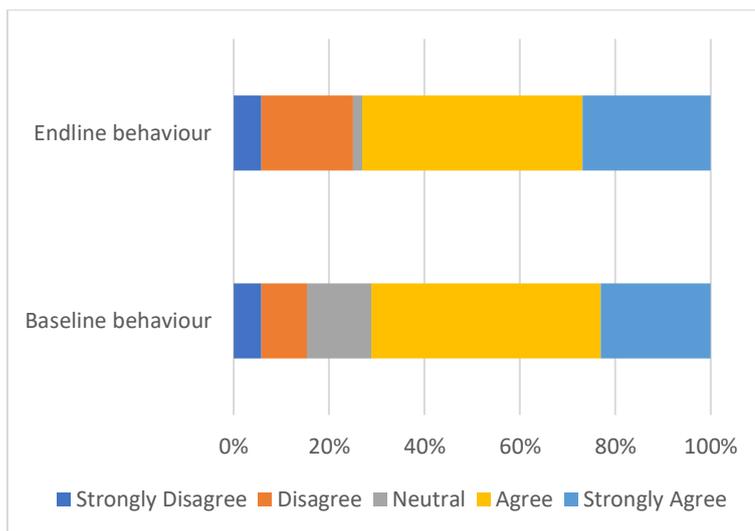
Graph 15. Behaviour: Waste Disposal

Beneficiaries have good behaviour in handling waste, which can be seen from before the implementation of the intervention program. The disposal of waste in the space provided is carried out by all PPP Tegalsari and TPI Jongor cleaners, fish dryers and UPI actors. However, groups of fishermen, MSMEs and fish traders are still limited in doing the same. The condition of the slum Tegalsari Fishing Port, which means that a pile of waste is scattered and piled up in various locations, indicates that there are still a significant number of beneficiary groups of

capture and commercial fisheries industry players who do not handle waste in the form of waste disposal in the space provided. Fishermen, for example, directly dump plastic snags of fish into the dock, which then leak into the port pond; fish vendors also only keep the same type of plastic on the TPI floor and leave the cleaners to sweep it. Parties from outside the port such as fish buyers are also assumed to contribute to disposing of waste in any place from the process of buying and selling fish at TPI Jongor as well as instant food and beverage products and activities in and out of the port. This is then believed to have implications for the accumulation of waste at fish auction sites, roads to TPI, docks and drainage. However, this assumption still requires further substantiation. Due to these limitations, the information from the baseline survey that the majority of beneficiaries are behaving well in managing waste is not entirely valid, as it is not supported by the dirty real conditions of the port when the new program is about to be implemented.

The condition of the fishing port, which is clean from the accumulation of waste seen at the end of the program implementation, is known to be the result of changes in the behaviour of beneficiaries who have routinely carried out waste disposal in the space provided. The increase in the number of beneficiaries, apart from the cleaners of PPP Tegalsari and TPI Jongor, fish dryers and UPI, with good behaviour in disposing of waste into the space provided regularly both in their own containers at the source of waste and in communal containers in two containers of waste located in the fish processing area. Groups of fishermen, MSMEs and fish traders are seen to actively contribute to handling waste from sources. The change in fishermen's behaviour is claimed to be driven by the availability of port reception facilities to collect marine-based waste from fishing vessels returning to the port from fishing operations at sea. Fish traders are motivated to do the same because of the availability of two special communal waste storage facilities within the scope of the Jongor TPI area. MSMEs / kiosk traders also routinely dispose of waste because of the increasing awareness of the importance of a clean environment at the port so that most related parties provide their own trash cans so that waste does not scatter and/or accumulate in their respective work environments.

Apart from MSMEs, other beneficiaries also comprehend that a clean environment is a basic need that should be met at the port so as not to interfere with the main activities of each party. The dirty environment, said by fish traders, MSMEs, fish dryers and fishermen, limits the space for movement to carry out basic activities at the port. Fish traders and MSMEs also added that the presence and / accumulation of waste interferes with the appearance of products and is feared to make buyers lack interest in shopping. The same thing was said by UPI actors that the presence of waste with a pungent odour decreased the assessment of processed fish products

when quality audits were carried out by outside parties. Cleaning staffs who have good behaviour to dispose of waste in their place from the beginning noticed that the accumulation of waste would harm the port not only in terms of the environment, but also for the economic and social communities. A good awareness of the importance of attention to the issue of waste accumulation and the need for a clean environment, in the awareness chart II.3, are factors behind the implementation of environmentally sound behaviour in the port.

Related negative impacts are then avoided as much as possible by beneficiaries by conducting regular disposal of waste so that the opportunity costs incurred due to waste accumulation can be reduced. Opportunity costs are costs incurred as a result of choosing one of the various available alternatives (Ubaidillah, 2018). Unselected alternatives or sacrificed costs are opportunity costs (Mankiw, 2000). Opportunity costs are related to decision-making. The decision of beneficiaries who actively participate in the handling of waste mitigates the invisible costs that need to be incurred as a result of dirty environmental conditions at the port.

The behaviour of disposing of waste has a positive relationship with the variables of awareness that waste can cause disease, awareness of beneficiaries in processing plastic waste and awareness of the party responsible for the cleanliness of the port with two weak forces ($\rho = 0.29$; $\rho = 038$) and one medium ($\rho = 0.46$). This means that the better the behaviour of disposing of community waste, the better the beneficiaries' awareness of the emergence of diseases due to poor waste handling, procedures for processing plastic waste and the person in charge of cleanliness of the port environment. Conversely, the more beneficiaries dispose of waste in any place, the lower the relevant party's awareness of the three related assessment indicators.

II.4.1.2 Self-Cleaned Working Environment

Graph 16 shows the beneficiary's position in self-sustaining environmental clean-up, which is the result of baseline and endline surveys. Beneficiaries have good behaviour to clean their work environment on their own or without relying on janitors, both at the beginning and at the end of the program.
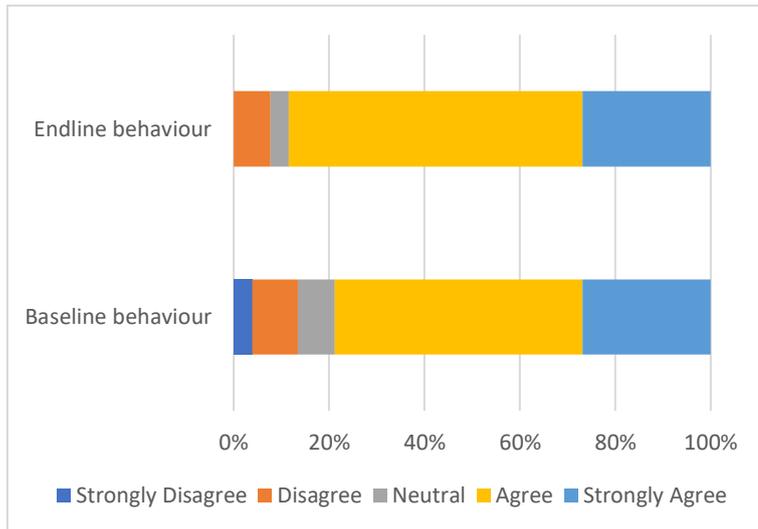
Graph 16. Behaviour: Self-Contained Environmental Clean-up

Self-cleaning of the environment in their respective work areas is common for beneficiaries, both at the beginning and at the end of the program. Environmental cleanliness itself is one thing that is always ensured to be fulfilled by beneficiaries every day. This is encouraged for the same reason why related parties dispose of waste in the space provided, namely the need for a clean environment. The majority of beneficiaries, from the results of the baseline survey, namely the group of cleaners, fish traders, fish dryers, MSMEs, UPI and fishermen claim to continue to try to clean the environment independently rather than waiting for cleaners to sweep waste from the source. Due to the duties of the relevant authorities, the cleaners of UPT PPP Tegalsari and UPTD TPI Pelabuhan have a high awareness of the importance of cleaning the port independently. Fish traders clean the floors of Jongor Fish Auction, even though they have been cleaned by cleaners, to ensure that the workplace is not dirty from plastic waste and fish washing residues, fish dryers sweep fish dryers, both floors and drying tables, MSMEs carry out sweeping for areas outside the stalls, UPI cleans waste outside the fence and drainage in front of their respective units and fishermen carry out cleaning on their main boats during berthing and loading and unloading periods.

However, the fishermen did not do their own environmental cleaning at the pier there were some fish traders and fishermen who stated that they relied more on cleaners to clean the Jongor TPI area and the outer area of the UPI fence and the port drainage system because the work was the duty of the port management authority, and payments have been made in accordance with the provisions of the fishing port. The statement is true that the cleaners of UPT PPP Tegalsari and UPTD TPI Pelabuhan are required to clean their respective work areas in accordance with Law No. 18/2008. However, because the relevant agencies, especially the UPT

PPP Tegalsari, have limitations to clean up the entire area in the port, the involvement of all parties is encouraged to obtain a clean fishing port.

In contrast to the above situation, the provision of interventions encourages almost all beneficiaries to clean their respective work environments independently, compared to relying solely on cleaners to solve all the thorny problems of waste in the port. Beneficiaries who are commercial and industrial actors apprehended that clean environmental conditions are needed at all times at the port, so relying only on the cleaners to always be available every time cleaning the port at all times will be difficult to achieve. Although some people are not satisfied with the environmental conditions of the port filled with waste in the busy period of the port and are not satisfied with the performance of the cleaners in handling waste, the beneficiaries who understand this after understanding that the port management authority is limited in manpower and the waste transportation fleet for a large port area. Due to these two factors, a significant change in behaviour in a positive direction where all parties contribute to ensuring the cleanliness of the port together is reflected at the end of the program.

II.4.1.3   Subscribe to Cleaning Staff
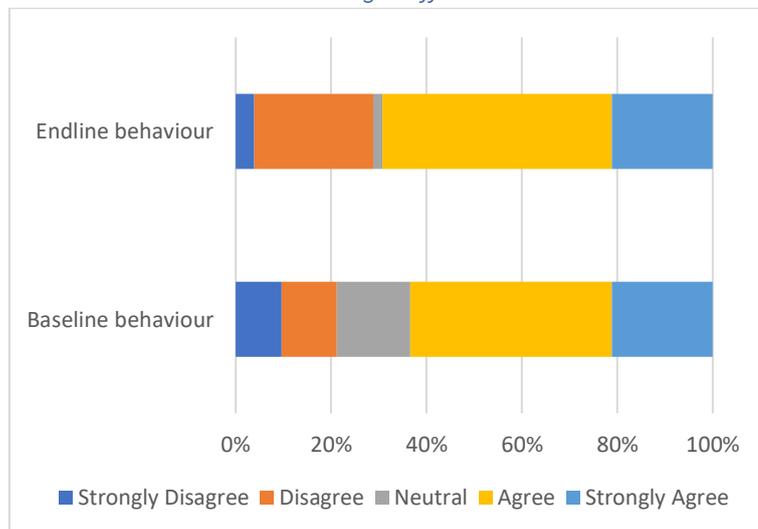
Graph 17. Behaviour: Subscribe to cleaning staffs7

Many beneficiaries subscribe with cleaning staffs before the program begins. The participation of the majority of beneficiaries to pay the port cleanliness levy to the managing authority is motivated by the desire to reduce workload outside the main task. Fish processing industry players, and MSME traders stated that they have subscribed to the collection and transportation of waste for many years as a guarantee so that their work environment and its surroundings can always be clean. The relevant parties claim that they do not have free time to take care of the waste problem so the option of working with cleaners is the best solution to overcome waste and reduce the backlog from commercial and industrial businesses at the port. In addition, some

people also stated that they were quite satisfied with the performance of the cleaners in maintaining cleanliness at various points in the port. Another factor is that all waste producers are obliged to pay a hygiene levy for the environmental management of the area.

However, other groups such as fish dryers and some of the fishermen do not see the urgency of subscribing with cleaners because the waste is claimed to be able to be directly disposed of by themselves into communal containers within the waste port area if the individual shelter containers are full. Most fishermen do not pay for the collection of plastic waste that leaks the cleanliness of the port pond. The main management authority of the port said that payments must still be made for the use of waste containers and, the hygiene levy must be paid by everyone who is active in the Tegalsari PPP.

Changes in behaviour are seen at the end of the program after socialisation through workshops is given to all beneficiaries. The majority of fish traders (77.7%), fish dryers (57.1%), MSMEs (83.3%), UPI (100%) and fishermen (58.8%) subscribe to cleaning services for collecting waste from source to TPS and transporting waste from TPS to landfill. The main motivation of all parties, especially fishermen groups and fish dryers, to subscribe with cleaners is the same as the reason for the changes in the two behaviours above, namely awareness and an increasing need for clean fishing port to carry out the main activities at the port from the fishing industry and commercial fisheries and MSMEs. Fish dryers feel more able to do basic work effectively by relying on cleaners. Although they generally carry out their own environmental clean-up, efforts to collect and transport waste are found difficult to do.

The purpose of the large number of people who subscribe to the cleaners every day is to increase income for the improvement of facilities and infrastructure supporting waste management at the port. Although the entire cleanliness levy goes to the treasury every year, the port can get more budget if the port budget revenue exceeds the target. There has been an increase in the number of waste-producing units that subscribe to cleaners for sweeping and waste collection at the port. Although there was a decrease in hygiene levy income in 2021, which was IDR 154,016,000 from IDR 155,700,000 in the previous year, this figure met the port PAD target of 138,000,000. This signals a positive change for waste management at the port.

II.4.1.4   Waste Sorting
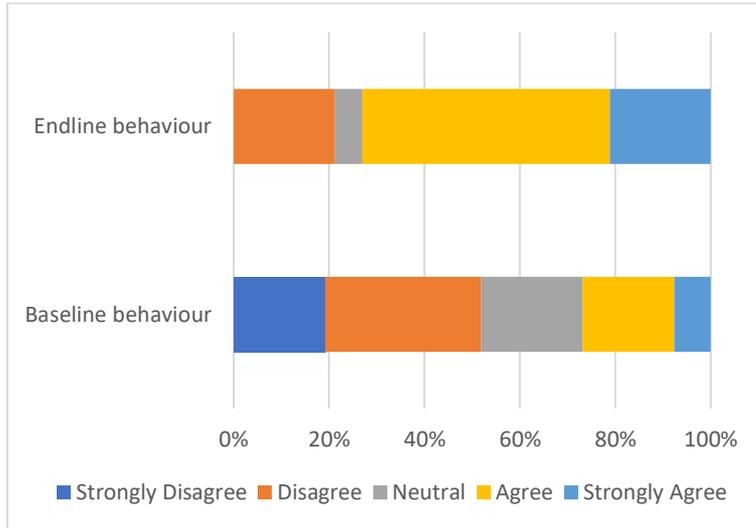
Graph 18. Behaviour: Waste Sorting

Graph 18 shows that waste sorting is carried out by less than half the number of beneficiaries at the port. Beneficiaries have become accustomed to combining different types of waste into one container for reasons of cheapness and practicality, which do not require more containers, so waste collection is easier to do. In addition, there are no waste containers that separate waste by type be it individual or communal containers. The two port management authorities do not focus on efforts to handle waste in the sorting stage, assuming that the container will not function properly. The condition was said after seeing the condition of the port which remained filled with waste even though communal containers had been provided. The lack of understanding of the benefits of waste sorting for individual beneficiaries also does not support waste sorting behaviour at the household level. Beneficiaries are less aware that waste sorting will be beneficial for better port waste handling.

The above conditions are believed to contribute to the small contribution of beneficiaries at the port. Only a few of the fish traders (5.7%), MSMEs (1.9%), UPI (1.9%) and fishermen (5.7%) carried out waste sorting. Not even one from the fish dryer group sorted out the waste. The cleaning staff who sorted the waste in the baseline survey was also only one person, who was the head of the fish plastic waste collector in the port.

The waste that is most often sorted by some beneficiaries is organic waste such as fish washing residues and inorganic waste such as fish plastic. The sorting was mainly carried out by UPI and TPI cleaning staff Jongor. UPI sorts organic waste so that it can be given to waste processors in the port, while cleaners sort out inorganic waste to be collected by groups of waste pickers. B3 waste such as cooking oil and oil are claimed to be also sorted to be given by certain groups as

well, but this information cannot be proven to be sustainable because the relevant parties do not know its existence.

Beneficiaries who before the program had carried out waste sorting had concerns for the environment and economic benefits. One plastic waste collection group was formed by one staff of the port management authority after seeing the large amount of waste scattered in the port for a long time and having no further processing has been implemented. Related organisations carry out sorting of plastic waste by type, nature, colour and size.

The provision of continuous intervention through voice over and appeals is believed to change the environmentally unfriendly behaviour of beneficiaries into environmentally friendly behaviour in handling waste from the source, by increasing understanding of the importance of sorting waste. People's habits, which should be changed as a whole, can improve little by little, where people are consciously encouraged to separate the waste produced into two containers. The assumption that two containers are impractical and expensive is not the main concern of the beneficiaries because the advantages of sorting the waste lower the attention to the losses that can be obtained. Beneficiaries feel that waste sorting could increase the waiting period for waste to be taken to the polling station. Previously, organic waste combined with inorganic waste had to be immediately transported to waste containers because it caused odours and worms. After the sorting is carried out, the waste that needs to be transported every day is only one bag of organic waste, while one bag of inorganic waste can be used three to four days before being transported to the TPS. Fish traders, MSMEs, UPI and fishermen are beginning to understand that sorting waste from sources not only helps in waste waiting times, but also helps other parties to benefit from waste.

Waste sorting is important to do in order to reduce additional costs in the waste recycling process. The absence of waste sorting will also increase time and energy in the follow-up sorting process where waste has merged into one unit from various sources (Bohm et al., 2010). Therefore, handling waste from sources is an effective step for sustainable waste management.

II.4.2   Waste Reduction

II.4.2.1   Shopping Bag Usage

Graph 19 illustrates the beneficiaries' answers to indicators of plastic bag usage in baseline and endline surveys. There is a positive trend of changing the behavior of beneficiaries to replace the use of crackle with other, more environmentally friendly options
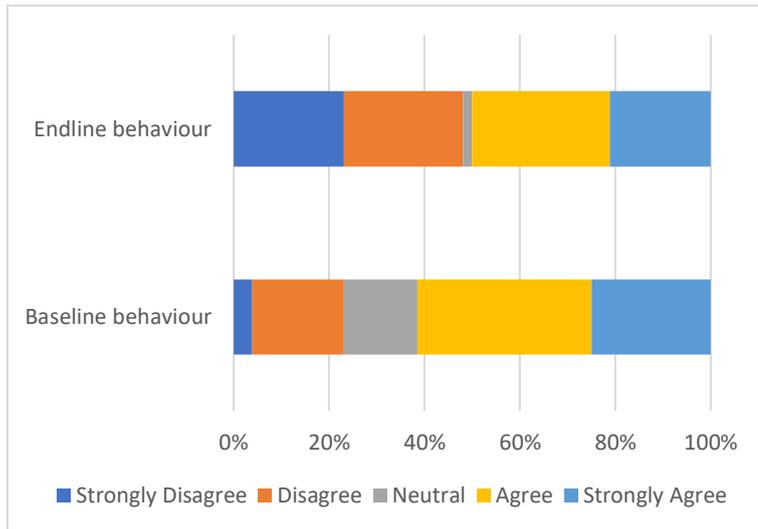
Graph 19. Behaviour: Use of Plastic Bags8   9

Only 23.1% of beneficiaries had good behaviour or performed plastic crackle replacement with shopping carts in the baseline survey. This number is lower than the number of people who have a good awareness of the importance of shopping cart use (1.9%). All groups of beneficiaries prefer to use crackle as opposed to baskets. Beneficiaries find it difficult to avoid the use of single-use plastics driven by a high need for plastics and a lack of understanding of the negative impacts of plastics on the environment.

Shopping crackles are always provided by stall vendors and fish vendors to be given to consumers who do not carry shopping carts. MSMEs revealed that it is very rare for buyers to bring their own shopping carts/bags, so related parties need to provide quite abundance of plastic bags. Fish traders stated that in contrast to the case at TPI Jongor, fish buyers in general often carry buckets to transport large amounts of fish catches, so fish traders do not need to provide large amounts of plastic. Fishermen, UPI and fish dryers state that plastic has become a major need that cannot be separated from the people at the port. This statement was not opposed by the cleaners, because single-use plastics are also still often used by related parties.

Plastic packaging is still the main choice of all waste-producing units in the area because there is no substitution of products with relatively the same functions and prices and can be mass-produced. Fish wrapping plastic still has no substitution that can survive under the scorching sun for a long time during the fishing operation period. Although plastic bottles can be substituted with canned bottles, people's awareness of bringing their own drinking utensils is still low. Also, there has been no proper innovation to replace bottle packaging that also does not produce other types of waste. Plastic replacement products needed in the port area are those that have non-translucent properties, are cheap, have high resistance according to their functions but are easily biodegradable in nature.

The behaviour of the beneficiaries changed in a positive direction at the end of the program, where there was an addition of 13 people who replaced plastic crackles with shopping carts. Fish traders are parties who have experienced many changes in behaviour. Related parties limit the provision of plastic bags and advise buyers to bring their own baskets / shopping bags in an effort to minimise the generation of plastic waste at the port. The same is done by stall vendors. The two groups of beneficiaries and cleaners have listened that there are calls for restrictions on the use of single-use plastics in Tegal City, including for plastic crackles. Because of this, all three groups recognised that behaviour change was needed. Some fishermen also seem to have begun to refuse when given plastic by food and beverage vendors. This change in behaviour in fishermen is believed to be formed little by little from continuous socialisation and the procurement of illustrations about murals that are directly placed in front of when leaning to carry out loading and unloading. Although some fishermen have limitations in reading and writing, the image in the mural that gives the message that the presence of plastic in the sea, one of which is donated from single-use crackles, can be understood by related parties. UPI workers and fish dryers who usually eat and drink at boarding houses within the port during the course of the program prefer to eat on the spot rather than wrap food so that plastic bags do not have to be brought to work. The provision of appeals by local governments, mural installations and socialisation is believed to be the activities of beneficiaries to replace the use of plastic crackles with spending in order to protect the marine and land environment from the negative threat of plastic waste.

Although there was a change in behaviour at the end of the activity, the number was still less than half of the number of beneficiaries. This is in line with the low awareness of various relevant parties to limit the use of single-use plastics according to chart II.3 on the variable "shopping cart use".

The assumption that shopping carts are not effectively used in the port especially at Jongor TPI makes beneficiaries prefer to limit plastic bags and not carry plastic very often. Plastic film from sweet potatoes is one of the innovations to replace plastic that has the potential to be adapted at the Tegalsari Fishing Port. Plastic film has properties that are resistant to moisture and can be used instead of disposable packaging (Mahalik, 2010). Plastic film is biodegradable which at a certain time undergoes changes in properties due to the influence of microorganisms, be it algae, fungi and bacteria (Griffin, 1994). Biodegradable packaging contains polymeric compounds that change low molecular weight which can have an impact on degradation at one or more stages through the natural process of microorganisms. Compounds resulting from polymer degradation are harmless to the environment. Plastic film can decompose up to 20

times faster compared to plastics that are widely used so far (Aripin et al., 2017). Plastic films from sweet potatoes have also been mass-produced in various countries in the world including Indonesia. However, it is still not as big as conventional plastic. The use of this plastic for various needs in the port, especially for fishermen in the sea, still needs further research because the durability test of this plastic film is still limited to room temperature (Setya, 2020).

II.4.2.2 Subscribe to Plastic Waste Scavengers

Graph 20 shows the beneficiary's statement of the indicator of subscription behaviour with the waste collector based on the results of the initial and final surveys. The beneficiaries have a good awareness of the topic in question even before the intervention is given. There was a change in behaviour at the end of the program, but it was limited to fewer than five people.
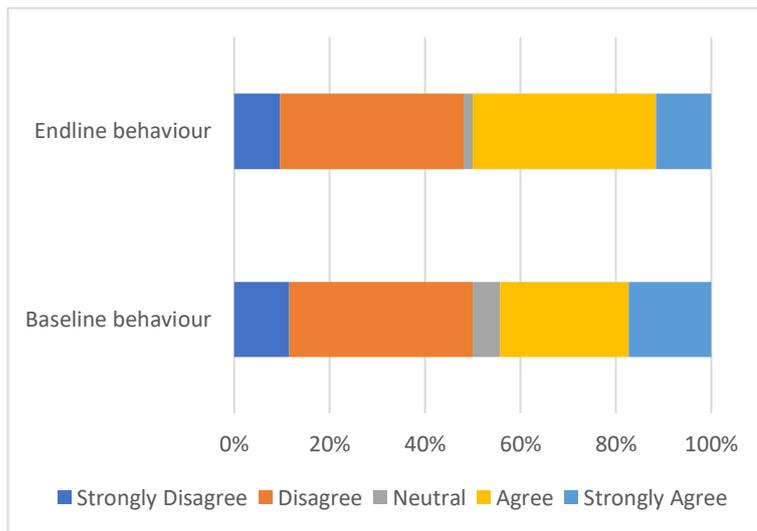
Graph 20. Behaviour: Plastic Collector Subscription

Only a few of the beneficiary groups subscribed with scavengers/waste collectors for processing specifically before the program was started. All UPIs and most fishermen stated that they subscribed to individuals/groups of waste collector to transport the resulting fish waste snags at the fish processing units and at the docks. The cleaners also subscribe to the relevant groups, but are limited to UPTD TPI Port officers. One UPT PPP Tegalsari cleaning staff actually billowed fish plastic waste at the port, or in other words did not subscribe to the waste collector but to the group formed by himself. MSMEs, fish traders and fish dryers also do not subscribe to waste picker groups.

The behaviour of subscribing to collection with groups of waste pickers does not generate economic benefits for fishermen cleaning staffs TPI Jongor as a waste provider and the two related parties also do not have to pay for the cost of collecting and transporting waste outside the port. The term "subscription" is claimed to be not very appropriate in describing the

relationship between the three parties concerned, although the transportation of waste occurs on a daily basis and involves the subscription party and the customer, and prefers the term "cooperate". The term was rejected because there was no buying and selling transaction in it. The statement was approved by UPI and parties who did not subscribe to the cleaners. UPI explained that they are the only party who can use the term subscription because they have a profit from buying and selling fish plastic. The Modern Fish Processing Unit has its own cleaning team and deals with other waste picker groups to sell fish plastic waste.

The low cooperation between beneficiaries and the waste picker groups is motivated by the limited type of waste received by the relevant group. The beneficiaries claim that the relevant group only accepts LDPE type fish plastic waste because it has a high selling value. This was then confirmed by the head of the plastic waste collection group. However, the relevant parties added that they also collected plastic drinking bottles and plastic snacks. However, apart from the plastic waste, the group of waste collectors/scavengers does not accept. This has implications for the high volume of plastic waste from coffee packaging, instant noodles, shampoos, styrofoam and other types of waste in the port.

The provision of interventions about the purposes and benefits of subscribing with groups of plastic waste pickers only impacted three beneficiaries, as measured in the endline survey. The change in behaviour can be seen from the fish dryer group, which is driven by increased awareness of the importance of a work environment that is clean from plastic waste. There is no increase in cooperation from other groups in the port. In addition to the awareness factor, it is the same as found in the baseline survey that the limited type of waste received by scavengers contributes to low levels of hygiene subscriptions with plastic waste collectors.

Pearson's correlation analysis showed that subscription behaviour with plastic waste pickers had a positive relationship with waste disposal awareness variables. Beneficiaries who subscribe to the collection and transportation of plastic waste have good awareness in the disposal of waste in the space provided ($\alpha = 0.04$; = -.29).

The provision of fish plastic to related groups without buying and selling transactions is claimed to be a form of mutually beneficial cooperation for the port and related private parties. Port can reduce waste generation and increase the amount of waste handled and successfully reduced, while waste picker groups benefit economically from the sale of plastics.

Research from Kustanti et al., (2020) stated that the net profit that can be obtained at the scavenger level in Purwodadi, Semarang City is IDR 500 – IDR 2,600, the waste bank level ranges from IDR 100-IDR 400, the collector level I ranges from IDR 91.67-IDR 391.67, the

collector level II ranges from IDR 173.46-IDR 473.46, the city level ranges from IDR 186.94-IDR 686.94, and the recycling industry level ranges from IDR 136, 23-IDR 1,136.32. The daily income of labour at the collector level I is IDR 55,000, the collector level II is IDR 62,500, the Bandar level is IDR 73,125, and the industrial level is IDR 82,000. Economic benefits can also be obtained by beneficiaries through the same scheme implementation. The same research needs to be carried out at PPP Tegalsari so that the value of the benefits of plastic waste management in the informal sector can also be known.

## II.4.3 Comparison Between the Conclusions of Baseline and Endline Behaviour

The most significant behavioural change was seen in the behaviour of sorting waste from sources, namely 46.1%, while changes in other indicators ranged from 1.9% to 25%. The addition of five people and 12 recipients who routinely carry out waste disposal in their place and the use of shopping carts/bags when shopping. The indicator of subscribing with cleaning staffs as well as cleaning the environment itself undergoes the least changes.

The disposal of waste in its place and the cleaning of the environment of each work independently was carried out by the majority of beneficiaries both before (78.8%) and after the program intervention (88.5%), while the behaviour of subscribing with cleaners was rarely found at the port i.e., only eight people in the preliminary survey and 15 people in the final survey. Three indicators of beneficiaries' behaviour that were not widely implemented by beneficiaries (< 14 people) before the intervention were subscription behaviour with cleaners, behaviour of using single-use shopping plastic bags and waste sorting.
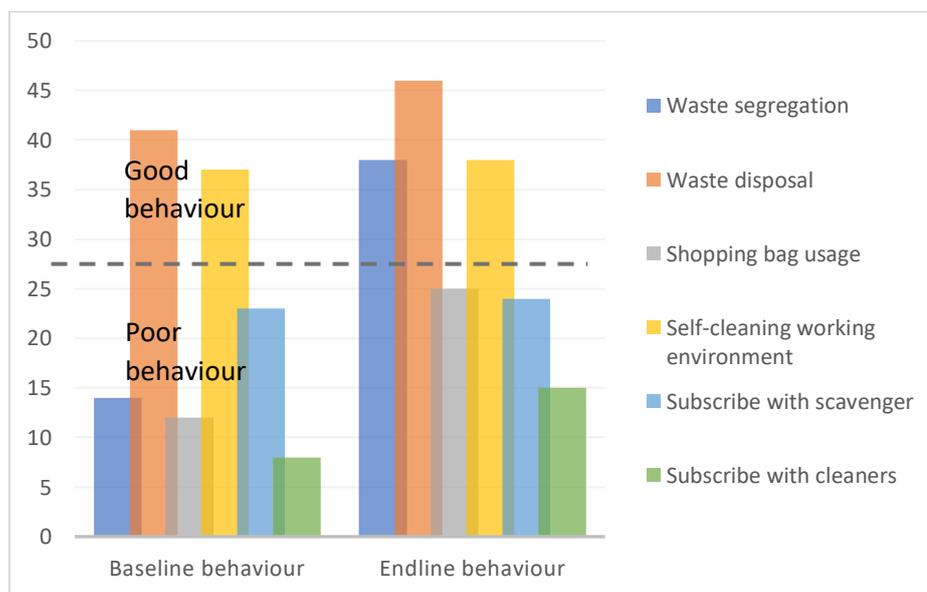
Graph 21. Baseline and Endline Survey Results of Behaviour Indicators

In contrast to the results of the baseline survey and endline knowledge and awareness, most of the beneficiary groups, namely 22 out of 52 people, are still disobedience in managing waste. However, significant changes in behaviour increased by 23.1%, the same as the percentage increase in awareness. Less than 10 people from the total beneficiaries did not have good behaviour in reducing and handling waste before the program intervention was given, this number decreased to 57.8% after the implementation of the program was carried out.
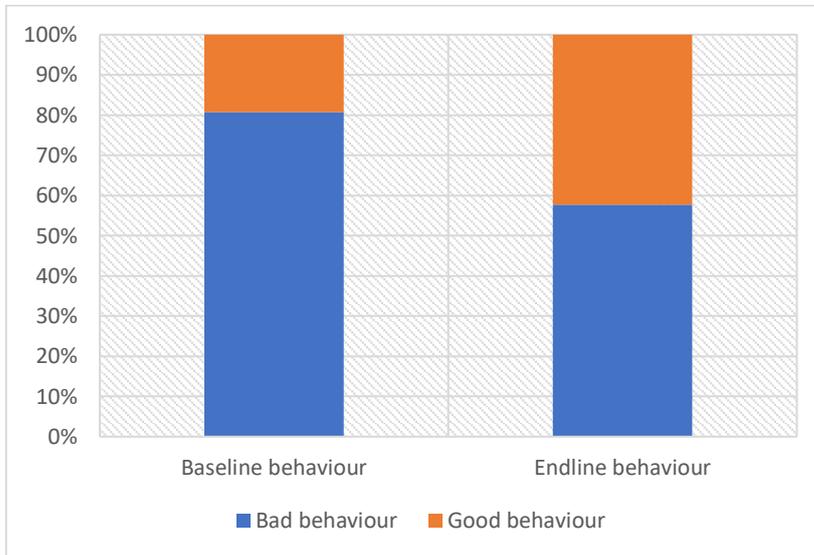
Graph 22. Baseline and Endline Survey Results on Program Behaviour

The social practices carried out by most elements of society at the port encourage others to implement the same behaviours mainly in terms of handling and reducing waste at the port. Mustikawati (2013) agrees that the social practices of a particular group can influence a person's behaviour. This also applies to changes in the behaviour of beneficiaries at the port after seeing other groups implement certain behaviours at one time or for a long time. This includes if many elements of the community at the port behave badly by disposing of waste in any place, related behaviours will also be imitated by the people at the port. Nugroho (2022) suggests that the resulting practices shape social systems in society. The resulting practice includes activities bound to a specific space and time that are re-held in a cross-space and time that iteratively involves structures within it.

Social Practice Theory (SPT) is a model that describes and provides an alternative means of understanding the complex dynamics between the elements that make up the practice of waste management, allowing it to be considered a social problem, rather than focusing solely on individual behaviour (Spotswood et al., 2015). The three main elements of this model are images (meanings, symbols), skills (forms of competence, procedures) and goods (materials,

technologies) that are dynamically integrated through orderly and dynamic performance (Hargreaves, 2011).

In order to gain the Clean Fishing Port programme, all community groups in the port as the main actors behind the waste problem are said by the beneficiaries to be obliged to actively contribute to the handling and reduction of waste. The principle of togetherness where all stakeholders including the community are involved in the implementation of waste management is the main foundation of waste management in Indonesia. Other principles that are also as important as the principle of togetherness are the principle of responsibility, the principle of sustainability, the principle of benefits, the principle of justice, the principle of justice, the principle of awareness, the principle of safety, the principle of security, and the principle of economic value (Law No. 18/2008).

3. Conclusions and Recommendations

III.1 Conclusions

The results of the baseline and endline surveys on the knowledge, awareness and behaviour of beneficiaries in terms of managing waste can be concluded as follows.

1) **Knowledge**. Only about 13.5% of the beneficiaries had good knowledge of waste and waste management at the beginning of the program. A percentage increase of 50% is seen at the end of the program. Assessment indicators on the "definition of sorting" and "early stages of waste handling" are known to the most beneficiaries both before and after the implementation of the program, namely 53.8% and 86.5% and 50% and 73.1%. The highest increase in knowledge was seen in the "understanding of 3R" indicator, which was 38.5%, while the lowest increase in knowledge was seen in the indicator "waste class based on its properties/characteristics" which was 19.2%. The indicators "waste grouping", "definition of 3R" and "type of waste by their nature" had the lowest percentages in both surveys.

2) **Awareness. Around** 40.4% of the beneficiaries had good awareness of the port waste management before the intervention. The increase in awareness was seen at the end of the program, and made 59.6% of the beneficiaries have good awareness. The awareness assessment indicators of "disposing of waste" and "disease from waste" were discovered by the most beneficiaries both before and after the implementation of the program, namely 82.7% and 91.5% and 67.3% and 82.7%. The highest increase in awareness was seen in the "'hygiene responsibility" indicator with a percentage of 23.1%, while the lowest increase in awareness was seen in the "shopping cart use" indicator, which was 11.5%. The indicators "shopping cart use" and "how to process plastic waste" had the lowest percentages in both surveys.

3) **Behaviour.** Less than 20% of beneficiaries had good behaviour about waste and waste management at the beginning of the program. The higher the percentage of beneficiaries by having environmentally sound behaviour at the end of the program was 42.3%. The assessment indicators of "disposing of waste in its place" and "cleaning the environment independently" are most carried out by beneficiaries, both before and after the implementation of the program with percentages of 78.8% and 88.5% and 71.1% and 73.1%, respectively. The highest increase in knowledge was seen in the behavioural indicators of "sorting waste" which was 46.1%, while the lowest increase in knowledge

was seen in the behavioural indicators of "cleaning the environment independently" and the behaviour of "subscribing with the group of scavengers/collectors" which was 1.9%. The indicators "subscribe with cleaning staffs" and "shopping cart usage" had the lowest percentages on both surveys.

III.2 Recommendations

1. Increasing public knowledge through seminars / workshops / webinars / sharing lessons from parties with the scope of work of waste processing with recycle and reuse such as the Waste Bank, Integrated TPS, 3R TPS, waste recycling business actors, or from local community organisations related to

2. Involvement of beneficiaries in waste sorting and processing training in various waste processing forums

3. Gradual and periodic socialisation related to the issue of waste on fishery catches, food chains, health and economic losses from unprocessed waste as well as socialisation related to proper waste handling and reduction at PPP Tegalsari.

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ATTACHMENT

Appendix 1 Baseline and Endline Survey Questionnaire

Questionnaire

Clean Fishing Port Program on PPP Tegalsari, Tegal, Central Java Province

Our team from DFW or Destructive Fishing Watch is conducting a survey on the knowledge and behaviour of waste generation generated in PPP Tegalsari and surrounding areas. The purpose of this study is to determine the level of knowledge and behaviour patterns of fishermen, fish traders and local communities towards the presence of waste from the sea and from land in the Tegalsari PPP.

This questionnaire will take 7-10 minutes. Please answer any questions. Then, put a check mark (√) in the answer column and choose according to the actual situation.

Again, thank you for your contribution and cooperation in this survey.

No.	Question		Answer
	Socio-demographic		
1	Age		_____ years
2	Gender		Male □ Women's □
3	Recent education		□ Not going to school □ S1 elementary school □ / equivalent □ S2 Junior High School □ / equivalent □ S3 High School □ / equivalent
4	Work		Fisherman's □ □ Fish merchant MSME □ Community □ □ UPT PPP Tegalsari
5	Length of work		_____ month/year
6	Domicile		Tegal □ □ Outside Tegal

	Knowledge		
1	How many types of waste are there based on the nature/type you know?		□ 1 type □ 2 types □ 3 types □ 4 types □ 5 types
2	Which one **is not** the **** "kind" of the following answer choice!		□ decomposed litter mixed litter □ □ recycled waste □ litter containing hazardous and toxic materials
3	What is sorting?		□ activities to temporarily collect waste in individual or communal containers □ the activity of picking up and moving waste from the source of waste to temporary shelters □ the activity of grouping and separating waste according to type □ activities change the characteristics, composition and or amount of litter
4	Who do you think was first in charge of sorting waste from sources?		□ society □ cleaning staff □ waste haulers □ local government
5	What is the first stage carried out in managing waste?		□ of the event □ of transporting waste to the TPS □ processing with the 3R system □ transport to landfill
6	What does 3R stand for?		□ refuse, remove and recycle □ reduce, reuse and recycle (waste reduction, reuse and recycling waste) □ remove, reduce and reuse □ refuse, remove and reuse

				SS	S	N	TS	STS
	SS = Strongly agree S = agree TS = disagree STS = strongly disagree							
	Awareness			SS	S	N	TS	STS

1.	The waste I produce can be of economic value					
2.	Waste must be disposed of in its place					
3.	Litter can carry disease if not handled properly					
4.	I know how to process inorganic waste (plastic)					
5.	When shopping it is better to use single-use plastic bags better than shopping carts/bags					
6.	Port cleanliness is only the responsibility of the port management authority					
	Behaviour	SS	S	N	TS	STS
1.	I'm used to separating my wet trash and dry trash					
2.	I always throw waste in the space provided					
3.	I choose to use plastic bags to shop at the market instead of carrying a shopping cart/bag					
4.	I prefer to clean my environment instead of relying on the cleaners to clean it					
5.	I subscribed with a plastic waste collector					
6.	I subscribe with the cleaners for the transportation of waste every day					

Appendix 2 Variable Correlation Analysis

Correlation Variables	Degree of significance	Rho coefficient	Strength
Baseline survey			
1. Knowledge of types of waste			
>< awareness of the economic value of waste	0,02	0,32	Weak
>< self-cleaning behaviour	0,02	0,33	Weak
2. Sorting knowledge			
>< awareness of taking out the waste	0,02	0,32	Weak
>< waste disposal behaviour	0,01	0,38	Weak
3. Waste reduction knowledge with the 3R			
>< awareness of taking out the waste	0,04	0,28	Weak
>< crackle replacement behaviour	0,01	0,35	Weak
>< self-cleaning behaviour	0,02	0,31	Weak
>< the behaviour of the collector subscription	0,00	-0,48	Keep
4. Awareness of the economic value of waste			
>< awareness of taking out the waste	0,01	0,31	Weak
>< awareness of waste carrying disease	0,07	0,32	Weak
5. Awareness of disposing of waste			
>< awareness of waste carrying disease	0,00	0,45	Keep
>< awareness of plastic waste processing	0,00	0,46	Keep
>< waste disposal behaviour	0,00	0,47	Keep
6. Awareness of litter carrying diseases			
>< awareness of port hygiene responsibilities	0,01	0,28	Weak
7. waste disposal behaviour			
>< awareness of waste carrying disease	0,01	0,38	Weak
>< awareness of processing plastic waste	0,03	0,29	Weak
>< awareness of port hygiene responsibilities	0,00	0,46	Keep
8. Self-contained environment cleaning behaviour			
>< awareness of taking out the waste	0,006	0,35	Weak
Endline survey			
1. Awareness of the economic value of waste			
>< awareness of waste carrying disease	0,02	0,43	Moderately
>< shopping crackle replacement behaviour	0,00	0,38	Weak
2. Awareness of disposing of waste			
>< awareness of waste carrying disease	0,01	0,36	Weak
>< the subscription behaviour of plastic collectors	0,04	0,29	Weak
3. Self-sustaining environment cleaning behaviour			
>< awareness of processing plastic waste	0,00	0,40	Moderately
>< waste sorting behaviour	0,04	0,28	Weak
>< waste disposal behaviour	0,01	0,37	Weak
4. Plastic collection subscription behaviour			
>< the behaviour of the cleaner subscription	0,00	0,40	Keep