Public perspective towards marine litter in West Aceh City

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Abstract. Marine litter or marine debris is a man-made solid material discarded, abandoned or lost in coastline or into the sea. To reduce the amount of marine litter in the ocean, raising public awareness is an important way. One of the contributing factors on marine litter is the lack of understanding within the community, but to identify how people notice the problem is required adequate research literature. The purpose of this study is to examine the awareness of West Aceh community on marine litter along western coastal area. The research objectives; 1) to evaluate societal perception towards marine litter; 2) to examine the urgent indicator of public awareness in West Aceh City. This study will employ a survey approach by distributing questionnaires to 383 respondents. It was found that respondents show low awareness on marine litter according to statistical data, but there are some rooms to manage in order to raise the level of public awareness. It concludes that sense of responsibility could be enhanced by involving public in any activities for preventing and eradicating marine litter. Education aspect is also important to increase public understanding about the threats of marine debris on environment, human health and economic income.

1. Introduction
The ocean is an extraordinary resource, covering nearly three-quarters of the Earth. The ocean supports fishing industries and coastal economies, provides recreational opportunities and serves as a nurturing home for a multitude of marine plants and wildlife [1]. However, the ocean is currently under a considerable threat. The seeming vastness of the ocean has prompted people to overestimate its ability to safely absorb our wastes safely.

Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items that have been made or used by people and deliberately discarded or unintentionally lost into the sea or coastline including such materials transported into the marine environment from land by rivers, drainage or sewage systems or wind. For example marine litter consists of plastics, wood, metals, glass, rubber, clothing, paper etc. This definition does not include semi-solid remains for example mineral and vegetable oils, paraffin and chemicals that sometime contaminate sea and shores [2]. In general, marine debris is any object on the surface of the sea, the sea and the coast as an impact of human activities [3]. Marine debris has become an international problem considering that debris can flow and enter any country without being impeded by national borders or political ideology and has been widely discussed in various literatures [4, 5].

Currently, the highest waste contributor is the Asian country which has long coastline and wide waters area. Indonesia became the second highest polluting country after China. Indonesia produced 3.2 million tons of plastic waste in 2010, with around 1.29 million tons of that ending up in the ocean.
The problem of marine debris is inseparable from the lack of community role in maintaining hygiene, especially the culture of our people who have not been aware to not litter and low communication between stakeholders to manage waste also become problems related to the issue of marine debris [4]. Inadequate management, infrastructure and lack of community knowledge about the impact of debris on the environment are also the problems in marine debris management [6].

Community behavior about marine debris is strongly influenced by knowledge, environmental insight, attitude to the issue and motivation to find a solution to the problem [5]. Therefore, increasing community awareness is important effort to reduce marine waste through behavioral change of people. This is the only powerful way to reduce the amount of marine debris on the coast [8]. Increasing community awareness can be an opening step in combating marine debris to then integrate with approaches to achieve a clean sea.

The issue of marine hygiene has not been a major political agenda and has not been the concern of the majority of the people. Researchers [9] said that politicians and the public have not paid attention to the level of waste plastic problems at sea. As a result, infrastructure, management and policies concerning the problem of marine waste are still very limited.

Panglima Laot of West Aceh attempted to encourage the social community in order to make various efforts to overcome the marine debris issue in Aceh. According to Panglima Laot, waste disposed into the sea will be a poison that can kill marine biota, so awakening public awareness is necessary for marine environment [10]. Therefore, researchers believe this research with title public perspective towards marine litter in West Aceh City is essential to conduct. This research aims to evaluate social perception towards marine litter and to examine the urgent indicator of public awareness in West Aceh City.

2. Materials and Methods

2.1. Study areas and research design
The study is conducted in West Aceh regency, one of regency in Aceh Province Indonesia. Figure 1 showed map of Aceh Province. Researcher uses quantitative descriptive approach in this research to explain the research problem that focused on research objectives. This design is expected to provide an overview of public perceptions on marine debris.
2.2. Data collection

The data is collected by questionnaires survey (self-administrative or face-to-face) from January 2017 to June 2017. The population is all residents of West Aceh Regency around 190,244 people [11]. The sample was taken by using random sampling approach. To determine the sample size, researchers use [12], with 95% confidence level and confidence interval five. A total of 383 samples were selected in this study. Researcher met the respondents randomly by visiting beaches, cafes, government offices, schools and universities. This approach is used in order to get the adequate respondents without the demographic background.

2.3. Questionnaire design and data analysis

The questionnaire was designed in three stages. First, preliminary questionnaire was drafted based on previous researches. Second, the preliminary questionnaire was pre-tested with 40 respondents. Pre-test of questionnaire were conducted by face to face and got 95% responses. After the revision by pre-test of respondents, the final questionnaire is confirmed and comprised 12 parts adapted from previous study [4]. The surveys of questionnaires were conducted in person contained close-ended questions. The questionnaire section contains three groups of questions as follow:

- Personal experience of visiting the coast.
- Personal opinion on debris amount due to people behavior.
- And others marine important issues.

The responses will be analyzed through statistical approach by providing the basic information of the descriptive data. Therefore, researcher will employ SPSS 24 to run descriptive statistical data in order to acquire adequate evidence of public awareness.
3. Results and Discussions

3.1. Public awareness and concern on marine debris

Respondents’ replies show that most of sample data approximately 60.3 % have frequent visits to coastal area in a week and around 65.6 % respondents regularly noticed litter in most of their visit and every visit (figure 2). Moreover, according to research data, littering on the beach is triggered by visitor’s bad behavior dispose debris directly as 92.5 % responses indicate that beaches are contaminated with a lot of debris (figure 3).

![Frequency of visiting coast](image1)

![Notice litter](image2)

**Figure 2.** Personal experiences of visiting the coast.

Similarly, the ocean is polluted by debris because of human activities on the beach which abandon trash [13]. People’s incompetency in managing debris becomes the core of marine debris problem.

![Percentage of litter](image3)

**Figure 3.** People behaviour in direct litter on the beach.

Regarding with people’s knowledge on the amount of debris across the world referring to its type, most of respondent do not aware how many debris is according to their category. Metal has a small number of debris around 2.89 % according to previous study [14], but the majority respondents answered that metal contributed 20–40 percent of debris in the sea. Relatedly, the result shows that most respondents believe that there are more than 10 percent cloths or textile materials contaminate the ocean while the previous study shows that there are only less than five percent of cloths contaminating marine environment [14].

However, regarding the amount of plastic debris, respondents perceive that plastic is the most abundant material and ubiquitous waste materials. The sample data indicate more than 70 percent
respondents feel plastic has a huge contribution in marine litter with more than 60 percent. This statistical data is supported by many studies which show that plastic give 60–80 percent in whole marine debris quantity [15] and it was the major component of debris [14, 16].

Based on figure 4, there are 59.2 percent of respondents who consider that marine litter is not a problem in Indonesia nowadays. Meanwhile other respondents disagree about marine litter is not a problem in Indonesia with 10.4 percent strongly disagree and 19.2 percent disagree. This finding is contradicted with some reports. Latest study reports that Indonesia is the second top countries which mismanage plastic waste approximately 3.22 MMT (Million Metric Ton) each year [17]. This situation should be a massive problem for Indonesia people, but the lack of information make society do not aware what the world facing with now. Marine debris has become a pervasive pollution problem affecting all of the world’s oceans [18]. Marine litter which caused by mismanaged waste material of beachgoers has become a serious environmental problem due to its ability to move following the current sea with no border [19].

The marine debris problem is perceived by respondents as shown on figure 4 with 82.1 percent respondents feel concerned in impacts of marine litter and 14.1 percent respondents are strongly agree. The result signs that respondents aware about the problem of marine debris and worry about the situation which caused by the issue. On the other hand, respondents assume that marine litter is not the problem today, yet it will be a serious problem in the future. There is 80.3 % respondent expect the issue will be the future problem. In contrast, a report said that some evidence proof that marine debris is one of the world’s most persistent pollution problems affecting the oceans [13].

3.2. The urgent Indicator of public awareness in West Aceh City
It is clearly shown that marine litter problem in West Aceh City is related to human behavior in littering. Behavior problem is the foundation of marine debris issue and to manage this problem needs strong will and effort from every stakeholder particularly government to educate people. To reduce the amount of marine debris, changing the attitude is an important factor [5].

4. Conclusion
People of Aceh aware of the marine litter situation and they believe that bad behavior is the problem to solve for eradicating the amount of debris. Furthermore, plastic is still the major debris in the ocean as the research finding indicates that abundant plastic waste was easy to find on the beach.
However, most of respondent do not perceive the amount of debris according to its category. People think the other debris such as clothes and metal contribute only a small amount. People also believe that Indonesia still in safe situation regarding marine debris. It indicates that most of respondent has no any information about how people of Indonesia dangerously contaminate the ocean. Unfortunately, the threat of marine litter is a future problem according to respondents, yet they concern to the threat of marine debris towards the ecosystem.

Finally, the full understanding of marine debris and human behavior is a requirement for a successful management in order to eradicate marine debris from our ocean. Changing bad behavior through education especially for young people is a vital step for raising the high awareness on marine litter.

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