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R Smeets[1], L Winkelmann[1], R Knoester[2], T. H. Heikoop[1], and C B C Castro[23]*

[1] University of Rotterdam the Netherlands
[2]CLEAR RIVERS Rotterdam, the Netherlands
[3]Avans University of Applied Sciences Breda the Netherlands

*E-mail: claudia@clearrivers.eu

Abstract. Ambon has problems with plastic pollution, both in the rivers and the bay. Due to faults in the waste system, 60 tons of waste is not collected in Kota Ambon. This waste ends up in illegal landfills, the waste is burned or thrown in the water. The plastic pollution in the bay contributes to the global problem of plastic soup. Research was conducted based on question; which recommendations can be given to collect the floating plastics in the rivers around Ambon Market by using the litter traps. To answer the main question, sub-questions are drafted covering the sources of pollution, possible locations, and the possibilities for a trap. The research is conducted using different methods that is interview to local experts, observation, literature research and talks to residents. Most of the plastic found are single-use plastics, like water and food packaging materials. The most feasible location for a litter trap is the end of Batu Merah River due to the abundance of plastic, the depth, and the nearby presence of Speed *Sampah*. The concept litter trap showed that this device could be effective at Batu Merah River. Further research is needed to create a more definitive solution for plastic pollution. Several aspects must be taken into account, such as the circumstances like the rainy season, sedimentation, current, and tide can impact the working of the litter trap and should be considered during the designing process.

1. Introduction

Ambon is an island located in the east of Indonesia and is part of the province of Maluku Indonesia. The city of Ambon is located on the western part of the island. During the past years, the city became more popular, due to the availability of work. Thus, the island has grown from 233.000 inhabitants in 2005, according to citypopulation.de, to 355.500 inhabitants in 2017 [1]. Not only the population expanded, also the amount of waste has grown in the same pace. The new pressure on the city is noticeable on different levels, such as the waste system. Nowadays, the common strategy of disposing the waste is by storing the waste on the landfill. Only these strategies cannot cope with the amount of waste that is currently produced. Waste, that is not collected, is dumped in illegal places, burnt on private property or ends up in the rivers. During rainfall the waste in the rivers is flushed into the bay of Ambon. The composition of the waste is a 70-30 ratio, around 70% consists of organic waste and 30% is non-organic waste, containing plastics and other materials.

A foundation in Rotterdam Netherland, CLEAR RIVERS has a solution to the problem of waste in the rivers. In the harbour of Rotterdam, they has placed three litter traps to catch floating waste. With the traps, plastic waste is caught before it can enter the sea. Using the current of the river, the plastics are caught. The plastics from the river are used to create a floating park. The park is made for recreation and creating extra value for ecology. The litter traps are designed with the help of Hebo Maritime Services and Europe 90 Bv., which is also the producer of the litter traps.

In this internship, the possibilities to place a litter trap in Ambon is researched. To create a clear research the following main question is drafted: Which recommendations can be given to collect the floating plastics in the rivers around Ambon Market by using the litter traps of Recycled Park?
The following questions support the main question: 1) What are the sources of the pollution around Ambon Market? 2) Which locations are feasible for the litter traps, as designed by CLEAR RIVERS? 3) What are the possibilities of producing a litter trap in Ambon, regarding design and stakeholders?
By answering these sub-questions, the knowledge gap is filled. In this research, the knowledge gap is the amount of waste that is polluting the bay and a possible solution. It is unclear what the measures are which already taken by governmental and private parties.

The research was done in both Rotterdam at the office of CLEAR RIVERS and Ambon City at the office of LIPI Deep Sea Research Centre. The internship students worked together with local experts and students for knowledge transfer and translation and the report is written for the foundation and the local authorities in Ambon.

2. Materials and Method

There were three sub-questions formulated to answer the main question. For each sub-question, different research methods were used.

2.1 Sub-question 1. ‘’What are the sources of the pollution around Ambon Market?’’

Before starting taking measurements to collect waste from the waterways, the source of the pollution had to be clear. Different activities were set up to gain this knowledge.

The first question is a descriptive question, literature research on plastic pollution in Ambon Bay was needed. With this data, a clear conclusion can be formulated what the sources of pollution. The sources of information were the local authority, environmental department, and LIPI Deep Sea Research Centre. The local waste and water management department of the city council of Ambon, provided the local waste law. The kind of literature were maps from LIPI Deep Sea Research Centre and reports of earlier conducted studies found on ScienceDirect.

During the literature research, the possible polluters/sources became clear. Observation research contributed to conclude what the sources of pollution were around Ambon Market. Outdated information was checked during observations around Ambon Market. The observation was done in daily life situation besides that the time to observe was around 3-4 hours. The founded sources/observations were noted and the useful observations are supported by pictures.

2.2 Sub-question 2. ‘’Which locations are feasible for the litter traps?

A document with possible locations of the litter traps in Ambon was made. These locations are analyzed. Analysing literature about the possible locations was needed to create an objective description of the situation around Ambon market. In the literature information about what kind of forces are from influence on objects in a river or in the sea was found. On the maps, the locations of pollution were presented and with that information, feasible locations were found. The literature consists of primary, secondary and grey sources. Reports and maps are used to generate the information, most of the literature were generated from LIPI Deep Sea Research Centre.

The sources of pollution were interesting for the location of a litter trap. At least three feasible locations had to be found before the observation research could started. These locations had to be reviewed during the observations on eight different criteria; stream, ship traffic, deepness, waste flow, anchoring, permission, flora and fauna and the possibilities to empty the litter trap based on a research in Rotterdam. Stream or current, by using the current of the water, the plastics can be retrieved without using energy. The litter trap cannot interfere with the ship trafficking. Depth is to find the plastic litter present in the first metre of the water surface [2]. The abundance of plastics in the water means plastics should be available to catch and retrieve. If the litter is in a different location, the trap is useless. The way of emptying the trap is the trap needs to be easy accessible to be emptied. Possibly with the help of a boat, this means that there needs to be space to reach the trap. Anchoring is the trap needs to be anchored to a solid point in the water, for example a wall or point under water. Next criteria is permit, in the Netherlands litter trap can only be able to place with a permit. The last criteria is the ecology of the area, when implementing the litter trap, the ecology cannot be harmed. These criteria are set to choose the correct location and make sure the litter trap is on an effective location. The observation took place in daily life situation besides that the time to observe was around 3 hours.

Another source of information were the local experts and inhabitants. Several interviews were conducted during the research. During the observations there were open interviews, small groups of people were asked to their opinion/experience. Also, there were interviews with experts to get general information. These interviews were half-structured and structured, it depended on the purpose of the interview. Two staffs from the environmental department and 15 local inhabitants were interviewed.

Extra field work has been done on the most feasible locations Batu Merah (nearby Mardika). Sedimentation has influence on the depth nearby the outlet of the river. Depth and current were

generated during the measurements. The measurements were done in cooperation with LIPI Deep Sea Research Centre. The information was worked out into a map.

2.3 Sub-question 3. ''What are the possibilities of producing a litter trap in Ambon?''
During the research, the students found which laws count and which company are interesting contacts for CLEAR RIVERS. There are two options which had to be considered; producing on location or producing in the Netherlands and shipping to Ambon.

The literature used to answer this sub-question were technical documents and reports about the litter trap in The Netherlands. This information was generated in The Netherlands with the partners of CLEAR RIVERS (Hebo Maritime Services and Europe 90 Bv.). These companies designed and produced the litter trap which is located in the Maas in Rotterdam. The source of information about law and regulations was the waste law of Kota Ambon. The sources were secondary and grey sources.

The local circumstances are different than the situation in Rotterdam. During the Design Research, the students focused on the opportunities to produce a litter trap in Ambon, the design was in base the same as the trap in Rotterdam. The concept design was a primitive trap with materials that were available in Ambon at the time of the research.

During the research, the literature/sources that are written in the Indonesian language were translated into English. The students of Pattimura University helped during the observations by interpreting. The sources had to be of a high quality (for example: reports and actual). To prove the finding pictures of the observations were made.

3. Result and Discussion

To understand the problem of Ambon Island, an analysis of the waste system was needed. When the waste system fails, it is common that waste ends up in rivers or in illegal places, with many consequences for the environment and human health.

3.1 Waste management system
The island is divided in two regions, Kota Ambon and Maluku Tengah. Kota Ambon is responsible for the city and the villages around the city, while Maluku Tengah has jurisdiction on the more remote areas, such as Waai and Hatu which are in Ambon Island. Maluku Tengah is also responsible for different regions in the Maluku area, such as the island of Seram.

The Toisapu landfill and the recycling installations are located next to each other. The result of interview was the waste management system applied in Kota Ambon. The waste produced at home is collected by inhabitants in central containers. These containers are made from concrete and placed alongside the streets. Trucks from Kota Ambon empty the containers daily. The waste is brought to the landfill in Toisapu. On the landfill, several scavengers are working. The scavengers collect plastics, which have value, and sell these plastics to the recycling installation of Kota Ambon. They also collect glass and organic material. The organic material is mostly used to feed their animals. The scavengers can make a living of this work and work five days a week. The plastics, which are sold to Kota Ambon are processed in the Integrated Solid Waste Installation. In this installation the plastics are separated, shredded and cleaned. The shredded plastics are shipped to Surabaya, where the plastics are sold to a recycling company called *Rumah plastik*. Every month around 10 tons of plastics are recycled using this method. While every day 160 ton of waste is brought to the landfill.

In this research, the focus is on Ambon Market that was about the collection system on the market. There are two locations where locals can bring their waste but only one container available [3]. Every night, the waste on the locations is collected and brought to the landfill. The waste is collected at night, due to the crowded market during the day. Also, at night there are people who sweep the market after the activities, and the waste truck will collect the waste. Nowadays, there is no specific rule for the market, only general rules for the inhabitants and seller. Figure 1 shows the waste management system.

Figure 1 Waste management system in Ambon

3.2. Sources and kind of pollution

In this subsection the sources of pollution will be described, the rivers behind the pollution and the kind of pollution are mentioned.

3.2.1 Sources of pollution

The first source and most important source of the pollution are the citizens of Ambon. The number of inhabitants in Ambon has increased rapidly. In the period 2000 – 2005 the population growth with +5,53% a year and in the period 2005 – 2010 with +10,16% a year [4]. This population growth has impact on the environment, more people want to make a future in Ambon city and more people need to eat. The local economy is increasing by the increasing consuming demand, so as the amount of plastic packaging materials. The popular market of Ambon faces the consequences of the population growth, many people want to make a living by the market activities. It is one of the most densely populated areas in Ambon city. In combination with a lacking waste system, this is also one of the most polluted areas. Sellers from the market dispose their waste into the collecting places or nearby located rivers or directly in the bay. There is no strictly enforcement of the government to warn the people who are polluting the rivers or the bay.

In the area of the market there are 2 rivers that end up in the bay of Ambon, Batu Merah and Mardika River. These rivers start as small streams in the upper stream mountains of Semenanjung Leitimur. The villages who mostly are located nearby these rivers in the mountains do not have a waste system. They have two options to dispose their waste, the first option is burning the waste and the second option is disposing the waste in the rivers or nearby areas. For example, in the area of Benteng Atas it is not possible for a waste truck to pick up the waste because of the small streets and the hillside. In these areas landfills in the city occurs (places where people dispose their waste), most of the time these areas are riverbeds where during rainfall streams occur which wash the waste into the bay. The third form of pollution in Ambon bay is by disposing waste from ships who enter the bay.

Table 1 Waste categories found in Mardika Market

Plastics	**Wood**	**Paper**	**Clothes**
Shopping bags	Pallets	Carton	Shoes
Small plastic bags	Other wood <50 cm	Cigarette buts	Slippers
Drink bottles	Other wood >50 cm	Napkin	T-shirts
Cleaner bottles/containers			
Fast food containers			
Caps			
Cups			
Sweet packets			

3.2.2 Kind of pollution

In the area of the market there are different kinds of pollution. The most common pollution are plastics, organic materials (wood and footrests), paper and clothes. These categories be defined more specifically in Tabel 1. Most of the pollution consists of plastic waste. Because of the lack of a drinking water systems, most people drink water from cups or bottles. People have to walk a long way to throw their waste away so the easiest way is disposing on the street.

3.3 Possible interventions

Different interventions to the problem of pollution were given by the local authority and environmental department. One of them is the new law. In 2015, a law was drafted to create more awareness, the other one is activities to improve the waste system. The following objectives were discussed:

1) Infrastructure (waste collecting system)
2) Specific law enforcement (making laws and policy to attack the problem)
3) Funding for handling waste (to implement the other points)
4) Public awareness around the waste (education and socialisation)
5) Supported role for the government and an active role for private companies
6) Plastic manufactory by rules of the amount of plastic material (packaging) (law enforcement)

To improve the system the main objective is the socialization of waste issue to the seller in the market. When the seller are more socialized and are more aware of their surroundings, they probably take better care of their waste. Another objective is law enforcement, with a law enforcement the government can achieve more and is stronger to take action. And a physical solution is placing more litter containers on the market. With more containers, the problem is more visible and it will be easier to dispose the waste in a container.

The most effective objective is creating more awareness. As seen in the interviews, people are not aware of the impact of the pollution in their environment. By creating more awareness, people will take more action in dealing with their waste. Second, the recycling installation in Toisapu is already doing work, but the capacity needs to be enlarged. The amount of recycled plastics could be more in the future. And finally, the need for more trash containers is clear, the government should invest in this infrastructure. This way, the possibilities to dispose the waste are frequent and it is easier for the local people to dispose their waste.

3.4 Litter Traps

With the list of criteria, different locations are discussed and the best location will be pointed out. This information will answer the sub question: Which locations are feasible for the litter traps?

3.4.1 Criteria litter trap

To choose the most effective location for the concept of litter trap, a research to the surroundings of the Market was done. The researched locations were Batu Merah River, Mardika River, Mangrove near Poka, and Under the bridge (JMP).The results as per locations can be seen in Table 2.

Tabel 2. Different criteria observed at four research locations for the litter traps

No.	Criteria	Research locations			
		Batu Merah	Mardika River	Mangrove near Poka	Under JMP Bridge
1	Current	Plastics are already present in the bay, float from right lo left along the market. This current can be used to also catch plastics that already in the bay. The flow from the river is	Plastics are already present in the bay, float from right lo left along the market. This current can be used to also catch plastics that are in already in the bay.	The current shows the plastics that float into the bay are not able to leave the inner bay. The current is flowing towards the coast of Poka and naturally collects the plastics	There is a one-way direction under the bridge. A point of attention is the velocity. The velocity of the water is higher under the bridge

		depended on the amount of rain. During heavy rainfall the amount of water running to the bay is high and the amount of plastic is significant, concluded from observation research.	The flow from the river is depended on the amount of rain. During heavy rainfall the amount of water running to the bay is high and the amount of plastic is significant.		in comparison with other locations [5]
2	Ship traffic	On this location there are no ships, as seen in observation	At the end of the river, on the north side, the pier for small boats is located. These boats transport people across the bay, which is a popular way of transport across the bay. The trap cannot interfere with these boats	On the coast of Poka there is ship traffic. In front of the mangroves there are no ships.	There is ship traffic under the bridge, they cannot interfere with the litter trap
3	Depth	The most plastics are present in the first meter of the water surface [2] or mostly seen in the first layer of water.	The most plastics are present in the first meter of the water surface [2] or mostly seen in the first layer of water	The most plastics are present in the first meter of the water surface [5] or first layer of water	The most plastics are present in the first meter of the water surface [2] or the first layer of water.
4	Abundance of plastic	The abundance of plastics is present	The abundance of plastics is present	The abundance of plastics is present	The abundance of plastics is present
5	The way of emptying the trap	Kota Ambon (the local government) has four speedboats, which clean floating waste in the bay every day. The boats are already used and could be scheduled to empty the litter trap on a regular base. Also, the harbour of speed sampah is close to this location	Kota Ambon (the local government) has four speedboats, which clean floating waste in the bay every day. The boats are already used and could be scheduled to empty the litter trap on a regular base	Kota Ambon (the local government) has four speedboats, which clean floating waste in the bay every day. The boats are already used and could be scheduled to empty the litter trap on a regular base	Kota Ambon (the local government) has four speedboats, which clean floating waste in the bay every day. The boats are already used and could be scheduled to empty the litter trap on a regular base
6	Anchoring	There is a possibility to anchor the concept litter trap by using cement blocks that are sunken. The trap can be anchored to these blocks and is anchored. This solution is usable on any location.	There is a possibility to anchor the concept litter trap by using cement blocks that are sunken. The trap can be anchored to these blocks and is anchored. This solution is usable on any location	There is a possibility to anchor the concept litter trap by using cement blocks that are sunken. The trap can be anchored to these blocks and is anchored. This solution is usable on any location	Looking for possibilities to anchor with cement blocks, but also look for possibilities to anchor on the bridge. This solution is usable on any location
7	Permit	No permit is required, because of	No permit is required, because	No permit is required, because	No permit is required, because

		the cooperation with Kota Ambon	of the cooperation with Kota Ambon	of the cooperation with Kota Ambon	of the cooperation with Kota Ambon
8	Ecology	The ecology cannot be harmed, because the litter trap is open at the bottom. Marine life can leave the trap unharmed.	The ecology cannot be harmed, because the litter trap is open at the bottom. Marine life can leave the trap unharmed	The ecology in the mangroves needs to be addressed in the design for a trap near the mangroves	The ecology cannot be harmed, because the litter trap is open at the bottom. Marine life can leave the trap unharmed

From the start of the research, the location of Batu Merah River have got more attention. This location was already mentioned in a previous proposal from CLEAR RIVERS, and the river flows directly along the market. This location got more attention in the form of more observation research and extra research. The extra research that is carried out is measuring the depth of the river. This is only done for this location. In a future research, every potential location should have the same amount of research to set up a full comparison.

The other locations mentioned were feasible for a litter trap, but possibly need different solutions, like the Plastic Visser, to reduce the amount of plastic. This could be done for the Mangrove near Poka. The other locations could be further researched in the future. A following research to this subject should be about a further analysis of the potential locations, a dismountable litter trap and the possibilities to create a more definitive litter trap on Ambon. Also, if possible research should be done during rainy season to analyze the conditions in this season and the possible effect on the trap.

3.4.2 Wind and current

Wind, current and tide are three of the most important criteria. The wind, current and tide have influence on the floating plastics in the water, these aspects cause the direction of the floating plastics. The current can be used in a positive way by directing the floating plastics into the trap. The wind influences the plastics that float on the top layer of the water. The current and wind which can have influence on the floating plastics are demonstrated in Figure 2, this is the current on the surface.

Wind, current and tide can also have a negative influence on the working of the trap. If the wind comes from behind the trap the floating plastics can leave the trap. The same situation occurs during high tide because water from the bay streams into the Rivers and the water level rises. The wind directions per month and the average over a year are presented. The wind comes for most of the time from the NWW. Also, the directions SSW and SSE occurs often [6].

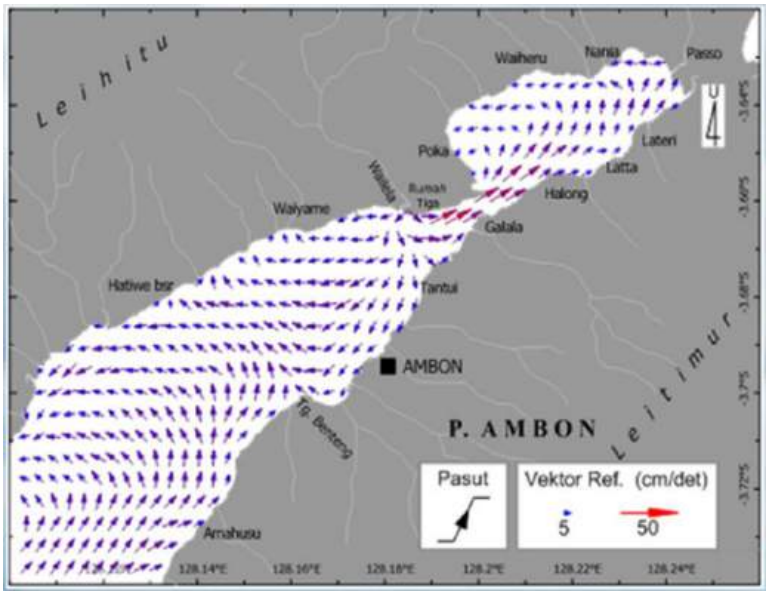

Figure 2 Surface current Ambon Bay *[5]*

The influence of the wind had to be combined with the average current on the surface were most of the plastics float. In Figure 3 is shown were in the inner and outer bay of Ambon plastics are found and the abundance of plastics. The map shows that the highest amount of plastics were found nearby Mardika, this is the market area where many people live. Also under the JMP bridge nearby Rumah Tiga and in Hative Besar and Gudang Arang are high amounts of plastics. The wind directions and surface streams show that these plastics mostly come from Ambon city (Mardika) and by current are transported in the bay to these areas.

Figure 3 Floating litter in Ambon bay *[7]*

3.4.3 Possible locations

Ambon island is split up in two parts, which are separated by an inner and outer bay. The inner bay is located on the northern part and is connected to the outer bay by on opening under the bridge. The current of the water in both the inner and outer bay (Figure 2) are important to understand in order to find locations of trap positions. The outer bay is connected to the sea and is located on the southern side (Figure 3). With this map and other literature, the researched locations are chosen.

Batu Merah

The market of Ambon is a vibrant place, with many activities on selling daily products as vegetables and fish. These activities lead to a significant amount of waste every day. The collection system lacks on different points and the level of awareness is too low. In a research it mentioned that the market is one of the biggest sources of pollution [7].

Batu Merah River originate in the mountains of Ambon Island. When the river reaches the market, it is already polluted due to the lack of a waste collection system in the mountain villages. During observations after heavy rainfall, it could be seen that many plastics from the river float into the outer bay.

The possible location for the concept litter trap could be at the end of Batu Merah River due to possible large objects that could damage the trap during rainy season. According to experiences from inhabitants, objects such as tree trunks are flushed with the river that is why the position of the trap should be at the end of the river to protect it.

Extra research is done at the end of this river. Together with a researcher from LIPI, a map of the depth of the bottom is made (Figure 4). With this map, the feasibility for this location is empowered. The depth zones are deep enough to place a litter trap, because a litter trap should not be higher than 1.5 metre.

Mardika River

This river has the same story as Batu Merah River. The river is on the south side of the market and flushes into Ambon Bay. This river also originates in the mountains and carries waste from the villages without waste system. This location is also located on Mardika. Mardika is named as a location where anthropogenic activity has influence on the volume of waste [7].

Figure 4. Bottom depth at the end of Batu Merah River *[8]*

Mangrove near Poka

From the outer bay, there is a current to the inner bay as seen in Figure 2. This current is only flowing into the inner bay. It is most likely that plastic that flow into this inner bay, will accumulate and are not able to leave. During a visit to the Poka area, many plastics were floating in front or in in the mangrove. The plastic become trapped in the forests and are not able to leave again. There is no river to place the litter trap at, but the abundance of plastic is present.

Under Jembatan Merah Putih (Bridge)

The bridge that connects the two sides of the island together is placed on the smallest part of the bay. On this location, plastics from the outer bay can be flushed into the inner bay. Due to the smaller area, this location could be a potential place for a litter trap. Another point of attention with this location is the sedimentation. As seen during visits or walks across the bridge, sedimentation is forming a new piece of land under the bridge. Also, it could be seen that after heavy rainfall, a significant part of the bay is discoloured into brown due to the sedimentation load. This a factor that has to be taken into account for this location.

3.5 Possibilities for a Litter Trap

In this part the last sub-question is described ‘What are the possibilities of producing a litter trap in Ambon, regarding design and stakeholders?’ The important aspects for a design, the stakeholders and the law regulation on waste are discussed. These three factors will contribute to a functioning catching system in the future.

3.6. Important conditions for a design

During the process of designing a concept litter trap for Batu Merah, different variables came up. These variables can have an effect on a more definitive litter trap and should be considered during the design process, they were rainy season, sedimentation, current and tide, wind and dismountable (Figure 5).

According to experiences from local residents, during rainy season the amount of water that flushes through the rivers is high. Also, the number of large objects increase. If a litter trap is placed in a river of just outside the river, these large objects could damage the trap.

- Sedimentation: as seen during visits of the locations, sedimentation is creating new pieces of land. It was noticed under JMP and at the end of Kelurahan Rijali River. In the future this sedimentation could be a problem for a litter trap (can have influence on depth).
- Current and tide: the tide and current in the bay have influence on the motion of the plastics. This same situation also occurs in Rotterdam. When tide and current occurs, plastics can be pushed out of the trap again. Possible inventions may need to be applied in a litter trap.
- Wind: during a monitoring in Rotterdam, it appeared that wind is a variable that can cause plastics in the trap to flow out of the trap. The wind conditions can interfere with a litter trap and should be taken into account.
- Dismountable: in the research in Rotterdam it has showed that the litter trap in Rotterdam can be designed to be dismountable. The materials as used in Rotterdam are not available on Ambon and producing a (long term) litter trap with local materials is not possible.

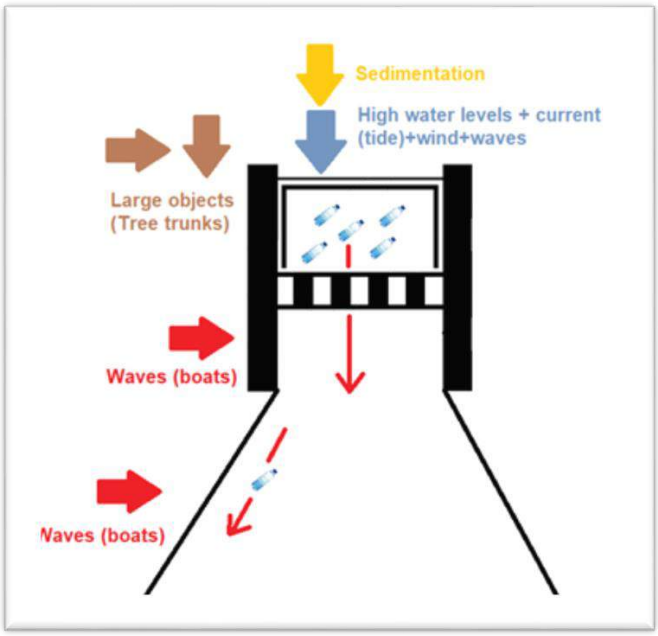

Figure 5 Impacts on the litter trap

Possible interventions to stop the plastics from leaving the trap by current, wind and tide are showed in Figure 6. This figure is based on the trap in Rotterdam where these elements also have influence on the working of the trap. The problem of sedimentation is that the depth for the trap cannot be guaranteed. This can be tackled by placing the trap in deeper water (at the end of the river) and monitoring of the depth around the trap.

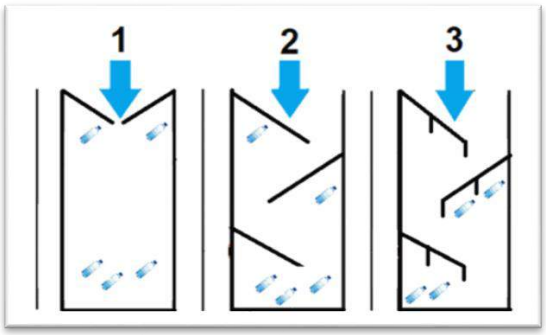

Figure 6. Possible intervention in design

3.7 Other condition of this research

In this research different elements are of importance for the quality. The first element is the language barrier. When conducting the interviews, there needed to be an interpreter to translate the questions and answers from Bahasa Indonesia to English. It is possible that the interpreter can translate a bit different and as a result the questions and answers have a different meaning. At the beginning of this research it is said that the role of an interpreter is needed, but the role of interpreter can also create flaws in the research.

Not only the language barrier can cause different interpretations, also the person being interviewed can make an interpretation of the reality. Of course, this could partly be prevented by adjusting the questions, but the answers of a person being interviewed are always his or her personal opinion. Also, during the interviews executed on the market in Ambon, sometimes it was noticed that socially desired answers were given. Almost every person who was interviewed told that he or she never threw waste on the ground. Seeing the circumstances, it is most likely that there were socially desired answers given. The last point according to the interviews during the research is the amount of people who were questioned. In total there are around 20 people interviewed, it can be questioned that the answers of these people stand for the opinion of the rest of the people on the market.

In the research methods, every sub question should be supported by literature research. During the research, it appeared that most of the found literature was from the period around 1995. This literature is outdated and therefore not used in this research. Therefore, only a limited amount of literature was available and information was collected by doing fieldwork such as observations and interviews.

4. Conclusion

The main question in this research is 'Which recommendations can be given to collect the floating plastics in the rivers around Ambon Market by using the litter traps of Recycled Park?' This was quantitative research to the possibilities of placing a Litter Trap by CLEAR RIVERS in Ambon.

Concluding after research there are several factors which have influence on the sources of pollution. First of all, the population growth on the Island, in the period 2000 – 2005 the population growth with +5,53% a year and in the period 2005 – 2010 with +10,16% a year [4]. The market is overcrowded because of economic activities. Second the waste system, there are two separated areas where different waste systems are used, Kota Ambon and Maluku Tengah. Most of the pollution that occurs consist of daily used products, like water and food packaging materials. These materials be classified in single used plastics, also there is deposing of organic waste, wood and clothes.

The best location for the concept litter trap is at the end of Batu Merah River. This is the best location due to different factors. The factors are in Batu Merah showed abundance of plastics, also in the research of LIPI [9] the Mardika area is set as an area that has a higher number of plastics. This is because of the potential of the river and extra research is carried out. In that research the depth of the bottom is measured to have a better insight in the area. The map also showed that the location is feasible for the concept litter trap.

The harbor of *sampah* speed is close and is able to empty the trap. There are good opportunities to realize a litter trap in Ambon. But there are several aspects which must be taken into account. First, the

circumstances which can have impact on the working of the litter trap. Circumstances like the raining season, sedimentation, current, tide, wind and dismount ability of the trap. These aspects have influence on the working of the trap and should be taken into account during the designing process.
Partners for application a trap in Indonesia can be separated in two groups, the local authority and the national authority. The local partners could be Kota Ambon, Province Maluku and LIPI Deep Sea Research. Based on law and regulation CLEAR RIVERS have to set up a cooperation because of Article 31, *Tentang Pengelolaan Sampah* [10] 'Every person carrying out waste management activities shall have permission from the Mayor (local government)'. The Ministry for Maritime Affairs is an interesting partner to implement litter traps in different locations around Indonesia.

As main conclusion there are good opportunities for placing a litter trap in the River Batu Merah nearby the market, as designed in the project Recycled Park that is implemented in Rotterdam, The Netherlands by CLEAR RIVERS.

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