



Pateros River

Research report

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January 2017



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OCCASION

Occasion

Research is being conducted in response to the water pollution problem in Pateros, Manila. The Pateros River is polluted by people throwing garbage into the river. A large part of the waste ends up in the water from the families living directly and indirectly near the water. The Filipino people should use solid waste management that take on the responsibility of the waste of households. Sadly the waste legislation does not apply for everyone.

Summary of problem analysis

The Philippines has a large contrast in rich and poor. After World War II, a large group of illegal immigrants moved to Metro Manila for work and a good reconstruction of their own family. After the Philippines have been occupied by the Spaniards after over 300 years, the Roman Catholic faith became the dominant faith of the whole country. 83% of the population is strict Roman Catholic. This fact could logically be the cause of the strict rejection for contraception and family planning. This is reflected with the family size, the average family consisted out of 5-7 children.

The population in Metro Manila grows every year with 1.8 percent and consists out of more than 50% of all inhabitants of the Philippines. (landenweb, 2016). The informal settlers are also known as informal settlers which are popularly known as the 'squatters'.

A squatter is someone who decides to leave their given social house to someone else to live in the city. squatters think that they can live a 'better' life in the city than in the province where they are supposed to live according to the government. The reason of moving to the city is the increased employment. (Kristina, 2016)

The government has built social houses for the informal settlers outside the city where these people could live. This was for the people too far away resulting in not being able to find a job, so they preferred to live as close as possible to the city. This is not a sad thing; squatting also means that the people rent their houses in other people and make an income out of the social houses. In this picture below you see the difference of livelihood. For the Filipino people it is very important to have a job to gain income for their family. No income means no food, which means no primary needs that are filled which could end up in death. Generation after generation live in these slum areas. Corruption is a huge problem in the Philippines. The urban poor are victim of this hierarchical problem. People are surviving and do not think further than day after day. Saving money is something which will not come up in their mind because they most of the time lack in having enough money, so they might spend the money they have immediately.

An urban poor area is created by small cabins where urban poor start living and building. This area starts often near the river bank. The riverbank is chosen because this area is the only area where urban poor might be secured to stay for a longer time. The environmental police winks at the people living here. The police does this because of economical benefit. The rivers are located at the outside of the city. Everyone in the Philippines has the right to live in a proper house, right now there is not a proper house for everyone especially not the urban poor people. Most of these people want to live in the city what the police can not help. The police of government can not push them away because they do not have a place to live. To control the places where the urban poor start living the Environmental police wink at them starting to live in the riverbanks. But why is that? The riverbanks are located at the border of the city. When the urban poor start living there they will form communities, this is something they can not prevent. To provide people starting to live in the city itself the police needs to give them a safe place for these people. The only area where they have a chance to live and stay is a cabin built of local waste facilities where people live very primitive with several people (families). A slum often is built directly to the water because these areas are for the government not registered as liveable ground. The waterfront where the slums are built are actually intended for the river to act as extra capacity with abundant flood / rainfall. In this case the government is not as consequent and strict as they are supposed to be, because this is for a lot of people not a reason to leave this area. They might stay there for another ten years.

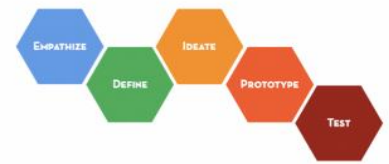
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INTRODUCTION

As Human Technology students we try to define the user needs of the future target group. We are Lisa van Loon and Fenna den Hartog, both Human Technology students at the Hanze university of applied science in Groningen, the Netherlands.

The Human Technology discipline focuses on the involvement of users during research, innovation and development.. This involves physical products (devices) but also websites, applications or extra curricular services. To manage the process, the Design Thinking method is used.



Design thinking is a specific method which suits problem-based innovation. Below displays the model.

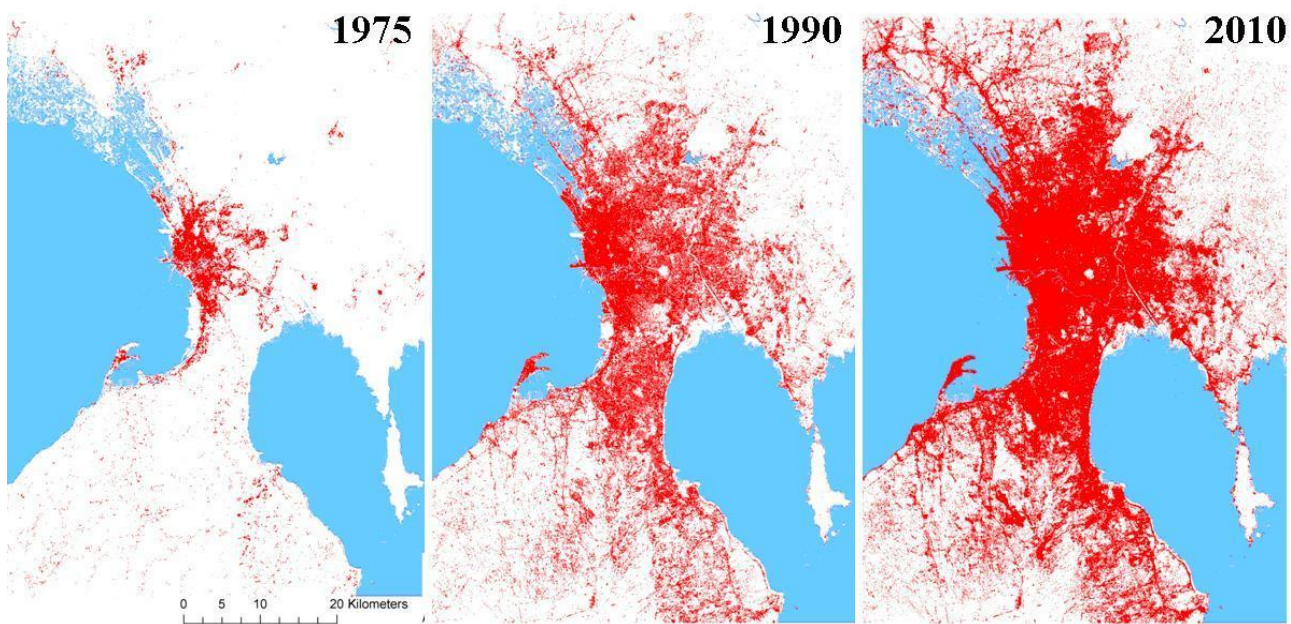
Figure 1) model design thinking'



Background

In October, students from Hanze University of Applied Sciences and Rotterdam University of applied sciences have depart to Manilla to practice field research concerning the waste management and water quality of the Taiguig river in the Pateros Area, metro Manilla. The Taiguig river is extremely polluted.

Metro Manilla, Capital of the Phillipines, is a metropolitan in South-East Asia. The dynamic city, which does not sleep, offers a huge amount of diversity and contrast. Like many cities in south-east Asia, the city struggles with natural disasters and political disturbance. Manilla Metro shows also a high extent of urbanization. The results of these phenomena are tend to be visible in the daily life of Metro Manilla. The concepts 'pollution' and 'poverty' are very suitable when you read and hear about Manilla.



Afbeelding 1 Lotte de Jong Bachelors thesis

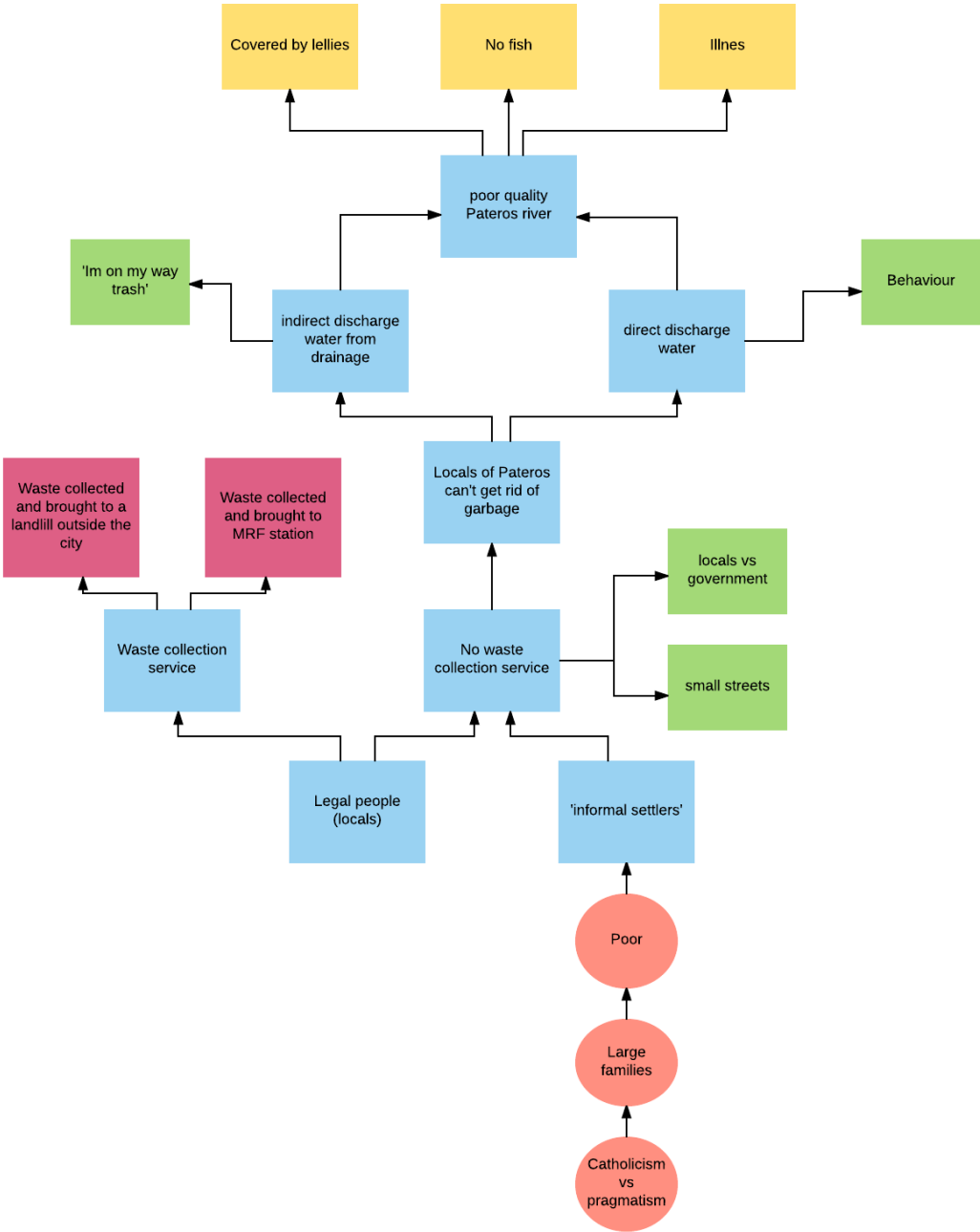
Poverty and pollution are correlated concepts. The focus has been put on the Pateros Area. The Pateros Area consist of 70.000 inhabitants which are registered people. It is a fact that there are a lot more people living in Pateros but mainly these people are the squatters/ informal settlers. Squatting would not be a big problem as it is today if these people would life in normal houses and participated well in the area they live in, but these people build small instable cabins really close to each other so no normal garbage truck can pass these roads. People get rid of their waste by burning it themselves or by dumping the waste into the river. These illegal inhabitants can't get rid of their waste, what makes it logical behaviourism to discharge it into the river. The government doesn't come with strict measures against this problem.

The main goal was to meet the local people near the Pateros river concerning waste management. We have worked to a solution (or service) what triggers behavioural change in a way that people are not forced anymore to discharge their waste in the river. This will lead to a cleaner river which makes it possible for the nature itself to gain a better water quality over the years. The most important aspect is that the local people are involved in the best possible way during the process to this solution.

Problem analyses



Flowchart problem analyses



METHODOLOGY

Overlap with other projects

This project is building forth on researches what have already been conducted regarding to the Pateros river. Lotte de Jong (Jong, 2016) conducted the research with the goal of using the forces of the nature in combination with civil engineering. She mentioned in her thesis not to focus on social solution based on community research, but on a technical solution. A social, community based solution is where we come in.

Sije Kloppenburg (civil engineering) also focused on a technical solution and did a lot of research concerning wastewater and the sewage system. However, in this case the focus has been put on **prevention**; to prevent people to discharge their solid waste into the river by implementing a new destination for the waste. Because of the different focus points, solutions can complement each other in order to get the goal of Flood Free Manila one step closer to reality. The pollution of the Pateros concerns not only solid waste (where we are focusing on) but also the untreated waste water, which comes from the households.

Method

To get insights in this question, a main question and (multiple) sub-questions are defined and will be considered as a common theme and will provide guidance through the research.

Due to the insights after doing orientation of the current situation in Pateros we formulated one main questions and three sub questions

- How can we involve the people living near the riverbank within the current waste management system?
 - What will motivate the urban poor people living in the urban poor areas near the riverbank to actively participate/put effort into the current waste management system?
 -
 - How might we implement beautification in order to stimulate people not to discharge their waste in the river?
 - Why should the involvement of the urban poor have a better outcome than ignoring them away?
 - How can we approach the situation based on cultural aspects in the Philippines? – Cultural Analyses

To prevent miscommunication about the research questions an operating model is made. In the table underneath are the main and sub- questions divided into smaller parts , the questions are divided into contextual parts and subjects which could be misunderstood through this report.

This way of looking at a question makes sure that there is no part forgotten when the research is in a further state.

Table 1) operationalized research questions

IMPORTANCE	QUESTION	SOURCE*	EXPLANATION
MAIN QUESTION	How can we involve the people living near the riverbank within the current waste management system?		
	We	Cultural analysis Geert-Hofstede	People with more prestige, think of the (local) government.
	Involve the people		People with a distance from the society
	Living near the riverbank		Within the 3 meters of the riverbank and expanded to the streets.

	Riverbank	Introduction	Within the 3 meters of the riverbank
	Within the current waste management system	3.1 community waste & 3.2 solid waste management system,	The Connection both parties together. Both parties are: 'people living near the riverbank' with 'local governments solid waste initiative'
	Current waste management system		This system is used for everyone.
IMPORTANCE SUB- QUESTION 1	QUESTION What will motivate the urban poor people living in the urban poor areas near the riverbank to actively participate/put effort into the current waste management system?	SOURCE	EXPLAINATION
	Motivate	3.5.1. motivation	What is valuable enough for these target group to be convinced and participate?
	The urban poor	5.2.1 who are being discussed	Used to be the illegal settlers, also known as the squatters.
	Living in the urban poor areas		Urban poor areas = slum areas (riverbank + extension)
	Actively participate/ put effort into the waste management system		Structural and consistent participation through the years forever.
IMPORTANCE SUB- QUESTION 2	QUESTION How might we implement beautification in order to stimulate people not to discharge their waste in the river?	SOURCE	EXPLAINATION
	Implement beautification	Passig river beautification	People feel guilty to harm the beauty of the river. if you make something look beautiful enough, people will less quick destroy the beauty by polluting in this case.
	To stimulate not to discharge waste in the river		Stimulate: trigger people to handle different
	Their waste	responsibility	Waste which is their responsibility. People need to be and feel responsible for their of own waste.
IMPORTANCE SUB- QUESTIONS 3	QUESTION Why should the involvement of the urban poor have a better outcome than ignoring them by pushing away?	SOURCE	EXPLAINATION
	A better outcome		More effect of improvement
	Than ignoring them by pushing them away	Social houses policy	Sending them to places far away from the city in a social house of just pushing them away and not even offering them an other place to live, is not the solution. They will come back and

	establish in a similar area.		
IMPORTANCE	QUESTION	SOURCE	EXPLANATION
SUB-QUESTION 4	How can we approach the situation based on cultural aspects in the Philippines? – Cultural Analyses		
	Cultural approach	Cultural analyses Geert Hofstede	How can we explain the situation in Pateros as it is now based on the Filipino culture?
	*Refers to chapter in research proposal		

The research methods will be as following:

Interviewing + Participants

this method consists out of open questions which can be asked to anyone who has a certain interaction with the subject in any kinds of way. The interviews that will be used are half-structured interviews with open questions. This has made sure that the people we spoke with are free to say anything they want, but we already choose the subject that needs to be talked about. The reason for this is that in this way we will gain a lot of information without investing too much time. To who did we speak? The environmental police from the local government has a close band with the people living in urban poor areas. The environmental police was willing to help us and is willing to give the information we need. They have brought us to the barangay captains and to the people from the urban poor areas who can give us information about living a certain area.

The people we spoke to are:

- Mayor of Pateros -Miguel “Ike” Ponce III
- environmental police from 6 barangays in Pateros, partly made possible by The Mayor of Pateros. “ Miguel “Ike” Ponce III”.
- Local barangay captains: Charley Añonuevo

Materials needed:

- interview questions
- something to write down the answers or to record the answer of the interviewed person
- pencil or laptop
- place to interview.

Public forum – anonymous

This public anonymous forum made sure that everyone is free to respond on the topic. This ‘write-your-mind’ was physically placed in the area where the local people live so the change of obtaining information from the people who really live in the area is larger than asking them to visit another place to participate with the research. Also placing this in the area where they live makes it more accessible.

The public forum consists out of multiple questions where we asked about the thought of the people about the subjects concerning waste management, responsibilities, environmental aspects and their dream vision.

materials

- large papers for the subjects to write down the questions (A0)
- markers to write
- papers and pencils where people can write down their answer on
- box with different sections so every question can be answered separately
- coloured paper to decorate the box

Photo analysis

to get a good view of the environment a photo analysis will be made, after doing a slum tour which is made possible by Charley Añonuevo. A photo analysis's made to show the frictions in the concerning area.

A picture gives a better insight in the real friction than a description, especially because we are researching an area which is not known by every party that is involved in this internship.

materials

- camera
- laptop to create a realistic mood board of the context

Brain dump

When the orientation phase was done and the contextual information is gathered together and defined. So, when we had a good view of what is going on and what the real problem is, thinking of solutions can be done. A brain dump is the best way to let you creativity speak and feel free to draw down anything.

In a brain dump session every participant has got enough post-it's for at least 100 ideas per person and a marker to draw ideas on the post- it's. during the session the post-its have been placed in the wall. Per 'How might we' question the group got 8 minutes to brain dump.

All ideas have been structured afterwards in categories, there have been a lot similarities regarding the ideas. In a group setting it is considered important to chose three best ideas of all and it possible combine the best two. If this is done you ,or have one best combined idea, or chose the best idea. This is now the first solution for friction 1.

You repeat this with the other questions. It is also possible to categorise all ideas in the end.

Materials

- post-it's
- markers
- wall
- table
- stopwatch

RESULTS

What will motivate the urban poor people living in the urban poor areas near the riverbank to actively participate/put effort into the current waste management system?

Comparison to the Netherlands

Since the existence of the human being, water has been used as discharge disposal. Before drainage systems and waste service were implemented, the water pollution has gotten on his highest level; especially during the urban growth at the end of the 19th century. In Amsterdam, discharge and feces were dumped into the canals, and the amount of fish decreased drastically (Roekel, 2013).

According to Maarten Ouboter, waterexpert, the pollution in the canals of Amsterdam is mainly the result of 'over disposal' of the drainage water during heavy rains. This 'over disposal', which is spread across hundreds of locations in the city, takes place less than ten times a year. But when it takes place, it is well measurable. After three days, the pollution has gone because of dilution and depletion (Roekel, 2013).

Amsterdam in 1950	Amsterdam in 2012
	
Amsterdam during an extreme situation: because of the lack of drainage systems and waste service, all the disposal ended up in the river	Canals of Amsterdam in 2012; because of the clean water, the Amsterdam Swim City event took place.



How?

To stop the pollution, the Netherlands confirmed in 1971 a new act regarding to the disposal of the surface waters. Part of this act, companies were obligated to have a license concerning the disposal of toxic substances. Since then, several severe measures were taken concerning the disposal of heavily polluted substances. Water boards have been pointed to build drainage systems for the cleanse of effluent from household and companies. These measures resulted in the improvement of the surface water the last decennia. (Rijkswaterstaat, 2016)

Important aspects of these measures, are the human aspects. How did the Netherlands motivate the community to work with them?

Accesability: A big difference, based on our own experience, is the accesability and the amount of trash cans in the environment. When walking in the Netherlands, you can find a trash can on every corner; especially in the cities. Here in Manila, it is hard to find a trash can. The Mayor of Pateros told that trash cans were implemented a while ago, but that they got 'stolen' and sold by the local people. Obviously, a trash can system does not work as well in Manila as in

the Netherlands. In the Netherlands, nobody thinks about stealing a trash can. If there is a trash can a few meters away, people are willing to make effort and take a few steps to discharge your waste in a proper way. If there is no trash can situated nearby, what are you supposed to do with your waste?

Culture and mentality: Another big difference why systems in the Netherlands are working well, is the different mentality and the culture. The mentality concerning waste management is something what the Dutch governance triggers by media, advertisements, commercials etc. A lot of effort is being put to motivate people to discharge their waste in a proper way. Positive feedback is something stimulating; think about Holle Bolle Gijs, a famous trash can located at the Efteling with a fat, masculine appearance. When people put their trash in it, Holle Bolle Gijs says ‘thank you’. Especially children really like this form of interaction. Discharging trash in the Holle Bolle Gijs trash can is fun, and that’s why people like to do it.



Policy: In the Netherlands, strict rules are being maintained concerning waste. Everybody is indirectly paying for waste service in a tax form; waste not being picked up isn’t common. If you live in an uncrowded village, you can collect and separate your waste in different containers; once in a while, a truck drives by and takes the waste.

When you live in a more crowded place like a city, you’ll share a big container (which is located underneath the surface) with other inhabitants. In order to discharge your waste in this container, you’ll need a card. When the container reads the card, you are able to put your trash bag in the holder of the container. When you close this holder, the trash will automatically fall down.

Finances and expertise: a really important (and logical) difference is that the Netherlands has simply much more money available for waste management and waste policies and that these policies are strictly maintained. The Netherlands has always been a Delta country, with a lot of expertise with regard to water management, waste management, separating and recycling.

In the pictures below, you can see the situation at the Pateros river from how it once was, to how it is nowadays. To find a suitable solution for the situation nowadays, we have to look at several aspects in Manila to see whether solutions are implementable or not.

Manila 1950	Manila 2016
	

In the picture above, you can see the amount of waste in the river. The pollution of the river consists of solid waste, organic waste but also untreatend waste water from the households. According to Sije Kloppenburg (Kloppenburg, 2016), current knowledge about the sewage system is very limited. It was assumed by Sije that the waste water, what

ends up in the Pateros river, comes from the people in the near area. It was also assumed that companies or business related organisations do not discharge their waste water in the river.

However, when we asked a member of the MMDA (Metro Manila Department Authority) about the main source of the pollution in the river, she mentioned an 'oil' company what discharges it's waste water into the Pateros river. These findings contradict each other and will be discussed in the discussion later on.

According to captain Elmer V Mangoba (Barangay captain in Pateros) there is a system for collecting waste. The residents have to opportunity to bring waste to collecting points where small vehicles collect the gathered waste from the locals and bring it to a garbage disposal area (Kloppenborg, 2016)

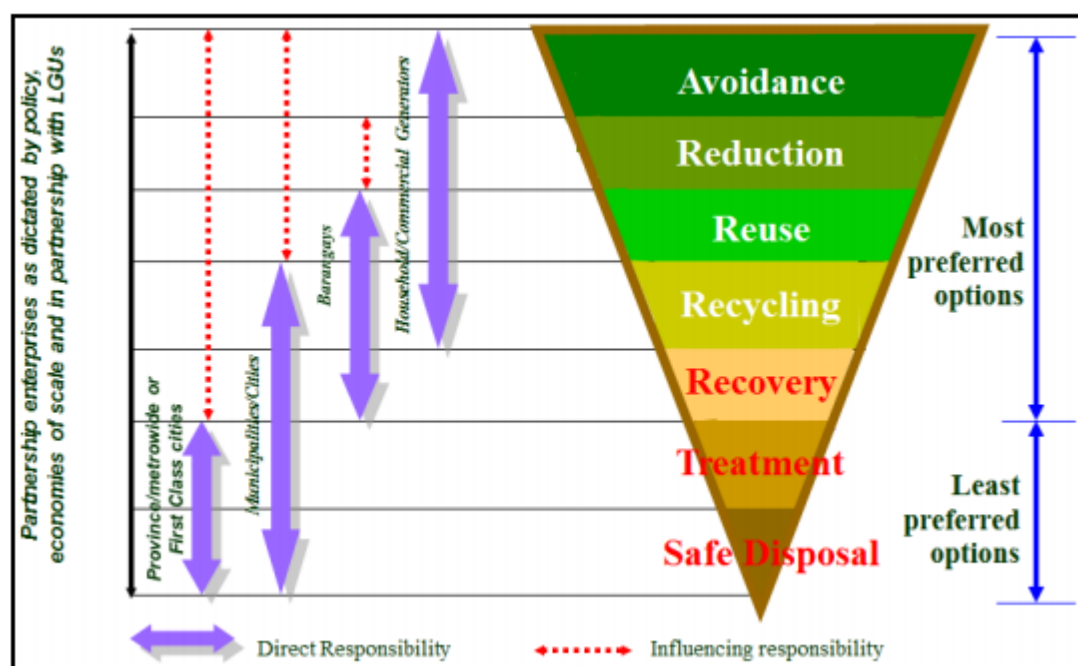
This statement can be confirmed based on own observation. Near the road, you often see garbage bags and solid waste piled up. It is assumed that this is a collecting point, where residents can bring their waste and where it is being picked up by a garbage truck. If the system works this way, residents have to put effort in bringing their garbage to this collecting point, especially when you live far away from this point.

Municipal solid waste

MSW comes from residential, commercial, institutional and industrial sources. Residential waste constitutes the bulk (56.7%) of MSW and includes kitchen scraps, yard waste, paper and cardboards, glass bottles, plastic containers and sando bags, foils, soiled tissues and diapers, and special wastes such as containers of household cleaning agents, batteries and waste electrical and electronic equipment (WEEE). Commercial sources which include commercial establishments and public or private markets contribute 27.1% of which, in some regions, about two- thirds of commercial wastes come from the latter. Institutional sources such as government offices, educational and medical institutions account for about 12.1% while the remaining 4.1% are waste coming from the industrial or manufacturing sector. (NSWMC, 2014)

SWM implementation follows a hierarchy of options as illustrated by an inverted triangle in Figure 5. The most preferred option is waste avoidance and reduction where the ultimate goal is to reduce the amount of materials entering the waste stream. Apart from avoidance, achieving this goal involves product reuse, increased product durability, reduced material use in production and decreased consumption. Behavioral

change is considered as necessary (NSWMC, 2014).



1 Waste management hierarchy, NSWMC

According to the NSWMC, avoidance and reduction are the most preferred options because these options are more likely to be an 'eco-approach'. With a well working waste-management system, like in the Netherlands, this would be suitable and realistic. But in certain cities and municipalities, where there is no well-functioning waste management system, words as 'avoidance' and 'reduction' and 'reuse' are not relevant (yet) and can be considered as too optimistic. The first step is a well functioning system, and this contains safe disposal and treatment. If the waste is

laying near the roads, on the streets and in the river, how can you already talk about reuse and reduction, when the waste does not even gets collected? Therefore, a safe disposal system and a treatment system can not be managed because of the lack of structure, knowledge and awareness. This is what we consider as a potential first step in a municipality like Pateros. What the Netherlands did with regard to the polluted canals, was implementing a drainage system and a proper working waste management system in order to reduce amount of feces and waste. When that worked out, next steps to think about were recycling, reduction and reuse.

According to this model, Pateros needs a bottom-up approach. Pateros and a lot of other municipalities are simply said not far enough (compare it with the Netherlands during 1950) to already implement re-using and recycling systems. 'First things first' is the way how the situation should be approached.

Why does the current system not work?

Reasons identified for waste collection inefficiencies according to the NSWMC are:

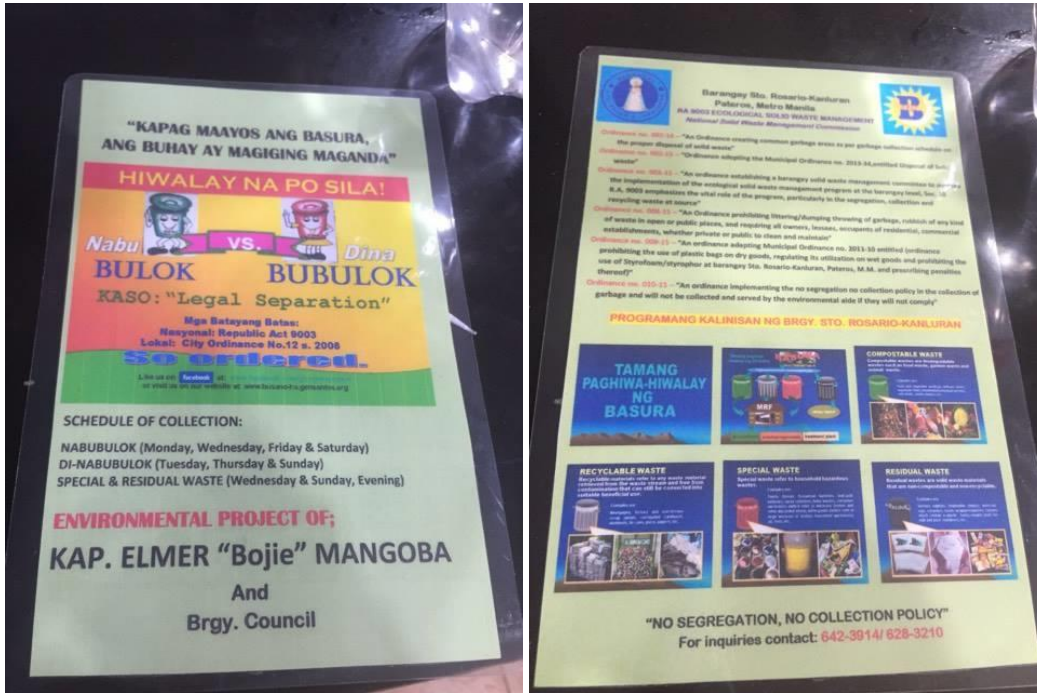
- poor labor management and supervision
- more workers on the roles than needed
- inadequate cooperation from the citizenry with collection schedules and methods
- inappropriate type and size of collection vehicles
- non-rational routes for collection service
- failure to optimize vehicle productivity by selecting the appropriate crew size and shift duration
- inadequate communal container capacity at the communal collection points
- long vehicle down times from poor equipment maintenance and repair
- long haulage times to disposal sites coupled with lack of transfer stations
- harsh driving conditions at disposal sites cause vehicle and tire damage (NSWMC, 2014)

Responding to the waste problem has been at a very slow pace. The not-in-my-backyard (NIMBY) phenomenon is hard at work in Metro Manila. Despite many efforts, no community has been willing to take Metro Manila's garbage. A survey found that while 67% of residents believed that Metro Manila has a serious garbage problem, 73% did not want to see a sanitary landfill in their community. Notably, 78% of surveyed households had no idea where their collected garbage was taken for final disposal. (Allen, 2004)

Pateros

There is a functioning waste-management system in Pateros, although it differs between different Barangays. At one barangay, effort is being put to segregate the waste, although not everyone is doing it. It is not a habit and people are not used to do it.

Very positive is the following:



It's a card which has been given to the Barangay of Santo Rosario. The card is explaining about how to segregate your waste, and when it will get collected. The Tagalog Title means in English: 'If waste is segregated, life will be beautiful'. The barangay also has an MRF station.

A positive thing about the waste management is also that Pateros has such a thing as 'environmental police'. The environmental police looks after the environment, and is helping during community clean ups.

In Pateros there is a policy which says that waste is only being collected when it is segregated. It's sad that not everyone is segregating their waste, so they place it on the street, non-segregated. When we asked whether the waste is being collected in that way, the answer was yes.

2) How might we implement beautification in order to stimulate people not to discharge their waste in the river?

The Pasig River rehabilitation has proven that beautification of the river works and is also an eye-catcher.

Mission, vision and goal Pasig River Rehabilitation Commission:

Mission - To transform Pasig River and its environs into a showcase of a new quality of urban life.

Vision - A new Pasig River clean and alive reflecting the country's noble history and progress.

Goal - Restore river water quality to Class C level.



Class C Water Quality

- Water for fishery
- Secondary recreation like boating
- Water supply for manufacturing processes after treatment (Commission, 2014)

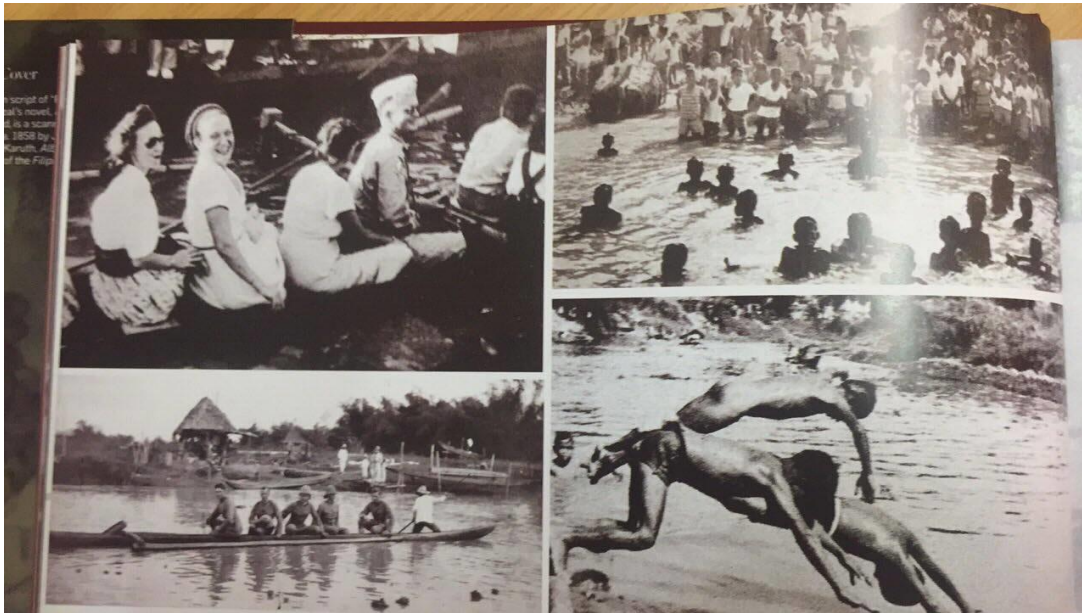
With only beautification this goal will not be reached, but beautification can be a valuable aspect on the long term. A good looking river (regardless from the water quality) works motivating for the community, and could arise pride.

According to several inhabitants of Pateros (See the attached excel document) their dream was to see a beautiful and healthy Pateros. Important outcomes on this method are that people are aware of the environmental impact of waste and littering. Many people answered that they want to see a clean river again, but they simple don't know how and they considered it beyond their powers.



An important aspect of what the people living near the riverbank were missing was light. They emphasized that they considered the lack of light very dangerous for their kids, especially during the evening/night. There is no electricity available at their living area. Based on this statement, people might consider light as a part of beautification.

When using beautification the people are more likely to see the value of a clean river, and will therefore adjust their behaviour. According to several inhabitants in Manila, the Pateros river will be cleaned in 2017. After this cleanup, beautification can be implemented. The same is conducted with the Pasig River. Nowadays, the Pasig river is still clean, also due to strict maintainment.



3) Why should the involvement of the urban poor have a better outcome than ignoring them away?

Policies regarding to the urban poor

Based on observations and interviews, an assumed method to 'deal' with the urban poor is to get rid of them. According to several inhabitants of Pateros, there are several governmental initiatives to relocate the urban poor in the so called 'social houses'. As explained earlier, there are not enough social houses to relocate all the 'informal settlers'. Every year, 100.000 informal settlers can be relocated and placed in a social house in the provinces. Despite the fact that families and communities get ripped apart, there are not enough social houses to cover the extent of urbanisation in Manila. At the moment, Manila can't deal with the urbanisation. A result of this phenomenon is an expanding metropolitan and growing slums and therefore more informal settlers.

All the informal settlers can't be relocated within now and 10-20 years. Therefore, Manila should find a way to deal with the situation as it is right now. That means that the informal settlers should be involved right now, instead of waiting for them to be relocated. The urbanisation does not stop, so it's not considered realistic to think that all the illegal settlers will be recognized for social housing. Additionally, the people are often inclined to return to the city. There is a higher chance of employment, and they consider it as their 'home'. People living near the riverbank emphasized that they were already living there for more than 50 years, and that they were really afraid to be relocated. To conclude, waiting for the urban poor to be relocated and to rely on that is not a suitable attitude for this situation.

According to Andrea Abalos (Abalos, 2016), people will get positively motivated to their part on proper waste segregation if you involve them in practicing waste management. She suggested that each household/family must have a "Eco-Card" in where (like in Starbucks) they could get a star/points every time they reach a certain amount of recyclables (bottles, papers, plastics, etc). Then perhaps they can redeem their stars and points to the barangay or NGO (non-governmental organization) with grocery items or something that they could benefit into.



Emerging with locals

'It was a simple suggestion/idea since the people in the slum areas (just like Dennis said) only live by their means and can be easily excited at first but can easily disobey because they are not getting an immediate benefit on that environmental cause.'

Especially people from the riverbank are not knowledgeable about environmental aspects, and are not aware of the difference that they can make. Therefore, it is of high importance that the people are narrowly involved and that they, even though they don't see the direct effects, keep motivated to for example, practice waste segregation and participate in waste management and to show willingness to put effort in this system.

According to Andrea Abalos, trust comes from both sides. Therefore, the LGU's should be engaged as well. The urban poor can't really understand or sometimes read the card. Due to this reason, she suggested that the local government must partner to different environmental organization to conduct on-site environmental lectures. People from the NGO's can come to the slum area and conduct a whole day cleaning and waste segregation lectures and teach them and on hand how to do it. 'I think the people might feel more responsible since it was the people concerned (the government and the NGO's) went to them personally. After that, it will be the responsibility of the environmental

police and the head of the slum area to sustain cleanliness and to maintain the discipline that they were taught. She also suggested a monthly assessment on the cleanliness of the area/barangay and there must be an annual award for the most clean barangay. Therefore, the people will stay motivated.

When the urban poor remain to be 'ignored', the uncontrolled slums will grow, and the contrast between the 'urban poor' and the middle/upper class will grow. Therefore, the extent of segregation will be higher. According to Neville Mars, a Dutch urban architect currently living in Shanghai, a metropolitan as Manila should react accurately on urban growth. His approach is not to push them away, but to let them emerge with the middle and the upper class. In this case, the people are more likely to participate in society and will be recognized. He also emphasized that it was of high importance to show what the exact causes are. To show this, he mentioned to do a pilot version where everybody is asked not to discharge anything in the river for a week. When there is no progress, you can prove that that certain part is not the only cause of the pollution of the river, and that there are more parties involved. In this case, bonding can arise because there is proven that you harm the water quality together, so it could be solved together as well.

Neville Mars (Mars, 2016) also mentioned the importance of a small, circular economy. This statement contributes to Andrea Abalos Saying. In order to keep the people motivated, the people need to be rewarded. Otherwise they will not see the value of changing their behaviour. The people need to be informed, and something suitable for the small alleys should be implemented in order to make it easier for the people to participate.

Lastly, the importance of a drainage system should not be forgotten. In the Netherlands, it is common to have a drainage system. But in undeveloped countries as the Philippines, it is rare to have a drainage system. Also in the rich neighbourhoods and shopping malls, you are not allowed to flush your toilet paper, which means that the water does not get treated, and ends up directly in the rivers or in the bay.

4) How can we approach the situation based on cultural aspects in the Philippines? – Cultural Analyses

Culture -Geert Hofstede

To clarify the culture which is been applied by the citizens of the Philippines we need to know what culture actually is: the definition of 'culture' is as follows: "The things that people think, do and have as in habits and patterns, norms and values, the way of living, religion, music, items and building architectures. " By taking this definition into account it is needed to clarify the culture in the Philippines. There is an obvious difference between the two countries what could abstain the research and harm the results. The Dutch culture is a culture which is formed in a first world county there where the Philippines is a third world country.

6D-model

The 6D-model of Geert Hofstede consist out of the following six dimension. Power distance, idealism, masculinity, uncertainty avoidance, long term orientation, indulgence.

Power Distance

In Manila we discovered a large power distance, this means people who have more prestige have more to say than people with less prestige, you get more prestige if you work for the government in a higher segment or when you have a lot of money. The Philippines in a Hierarchical society what means that not all the citizens are equal. If you work for a boss you have t do what he is saying, it is not accepted to behave differently.
score: 94

Individualism

the people are really close with family and friends who mean so much to them. They take care of each other, where it is normal to take care of you family when it is needed. The Philippines is a collectivistic society. If we look into our perspective we see a difference between the families which are more wealthy and the families which live in more poor areas. Maybe this is because of their ability to be more independent in the future because they might get well-paid jobs, but this is just an assumption.
score: 32

Masculinity

This indicates in what level are the people motivated and compatible to be successful. People really fight to be successful and achieve their goals in life. They are proud of what they have and they will work as hard as possible. Also it is important to keep working hard otherwise you will get or less paid or just have no work. This subject good together with the collectivistic society, people work to be able to pay for food for their families. Conflicts will be fought out.
score: 64

Uncertainty Avoidance

In Manila we discovered an lack of discipline in following rules and even wanting to try to follow rules, if everything goes okay and nobody in bothered why should we create more rules? People are ok with living in the fact of unknowing what will happen in the future. The Philippines scored a score of 44 which is still quite high in our eyes, this can be caused by the wealthier people who are willing to live with more rules but this will today harm a lot of urban poor people. Corruption makes it hard to read this Philippines cultures because the high-end people with a lot of prestige live a totally different live that people who form the bottom layer of the society.
score: 44

Long Term Orientation

This is a subject which is easy to answer. If you ask someone in Manila of even Pateros, people will answer questions like: What is you dream vision of ... or what do you want to achieve in ten years, they will answer the question with very unrealistic thoughts as: "

My dream vision is, a large magnet above the city that collects all the metals so we can make a lot of money." This is king of futuristic. And goals for the next ten years can be: "that all the urban poor people are relocated and that the rivers are clean". If you Interrogate on that answer they will have no idea how to achieve the goals.

Score: 27

Indulgence

This dimension has a strong connection with the 'long term orientation' dimension because people in the Philippines do not much think on the long term and they will see what comes next, but they do work all day all night if needed. They do not work that efficient all the time but they at least do work. Thinking of leisure time and holiday is something they do not think off because it is not common to go on vacation etc. there is always a need for food and money to pay for the food. Every day people wake-up and go to work because if they don't there will be no food or no income which makes them frightened for what will come next. Not only poor people camp with this also the people with a modal income camp with this. Maybe there is some kind of guilty feeling, or they just do not save the money for this which has the connection with the long term orientation which is scored a low score, but this is an assumption.

Score: 42

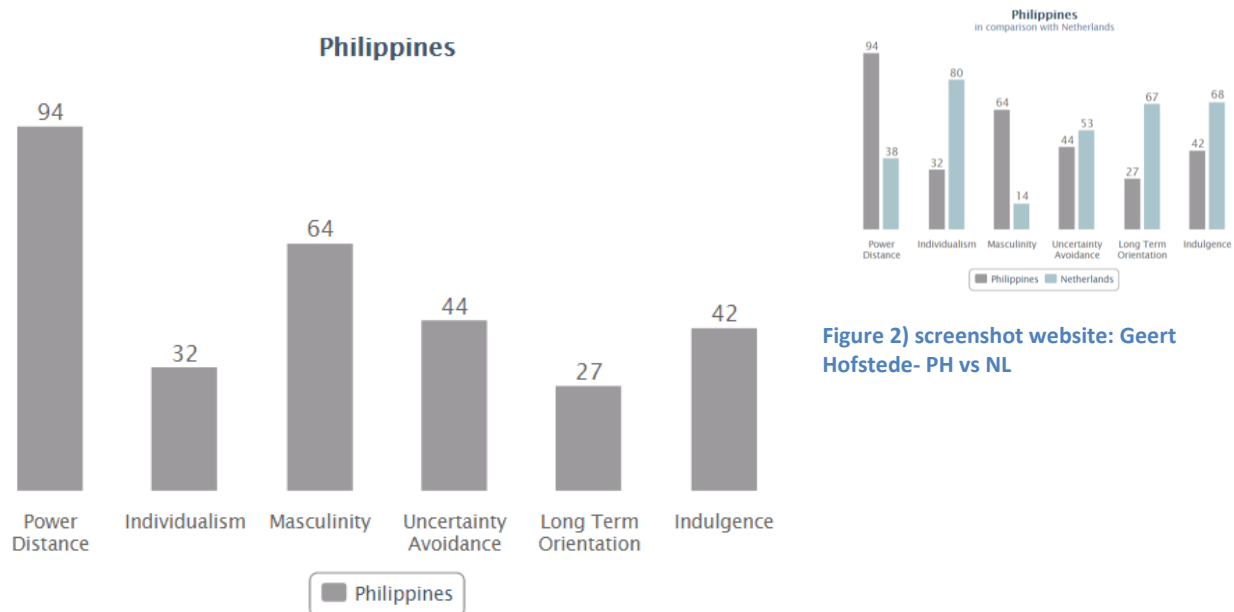


Figure 2) screenshot website: Geert Hofstede- PH vs NL

Figure 3) screenshot - website Geert Hofstede

This chapter is partly made possible by the 6D-model of Geert Hofstede: (Hofstede, -)

(<https://geert-hofstede.com/philippines.html>)

Historical perspective

According to a story from Andrea Abalos, (Abalos, 2016), the Spanish reign did not benefit the Philippines. The Philippines have been underneath Spanish rule for 400 years. The Spanish people have left their mark on the Philippines, but they did not really give or learn the Filipino people anything. The Filipino people do for example not speak Spanish (you can measly hear some Spanish intonation in the language). According to Andrea's story, the Spanish have always looked down on the Filipino's and made them believe that they were short and not useful, and always made them feel that they were less. Based on this story, the Filipino never had the change to develop their selves, and that they have been slowed down by the Spanish ruling. However, Rizal, a national hero who went to Spain, (spoke several languages and wrote books and poems) inspired the Filipino people and motivated a revolutionary group to achieve reforms regarding the Spanish. He told the people that they were worth something. If he could (speak different languages, write etc) do it, also meant that other Filipino people were able to. This statement is only based on one interview, and has not been confirmed by other sources. However, you can tell that Rizal is a national hero and that he still inspires people nowadays. This story contributes to the fact that the Philippines do not have their own certain culture, especially when you compare the Philippines to other south-east Asian countries. The food is different, the faith is different, and the people are inclined to act western. It looks like the Philippines want to appear and act as a Western country, but it's not succeeding. In fact (this is an assumption), they fade away their own culture, because they are probably always told that they were the 'less'.

CONCLUSION

It is important to mention that not all the informal not be relocated within now and 10-20 years. Therefore, Manila should find a way to deal with the situation as it is right now. That means that the informal settlers should be involved right now, instead of waiting for them to be relocated. The urbanisation does not stop, so it's not considered realistic to think that all the illegal settlers will be recognized for social housing. Additionally, the people are often inclined to return to the city. There is a higher chance of employment, and they consider the city as their 'home'. People living near the riverbank emphasized that they were already living there for more than 50 years, and that they were really afraid to be relocated. To conclude, waiting for the urban poor to be relocated and to rely on that is not a suitable attitude for this situation.

To prevent the current problem to escalate a preventive approach is essential. However, the problem is already going on so therefore a real-time approach, what reduces the problem right now, is of high importance as well.

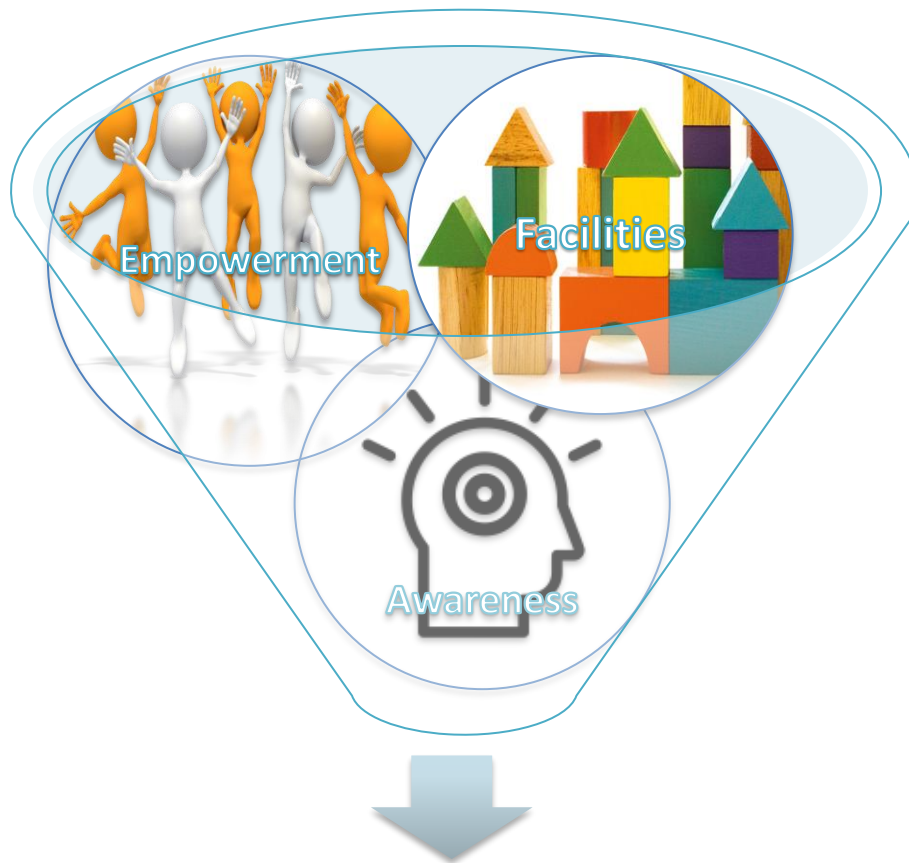
The community approach (**preventive**) to involve the urban poor in practicing waste management and to make them aware, and lastly, to emphasize that they can make a difference as an individual. That behavioral change will always be lucrative.

The Longganisa approach (**real time**) (Jong, 2016) to collect the flowing visible waste in the river. This is a solution what can reduce the amount of waste in the river at this moment, real time.

The 'drainage approach' (**preventive**) (Kloppenburger, 2016) to prevent the human feces (non-visible) to end up in the river. The effects of the human feces play a dominant role regarding to the water quality.

Based on the results, it turns out that three elements will make it easier for the people to participate in society regarding to waste management. These three elements are: awareness, facilities and empowerment.

The people need to be aware of the problems which are going on, and what the consequences are of their behavior. When the people are aware, and this is something what needs to be maintained by the LGU's, they are able to take responsibility for their behavior and change it. In order to motivate the people to take this responsibility, they need the empowerment to do it, the idea that they can make a difference as a person. When speaking to the people, they gave the impression that they wanted to, but they don't realize that every small thing they do, is already lucrative. Since urban poor people (based on the cultural analyses) only think on short term and not on long term, they are only triggered by things which give direct results and direct change, which is not the case during a process of improving the water quality. Therefore, several elements are needed to keep the people motivated, to maintain this motivation and to stimulate them. The last element is about facilities. If people are told to bring their waste to a collection point, and when that collection point is not approachable for those people (sometimes they have to walk a few kilometers), you can not expect from a person to do that. Therefore, the people need the facilities to practice and participate in waste management. You can tell them to change their behavior, but if they do not have the facilities to do it, it becomes a hard task.;



Behavioural change urban poor

These three elements will form a fundament in order to change the behaviour of the urban poor from cultural and social perspective. These elements are complementary towards each other and therefore, the one will not work out without the other. In terms of solutions to improve the water quality, these three elements have to be taken into account. Because right now, there is no awareness, no empowerment in terms of motivation and stimulation and no facilities for these people to make it work.

Not only the Pateros river in Manila is victimized by pollution; in fact, the whole metropolitan is. From 'umbrella perspective' the main cause of pollution is the overpopulation and the density in Metro Manila. Because of the high extent of urbanisation, there is a lack of urban planning and therefore taking control on this city becomes harder and harder. The extent of urban growth is considered unbridled and the city is becoming more dense. Manila is highly attracting people from the provinces, hoping to get employed. The middle class and the upper class are living in compounds or the so called 'gated communities', where they do not have to deal with the misery of the urban poor. Speaking of 'unity' is therefore not relevant. If the urban poor would be recognized, accepted and involved, Manila could have a bright future.

DISCUSSION

In this chapters the assumptions about the methodology are discussed on the level of validity and reliability. The research methods are shortly described what follows with the value of reliability. The validity shows the representability of the outcome of the research for the entire population that we rule on. For the reliability of the outcome is the way of obtaining the data discussed in what way this would be valid for the focus on the research.

How can we involve the people living near the riverbank within the current waste management system?

- What will motivate the urban poor people living in the urban poor areas near the riverbank to actively participate/put effort into the current waste management system?
- How might we implement beautification in order to stimulate people not to discharge their waste in the river?
- Why should the involvement of the urban poor have a better outcome than ignoring them by pushing them away?
- How can we partly reverse the history in the future?

How can we involve the people living near the riverbank within the current waste management system?

Interviews with organisations, companies, LGU's are valuable. Access to data is also required. PRRC has already conducted a lot of community research with regard to the Pasig river. The rehabilitation of the Pasig river has been a successful project, and still sustains.

When interviewing people who are expert in a certain work field, for example when they work for the government as an environmental police, the information we get is more reliable to the situation than interviewing a local who has not the amount of influence in the neighbourhood. They have more knowledge about the subject they work for and studied for. Also when interviewing people with more prestige makes it easier to get in contact with people from other departments and knowledge. because these people have a higher function. The Philippines have a dominant Hierarchy, so interviewing people who stand higher in the hierarchy will obtain more valuable data and more support. The people from this level feel more free to speak about the problems which makes this data more reliable. We will speak with people from all parties so the data matches with every future stakeholder which will automatically obtain more support. To gain validity we will also speak with people who are the cause of the problem and their opinions and way of living. Because they give us more insights in the physical problem instead of the theoretical problem.

Semi- open interview

The power of the government here can't be underestimated. To answer this question, we have to find out the governmental foundation here in Manila towards new waste and water management systems, and in what extent the government is willing to cooperate with us. Therefore, is it necessary to talk with the LGU's and create acceptance towards the research.

Having an open interview with people who are working from the hierarchy gives us insights in how this hierarchy works and how people act within a hierarchy. This data is based on facts and will be tested after obtaining the data by introducing this into our prototype and showing this to the people are mostly effected. Also this open interview is been done with barangay captains.

User centred research

Community research is valuable in this part. To answer this question, we have to find out when people feel responsible for something and when they feel proud. Therefore, the community needs to be intensively involved during the research. Previous initiatives have proven that placing trashcans is for example no option what works on the long term, because these trash cans are being stolen and will not last long.

Validity is been proved when the data of observation and conversation is tested in practice. The data is reliable if the advice is a solid plan. So there needs to be a cause-effect described with the consequences. We also need to know what kind of enforcements works in this society. The enforcement needs to be equal for the whole society and not only for one group to have a reliable outcome. The data we obtain is valid when the majors from the involved areas can handle the new structure and introduce the enforcement method.

Participants

The participants who we will work with during our research are the Philippine inhabitants in Manila. These inhabitants differ between poor people from the lower class (partly living in slums), people from the middle class with a modal income, and people from the (local) government. This diversity of local people will give us different perspectives with regard to the situation. This is also considered as a challenge, because it is hard to find unity.

Via IWASTO we will get in contact with the LGU's and with the PRRC (Pasig River Rehabilitation Commission). They will provide us data concerning the work what has already been done and will tell us about the current policy and problems.

The participants will give us information about what they are doing and what they are good at. We need to form a map of table with all the data so it could be combined. This way we only look into the true information and not into assumption. We need to be consistent in the purpose of the data we want to get. Turning the conversation and talking about what other people do is a risk which we need to avoid.

From every participant that is involved in this research we only dig deeper into what they are doing (/good at) and what their vision is.

method: interviewing

All the participants will be interviewed (see the following scheme). It is important that cultural differences are taken into account. Local people will often say 'yes' when they mean no. People who speak English on a certain level need to be approached during interviewing. To find a person from the lower class who speaks English could be a challenge.

to get valid data out of the interview we need to speak to all parties to get a good insight. At least we need to speak to people with prestige in every area from the involved areas around the Pateros River. This will give us the right information of how every party is involved and is willing to give information and work with the advice. All areas needs to create support for the advice so it could really work for cleaning the Pateros River.

When the parties create support the reliability of the data and the outcome is more valid.

method: observing

This is a suitable method for situations concerning language problems. It is of high importance that the behaviour of people (especially people living near the river) is noticed. Therefore we can see with our own eyes how certain people deal with their garbage, and especially the what kind of garbage. When people discharge their waste into the river, there can be observed where exactly they discharge their waste.

To really get into the community we need to see how they live with our own eyes. It is reliably if we walk around and do shadowing to see how people live. Because We (Fenna and Lisa) are not used to the situation so we are open minded and this data will be more representative to the reality then the people who are frustration themselves for this problem for over years. To give valid information we must be open-minded and unprejudiced.

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ATTACHMENTS

HT vision Fenna; Explanation why policies are not maintained, from cultural perspective

In the chapter above, the inefficiencies have been identified, regarding to why the policies are not being maintained. Even though the inefficiencies have been identified by the NSWMC in the report from 2008-2014, there can be concluded that these inefficiencies still occur, and that they are hard to solve.

What we see a lot in Manila, is that there is a huge contrast between the rich and the poor (however, you can notice that a middle class is rising). In Manila you can find huge shopping malls, skyscrapers, fancy areas, and so on. Whereas on the other hand, you can find a lot of poor areas where the people live on the street, where they have no clean water access and where the smell is dreadful.

From my perspective, these statements are a combined result of corruption, and the non-involvement of the poor (segregation). Here in the Philippines, it is of high importance where you come from. It is a hierarchic society, divided in layers, wherefrom it is hard to escape because it is not 'agile' at all. For example, skin colour is an important aspect which can be placed in this context; many people (especially women) are walking with umbrellas, preventing their skin being exposed to the sun. In retail stores, everywhere you can find 'skin-whitening' lotion. Why?

The people want to be white; when you are white, it indicates that you're not exposed to the sun often, which indirectly means you are more wealthy because you have for example an office job, and not a job in the open air. Many people in the poor areas work on the street, on the market, etc, which is easy to see because of their tanned skin.

In the shopping malls for example, there is a lot of surveillance. At the entrance, everyone has to pass a surveillant who checks your bag and determines whether you may pass or not (especially at the more 'high class' shopping malls).

It is obvious that people who are and look wealthier, are more advantaged by the way they get treated here in the Philippines. This can be placed in the context of the policies here; a lot of effort is being put in the wealthy areas, and significantly less effort is being put in the poor areas. Segregation vs involving are two contradicting aspects, whereby segregation is obviously in the lead.

The disadvantaged people, the poor, are dealing with their 'disadvantages' but seem to handle it really well, as long they have each other. People in the poor areas smile, are mostly kind and are extremely surprised by seeing western people. They have a 'short term' way of thinking, living in the moment and not thinking about tomorrow. We as western people, live up to something. We do the things the way we do, because they might be lucrative on the long run. That is why we are motivated and are willing to put effort in it. We focus on personal development, learning, whereby the main goal of a squatter is surviving the day and get fed.

There are projects for the squatters and the poor for example to help them. Schooling project, social housing projects, rehabilitation projects, but from my opinion, the government is not willing to see the extent of certain problems. The initiatives are good, but many problems are related to each other, and if you solve one problem, and the other problems remain unsolved, the sustainability of the 'solved' problem will fade, due to the influences of the other problems. Eventually, the government will blame the community of not cooperating, because from the government's perspective, they'd put effort in the community, but the community messed up their selves. Why put effort in the community again? They are going to mess it up anyway. I can write so much more about this, but the main point, and also the main problem is involving, and intercultural communication. Communication between the government and the community can already be considered as 'intercultural communication', because of its completely different perspectives. I think involving yourself in a situation like this, being willing to understand the people, why they do the things they do, because there is a reason for that.

Therefore, with this being said, the government needs to dig deeper, and approach the community based on their habits, their needs and respect it. I think the government has to put it's 'hierarchy attitude' aside, and show goodwill towards the people, and give the people a reason to trust them. Because when the community trusts you, they are willing to cooperate.

Currently, it is a 'us' vs 'them' approach, and that is not a fundament for acceptance and credibility for both parties. For example; the government started social housing projects for the squatters. This was not a success, because a lot of these houses did not get occupied. Why not? Why do people prefer to stay in slum, rather than in a social house?

It turns out that people have a community there in the slum; their whole family, friends, everyone lives there. By relocating these people, this community gets ripped apart. Besides, a lot of people can't move that easily; issues as work, debts, prostitution and fear play a dominant role in this situation, which results in staying in the slum.

Being together, having each other, is something what people more value than a decent house and materialistic aspects. I think that we, as western people, can learn something from that.

Ofcourse, it is an easy thing to say of how the government should act towards the community. Therefore, the (local) governments need a concrete action plan, which suits the situation and the culture. It has to show that the results of these plans could be sustainable and lucrative on long terms. Approaching the government here is hard; it works hierarchic, and they will not be easily willing to take advice from 'just' reports. Therefore, you need to be introduced by other people. As a western person, you are advantaged in the Philippines, but only if you got introduced **by** the right people, **to** the right people. Making a difference is hard, but with the right approach, you might have success. That is why Human Technology is valuable in this situation; if you apply the 'HT' vision the right way and when you stand your ground, it takes you further and makes you grow. Even without success.

HT vision Lisa: Involve the users

Metro Manila, L.T.van Loon – 27.10.2016

The human technology vision is focused on user interaction and the user experience. A social problem is stated in Metro Manila where a large group called, the squatters, is being effected in a negative way. The squatters are people who live illegally in slum communities nearby riverbanks because only there the squatters do not bother the local (legal) people living in the city. This group is being pointed at as the cause of social problems, for example, problems with water quality, waste management, corruption, drugs, etc.. Some of these problems are partly caused because of the squatting, but this cause is just a small part of the bigger picture. All these issues are not solved by chasing the squatters away and acting like they have never lived there.. *"The solution is not that simple."* Giving all the squatters a social house is a harder task than you should think. The squatter population is growing and growing year after year, at this moment the counter reached a number of 2.8 milion squatters only in metro Manila. Every year there are build round about 100.000- 150.000 social houses which are available for a small family. This amount of houses being build is never enough to embrace all the homeless families.

Creating a solution for the whole problem is an impossible task to do in one time, multiple solutions and integrations are needed to create a solid structured solution for everyone. It is extremely important that all the people who are affected are involved during the whole research of creating a structure. Every person gives insights in what solution can work and what solution won't. As a human technology engineer it is very important to approach listen to all different perspective to get a really representative view of what the real problem is. Listening to people can give the key to a working accepted solution for everyone.

As a researcher from the Netherlands I need to understand the culture which leads the Philippine people. Why are things working the way they are and why are things NOT working the way they are. The Culture In te Philippines plays a big role In how people work, behave and live. Behaviour is very important to connect people with each other, if everyone behaves the same way this becomes 'socially accepted' When one person behaves different, who is going to say something about it? In the Netherlands we live in an open-democracy where 'calling someone on their bad or good behaviour' is totally normal. But is this also the way people work here? Right now I do not have an answer to this question, but I can assume some things after describing the following scenario I have seen.

The social problem that is stated is about the waste management system. After looking deeper into the policies and the laws we could state that there is a good law and policy behind the waste management system. but the policy s not structurally being followed because cultural aspects are not involved in the strict policy. In the Philippines a dominant Hierarchy leads the citizenry. People are divided in groups, for example: not all mega malls are openly available for everyone. When walking through the doors you get scanned if you fit the picture of the groups. A step to the 'higher' level is harder than a step down. You are a lucky one if you are born in a wealthy group.

If you have money you can pay yourself a good wealthy live but if you do not, you are forced to live without any security of a stable live and long-term goals. A clear boundary is created between poor and rich.

People with more prestige can and will point at people with less prestige but this is not mutual. When you are in a specific layer of the society it is hard to call each other on their behaviour because you will get a bad face in the community "the bad guy"

Everyone is using the 4-lane highway as a 5-lane highway but no one is saying anything about it... why ? because

to assume after this description of how things work here:

- 1) "People rather keep their friendships than following the strict laws and take measures against the bad behaviour."
- 2) " people with more prestige are more connected to the society"
- 3) " I f we ignore the squatters, they do not exist..."

Everyone pays taxes and fees for waste management services but this percentage is badly calculated because the amount of money they receive is not enough to collect all the waste, litter and take this into a circular system. Only the 'rich' people can afford this service, because they pay extra for this. The poorer people do not have an other choice then to dump their waste at a waste dump. These waste dumps are against the streets where garbage trucks can pick this up. As I described the squatters live nearby the riverbanks and have no other option that to throw their waste/ feces into the river. This is a big cause of the bad polluted river. The drainage system is from all houses connected to the rivers so this is not the fault of the squatters. This is a problem only the government can fix.

Nobody is saying anything about the trash ending up in the river because everyone is doing it and the rivers are already polluted

So... who are we dealing with?

We are dealing with the government who has the most prestige to get things together, we have the legal locals who pay the taxes and fees and are fully involved in the society and we have the illegal locals (the squatters) who are not involved In the society and live their ons culture in their community. For them surviving is the wa of living.

As I assumed above I need to find a way to combine the following aspects into a working waste management system:

- Cultural aspects
- Interaction available for everyone
- Experience
- Behaviour change

The best thing is is to create a solution which is the same for every one, that there is no differentiation between different layers. This makes it hard for people with more prestige to point at people with less prestige and mutual. Also this could be a new model that leads to a working structure. If the rules are the same for everyone, all the measures are the same and also the consequences can be the same.

People can show each other how it works without leaving your social layer.

Creating a solution that can fade a away a part of the visible difference in groups of people makes the step to being treated equally smaller. This can be the first step to become a like-minded society.

Observations and interview at the police office – Taiguig

During the bus trip from Batangas to Manila, Lisa's camera got stolen. In order to make a police report (not that we thought we would get the camera back, but for the insurance) we had to go to the Police head-office of Taiguig. First we did several tries to get to the right office; at the office at Market! Market! they referred us to an office in Bonifacio. In Bonifacio, they referred to an office somewhere else in Bonifacio. When we went to that office (meanwhile, we were sweating because we really wanted to walk, and refuse to take a cab or a tryc, we have young legs) they said that they could not help us, and that we really had to go to Taiguig, because we live there.



In the evening, after we had some streetfood at Market! Market! we got a phonecall that we could go to the police office in Bonifacio. From there, they would take us to the head office in Taiguig.

Finally in the right office. The office was small, messy, but air conditioned. There was some kind of task-board hanging on the wall, but according to the task board, no tasks had been fulfilled from march on.

On first sight, the police officer was kind. He asked some questions about the camera, but then it got personal. He wanted to know our phone number, and whether we were single or not. Then we asked us if we wanted to see some dinosaurs. 'Dinosaurs?!' we asked? "yes, dinosaurs'. He told us to walk to another part of the room and take a look at it. We saw 5 prisoned men, on approximately 2 square meters. It seemed that they were involved with drugs. It was alright for us to talk with them, and ask them questions (not very humane, but we were very curious). They still had to be in that 'jail'. They still had to be there for three weeks, they answered.

All of a sudden, a few people walked in and walked towards the prison cell. They took some food out of their bag and gave it to the prisoners. 'Is that common here?' we asked. "yes that's very common' the police men answered. But in case of emergency, they'll have food as well. There can be concluded that when a person here is in a local jail, the family takes care of that person and feeds that person. Lack of facilities in jail, or a strong, caring family bond (or both)?

We asked the police officer some questions regarding to waste management in Taiguig. He told us some things what we already knew, which was confirming. He told us that people can bring their waste to a collection point, and there it gets picked up by a truck. After that, it gets brought to a waste dump. We asked whether they knew who is responsible for the waste dump. They couldn't answer this question. We also asked what happens when the waste dump is full, and out of capacity. They also couldn't give a clear answer on that question. 'Sometimes they burn it, or bury it'. We asked how the segregation works at the dump. He told us that it is a waste pickers job, and that they make a living out of it. For example; people collect plastic bottles, after which they hand it in somewhere for money.

The fact that they were not able to answer those questions clearly, and that they had actually no idea of what actually happens with the waste, or to answer the 'what if' questions, indicates that there is no clear, structured system regarding to waste management. You can at least expect from the local police that they know something about it and about the system.

Pressure cooker

What

The pressure cooker is a program organized from Dutch initiative to send Dutch student to Manila to work on this research project for one week. During the two months before the pressure cooker a lot of data has been gathered regarding to the Pateros River. During the pressure cooker this data has been analyzed and combined with own interpretation we created a vision (design thinking). In order to get an representative view of the situation, the students experienced the situation by themselves by listening, talking to the people and observing. Afterwards, all the knowledge and visions had been shared and the seed of a simple idea was planted.

SCHEMA + POSTER + DESIGN THINKING

Why

The pressure cooker has been quite valuable for this project because of the multidisciplinary setting. The group consisted of:

- One urban planner
- One water management student
- One coordinator
- Two human technology students

This multidisciplinary setting has worked motivational and inspiring. Due to the different disciplines everybody had his/her own qualities and characteristics and therefore everybody was able to do a different task during the ideation/prototype phase. Where Human Technology students lack visualization/photoshop/indesign skills, the urban planner or the water management student was there to help.

The final idea and the process

After categorize all the data, interpreting and label them, we formulated a simple and broad 'how might we' question which could send us in the right direction. '**How might we prevent people living near the riverbank polluting the river**'. Afterwards, we divined three aspects which could form a fundament for the potential idea: **Awareness, empowerment and facilities**. From these points of views, we formulated three new how might we questions to brainstorm on.

- How might we make sure people are able to participate in a waste management system?
- How might we empower the people of Pateros to take their own responsibility on waste management
- How might we make people aware of their behavioural causes which affect the waterquality of the Pateros river

Based on these how might we questions, we started three different brainstorm sessions. All the outcomes of these brainstorm session could be combined in one single idea.

The outcome of the first brainstorm session (how might we make sure people are able to participate in a waste management system) was a zip line installed above the ground. The people can collect their waste with separate small containers where they can practice segregation. Every container can be locked on the zip and when it's full the container can be clicked on the zip and 'transported' through the small alleys to a central point on the street. The only thing people have to do is to make sure the container get's from A to B. When arrived at B, the waste can get picked up by a waste truck.

A way of stimulation could be a 'eco-card' where te people can earn a star or point when they reach a certain amount on recyclables and redeem their stars or points at barangay or NGO's with grocery items or something that they can benefit into.

The outcome of the second brainstorm (How might we empower the people of Pateros to take their own responsibility on waste management) was a contributing aspect on the first question. **The facilities do not work without empowerment and awareness.** Therefore, real time feedback is needed to stimulate the people in a positive way and in order to make this solution sustain. To empower the people, they have to see with their own eyes that the change of their behavior has impact on the situation. In this case, that the water quality gets actually better and that the improvements are physically visible. On this part, the final idea is to place waterlilies, running on solar power. The color on the waterlilies is representative to the actual state of the water. When the water quality is really bad, the color of the lilies is red. When the quality of the water gets better, the waterlilies will turn green. The people of the community notified that they actually miss lights. Therefore, this would be a good idea to also fill the need to enlight the environment with floating waterlilies.

The outcome of the third brainstorm 'How might we make people aware of their behavioral causes which affects the water quality of the Pateros river' was that awareness needs different approaches, like education and also real time feedback. A cheap and collective way to do this is to give the people cards where is explained how to segregate waste, and what exactly is the cause of a polluted river. People need to know that not only solid waste has negative effects on the water quality, but also human feces and waste water from the laundry.

Group Interview Pateros

We are a Dutch research group doing research on the Pateros River. Our final goal is to improve the waterquality of the Pateros River, which is extremely polluted. In order to do that, we discovered that a proper functioning waste-management system is very important. Together with Awareness and involving the community, we are hoping to get Pateros one step further in the right direction.

Attendants: 7

Who?: Representatives from the barangay and people from the environmental committee.

Interviewers: Fenna en Lisa

Location: Pateros City Hall Congress room

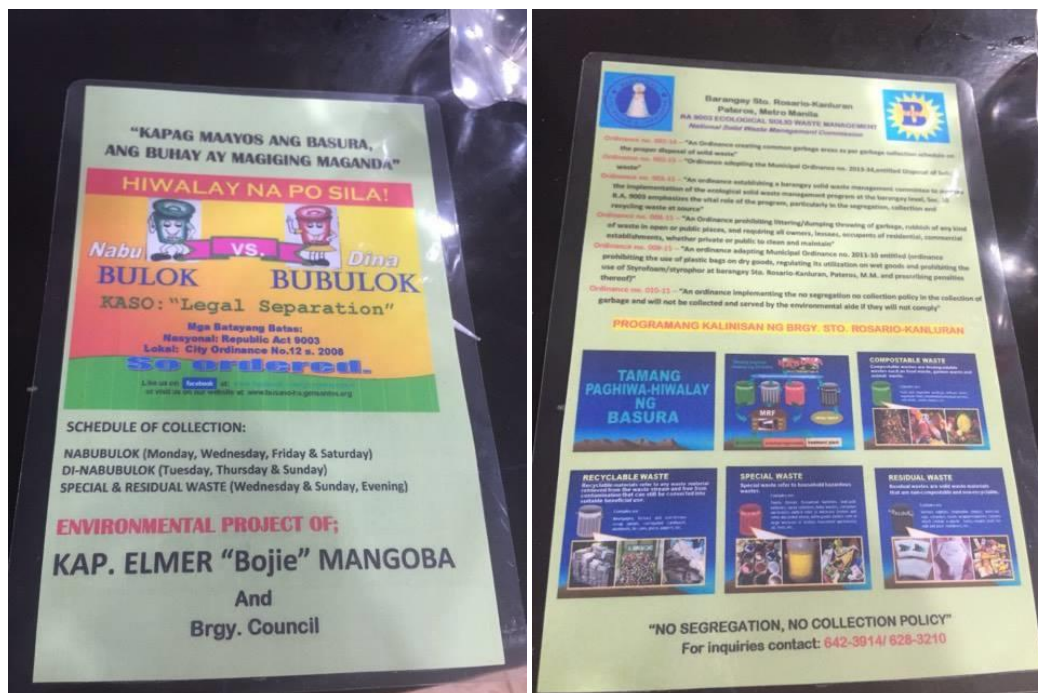
Questions:

Could you tell us something about the current Waste Management System in Pateros? What do you find positive about it?

Answer:

There is a functioning waste-management system in Pateros, although it differs between different Barangays. At one barangay, effort is being put to segregate the waste, although not everyone is doing it. It is not a habit and people are not used to do it.

Very positive is the following:



It's a card which has been given to the Barangay of Santo Rosario. The card is explaining about how to segregate your waste, and when it will get collected. The Tagalog Title means in English: 'If waste is segregated, life will be beautiful'. The barangay also has an MRF station.

A positive thing about the waste management is also that Pateros has such a thing as 'environmental police'. The environmental police looks after the environment, and is helping during community clean ups.

A positive thing about the waste management is also that Pateros has such a thing as 'environmental police'. The environmental police looks after the environment, and is helping during community clean ups.

- Which policies are important here, regarding to waste management?

Answer: There is a policy which says that waste is only being collected when it is segregated. It's sad that not everyone is segregating their waste, so they place it on the street, non-segregated. When we asked whether the waste is being collected in that way, the answer was yes.

- Do you have collection dates? When and how often is that?

Answer: Yes they have collection dates. Every Wednesday and every Sunday the waste is being collected in Pateros.

- Are there differences between waste management in centre area's and the river area's? what about the area's which are hard to reach?

Answer: Yes there are differences. People in the river area are not involved in this system. Sometimes (?) A trycycle takes care of waste in this area. People living in this area's sometimes have to walk a few kilometres to bring their waste to a collection point.

- Are there strict rules regarding to waste management? What if the rules are not maintained?

Answer: There are rules. They are warnings, fines, and if people can not pay for this people have to do community work. Every barangay has a register system. According this system, the environmental police for example will know who has already had a warning and who has not. These rules are for everyone. **What about people in the river area?**

Comments/things we have noticed:

It was a group setting which included nine persons (including us). At first, it was hard to get answers. The people were shy and were having 'nosebleeds' (which means they are shy to talk English and not being able to find the right words). Therefore, there was one or two persons who were taking the lead and gave us all the answers.

The last question we asked to everyone was: What is your dream vision regarding to Wastemanagement in Pateros in the future? We considered it very important that everybody answered the question. We mentioned many times that there are no false answers and that we would love to hear everyone's opinion. Still the people were shy to answer. Then we asked the people to answer the question in Tagalog. When they did this, they were giving long answers, and they also seemed to get a little bit angry/frustrated (someone punched his fist on the table). We considered this as a good thing, because it really showed that they care about the environment and that the current situation frustrates them, and that they are really willing to cooperate with us.

