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# PATEROS RIVER

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Research proposal

Fenna den Hartog

Lisa van Loon

Human Technology

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Kenniscentrum Noorderruimte

Internecoordinator: Floris Boogaard

Lecturer: -Maria Prins



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# OCCASSION

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# 1 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 Philippine 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.

## 1.1 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 Philippines 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 dead. 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.

A urban poor area is created by small cabins where urban poor start living and building. This area starts often near a certain 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. 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 this 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 people may not live there and every day they should be removed from the area, but this happens sporadic. So this is for a lot of people not a reason to leave this area because maybe they could live there for another ten years if they are lucky.

# Content

<b>1</b>	<b>Occasion.....</b>	<b>2</b>
1.1	Summary of problem analysis .....	2
<b>2</b>	<b>Introduction .....</b>	<b>5</b>
2.1	Method .....	7
2.2	Urban Structure Pateros.....	8
2.3	A perception of the daily life in Manila .....	9
2.4	Environmental analysis.....	10
2.4.1	Current river state.. .....	11
2.4.2	Bad smell.. .....	12
2.5	The slum .....	14
2.5.1	Who are being discussed? .....	14
2.6	Culture -Geert Hofstede .....	<b>Fout! Bladwijzer niet gedefinieerd.</b>
2.6.1	6D-model .....	<b>Fout! Bladwijzer niet gedefinieerd.</b>
2.7	1.6 research questions .....	17
<b>3</b>	<b>Define .....</b>	<b>21</b>
3.1	Community waste.....	22
3.2	Solid waste management system: .....	22
3.3	How the waste affects the water quality .....	25
3.4	Governmental policy concerning water quality and river rehabilitation .....	25
3.5	Behavioural changes.....	26
3.5.1	Motivation this is the psychologic model of Maslow, The livelihood and health of the human being is determined by the levels which are shown in the Maslow Pyramid below. Aspects which have influence on the wealthy being of the people is; money, genital aspects, physical aspects, mental aspects, personal features. This model is described with only pointing to the dynamic aspects because the static aspects have to do with ethnicity and culture. Nice method.....	26
<b>4</b>	<b>Methodology.....</b>	<b>30</b>
<b>5</b>	<b>Results .....</b>	<b>34</b>
<b>6</b>	<b>discussion.....</b>	<b>37</b>
<b>7</b>	<b>Literature .....</b>	<b>39</b>
<b>8</b>	<b>Attachment .....</b>	<b>41</b>

## 2 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, we use design thinking.

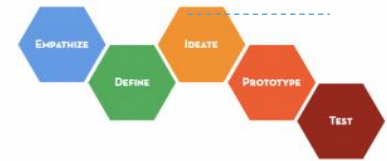


Figure 1) model design thinking'

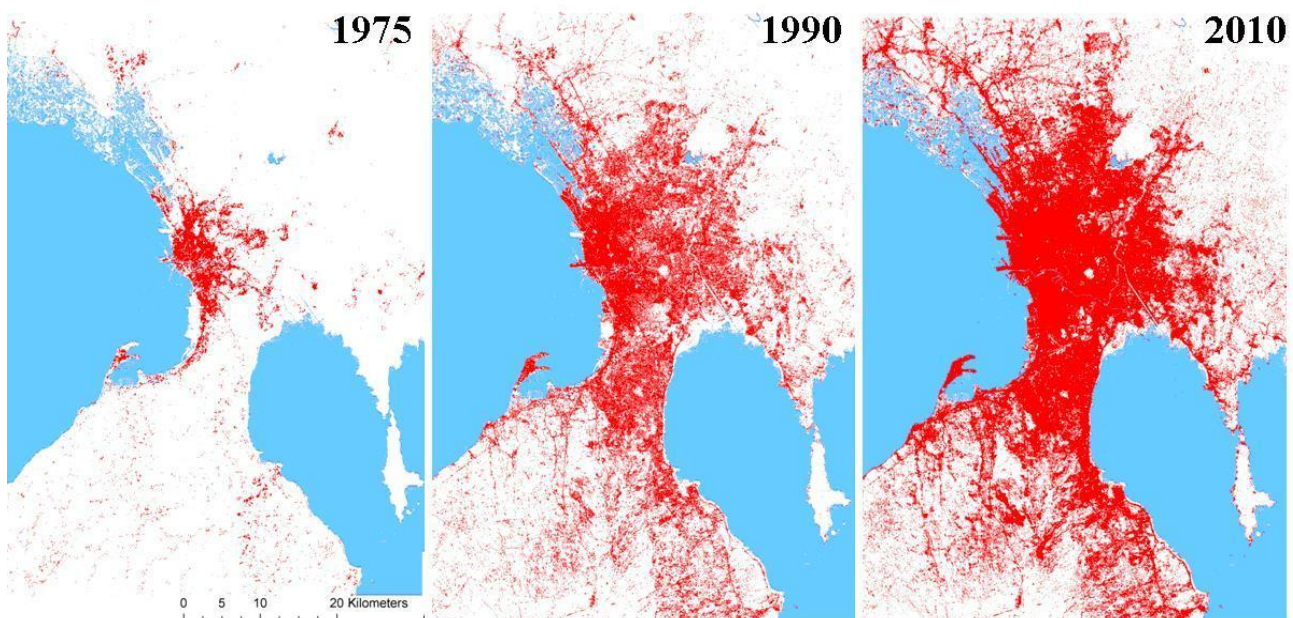
Design thinking is a specific method which suits problem-based innovation.

Below displays the model.

### 1.1 Background

October 2<sup>nd</sup>, two Human Technology students (Lisa van Loon and Fenna den Hartog from Hanze University of Applies Sciences and two water management students from University of Applies Sciences Rotterdam will 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. In this research proposal information about Metro Manila and Pateros (desk research) will be gathered. Based on the gathered information, a direction with main and sub questions can be defined.

Manila, Capital of the Philippines, and a Metropolitan 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.



Name and number the figure and ....Using pics from somebody else asks for a reference

Poverty and pollution are correlated concepts. The focus will be 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.

Our main goal is to meet the local people near the Pateros river concerning waste management. We want to work 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.



## 2.1 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. If a question turns out to be irrelevant, the question will be adapted in a way that it suits the project or shall be committed.

The main question is:

**“How can we trigger the local people of Pateros to change their behaviour in order to reduce the pollution in the Pateros river? ”**

To influence behaviour, you first have to know a lot about the context of the problem and approach it from its root, but not trying to solve the problem at its root, because beyond our powers. We assumed that the cause of the pollution of the river is (partly) the informal settlers. The informal settlers are the informal settlers

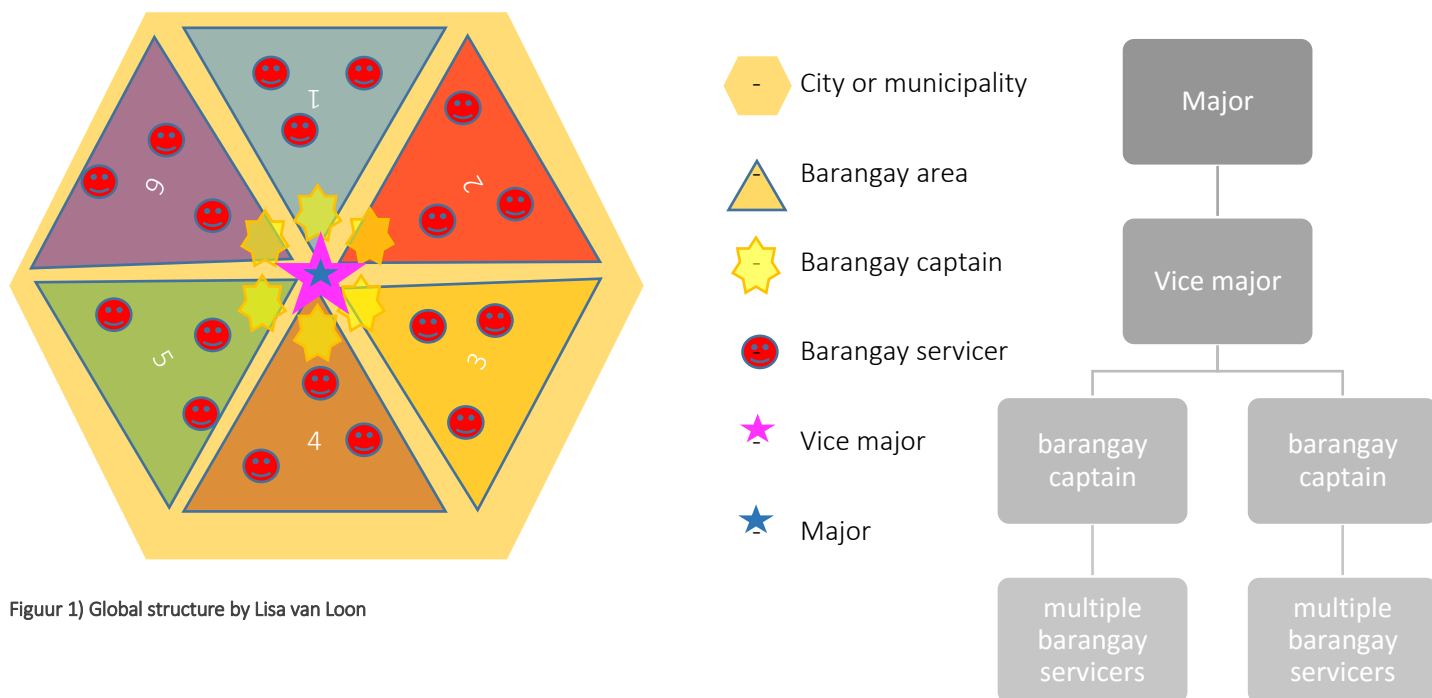


because they are very poor and do not have the money to buy or rent a house, so then the problems becomes poverty. The cause of poverty could be the fact that people born in poverty do simple not have the chances to get an education and remain poor, just like their parents. This could be a result by lack of policy from the government, for example corruption,. It is of high importance to be aware of these facts, and keep it in mind that all those aspects are involved.

Based on desk research, we defined the following sub questions which could be relevant for our questionnaire. With these sub-questions, we want to show which aspects are involved during our research and which aspects are not. While doing this, a direction will arise and then the problem can be framed.

## 2.2 Urban Structure Pateros

The structure of cities is logical organized by responsible parties. In the model below it is globally shown how the city and municipality (Local Government Unit- LGU) areas are structured:



Every city has a mayor and a vice mayor. The mayor is responsible for making all the important decisions. The mayor gets the overview of his Government area by the barangays, A city is build out of several barangays which are responsible for every smaller area they have. These barangays communicate via the barangay captain. The barangay captain controls a barangay servicer. These servicers watches the neighbourhood and need to be accountable to the captain. Every barangay has at least one captain but most of the time there are more. The amount of barangay area's depends on the size of the city or municipality. This also applies to how many barangay servicers there are.



Figuur 2\_ major sitting behind his desk, the person on the riht end is the vice major.

### 2.3 A perception of the daily life in Manila

Some first words that describe our first impression of Manila are chaos, pollution and bad smell. It is hard to find an area in Manilla which smells fresh and clean. Therefore, we were a bit of demotivated because of the bad living conditions, which also applies for rivers and the area's near the rivers. It was frustrating to think about the research *we had to there*. We considered the situation as hopeless and beyond our powers.

The weekend of 8<sup>th</sup> and 9<sup>th</sup> October we stayed in Antipolo (a city next to Manila) at Mylene and Peter Buijs' place. They live in the mountains and we have had some valuable conversations about our research and our purpose. They are founders of IWASTO, which means correct and prevent. IWASTO focuses on river rehabilitation and community education.

Mylene and Peter have told us that a lot of research about the communities and also told us that a lot of research already has been done. They also told us that we need to approach the situation from top-down instead of bottom-up. IWASTO already has create a lot of acceptance and willingness amongst the government and LGU's. Another community research would therefore be irrelevant, because the situation is not going to be approached anymore via the community. At first sight, we thought that there is no money available so that a community approach is required. Now, this is not the case anymore because there is money available. What the government and the LGU's need is a concrete and sustainable plan with potential. Mylene and Peter told us that the local people (especially the poor slum people) do not speak English very well. To gather valid data is therefore very hard. What we need to do, is to speak to influential people who know what is going on in the river and what is already been tried and what not. We will still think about something suitable for the community, something what fits their needs, but the approach will be different.

## 2.4 Environmental analysis

It is easier to understand by pictures than by description. In this chapter are the friction shown from the Pateros river and the relationship from the friction to the people. The original painting of this Pateros painting hangs in the Municipall hall of Pateros. This painting shows the mold of Pateros of how it used to be. This is the Pride of the citizens of Pateros, people really want the Balut, the fishery and the clean water back. There are four scenarios drawn.

How it used to be..

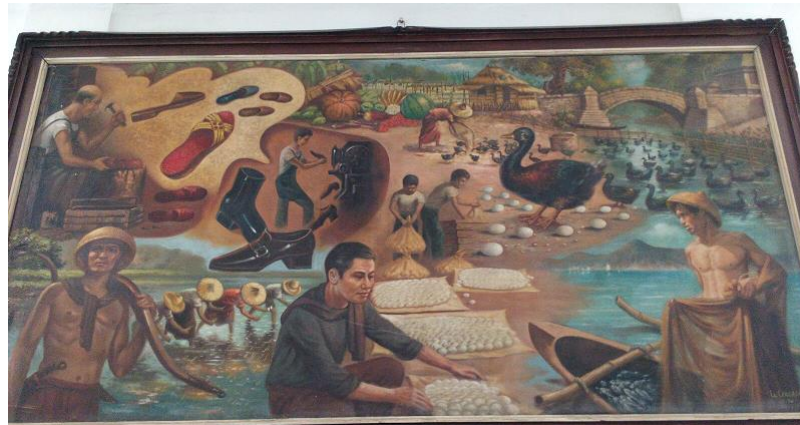
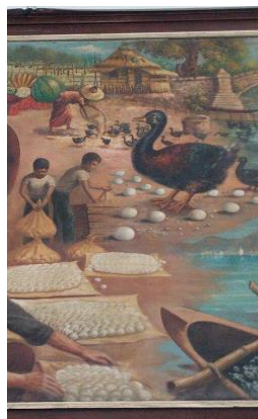


Figure 2) Pateros painting



1 People used to cultivate their rice into the water of the rivers



2 Balut is known as the product from Pateros, this egg was big business in its past. Nowadays the ducks are nowhere to be seen. The ducks can not keep themselves alive when there is no food in or near the river.



2 shoes where made and repaired, this business is still going on.



4 People used to catch their own fish from the rivers to feed their families, this is not possible nowadays because there is sadly no fish to be seen in the rivers. This is caused by the harmed water quality.



2.4.1 Current river state..

<div>1</div> 	<div>2</div> 	<p>These pictures show the current situation of the Pateros river. These pictures are taken in October of 2016. The river is visibly polluted by unnatural sources.</p> <p>Photo 1) floating trash Photo 2) River situation after heavy rainfall Photo 3) River situation when there is no rainfall for a couple of weeks Photo 4) Waterlilies start growing Photo 5) floating pieces of trash Photo 6) river with riverbank</p>
<div>3</div> 	<div>4</div> 	
<div>5</div> 	<div>6</div> 	

Table 1) Photo analysis Pateros river- current situation

#### 2.4.2 Bad smell..

Table 2) Photo analysis- global causes bad smell in the environment


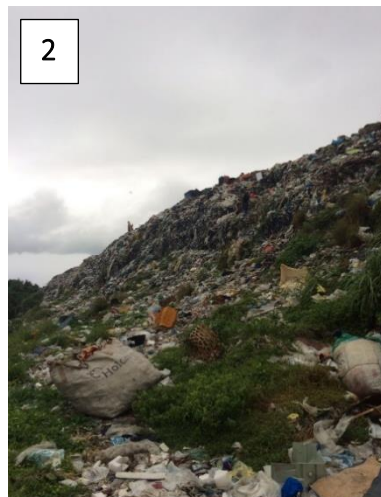


<p>1</p> 	<p>There are four main causes which have a bad smell as a result. On the first picture is a discharge pipe from wastewater discharges its water into an open hollow in the middle of the street. The origin of the water is unknown.</p> <p>In the second picture is the surface of the river water cover by waterlilies. The waterlilies makes that the water underneath gets a lack of oxygen. The lack of oxygen results in a rotting process underneath the water surface with a bad smell.</p> <p>The second pictures reproduces a dump side near to Manila city. Dump side are these days still used to replace the water from households in the cities and towns to a place where nobody gets disturbs by it. The smell of it is noticeable in public areas when there is no rain and he temperature is high.</p>
<p>2</p> 	<p>Picture four is taken underneath a bridge where clearly is shown how near some people live at the river. Also the drainage system ends up into the river water which makes the water quality very bad. Also the smell of all human faeces is noticeable.</p> <p>Waterlilies grow really good when the water quality is very bad so we are dealing with a vicious cirkel. The water quality is bad so waterlilies start growing which causes a even worse water quality and a even worse smell.</p>
<p>3</p> 	<p>4</p> 





Figure 3) the cause-effect that made the ducks leave Pateros

People we spoke with told us that this above shown problem (vicious circle) has been there for over 100 year. They have the feeling that they can not break this vicious circle. The government should think about a solution for this problem instead of them they are comfortable with being called as the urban poor of the victims of the modern society.

## 2.5 The slum

### What are slums?

Slums are created by the squatters after world war II. After the war the national capital opened opportunities for the population to reconstruct the capital. Factories, commerce and services were opened. Migrants came to the capital and settled themselves in the reserved spaced of expansion of the manila port. The amount of squatters rose in the first 10 year with 113% and the second seven year with 188,8% starting with 46000 squatters in 1946. people kept coming to the capital to be prosperous.

#### 2.5.1 Who are being discussed?

- Squatter
  - Someone who refuses social housing, these people sometimes rent their social house to make money. Squatters are used to live in the community and do not want to leave.
- Illegal settlers
  - In the beginning of the urbanisation in Mero manila, a large amount of people was not registered in this area. This is why these people where known as the illegal settlers.
- Informal settles
  - The illegal settlers had to register themselves and their family members so every person had a name and face for the government, this is when the illegal settlers where named as the informal settlers.
- urban poor-
  - To get rid of the past included in the name 'informal settler' we call these people the urban poor. The people living in urban poor areas are literally people who camp with the consequences of overpopulation and a bad living circumstances.

Nowadays there aren't enough houses for all the squatters so they have to build their own houses. hundreds of thousands of family's camp with this problem in Metro Manila New communities were arises in the riverbanks, the reason why people live in the riverbanks is is because this is the only area where the government will partly allow them to live. People living in the city centre of Metro Manila are not disturbed by the urban poor people if the live in the riverbanks. Because of the urban growth in this metropolitan the riverbanks became extremely dense, the rivers cannot handle the amount of people living there caused to the increasing amount of human faeces and trace that is being disposed into the rivers. Massive forcible eviction was been done by public lands and private lots. Despite that people kept mushrooming into the capital, they still believe that they can have a better future when they live in the city. In 2010 Metro Manila had 2.8 million (556 Families) squatters.

### Housing policy 1947

the government implemented the PHHC (people Home site and Housing Corporation) putted up a SLUM clearance committee which helped thousands of families from tondo and quezon City to Sapan Palay in Bulacan in 1960s.

Imelda Marcos held the title of Governor of Mero Manila in 1975 and as a minister of Human Settlements and ecology until the downfall of the dictatorship in 1986 of Ferdinand Marcos. She invented the housing project in and around Metro Manila by loans of the world bank . She invented this to reduce the flooding problem and restructure the infrastructure. From 1960-1992 the government replaced another 328,000 families to all-income-houses 25-40 kilometres away from Metro Manila. People like squatters have the human right to have safe and adequate housing.



## Social housing

*"The increase in number of "squatters" will continue for as long as the social roots that produced this remain. The "squatting" phenomenon in the country is a product of the neo-colonial order and it is imperative to continue exposing and solving the roots of this order regardless of whether the struggle for safe affordable, and appropriate relocation is achieved or not.*

*In relocation sites, the people should go on and fight for job creation and oppose economic policies that stunt the nation's growth. This demand can be achieved if the nation upholds national industrialization and agricultural modernization.*

*To do this, however, the Philippines has to assert national sovereignty and freedom from US imperialist control.*

*As the people dismantle the backward order, they will solve the housing problem by using state power over lands, beyond the right of private individuals (imminent domain) and by deciding to distribute residential places to the population as their priority in land-use planning."* (admin, 2014)



Figuur 3) Imelda Marcos - minister of human settlement

Social houses are built for the ones who live in the urban poor- / slum areas. Every year 1.000.000 houses are built, today there are 10.000.000 families living in these areas. Every year 1.000.000 families will be replaced to a social house, so in ten years if there are no families moving to the city and if urbanisation is not mentioned, the problem should be solved.

### Why are people forced to life in dangerous places?

because of the land monopoly. Arable land reached their limits because of land grabbing. The expansion of the production for export and for food has reached their limits. Land grabbing was a big problem and because the demand and supply was not in a balance the migrants were forced to move somewhere where they could get their basic needs.

The migrants moved to the northern side of Luzon where the squatter population grew faster in comparison with other parts of the country. The extension of the squatter population in these areas made the struggle for land rights and production relations intensive. The tillers from the lands were squatters and had some income but this was not common for all. The northern area's were known as 'public areas' and 'could be developed' areas so besides agriculture there was no work. Squatting became forbidden which did not solve the problem because these people do not have the amount of money to renovate vacant buildings, rent a apartment or even built a house. These people were now doomed to their slum houses in high-risk areas like sea shores, river sides, under bridges, transmission lines and in garbage dumps. Also these high-risk living places are not legal but the government fails in imposing order when looking at these living areas . (Jr., 2009)

### Why is this population growing so fast ?

The liveability in the Slums is really bad so shrinking would be more obvious then growing. people are strictly roman catholic and refuse family planning. There is a small group which agree with family planning after information sessions held by voluntary organization, but there is a lack of acceptance in the society when women choose for anti-conception. Also this option is only chosen when women already gave birth to more than five children.

### **Is the population aware of the waste problem?**

Yes, the government make sure that people become aware of the big water pollution problem but with a different kind of perspective. In several sources they say that the waste needs to be removed out of the rivers because of the water flood. Also, there are organizations which try to clean the rivers to give the river more capacity for then a typhoon comes over or when there is a long waterfall during the mason period. In just a couple of articles is been said that the waste needs to be removed out of the river because of the dangerous effect of the polluted water for the future. There might be an opportunity to create more awareness of the negative results of the polluted river whit heath danger and unfortunately dead fish. is the water is more healthy people might make advantage of it. (Philippines: A long-term vision to reduce flooding in Metro Manila, 2013).

## 2.6 1.6 research questions

Due to the insights after doing orientation of the current situation in Pateros we formulated one main question 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 partly reverse the history in the future?

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 3) 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,	<b>The Connection</b> 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	QUESTION	SOURCE	EXPLANATION
SUB- QUESTION 1	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?		
	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	QUESTION	SOURCE	EXPLANATION
SUB- QUESTION 2	How might we implement beautification in order to stimulate people not to discharge their waste in the river?		
	Implement beautification	Passig river beautification	People feel guilty to hard 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	QUESTION	SOURCE	EXPLANATION

SUB- QUESTIONS 3	Why should the involvement of the urban poor have a better outcome than ignoring them by pushing away?		
	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 partly reverse the history in the future?		
	Partly reverse the history	2.4 environmental analysis	Bring back the pride of Pateros
	Pride	(Kernerman Dictionaries, 2016)	Feeling of the additional benefit in a certain context, in this case for example the balut in Pateros.

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# DEFINE

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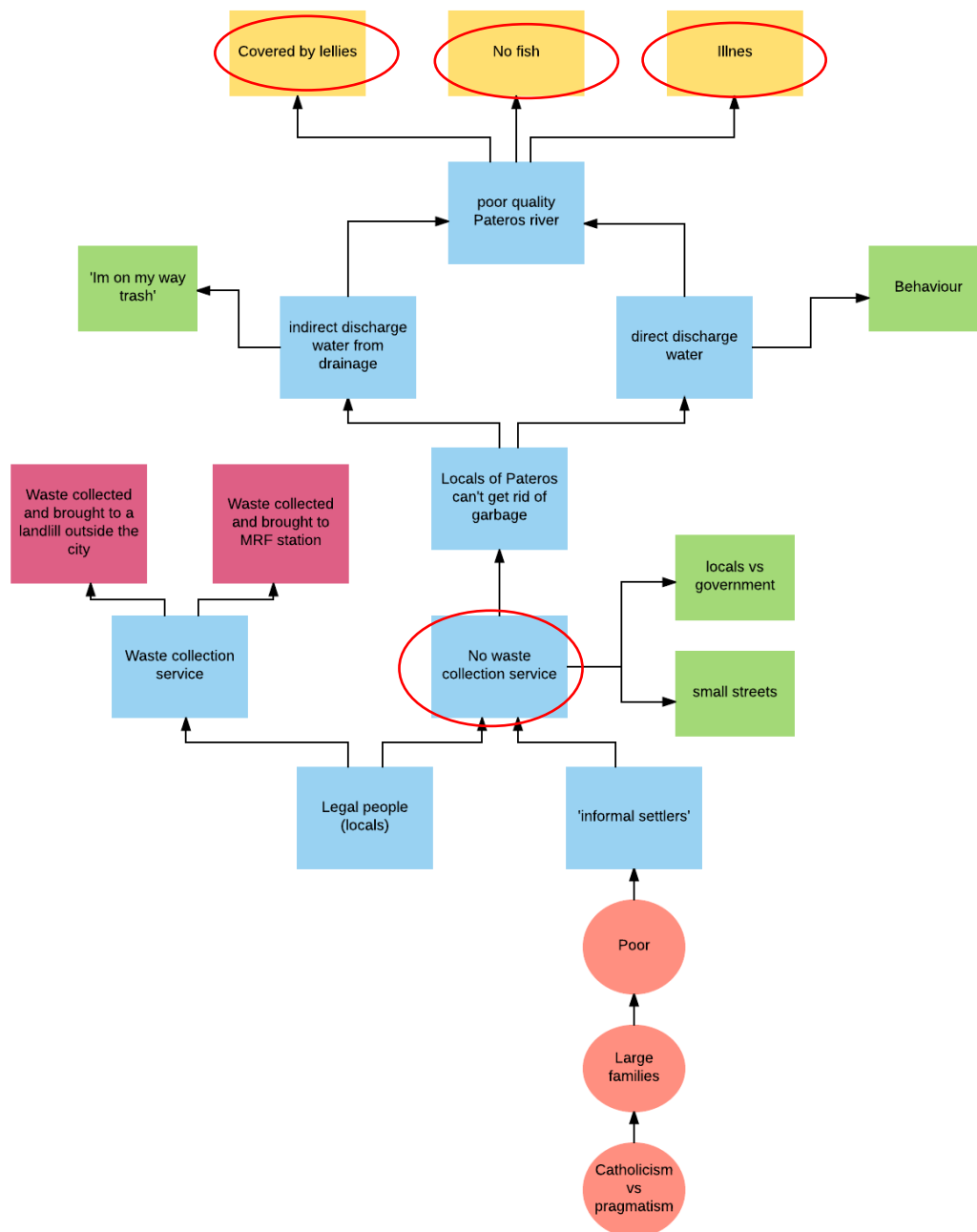
### 3 Define

In this phase, the definitions of the research is written down. All information about the situation and context about the frictions are described. The focus is narrowed down to the point where exact information needs to be obtained by conducting research in the specific area. The descriptions are given in the form of explanation, graphics or tables. The discussed subject is bold typed above the explanation.

#### Frictions that will be described

In this flowchart below a structure of the problem analysis is visualized. The subjects that are circled in red are the friction that will be looked deeper into.

Flowchart problem analyses



### 3.1 Community waste

To get insight into waste management among the community here in Manila, we combined the things we have seen on the streets of Manila with the desk research.

#### 2.3.1 What is community waste?

community waste is waste which is been produced by the community within households. One household mainly consists out of 8-10 persons.

who are the community's living among the river? There are several groups of people living among the river. First what needs to be known is that the government has a law that it is forbidden for people to live at the riverbank. The river needs to be clean for three meters on every side of the river. This number is for when there is an upcoming flood, the river has some space to overflow.

nowadays there is no strict consequence for living in that area. Some of these groups live there for over ten years. This group of people are called the "illegal settlers" these people have houses outside the city given by the government.

The thing is that people do not want to live in these houses. The reason for this is unknown. To assume that people rent their houses (which were given by the government) and they want to make more money in the city could be a reason. 2/3 of the income of the Philippines is not registered.

"when someone is registered they get a house from the government" but this house will quickly be rented to other people. So the big problem for the social houses is:

- why are people not registered?
- why do people not want to live in the social house they get from the government?
- In what way is the government consistent in following the law?

There are a lot of cons for the river because these people live there. At first people build their small slum houses really close to each other so no truck can pass. Most of the new-born people are not registered so the government has no specific number of people living along the riverbank. These people do not pay taxes and have no place for their waste to go, so what is happening next? People throw their waste and polluted water into the rivers, people burn their own waste which causes air pollution.

The waste management system in the Philippines is arranged by the government. When walking down the streets you see some containers which will be emptied by the garbage trucks. Sadly, the Illegal settler groups do not participate in this system. Not only the illegal settlers, but also legal inhabitants do not participate as well. What is the reason for this? To answer this question, we need to speak with the locals to see whether they want to participate.

### 3.2 Solid waste management system:

What policy does the government maintain in Metro Manila concerning waste management and which aspects are involved?

Due to the forced closure of two primary disposal facilities, the metropolis has been without any means to adequately and safely dispose of its garbage. The solid waste management sector requires a massive and urgent overhaul (Allen, 2004)

*Manilla generated in 2004 6,700 tons waste per day. From this amount, approximately 720 tons is recycled or composed. The balance—some 6,000 tons daily—is either hauled to the city's dump sites, dumped illegally on private land, in rivers, creeks, Manila Bay, or openly burned (when you see Manila from a higher place, the*



*mountains for example, you can see several puffs of smoke above the city*). Thousands of scavengers and waste pickers live and survive on this waste, eking out a harsh existence on mountains of smoldering waste. 'Taking into account their families, the hundreds of junk shops and their workers, the thousands of eco-aides, the thousands of garbage trucks and their crews, and the tens of thousands of slum dwellers living on, around, and near the dump sites, an estimated 150,000 residents of Metro Manila know the sight and smell of garbage as an integral part of their daily lives'. (Allen, 2004). great

Responding to this 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)

Another challenge concerns medical waste. 'Nearly 3,700 health care facilities in Metro Manila generate an estimated 47 tons of medical waste per day, with 56% of this waste, or 26 tons, considered potentially infectious' (Allen, 2004).

when looking for waste management organisations/companies, a company called Integrated Waste Management Inc (IWMI), was found. The company focuses on industrial waste management, portalets (transportable hygienic toilets), and in particular health care waste management.

Since 1991, IWMI has been an ambassador of proper disposal and treatment of health care waste. This action is in response to the government's need of assistance in terminating indiscriminate hazardous waste disposals which are direct sources of infectious diseases. This is done with the use of Autoclave.

An Autoclave is an instrument that sterilizes healthcare hazardous waste by subjecting the waste to high pressure saturated steam at the temperature of 121°C. The average process time is 15 to 20 minutes depending on the size of load and content (Management L. W., 2014).

Process of Disposal and Treatment of Health Care Waste



According to the image, the disposal is discharged at a landfill ('waste dump') outside the city. When we deepened into the landfill:

Figure 4) 5 process of disposal and treatment of health care waste IWMI (Management I. W., 2015)

## A brief history of the waste dump crisis

**The Rise (Early 1991–Mid-1992):** Early 1991 an important transition occurred in Metro Manila concerning waste disposal. Metro Manila operated numerous dump sites. When the internationally famous Smokey Mountain dump site closed, In San Mateo, Rizal, a regional sanitary landfill facility was opened, what was also a result of the public pressure to improve waste disposal. In 1992 this was followed with the opening of the 65-ha Carmona regional sanitary landfill in Cavite. International standards were taken into account concerning the construction and the design of the facilities; this represented a major accomplishment for the government.

**The decline (Mid-1992–Late 1997):** The operations at San Mateo and Carmona had a large impact on the local communities. The design, construction and operation standards decreased. This raised concerns about the environmental risks. Hundreds of trucks thundered through communities nightly, strewing garbage in their

wake. The public opposition increased largely, but the disposal operations continued and the dump-sites were growing.

**Prelude to Crisis (Late 1997– Late 1999):** Due to public opposition, the operations at Carmona were forced to be suspended. This caused increased pressure on San Mateo and other dump sites to deal with the additional waste. In 1998, the options to dispose waste were further limited by the passage of the Clean Air Act. Plans were made to build incinerators. Various studies have been done this period, but recommendations have never been implemented.

**The Crisis (Late 1999–Early 2001):** Because of immense public opposition, the operations of the san mateo sanitary were suspended in 1999 and the waste disposal crisis became a sudden phenomenon. Manila was out of options for disposal, and waste became uncollected. Dumping at the existing sites was accelerated, and small-scale private dump sites were developed. It is assumed that this was an initiative for the rich people who were able to afford it. Private sector initiatives began to grow. Plans to dispose waste to Bataan to the northwest and Semirara Island to the south. These plans causes public opposition. Uncontrolled dumping at Payatas led to a large waste mass failure at the site in July 2000. The government tried to select a private sector to develop an integrated waste management system, but these plans remained not persevered.

When searching for several act concerning waste management, the following act was found; Under RA 9003: the local government is responsible for collecting non-recyclable materials and special wastes, while barangay units are given the task and responsibility of collecting and segregating the biodegradable, compostable, and reusable wastes. Of Metro Manila's 17 cities and municipalities, 11 contract out garbage collection to the private sector and 6 collect garbage themselves as part of their local government functions.

According to this act, the government is only responsible for non-recyclable materials and special wastes. The Barangay units are responsible for collecting and segregating the recyclable wastes. Now the question arises, how much effort

the government and the LGU's (Local Government Units) put in collecting the waste, and that depends on the barangay. As mentioned above, 11 barangays contract out garbage to the private sector (Allen, 2004).

Current Collection and Disposal System				
Local Government Unit	Collection	Reported Coverage (%)	Own Disposal Facility	Reported Waste Disposal Location
Caloocan	Contract		Yes	Rodriguez
Las Piñas	Administration		No	Pulang Lupa
Makati	Contract	80	No	Rodriguez
Malabon	Administration		Yes	Catmon
Mandaluyong	Contract	95	No	Rodriguez
Manila	Contract	100	No	Rodriguez
Marikina	Administration	100	Yes	Doña Petra Rodriguez
Muntinlupa	Contract	85	No	Rodriguez San Pedro Bacoar
Navotas	Contract	95	Yes	Tanza
Parañaque	Contract		Yes	San Pedro
Pasay	Contract			Rodriguez San Pedro
Pasig	Contract	100	No	Rodriguez Taytay Payatas Rodriguez
Pateros	Contract/ MMDA		No	
Quezon City	Contract		Yes	Payatas
San Juan	Contract	90	No	Rodriguez
Taguig	Contract		No	Rodriguez
Valenzuela	Administration	80	Yes	Lingunan

Figure 5) 3 collection and disposal system in 2004

### 3.3 How the waste affects the water quality

Landfills require a lot of valuable space that cannot be afforded. Putting up landfills and open dumps that will compete with the demands for spaces for people to live and work in is an unacceptable proposition. The location of dumpsites, near and around major urban areas, could create problems

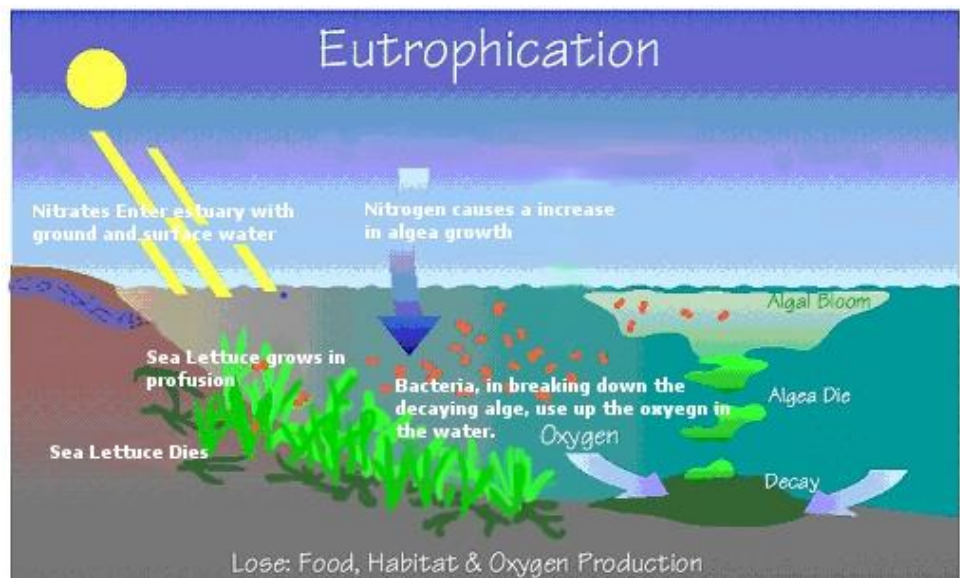


Figure 6) eutrophication - by google images

associated with this worst form of urban sprawl. Garbage landfills may leach out toxic substances that will contaminate water supplies, both surface and groundwater. The effects of such contamination may not be immediately evident, but environmental and public health would be severely compromised (Greenpeace, 2000).

For example samples of leachate (the liquid what drains or 'leaches' from the landfill) collected from the Carmona and Payatas dumpsites in Manila, showed high levels of toxic heavy metals chromium and copper. Elevated levels of zinc and lead were also identified. Dichlorobenzene also turned up but only at trace levels (just above limits of detection). Leachate from the Carmona dumpsite showed high levels of chromium being discharged directly into the Menama River. Leachate tested from the Payatas dumpsite had very high levels of chromium, up to 35 times uncontaminated background levels and six times guidelines to protect ecosystems from toxic impacts. It should be noted that leachate from both waste dumps flow directly, without benefit of treatment, into critical water systems – the Laguna Lake in the case of Carmona and the San Mateo-Marikina rivers in the case of Payatas. The La Mesa dam, Metro Manila's primary source of drinking water is also situated next to the Payatas open dump (Greenpeace, 2000).

Eutrophication is a cause-effect that happens underneath the water surface. Eutrophication. The specific reason for choosing this effect is to show that also the nature can harm the waterquality itself.

### 3.4 Governmental policy concerning water quality and river rehabilitation

The government is willing to reduce the pollution in the rivers of Manila. Via IWasto, a lot of LGU's and committee's are informed which have money available for sustainable projects concerning the rivers in Metro Manila on the long term. An example is the Pasig River Rehabilitation Project (PRRP). The Pasig River was a polluted river, which has been cleaned in 2015. The following committees have been appointed for realizing and sustaining this project.

- Housing and Resettlement Committee (HRC) shall be responsible for the relocation, housing and resettlement of those occupying the danger zone or living along the banks of the Pasig River System. It shall also conduct post relocation and Estate Management activities including the provision of the Livelihood Support to the relocates.

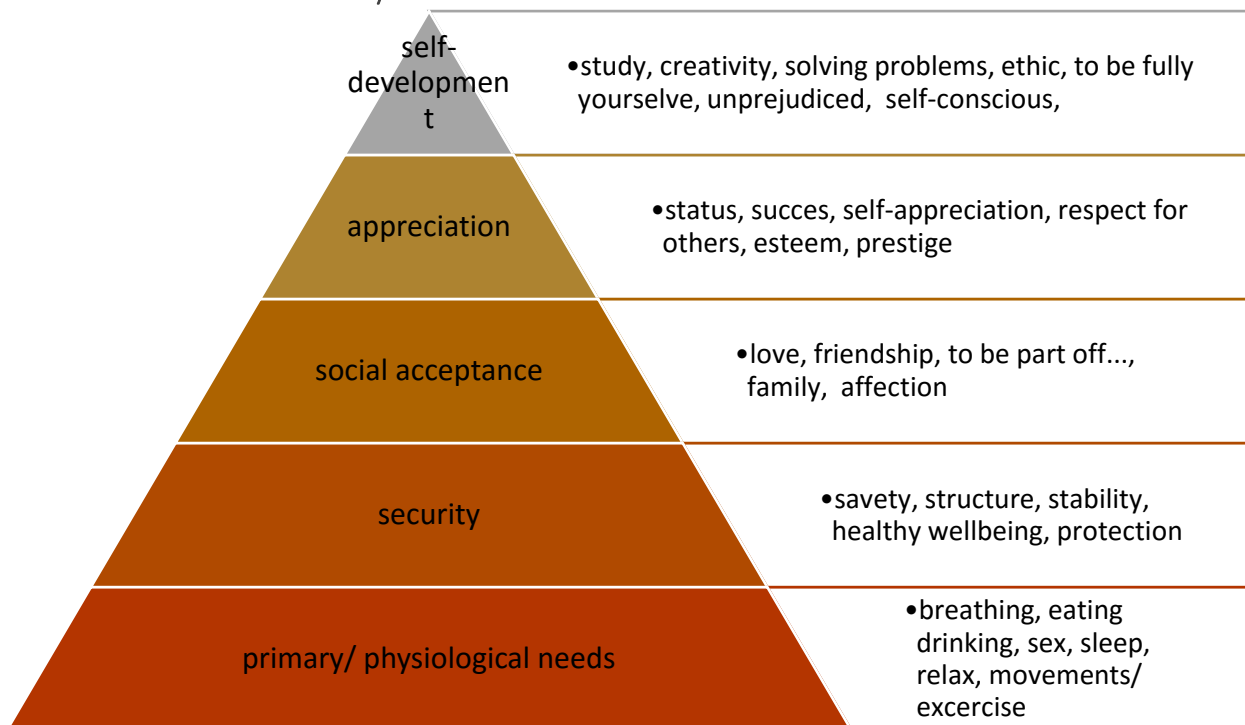
- Riverbank, Transportation and Tourism Development Committee (RTTDC) shall be responsible for ensuring that the easements provided for in the existing laws are observed within the Pasig River and its tributaries and other waterways that drain into it including the esteros
- Flood Control Committee (FCC) shall undertake civil works necessary for the rehabilitation of the Pasig River System. Environmental Management Committee (EMC) shall abate/stop the dumping of solid waste and untreated liquid wastewater and septage into the river from all sources including industrial, commercial and domestic in line with the goal of the Commission to upgrade the waterway to attain the Class C water quality.
- Public Information and Advocacy Committee (PIAC) shall promote the effort of the government to rehabilitate the Pasig River and its environs in order to create a high level of public awareness and support for the success of its program.
- Project Management Office (PMO) is headed by the Executive Director and Division/Units under PMO include: Office of the Executive Director Office of the DED for Operations Office of the DED for Finance and Administrative Services (Commission, 2014)

### 3.5 Behavioural changes

The things we saw during the observation was that there is no consequent policy. You see this problem in traffic areas where there is a large chaos. When there is a dual carriageway people use it as a three-lane road of even four-lane road. Nobody is telling them that this is not the way to do it. Also using the river as a garbage dump is socially accepted over the years. How could we make a difference in this change? We need to keep in mind that the people who use the river as a garbage dump do not have an other choice in their perspective.

#### 3.5.1 Motivation

this is the psychologic model of Maslow, The livelihood and health of the human being is determined by the levels which are shown in the Maslow Pyramid below. Aspects which have influence on the wealthy being of the people is; money, genital aspects, physical aspects, mental aspects, personal features. This model is described with only pointing to the dynamic aspects because the static aspects have to do with ethnicity and culture. Nice method



Layer	Need	Extern need	For who?
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primary	<ul style="list-style-type: none"> <li>• oxygen</li> <li>• Food</li> <li>• Water</li> <li>• Clothes</li> <li>• Shelter</li> </ul>	<ul style="list-style-type: none"> <li>• money</li> </ul>	<p>Inhabitants which for the bottom of the society.</p> <p>Short- term thinking is a big problem with these people. But they do not have anything to lose. The only security they have is that they are never sure about anything is this primary layer.</p>
Security	<ul style="list-style-type: none"> <li>• consequences</li> <li>• trust</li> </ul>	<ul style="list-style-type: none"> <li>• Spirituality</li> <li>• Exit prospective</li> </ul>	<p>For the new generation of the people of the primary layer. They go to school which makes the difference that they learn how the look into the future and what they want to achieve. Also the religion plays a big role in this. People use their faith to build on.</p>
Social acceptance	<ul style="list-style-type: none"> <li>• Uncover weaknesses and fear</li> </ul>		<p>When this generation go to school and recognise what they like and what they are good at they will form a group of people with the same talent of interest. They feel accepted and heard.</p>
appreciation	<ul style="list-style-type: none"> <li>• Self-esteem</li> <li>• Recognition</li> </ul>	<ul style="list-style-type: none"> <li>• Genetic facts</li> </ul>	<p>When you as a Person get the recognition of someone or a group that you really mean something for the big picture. You as a person feel needed. This is for all the people who are working for the society that make the difference.</p>
Self-development	<ul style="list-style-type: none"> <li>• No obstacles, uncertainty, struggles, self-prevention.</li> <li>• Energy stabbing In potential yourself</li> <li>• You feel confident and appreciated!</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge</li> <li>• Mental factors</li> </ul>	<p>When you achieved all passed goals and there is no struggle of obstacle in your way you can achieve your self-developing.</p> <p>This will only happen when you can put ALL your energy into you passion of interest or work, study, etc. No energy can go to struggles of obstacles this will deter realms beyond what you have been given by nature.</p>

(Funkyfish, 2007-2016)

To coop with the people who live in the primary level, they need to be taught of the short term thinking instead of long-term thinking. The locals need to see the difference between the current situation and the new situation within approximately one week instead of five years.

A change of the mindset of these people is what needs to be done to give them the insight and benefits of the advice. On the photos you see the waste in the water. It consists out of small pieces and when walking at the river bank the smell is terrible. Here you definitely smell the rotting process which happens underneath the water surface.



Natural forces	Not natural but human forces having influence on the situation
Water flow	Human

### Building materials

What materials are signalled in the environment? People have built their slum houses besides the river from wood and metal. It looked stable but small. Also there live a lot of strays around these houses. At some places you see mattresses and blankets, laying in the open air. It looked like some people do not even have a slum house.

(Picture 6) shows a community which is built within the 3 meters in the riverbank. Building within these three meters is forbidden because the river needs this space to flood when there is. So this is actually forbidden *but it looked like this community* was there already for a couple of years.

Picture 1 shows the slum houses, it looked like a small community with their own chickens and laundry hanging everywhere.

### Knowledge

The problem overall in the Philippines is that a lot of the local people living in the bad and unhuman living situation is that they are not educated. So changing the behaviour of someone who is living that way for over 40 years is a task that can not be done by writing a advice for the government. There needs to be a need for them in there as well as could see why they should change their behaviour.

The behaviour which we think is 'wrong' is for them a normal thing which became a ritual over the years. The government became solidary with the inhabitants and created different schools. Now there is a public school for everyone, this school has a low threshold for all. There is also a private school which focuses on leadership and organizing a business. This is where the rich people will stay rich and where the poor people keep having a hard time to make steps to a higher level.

### Gaining more environmental / community information

Interesting parties which could mean something for the research:

- tour to the social houses for the illegal settlers
  - why do slum people not want to live there?
- introduction to a slum community and to the local people living around the area
  - who are we actually coping with?
- Passig rehabilitation centre
  - relocation community, why are they not fully acting responsible? Or positive? How could we help them for creating more support for them from the inhabitants of their barangay?
- LGU (Passig, Pateros, Taguig, Makati)
  - who is feeling responsible for what problem?
  - support from them for our research?
  - designers, engineers, etc.
- Barangay captain (barangay baby(?))
  - to introduce us to locals and mayor/vice mayor. Create support by acting like an ambassador for helping the environment

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# METHODOLOGY

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## 4 Methodology

To answer the questions conducting research by using different methods is needed, because this makes it possible to gain information from multiple perspectives.

To repeat the research 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 by pushing them away?
- How can we partly reverse the history in the future?

The main and sub-questions concern the following aspects:

- Living in the riverbank: what is already done about this problem?
- How does the current waste management system work?
- Who is responsible for household waste?  
what is a consequence of not participating together with the waste management system
- What motivates the urban poor
- Can we use beautification in the Pateros river?
- Trigger people to change their behaviour
- Active participation and putting effort into a system

### Interviewing + Participants

this method consists out of open questions which can be asked to anyone who have interaction with the subject in any kinds of way. The interviews that will be used are half-structured interviews with open questions. This makes sure that the people we speak 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 because in this way we will gain a lot of information without investing too much time. Who do we need to speak with? The environmental police from the local government has a close band with the people living in urban poor areas. The environmental police is willing to help us and is willing to give the information we need. They will bring us to the barangay captains and to the people from the urban poor areas who can give us information about living a certain area.

so in the end the people who we will speak with 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 makes sure that everyone is free to respond on the topic. This 'write-your-mind' will be 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 an other 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 ask 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' 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 is done and the contextual information is gathered together and defined. So, when we have 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 gets 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 will be places in the wall. Per How might we question the group gets 8 minutes to brain dump.

All ideas will be structured afterword's in categories, you will see that there are familiarities together with the ideas. When there are groups Is it important to choose 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

Table 4) global research planning

Steps	What do we need to do?	What is the goal?	When
<b>Step 1)</b>	Get in contact with the most influential persons of the Pateros river?	<ul style="list-style-type: none"> <li>Who is making the decisions?</li> <li>What are the rules?</li> <li>What are the consequences of not following the rules?</li> <li>Why is there not just a net what catches all the waste?</li> <li>Where do the inhabitants need to dump their trash/waste?</li> </ul>	Start 10.10.2016  End - 2 weeks after
<b>Step 2)</b>	Collect some working and existing products. services from the Netherlands	<ul style="list-style-type: none"> <li>Implementing systems from the Netherlands to a system that fits the Philippines</li> <li>Creating a valuable area for the waste</li> </ul>	Week 2/3
<b>Step 3)</b>	Combining information from the influential persons and the Dutch systems	<ul style="list-style-type: none"> <li>Creating a fitting system for the community</li> </ul>	Week 3/ 4
<b>Step 5)</b>	Creating a video where we present the community system	<ul style="list-style-type: none"> <li>Pitch of the system which fits the community.</li> </ul>	Week 3/ 4
<b>Step 6)</b>	Presenting to Gina Lopez	<ul style="list-style-type: none"> <li>Signature for the community system that fits the government and the society</li> </ul>	Week 4
<b>Step 7)</b>	Creating a prototype and improve this.	<ul style="list-style-type: none"> <li>Thinking of several aspects.</li> <li><b>Sustainability</b></li> <li><b>Usability</b></li> <li><b>Visibility</b></li> <li><b>Physical aspects</b></li> <li><b>Cognitive aspects</b></li> </ul>	Week 5
<b>Step 8)</b>	Making advertisements (could be anything) for the system. People need to know what will come and they will accept the change more if they are prepared for the change.	<ul style="list-style-type: none"> <li>Gaining more acceptance by making people aware of the future change and making them enthusiastic.</li> <li>Also telling them that not following the rules will have consistent measures</li> </ul>	Week 6
<b>Step 9)</b>	<p>Hanging the advertisements or application</p> <p>Send all the locals a text via sms to attend them to the upcoming system.</p> <p>Creating a platform or meeting day where people can react on the upcoming system.</p>	<ul style="list-style-type: none"> <li>“ ”</li> <li>Making sure that people talk about the change.</li> <li>Giving them a change to give an opinion.</li> <li>If you give them aa change to give an opinion they can never say that this was decided without them.</li> </ul>	Week 6/7
<b>Step 10)</b>	Assimilate the opinions of the people within the system if possible.	<ul style="list-style-type: none"> <li>Gaining acceptance for the future and end-users.</li> </ul>	Week 7/8
<b>Step 11)</b>	Building the system if possible and fixing the final presentation.	<ul style="list-style-type: none"> <li>With the pressure cooker people end money form the government</li> </ul>	Week 9/ 10

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# RESULTS

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## 5 Results

The results as we expect them to be are described in this chapter. Now that we are in Manila, our perception differs from the perception we had in the Netherlands. Therefore, our expectations are more representative to the situation here.

Based on desk research and conversations with the IWASTO and PROUD organisations, a new perspective with regard to the problems in Manila has been found.

### **How might we create in cooperation with the locals and the government a valuable destination for waste in order to reduce the pollution in the Taiguig river?**

In order to answer this main question and to get in the right direction, the sub questions will partly be answered. We will also try to explain how to gather the further information (during the field research) we need in order to answer the questions completely and accurately.

Sub questions:

**What policy did the Dutch government maintain to clean the Dutch canals and in what way would this suit the Taiguig river in Manila.**

### **Policy in the Netherlands**

Due to the implementation of a drainage system in the canals of Amsterdam during 1970, the water quality significantly improved. Before this drainage system, the water quality was very poor because of all the 'human discharge' what ended up in the water. It was not only that; also companies discharged their waste into the rivers and canals. After the world war, these companies moved away (**Ouboter, 2015**).

In this chapter, the policy of HOW the Netherlands achieved this, and how they changed the people's behaviour, will be described.

### **Policy in Manila**

The government of the Philippines/Manila is willing to reduce the pollution in the rivers of Manila. Via IWasto, a lot of LGU's and committee's are informed which have money available for sustainable projects concerning the rivers in Metro Manila on the long term. An example is the Pasig River Rehabilitation Project (PRRP). The Pasig River was a polluted river, which has been cleaned in 2015. The following committees have been appointed for realizing and sustaining this project.

- Housing and Resettlement Committee (HRC) shall be responsible for the relocation, housing and resettlement of those occupying the danger zone or living along the banks of the Pasig River System. It shall also conduct post relocation and Estate Management activities including the provision of the Livelihood Support to the relocates.
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- Project Management Office (PMO) is headed by the Executive Director and Division/Units under PMO include: Office of the Executive Director Office of the DED for Operations Office of the DED for Finance and Administrative Services (Commission, 2014)



To answer this question, we endeavour to speak with the PRRC. The fact that there are several committee's focussing on different aspects, shows that there is structure within this organisation. It also shows which data they have and what we could use for our research. Contact is made with George, follow the leads of Peter and Mylene all the way to the top: Gina L. Come prepared... ask Mylene about 'the roast of Floris'

### How could we use the hierarch system in Manila to prevent water pollution?

To answer this question, we first need to map the strong hierarch system here in the Philippines. Then we know who to approach and who could be valuable and has positive impact on the situation. We already know a lot about Gina Lopez and her power and passion concerning solutions for environmental problems.



Figuur 4) Gina Lopez

'Gina Lopez is the current Secretary of the Philippines' Department of Environment and Natural Resources (DENR). She was appointed by President Rodrigo Duterte and has become one of the best environmental icons of the country ever since' (Wikipedia).

Gina Lopez

**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.

To implement beautification, we could offer the LGU an advice/design about which aspects they should think about, partly based on the Pasig River. This advice/design will not be our focus point; our focuspoint will be beautification aspects in combination with behavioural aspects and the correlation between.

### How could we motivate the locals to put effort into this system and to create willingness to make this system work?

A community and cultural research is required in this questionnaire. With regard to cultural research we already have a lot of information, based on what we have seen here, read, and heard. In this questionnaire, it is necessary to make the locals realize that a clean river is also in their advantage. Very typical for these people is the short-term way of thinking. With that in mind, they don't bother about a clean river in the future.

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# DISCUSSION

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## 6 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 need 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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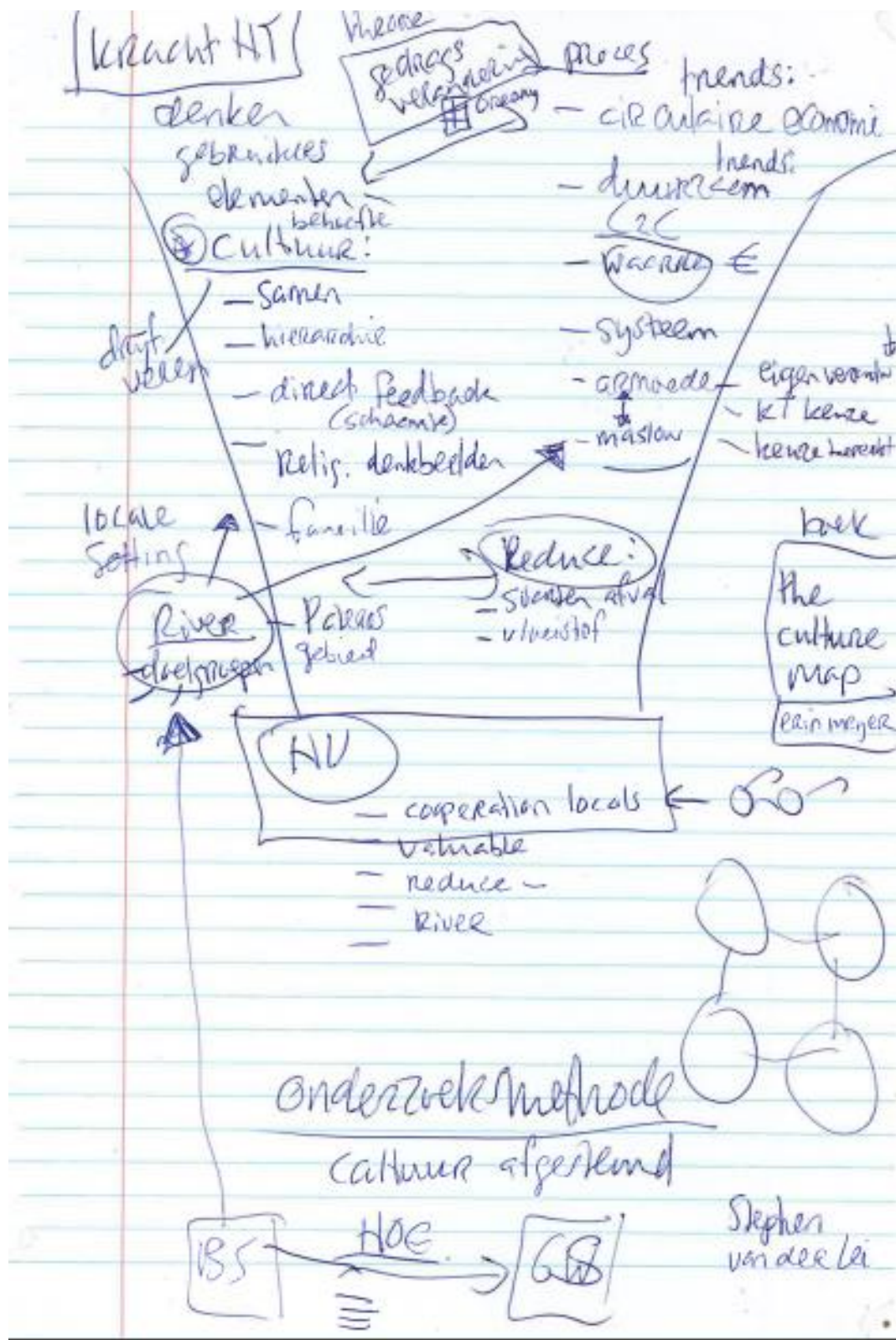
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# ATTACHEMENTS

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## 8 Attachment

Attachment 1) structures research by Maria Prins

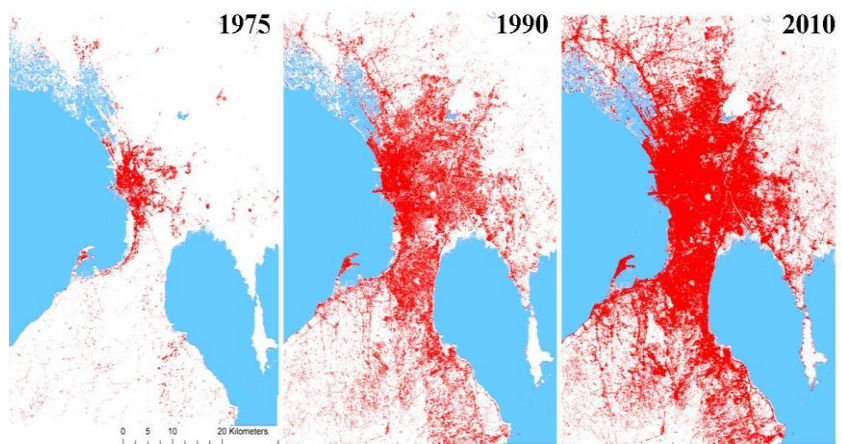




## Reducing the pollution in Pateros

### Background information

Manila has grown enormously the past 40 years. Metro Manila has 1200% more inhabitants than 40 years ago, and it is nowadays one of the largest cities of the world with a population around the 12 million people. Much of the population lives in slums, and also the slums are growing each year. The inhabitants used to be swimming and washing themselves in the rivers.



Urban population growth in metropolitan Manila

Because of the high population growth, the rivers are very polluted. This is for instance because many residents have septic tanks or don't have a sewer at all. All this waste water ends up in the river. In addition, you will see a lot of solid waste floating. Yet inhabitants still swim in the river and they also wash themselves in the polluted water from the river. Various people get really ill caused too the water.

### Problem analyses

Manilla struggles with a so called problem 'the Informal Settlers'. The illegal settlers are people who live near the river, at the riverbank. This is not allowed, but the people do not have an other place to live. It is dangerous for the people who live there, because living near the river brings high risks, such as flooding and illness. Therefore, the river is not approachable for the government and makes it hard to control the river for safety, liveability and health. Besides, it turns out that the Illegal settlers play a dominant role in the pollution of the river.



Slum in Manila



Above mentioned problem is very relevant for the Pateros Area in Metro Manila. The Pateros Area is an area which consist of approximately 70.000 inhabitants. The focus will be placed on the people who live near the river. Almost a thousand families are dealing with poor living conditions, including poor quality of the water. These days there is a solid waste policy but it is not solid in all places. Twice a day the local governmental units (LGU) pick up the waste of the citizens. But there is no structure in time management when they pick up the waste. This should not be a problem but actually it is. The government divided all provinces in smaller parts and placed there a LGU. The LGU's are payed by the people who live in that area, well not directly payed. The LGU's get money from the citizen of their area if they work. These people actually pay a sort of tax to the LGU. This Tax needs to be payed when the person who works get their paycheck. By doing some quick thinking you could imagine that not every area has the amount of people whit solid work. So these LGU's do not get enough money to buy garbage trucks and pay transport costs for the garbage. This means that not in all parts of Manila the garbage is collected.

By clicking on the following links, you can get an image of the situation concerning the illegal settlers in the slums of Manila.

<https://www.youtube.com/watch?v=FEX3TIM3tcU\>

<https://www.dropbox.com/home/Manila%20Delta%20talent/Foto's%20en%20video's?preview=PRRC+AVP.a>

## Case



The Taguig River is being severely polluted. This is a result of the fact that the local people cannot get rid of their waste, which makes it logical behaviourism for the locals to discharge their waste in the River.

Analeigh, her husband Paul, and their four children, live near the Taguig river and struggle with the poor quality of the water. All the waste covers up the water and as a result, oxygen can't reach the water. This has a big impact on the organisms living in the water. Water without oxygen means the death of a lot of organisms and stimulates the rotting process, with a bad smell as result.

Analeigh and her family produce approximately 5 kg of waste per day. A large part ends up in the river. The family does not like to discharge their waste in the river but very often they do not have a choice. Her son, Amando, became extremely ill from exposure to the polluted water.

It would be a big wish for Analeigh to be able to let her children grow up in better living circumstances. The river was once a clean river full of fish and ducks. People desperately want the old river back, but simply do not have the resources to realize that.

## Research questions

*"How might we create a healthy and flood free river?"*

- How might we make people aware of their (environmental) habits?
- How might we make people more proud of their river ?
- How might we make the river more approachable for cleaning initiatives without relocating the informal settlers?
- How might we make the waste valuable, in order that people can make money out of it?

Before you answer the main-question you have the answers of the sub-questions. Before the outbreak of panic, we created a structure for these two days so every time before lunch you as a group needs to deliver something. This could be a everything.

Our main goal is to meet the local people near the Taguig river concerning waste management. We want to work to a solution (or service) what triggers behavioral change in a way that people are not forced anymore to discharge their waste in the river. This will lead to a cleaner river and higher quality of the water. The most important aspect is that the local people are involved in the best possible way during the process to this solution. What actions could we take to create social acceptance towards the local people of the pateros and how do we involve them? And how can we involve natural forces during this process? Think about the climate in the Philippines and environmental aspects.

Bijlage 10000

#### **Focus points conversation Mylene and Peter**

- Operating on government level instead of barangay/local level
- Top-down approach instead of bottom-up
- Much data is available at Pasig river rehabilitation and via other organisations. Lots of research is already been done.
- Lisa and Fenna are still focusing on the human and social aspects (behaviour) of the local people. Yes, of great importance
- When you want to change behaviour; education is an highly important aspect and is something we should take into account.
- Gina Lopez and others... is a powerful person on the long term and in our situation. What we come up with has to suit her view.
- IWASTO is an important event which we have to use as an opportunity and where we have to present a convincing and suitable solution
- Clear plan of action has to be written; for Mylene and Peter and also for the government (based on our research and solution).



