

Manila's Growing Garbage Heaps

Improving Manila's household waste management system and see it as an asset

Elin Johansson

Lund University



1 Introduction

After three weeks in Metro Manila one of my biggest impressions was the amount of garbage that we had passed by, both on the streets but also in the various projects that we visited. It is not just about garbage in a dirty and disgusting way but also about the great desire to recycle and reuse materials in new forms. Along the streets and in between buildings scavengers, rag collectors and small kids dig through the waste in search for recyclable materials and profitable goods.

Repeatedly I get admired by Filipinos creativity and their desire to create something new out of waste. Old water bottles are used as pots along balconies to grow vegetation, old MountainDew's hanging like wind chimes in the trees and dated billboards are used as ceilings to create shade. A recurring view is also all the Filipino women who separate old plastic bottles and bags and creates small, delicate pencil cases, wallets and purses which will generate an extra income. It is obvious that recycling is a way of life for many Filipinos. Throughout Metro Manila a large majority of the population is living and breathing amongst heaps of waste to feed their loved ones.

The problem of overconsuming is a worldwide phenomenon that we struggle with daily. In many industrialized countries waste management is not a problem since the waste disposal system is well developed and efficient. But in Metro Manila we are facing another reality due to the poor, existing waste management system in combination with a high amount of waste which have resulted in a

situation that is out of control. The problem is not solely about the littering around the city but also about the risk of spreading diseases.

Another problem that Metro Manila is struggling with is the flooding that annually affects thousands of people in the city. The weakest people that are living along the riverbanks are forced to flee their homes and need to start over several times each year. This problem derives from the failure of a proper waste management system which results in contaminated rivers and creeks that prevent the natural waterflow and during heavy rain this contributes to an even bigger damage since the water is obstructed from flowing away.

Finding a solution to this problem is therefore more important now than ever. My intention is to investigate Manila's waste management system in comparison to countries in the industrialized world but also look into successful projects in low-income countries. How can these components be put together to be further developed into a solution in a larger scale and how can we as architects and urban planners contribute to this development?



Garbage in Baseco, Manila (Johansson, 2015)

2 Literature Review // Problems

In 1991 one of the biggest and most renowned dumpsites in the world, Smokey Mountain, was closed. The reason for the closure was the frequent fires that caused several deaths of inhabitants in and around the area. The security of these areas was way too low and in both dumpsites and landfills around Manila several accidents occurred that created concerns about further collapses and casualties. This means that the problem with waste management dates way back in the Filipino history and in conjunction with the growth of the city the problem has escalated even further.

As an attempt to control the problem the Republic Act 9003, RA9003, also known as the Ecological Solid Waste Management Act of 2000 was signed into law on January 26, 2001. The law was created to encourage separation at source,

segregated collection, storage, transfer, processing, treatment and disposal of solid waste. The law promotes a way of thinking that waste is a resource that can be recovered with the 3 Rs: Reduction, Reuse and Recycling. The goals with RA9003 was to protect the public health and the environment, to encourage resource conservation and recovery, to support research on technologies and techniques in solid waste management (SWM) and to promote environmental awareness (UNDP, 2011). Unfortunately the law did not give the effect they hoped for fourteen years ago and the problem with trash continues to be big issue in Manila.

The question to ask is why did not this become as successful as they thought? The law has been criticized by many sectors as unrealistic and unimplementable since some provisions of the law are hard to follow. One example of this is the time-bound deadline for the implementation of the project that are considered unrealistic by some local implementers, particularly Local Government Units (LGUs). Another problem is the financial and economic limitations that the LGUs are facing which makes it hard to fund and sustain an effective SWM that is embodied under the law (Mercado, 2006).

Health

Since RA9003 failed to improve the waste situation in the Philippines the health among the squatters and informal settlers has continued to increase. Among the children of Metro Manila's main dump site, 974 children were examined and out of them 24% had chronic cough, 25% wheezing and 19% a shortness of breath due to their exposure of hazardous materials. Economic difficulties pushes recyclers to consume recovered food which often result in stomach infections and parasites such as worms, flukes and different viruses. Tuberculosis, malaria and various skin disorders have been identified in several informal recycling communities in Manila. Stool samples taken from children working on dumpsites in Manila confirms that 98% have



Kids picking waste on the streets in Smokey Mountain, Manila (Johansson, 2015)

some kind of parasite. In addition to the different types of diseases the health is also affected by hand and back injuries caused by lifting heavy objects (Binion, E & J. Gutberlet, 2012).

Another health related problem is the risk of getting caught in surface subsidence, trash slides and fires which happened in Payatas, Philippines, in 2000. Heavy monsoon rain and a tropical storm was the trigger for the huge garbage mountain to collapse and the trash slide resulted in hundreds of dead people (BBC News, 2000).

Environment

The constant dumping of garbage in creeks and rivers is the main problem of flooding in the city. Out of the generated garbage everyday, 30 percent is dumped into canals, rivers and creeks which affects the drainage systems and contributes to the metropolitan flood problem. So by avoiding that the waste clogs these systems the flooding can become a smaller problem than today (Rodel Clapano, 2013).

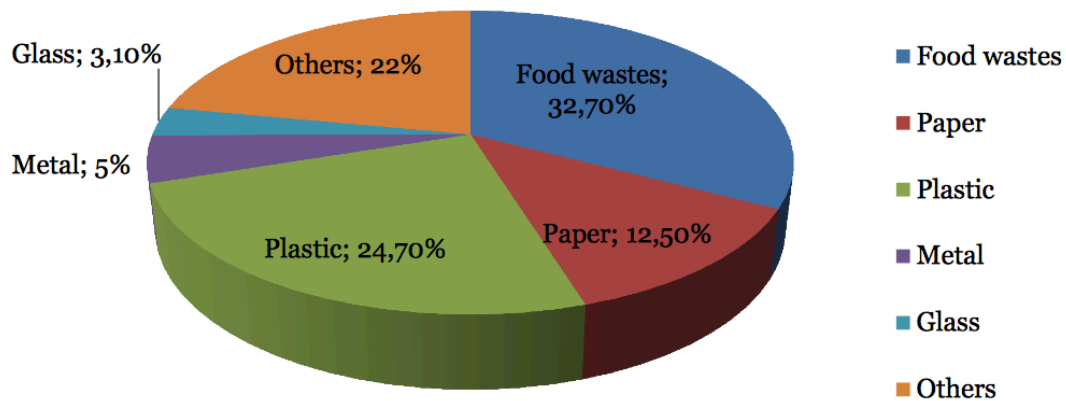
In contrast to many developed countries scavenging and recycling in the Philippines is seen as a livelihood. In the developed countries you throw your garbage and then the garbage truck collects it and after that you normally do not have any insight into what is actually happening. In the developing countries millions of people collect, separate and recycle as a livelihood. The scavengers contribute to the local economy and the environmental sustainability. Despite this, they have deplorable living and working conditions and a low social status. Improving the waste management system in the Philippines will decrease the amount of scavengers which means that thousands of people lose their livelihood (WIEGO).

To succeed in creating an effective system the problem with accessibility need to be solved since the narrow and sometimes non-existent network of roads creates difficulties, especially in the informal settlements. Solving the waste management system there is at least as important to get rid of this problem.

Since Metro Manila is running out of areas for dumpsites the reduction of waste is extra important. By preventing new harmful dumpsites to be developed the risk of casualties and other accidents will decrease on these kind of places (UNDP, 2011).

Economy

The amount of garbage per person in urban areas in the Philippines is 0,6kg/day, in comparison to Swedes that generate approximately 1,3kg/day (Westin, 2013). This means that in Metro Manila generates 7,000 tons of waste each day. The majority of the household waste is made out of food waste (32,7%), plastic (12,5%) and paper (12,5%) (Beck, 2014). Annually Metro Manila spends around Php 3,8 billion on waste collection, out of these Php 3,61 billion could be saved by segregating recyclables and biodegradables at source. The savings could for example be translated into 7220 classrooms to benefit 433 200 pupils, 20 056 additional teachers or 20 056 additional policemen or for the development of another 7220 low-cost houses (ADB, 2004).



Type of municipal waste composition in Metro Manila (Beck, 2014)

To raise the awareness is one important part of getting the Filipinos to understand the importance of managing waste. Two basic questions that can help determine people's willingness and participation in waste separation are:

1. Why do we need to bother about the trash we throw out?
2. How does it affect me?

A simple answer can be that a lot of money can be saved and used more productively for example in the development of schools and housing and to provide more medicine to the poor. Out of the household waste 45% can be reused or recycled and 50% can be turned into compost, only 5% are made out of residuals and hazardous waste (UNDP, 2011).

On the second question the answer is that if we segregate the waste properly we can reduce the volumes which saves money from the government so they can be used on public services instead. Segregating waste also results in savings in materials that can be reused and turned into products that generate an income for unemployed by letting people start up backyard businesses (UNDP, 2011).

3 Discussion

Health

It might be hard to see a solution to the waste situation in Manila since the attempt with regulating the system by law, RA9003, did not turn out very successful. To find a new, better solution with something similar feels far away. Nevertheless the increasing amount of waste needs to find an end to reduce the health risks for the people in the lower social classes.

One important element in the prevention of the spread of infections is that each household individually cleans and separates the waste immediately after consumption. Cleaning the waste at this early stage reduces the risks of bacteria growing and by avoiding contact with other materials the waste becomes cleaner.

To facilitate this step it is important that this section is seen as a part of everyday life already in the early planning stage. Each unit should be provided with space for separation, cleaning and storage of household waste. In developed countries this is something that we nowadays see more frequently where receptacles are planned in the kitchens, for example. As a result of facilitating and simplifying these spaces we can see a clear trend, over the past ten years, where the amount of recycled household waste has increased from 77 percent to 99 percent in Sweden (Sopor.nu). Apart from the health improvements this will also help to reduce the amount of waste that needs to be transported away and therefore reduces both the costs and the amount of emissions which also have an impact on the health.

Improving the spaces for separation within the units will make it easier for the individuals to recycle but beyond these changes it is necessary to create awareness and educate. By clarifying the importance of separation and cleaning in an early step and explaining what it contributes to in terms of a reduced risk of various types of infections will probably help to encourage the people to segregate at source.

Environment

The biggest environmental issue today is the overconsumption which spreads around the world. This was previously mainly a problem in the developed countries but as the developing countries grow the problem has increased here as well. The combination of increased waste and a weak economy have resulted in a huge problem regarding the waste management system. Today the system is

struggling with inefficiency and especially with problems of reaching out to everyone.

The issues often start after an area is developed from slum to an urban, low income area without any waste collection service from the municipality. Since the waste is an important source of income and employment for men, women and children it might be hard to change the system. Therefore it is important to find a system that can improve the health, the living environment and generate an income for the people. One good example in a low-income country is in Pune, India, where a Rag Pickers union created a strong community participation that led to socio-economically sustainable waste management solution. This cultivation of waste management culture led to a minimization of waste and increased the waste recycling for the next generation. The living standards improved and the urban poor were allowed to live with dignity. Involvement of the private sector made them feel responsible towards waste minimization and recycling which decreased the amount of waste that was generated. So by creating a strong community participation they achieved to decrease the amount of waste without spending a lot of money. One important part of this case is to give the waste workers a roofed and sheltered area to separate, wash and pack the materials so that they can obtain high prices. The issue with litter around public bins will also be reduced with this method since the waste pickers separate at their designated space (Gidde, 2007).

Another successful example in a low-income country is Curitiba, Brazil, where 70 percent of the city's waste is recycled. In Curitiba they have implemented a system called "The green exchange" which focuses on social inclusion. Since the slum areas often are unreachable by truck they let low-income families bring their trash to neighbourhood centers where they get bus tickets and food in exchange. A smart solution to solve the waste problem in the slum areas since they often are hard to access and the problem with waste often are very big in these areas (Macleod, 2002).

Looking at examples from industrialized countries can be another way to try to find a solution for a more efficient waste management system. A successful country regarding this is Holland which is renowned to have one of the best systems in the world. But what are the components that make the dutch system so good when it comes to waste management and recycling? As a result of the dutch waste management structure only a small percentage ends up in landfill since

most of the residual is incinerated to generate electricity. The approach is quite simple;

- I. Avoid creating waste as much as possible
- II. Recover the valuable raw materials
- III. Generate energy by incinerating residual waste and what is left over is dumped in an environmentally friendly way

This approach is known as “Lansink’s Ladder” and was incorporated into Dutch legislation in 1994. An approach that sounds pretty easy when you read it like this, but how do you manage to implement it into the Filipino culture? Through a survey carried out we can reveal that separating waste is one of the most popular environmental measures among the Dutch people which clarifies the importance of generating awareness among the inhabitants. Raising awareness was not the only factor that helped the Dutch system to be successful but the regulations implemented by the government were probably the deciding factor. Recycling targets were put in place with various waste streams, such as organic, hazardous and construction waste. A tax on every tonne of material landfilled were introduced to give processing companies the motivation to look for new methods such as incinerating and recycling. To simply go from landfilling to recycling is not something that is arranged from one day to another. By increasing separation at source we ensure that less waste ends up at disposal sites but after that we need to know what to do with the material, for example, if you collect glass you will need a glass processing plant. If this logistic chain is not airtight the whole system will collapse (Waste Management World).

Before making the waste management system airtight we need to reduce the amount of waste that is generated in the Philippines. I have never been in a country with so many small packages, which in one way is good since it is affordable but in the long way generates way too much waste. One question that I ask myself is if there is anything that we as architects and designers can do to reduce the overconsumption? I guess not. The only thing we can do is to inform about the impact on the earth and explain how much money that can be saved and thereafter provide an effective, simple collection system.

Economy

As mentioned in the example from Curitiba the new system means a city with less litter, less disease and less garbage dumped in rivers which results in a better life

for the urban poor. Another program in Curitiba is “garbage that’s not garbage”, a program that lets the people recycle their own waste and sell it. This results in an environmental improvement, raises money for social programs and employs homeless people in the city.

One important part of the economy is the awareness of how much money that can be saved. To inform about how much that could be built instead of spending it on an inefficient waste management system. Instead of transporting tons of waste away it can be segregated at source and only the small amount of residuals will have to be carried away. By doing this part together and strengthening the community spirit people will be more designated to take care of the area and keeping it clean.

By legalising the people that work with waste today and creating a safe and humane place for them to work on will raise the status of this social group. These people should be seen as heroes for the environment since they reduce the human impact of the earth and its resources. As long as they get the right resources to segregate and sell the materials they will contribute to a cleaner environment with less spreading of infections and less litter. The important thing when legalising the waste pickers is that these people earn more than before. That they get the opportunity to a new start and improve towards a more dignified and better life. One problem is that when the waste management system gets more efficient the job opportunities for many former waste pickers will be lost. To avoid unemployment and downturns for these people it is required to find a solution for them before the new system is initiated. The best solution would be to integrate them in the new system or in a related work situation which of course will be hard to find.

4 Urban Shelter Design

In order to establish a successful waste management system it is important to have a strong leadership, an enthusiastic barangay leader, empowerment work among the people and financial resources. The following steps can be seen as a guideline and are an important part when implementing a sustainable waste management system.

I. Education and awareness

The most effective way to reach out to the people and change people’s poor waste management habits is to educate the children. One good example of this is The

Metro Manila Council of Women Balikatan Movement, Inc. that implemented the waste management and composting into the education. By providing each student with a bucket to collect food waste and convert it into compost for the school gardens they have managed to give a pedagogical picture of how the biodegradation process works. Teaching and bringing out this knowledge to the children helps to influence their families to segregate and recycle their household waste (The Institute for Local Self-Reliance, 2000)

II. Community level composting

45 percent out of all household waste is food and kitchen waste (Beck, 2014) and therefore the community level composting is one of the biggest part to decrease the amount of waste. Implementing and maintaining the composting facilities can be done by people within the neighbourhood and gives an opportunity to manage waste effectively and also reduces the need for chemical fertilizers. The compost system consists of compost pits and compost facilities that are placed in a central part within the neighbourhood. In Cebu City in Metro Manila we have some successful examples where barangays established composting facilities. The residents and markets separates their waste that is collected and brought to a composting facility where the composting process takes place. To create a full cycle system this compost is thereafter sold at the barangay to generate an income to the neighbourhood (Premakumara, 2010).

III. Providing motivation

One project that encourages waste separation and recycling is the PAYT, “Pay-As-You-Throw”, which reduces the amount of waste by charging more for collection when you have more to dispose. This project reminds of the system they use in Holland where you pay have higher taxes the more waste you generate. By implementing this system you will force the barangays to provide an effective waste management system to avoid extra fees for disposal (The Institute for Local Self-Reliance, 2000).

By encouraging people in slum areas to bring their waste to neighbourhood centers in exchange for food and bus tickets is one successful example that has been tried in Curitiba, Brazil. As mentioned before this employment program, “The green exchange”, helps the city to reach out with waste separation and recycling even in the informal settlements that the trucks cannot access.

By using these methods you encourage the communities to segregate and recycle the waste properly. In combination with education and awareness people

hopefully will develop new habits regarding the waste management that will benefit both the individual households and the community.

IV. Waste collectors – education & facilities

Today many people work as scavengers under poor and unhealthy conditions. By developing and legitimizing this phenomenon it is vital to give these people a safe and designated place to work in to avoid accidents and to provide an effective system. At a neighbourhood level a designated place will be provided to give the opportunity to manage, separate and store the materials. This will not only result in better working conditions but also increase the environmental conditions within the neighbourhood.

V. Design of collection bins

Designing the containers according to what should be disposed is a method that simplifies the separation of waste. In the containers with paper we create holes that only allows rectangular materials and in the containers for glass we create round holes. By designing like this we reduce the risk that wrong materials ends up in wrong container. In combination with the holes, signs will be attached to indicate what materials goes in each container.

VI. Livelihood opportunities – products out of recycled waste

Another resource to reduce the amount of waste in a neighbourhood is to recycle and develop local crafts out of the segregated waste. An important thing in this step is that the waste is as clean as possible when it ends up at the livelihood premises. This will not only help reducing the amount of waste but also creating an income opportunity for people within the area and strengthen the neighbourhood spirit when creating and selling these products together. A successful project were held by The Good Shepherd Sisters of the Philippines that taught women to sew, crochet and create handcraft out of recycled materials such as paper, coconuts and plastic bottles (Fondazione Buon Pastore, 2013).

VII. Leads to proper sorting and separation

By going through each of these steps the sorting and separation of waste should not be a problem. Out of the household waste 95 percent can be reused either by composting or separation for collection within the neighbourhood (ADB, 2004). This can be done by planning for waste separation within the household and arranging a pick-up service within the neighbourhood where the waste collectors transport everything to their designated neighbourhood waste management station to clean and sell the materials further.

It is important to plan for these parts already from the beginning of the design process, both on a household and neighbourhood level. We need to integrate this as a part of the design and plan to make it as easy and efficient as possible. The waste station within the area should be central and accessible for everyone.

5 The Role of Architects

I have come to the conclusion that the problem concerning waste management is far more complex than I first realised. There are many factors that come into play including the economy, the health and the possibility of a livelihood. Looking at other examples in both developing and industrialised countries shows that it is hard to just use one method all over the world. Presumably we need to find an adapted solution that has something from each of these methods.

To find a good, sustainable solution to the waste problem in the Philippines I think that it is important to work in different steps. The first of these steps is to create awareness and educate, mainly focusing on the young people. By introducing recycling and waste management in schools we will reach out to many families and the result will be greater. Second, the waste management should be incorporated into the design process immediately as soon as a new housing project starts. It is important that the waste management gets a designated place within the neighbourhood where cleaning, separation and storage can be done. The third step is the economic impact that the waste management has on the neighbourhood, both as a resource and how much money that could be saved by having an effective system. We should look at the waste as a livelihood opportunity, both by working as waste collector and as creating local products that will generate an income.

So how do we as architects incorporate this into our design to improve and develop the household waste management? Probably the system needs to be divided into three different levels; the household level, the building level and the neighbourhood level. By integrating the waste into these three steps and providing a designated space for it we will help to simplify this process and encourage the people to segregate their waste. With the waste management system integrated in the design we will help to improve the living conditions on an architectural level and we deliver an overall concept to be embraced in further housing developments.

References:

Electronic References:

ADB. Asian Development Bank. (2004-03) *The Garbage Book – Solid Waste Management in Manila*. Available: <http://www.adb.org/sites/default/files/publication/29301/garbage-book.pdf> (2015-04-01)

BBC News. (2000-07-17) *Manila dump death toll rises*. Available: <http://news.bbc.co.uk/2/hi/asia-pacific/835034.stm> (2015-04-01)

Beck, M. European Chamber of Commerce of the Philippines. (2014) *Energy Production from Municipal Waste: Business Potential and Project Opportunities*. Available: <http://www.giz.de/fachexpertise/downloads/2014-en-beck2-pep-infoveranstaltung-biogas-biomasse-philippinen-thailand.pdf> (2015-04-18)

Binion, E & J. Gutberlet, International Journal of Occupational and Environmental Health, vol. 18. (2012) *The effects of handling solid waste on the wellbeing of informal and organized recyclers; a review of literature*. Available: <http://pswm.uvic.ca/wp-content/uploads/2012/05/Read-the-Publication9.pdf> (2015-04-08)

Fondazione Buon Pastore. Good Shepherd International Foundation Onlus. (2013-04-19) *Filipino Designers Build a Global Crafts Business with a Sustainable Twist*. Available: <http://www.fondazionebuonpastore.org/progetti/filipino-designers-build-global-crafts-business-sustainable-twist> (2015-04-18)

Gidde, R. Indo Italian Conference on Green and Clean Environment. (2007-08) *Municipal Solid Waste Management in Emerging Mega Cities: A case study of Pune City*. Available: http://www.bvucoepune.edu.in/pdfs/Research%20and%20Publication/Research%20Publications_2007-08/International%20Conference_2007-08/Municipal%20solid%20Prof%20MR%20Gidde.pdf (2015-04-18)

Johansson, E. (2015) *Own photos from Studytrip to Manila Februry-March 2015*.

Macleod, K. International Council for Local Environmental Initiatives. (2002) *Curitiba Orienting Urban Planning to Sustainability*. Available: http://www.iclei.org.br/polics/CD/P2_4_Estudos%20de%20Caso/1_Planejamento%20Urbano/PDF106_EC77_Curitiba_ing.PDF (2015-04-06)

Mercado, E. (2006) *Making RA 9003 Work: Putting Real Issues, Real Solutions in a Real World*. Available: http://zunia.org/sites/default/files/media/nodefiles/ma/150867_Making%20RA%209003%20Work1.pdf (2015-04-01)

Premakumara, D. Research Group for Alternative Development Inc. (2010) *Best Practices and Innovations in Community Based Solid Waste Management in Cebu*. Available: [http://pub.iges.or.jp/modules/envirolib/upload/4336/attach/Dickella_Premakumara_final\[Best_Practices\].pdf](http://pub.iges.or.jp/modules/envirolib/upload/4336/attach/Dickella_Premakumara_final[Best_Practices].pdf) (2015-04-01)

Rodel Clapano, J. The Philippine Star. (2013-10-11) *Garbage, 'missing' creeks cause floods in Manila – Erap*. Available: <http://www.philstar.com:8080/metro/2013/10/11/1243848/garbage-missing-creeks-cause-floods-manila-erap> (2015-04-08)

Sopor.nu, Sveriges avfallsportal. *Svenskarna återvinner allt mer*. Available: <http://www.sopor.nu/Rena-fakta/Avfallsmaengder/Vi-aatervinner-allt-mer> (2015-04-18)

The Institute for Local Self-Reliance. (2000-10) *Wasting and Recycling In Metropolitan Manila, Philippines*. Available: <http://www.greenpeace.org/seasia/ph/Global/seasia/report/2001/8/wasting-and-recycling-in-metro.pdf> (2015-04-01)

UNDP. United Nations Development Programme & The Department of Environment and Natural Resources. (2011) *Solid Waste Management Made Easy*. Available:

<http://emb.gov.ph/ECA%20Center/SOLID%20WASTE%20MANAGEMENT%20MADE%20EASY%20BLUE.pdf> (2015-04-01)

Waste Management World. *Dutch Successes*. Available: <http://www.waste-management-world.com/articles/print/volume-11/issue-1/features/dutch-successes.html> (2015-04-18)

Westin, J. Avfall Sverige. (2013-06-30) *Avfallsstatistik 2013*. Available: <http://www.avfallsverige.se/statistik-index/avfallsstatistik/> (2015-04-06)

WIEGO. Women in Informal Employment: Globlizing and Organizing. *Waste Pickers*. Available: <http://wiego.org/informal-economy/occupational-groups/waste-pickers> (2015-04-18)