



Handbook for Urban Poor Communities on Waste Management

Education, Advocacy, Solutions



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Sahmakum Teang Tnaut. a Cambodian Urban NGO

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1. Introduction

Waste management continues to be a challenge for urban poor communities in Phnom Penh and other cities in Cambodia. Our linear economy revolves around a system of make, take, and dispose and is generating more and more waste each year. Although we should be moving away from this linear economy to a more circular one we must not ignore the fact that those at the base of the pyramid have not been provided adequate services to manage the “dispose” aspect of our linear economy.

More than one third of urban poor communities in Phnom Penh still do not receive adequate municipal waste management services. This leads to issues in a variety of areas including public health, resource management, and local waterways. Government and Non-Government actors are aware of the issues, but more can be done.

This handbook was designed not as a presentation of research or a solution for every waste management issue, but as a tool for urban poor communities in Phnom Penh. It aims to educate about waste management issues, provide a framework for communities to advocate for themselves within the system in place, and inform them on useful tips and skills for community-based waste management. With this handbook, hopefully, the challenge of waste management will become a little bit easier to overcome.

Methodology

Although this handbook was not designed for the academic community it is still grounded in academic research and thought. Sahmakum Teang Tnaut’s (STT) January 2019 research report titled “Urban Governance: Waste Management in Phnom Penh”, which is a foundation for this handbook, involved research in all 277 urban poor communities. Four of these communities were revisited to ask follow up questions specifically for this handbook. Meetings were also held with other waste management stakeholders including CINTRI, UNDP, CSARO, and local academics. Finally, a secondary literature review was completed on topics such as municipal solid waste management, community-based waste management, and the three R’s (reduce, reuse, recycle).

2. Waste Characteristics and Issues

Waste is a part of our everyday lives. Each household in Cambodia creates some amount of waste. It is important to understand the contents of waste and how much we create if we are ever going to have a truly efficient waste management system. This section aims to describe the different types of waste we create, the many issues that they cause, and some suggestions for how to deal with each type of waste.

Households in Phnom Penh create more than 2 million tons of solid waste in a single year.

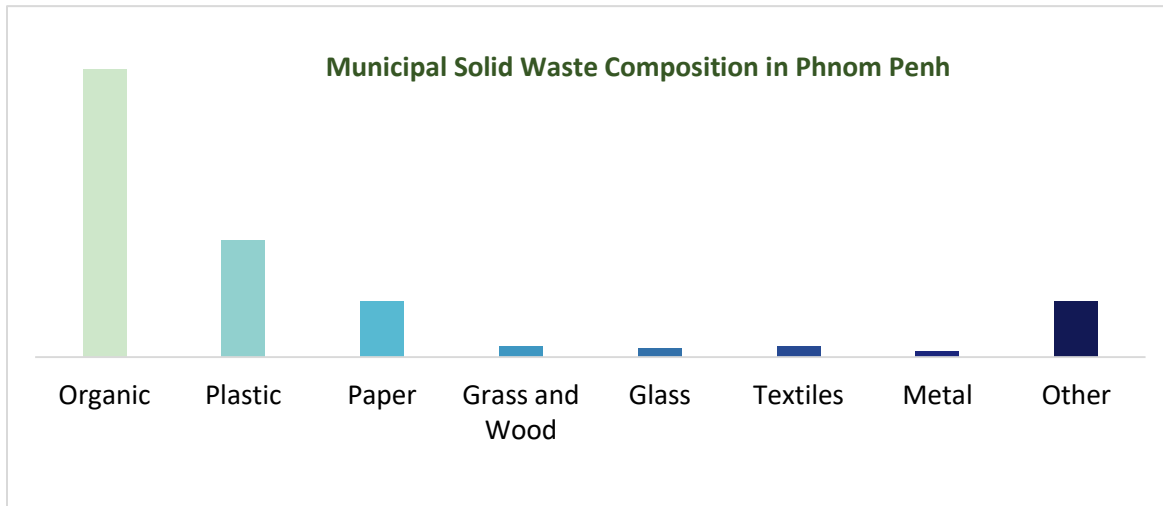
The average household generates around one third of a kilogram of waste every single day.

In just one year the average household generates around 133 kilograms of waste.

This means that in two years a household generates enough waste to outweigh the average Cambodian cow.



The contents of waste in Phnom Penh vary, but on average over 80% come from just three sources: Organic, Plastic and Paper.



2.1 Organic

What is it?

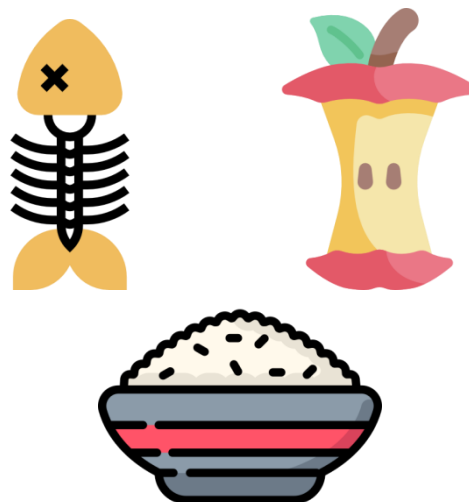
Organic waste makes up more than half the waste we generate on a daily basis. This is because every time we cook we open up the opportunity to create more organic waste. Organic waste is material that comes from plants and animals. This includes fruits, vegetables, meats, and scraps from our gardens.

What problems does it cause?

When organic waste builds up in landfills it generates methane gas which is a greenhouse gas that contributes to climate change. Organic waste that is not disposed of properly in our communities can also create problems. Pests that spread disease can become attracted to it or it can create a terrible smell that reduces quality of life.

How do we deal with it?

There are several ways to deal with organic waste on a household or community level. It can be composted to create useful compost for a garden or one can take advantage of the methane created by making a biodigesters. If these options aren't possible, organic waste should be collected and disposed of properly with the help of the local waste management company.



2.2 Plastic

What is it?

Plastic has become one of the largest sources of waste in the world and has become increasingly hard to avoid. We find it in our water bottles, coffee cups, toys, bags at the market, and takeaway containers. Plastics are not naturally occurring in the world and have only been relatively recently introduced into Cambodia.

How do we deal with it?






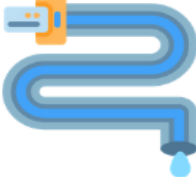






Since plastic doesn't decompose the best solution is to try and reduce the amount of plastic you use on a daily basis. Some types of plastic can be collected and then sent away to be recycled. Try and collect water bottles and other similar items to sell to local waste pickers. Plastics that are difficult to recycle like plastic bags and takeaway containers should be avoided.

What problems does it cause?

Plastic can take hundreds of years to decompose which means that every single piece of plastic that has been created still exists. Landfills and our communities are becoming overwhelmed with plastic waste. They can cause local waterways to clog which increases the likelihood of flooding. Plastics can also lead to death in marine life either by filling their stomachs or causing them to get trapped in plastic packaging. Recently scientists have found microplastics in the fish that we eat which means we now ingest plastic on a regular basis. Finally, plastic can become an eye-sore in our communities since it easily builds up into piles.

Different Types of Plastic

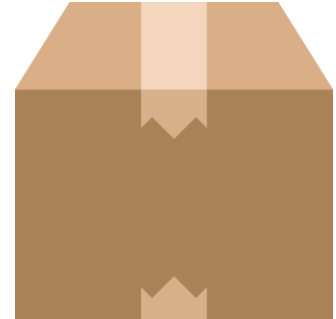
Not all plastic is made the same. Here is a list of different types of plastic and what products are made from them. Plastic products normally have a number on them identifying what type of plastic it is. Generally, the smaller the number the easier it is to recycle.

| | | | |
|---|--|---|---|
|  | <p>PETE Polyethylene Terephthalate</p> | <p>Water bottles, soda bottles, cooking oil bottles</p> |  |
|  | <p>HDPE High-Density Polyethylene</p> | <p>Milk bottles, shampoo bottles, trash bags</p> |  |
|  | <p>PVC Polyvinyl Chloride</p> | <p>Plumbing piping, plastic food wraps</p> |  |
|  | <p>LDPE Low-Density Polyethylene</p> | <p>Single use plastic bags, sandwich bags</p> |  |
|  | <p>PP Polypropylene</p> | <p>Bottle caps, plastic diapers, Tupperware, kitchenware</p> |  |
|  | <p>PS Polystyrene or Styrofoam</p> | <p>Takeaway containers for food, takeaway cups for hot coffee</p> |  |

2.3 Paper

What is it?

Paper waste comes from different types of packaging or paper products we buy like books and newspapers. We also may find ourselves creating paper waste in small ways by accepting paper receipts from shops or the bank.



What problems does it cause and how do we deal with it?

Paper waste may not seem like a major issue in our communities since it can decompose unlike plastic. The production of paper though uses a lot of resources like trees and water which harms the environment. Paper should be avoided when possible or disposed of properly.

2.4 Grass and Wood

What is it?

Different wood products like old furniture or recently cut down trees can sometimes end up in the landfill.



What problems does it cause and how do we deal with it?

Wood doesn't cause a direct harm when wasted, but like paper it does use resources to create. It is best to find another use for discarded wood either in a new product or using it as an energy source. Painted or treated wood should not be burned as they can release dangerous chemicals.

2.5 Textiles

What is it?

Clothing that we no longer need and is thrown away is known as textile waste.



What problems does it cause and how do we deal with it?

Although households in Phnom Penh do not produce huge quantities of textile waste, when it builds up in landfills it can create methane gas. It is important to try and find uses for old clothing we can no longer wear like rags for around the house.

2.6 Glass

What is it?

Glass waste mainly comes from different drink containers we buy but can also come from other containers that contain food or beauty products.



What problems does it cause and how do we deal with it?

There is no formal recycling for glass in Phnom Penh which means almost all the glass we buy ends up in the landfill or in our communities. On a local level broken glass on our streets and streams can lead to injury and can be dangerous for children.

2.7 Metal

What is it?

Aluminum drink cans are one of the biggest sources of metal waste, but metal waste can also come from constructions equipment like nails and screws.

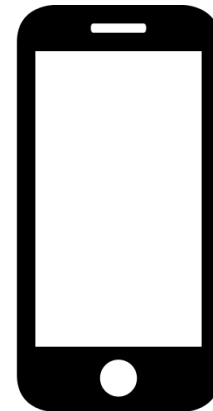


What problems does it cause and how do we deal with it?

Metals are some of the most valuable waste streams and local waste pickers will come buy or take them from your community. These should be collected and then sold or given away so they are recycled and don't end up in the street or landfill.

What is it?

Waste that does not fit into one of the categories above still makes up around 10% of the waste in Phnom Penh. One of the fastest growing waste categories in Cambodia is electronic waste also known as e-waste. This is waste that comes from products like phones, computers, TVs, and cameras.



What problems does it cause and how do we deal with it?

When e-waste is left in landfills, rivers, and communities harmful chemicals can leak and pollute water and soil. When it is burned dangerous emissions are released. It is important to try and use electronics for as long as possible and when they no longer can be used they should be disposed of responsibly by either selling or giving them to local recyclers.

2.9 Additional Waste Management Issues

Water

- A buildup of waste in local waterways can increase the chance of flooding in the rainy season
- Streams that could once be used for cleaning and bathing may become unusable or foul-smelling due to pollution
- Waste pollutes water with chemicals that can find their way into the water we use for drinking and bathing



Waste accumulation under a house in Phnom Penh



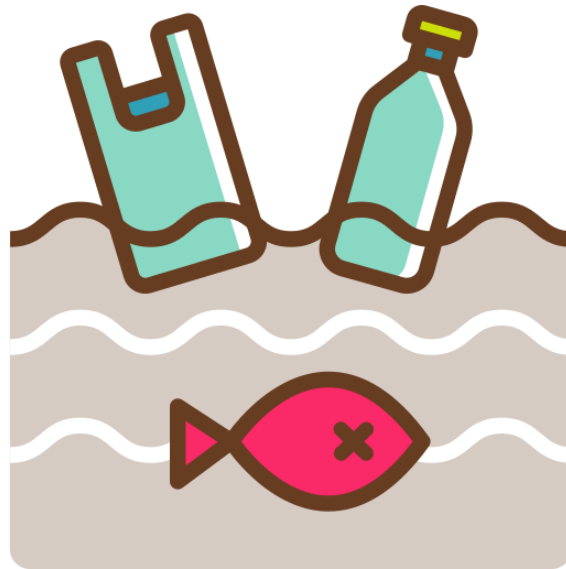
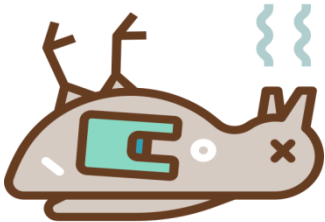
Waste accumulation under a house in Phnom Penh

Soil

- Waste that is disposed of on the ground can quickly become a local landfill which can start to smell and become difficult to live near
- Chemicals and pollutants can seep into the soil making it difficult to use for future farming

Wildlife

- Wildlife that we depend on for food may not be able to survive in severely polluted rivers and streams
- Microplastics can be found in the fish that we eat which means we in turn are eating plastic



Air

- Large piles of waste release methane and other greenhouse gases which contributes to climate change
- Burning trash exposes people to smoke which can lead to higher risks in a variety of diseases

3. Municipal Solid Waste Management

Phnom Penh has seen strong growth and development over the last two decades. Skyscrapers have changed the city's skyline and roads which used to be filled with bicycles and rickshaws are now filled with motorcycles and cars. Increase in consumption and waste goes hand and hand with development and Cambodia has lagged in its municipal solid waste management solutions. Many communities remain without municipal waste management and streets and waterways remain littered and polluted. There are strategies available to community leaders to advocate for waste management solutions and work with the local waste management company.

Phnom Penh Waste Management Quick Facts

Phnom Penh Population – 2 million

Phnom Penh Waste Generation – 4.09 million tons per year

Waste Management Company – CINTRI

Percent of Waste Collected – 83%

Percent of Waste Recycled - 9.3%

Percent of Urban Poor Communities Without Waste Management – 35.7 %

The 2015 Sub-decree on Management of Garbage and Solid Waste of Downtowns has designated responsibility to several groups

**Capital, Municipal and District Administration
(Article 9)**

- “Prepare management plans and yearly action and budget plans for the management of garbage and solid waste of downtowns within its territorial jurisdiction”
- “Prepare and implement any measure for the management of garbage and solid waste of downtowns through issuing an order (Deika) or other legal instruments”
- “Establish, control and manage cleaning, collecting and transporting services and garbage and solid waste of downtowns services within its territorial jurisdiction”
- “Advice citizens relating to environmental hygiene cleaning and local cleaning, collecting and transporting services and garbage and solid waste of downtowns services prepared”
- “Educate and disseminate information on garbage and solid waste of downtowns separation with environmental safety, program to reduce, reuse and recycle and promoting the usage of products from recycling garbage and solid waste of downtowns”

**Commune Administration
(Article 13)**

- “Manage and implement the management of garbage and solid waste of downtowns based upon delegation”
- “Participate in broader education and information dissemination with regards to the use of cleaning, collecting and transporting services and garbage and solid waste of downtowns services within its territorial jurisdiction”
- “Participate in providing advises on programs to cleaning, collecting and transporting services and garbage and solid waste of downtowns services within its territorial jurisdiction”
- “Participate in resolving problems relating to cleaning, collecting and transporting services and garbage and solid waste of downtowns services within its territorial jurisdiction”
- “Participate in cooperating to enforce the implementation of legal measures and legal instruments regarding to the management of garbage and solid waste of downtowns”

Khan Administration (Article 12)

- “Manage and implement the granted functions for the management of garbage and solid waste of downtowns”
- “Participate and cooperate in implementing programs of the management of garbage and solid waste of downtowns”
- “Participate in monitoring the implementation of cleaning, collecting and transporting services and garbage and solid waste of downtowns services within its territorial jurisdiction”

Personal and Community

- “Owners of garbage and solid waste of downtowns shall practice separating and packaging reusable and recyclable solid waste from garbage and solid waste” (Article 15)
- “Owners of garbage and solid waste of downtowns shall be responsible for waste packaging by a plastic bag or keeping their waste in a private bin with thorough manner, without any leaking, sipping of wastewater or emission of stink within the period of storage awaiting discharge” (Article 16)
- “Owners of garbage and solid waste of downtowns using services of garbage and solid waste of downtowns management shall pay for cleaning, collecting and transporting services and services of garbage and solid waste of downtowns landfills” (Article 18)

CINTRI

- CINTRI’s websites indicates they are responsible for cleaning, collecting, and transporting waste from the city to the disposal sites. To succeed they must do the following.
- Publish the trash collection schedule for different communities in a clear and transparent way whether it is online or at administrative offices.
- Follow the trash collection schedule and update it if changes need to be made
- Pick up all trash that has been left out for pick up and meets pick up standards
- Provide customer service to residents

3.1 Challenges and Solutions

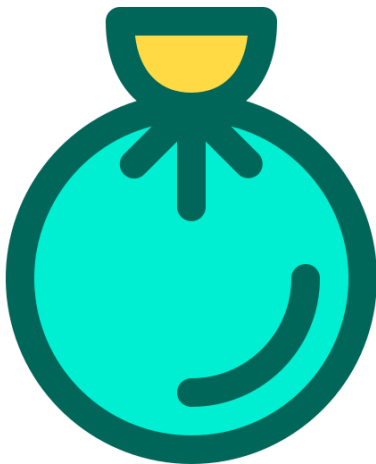
Despite the many challenges faced by urban poor communities there are steps that community members can take to solve or mitigate common challenges.

Your community has no municipal waste management services. →

1. Speak with your local Khan or Sangkat office to see if there is a collection point nearby or if they have access to the CINTRI schedule
2. Have your local representatives set up a meeting with CINTRI
3. Work with CINTRI on trying to set up a community collection point
4. Ask CINTRI, Khan, or Sangkat to provide a large bin or waste container

CINTRI comes to your community collection point but does not collect all the trash. →

1. Keep the trash organized in either bins or bags that are tied and secure
2. Contact your CINTRI representative to ask why they only collect some trash



The CINTRI drivers do not come on the same day or same time each week which makes it difficult to coordinate when to leave out your trash.



1. Speak with your local Khan or Sangkat office to see if they have access to the CINTRI schedule
2. If there is a schedule for your community contact CINTRI and ask them to follow it
3. If there is no printed schedule for your community contact CINTRI ask if they can create one

The community collection point is on someone's property and they do not let anyone leave their trash there in advance. Community members only have a 10-15 minute window to get their trash to the CINTRI truck when it arrives.



1. Work with CINTRI to do one or several of the following
 - a. Set up an alternative collection point
 - b. Get a CINTRI staff member with a trash cart to collect waste throughout the community
 - c. Get CINTRI or another group to sponsor large trash container to make this collection point less intrusive to the land owner

The community collection point is too far away, and many people do not bring their trash there.



1. Set up a meeting with CINTRI and your Sangkat or Khan to try and get a CINTRI staff member with a trash cart to collect waste throughout the community
2. Encourage community members to keep their waste organized and to bring it to the collection point
3. Consider forming a community pick-up group or paying someone to gather all the trash

CINTRI will not respond to community requests.



1. Work with the Sangkat and Khan office to keep trying to reach CINTRI
2. Try several contact methods including Facebook, Email, Phone, and visiting their local office
3. Contact City Hall or any local NGOs working in your community to assist you

A small pile of waste has quickly become a local dumpsite, so people do not feel motivated to bring their trash to a collection point.



1. Designate a community cleanup day to work towards removing all the waste
2. When trash starts to compile in one area try and quickly clean it up. Small trash piles are much easier to manage than large ones



Large local dumpsite



4. Community Based Solid Waste Management

Although many waste management solutions need to come from government and industry there are still things we can do on the community level to manage waste. Many of these strategies can fall in to what is known as the three 'R', *Reduce, Reuse, and Recycle*.

4.1 Reduce

Less waste, less problems

Reducing is one of the most effective ways to manage waste. If you reduce the amount of waste in the community then overall everything becomes a little bit easier to manage.

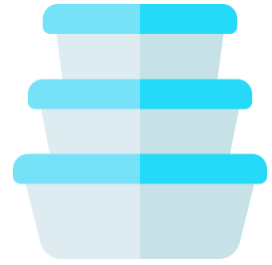
Bring a reusable bag to the market when you go shopping.

A simple trip to the market can sometimes lead to the use of over 5 plastic bags. Many times, we immediately throw them away when we get home. If everyone brings their own bags to the market, we can reduce the amount of this very difficult to manage type of waste.



Carry reusable food containers and cutlery.

Styrofoam food containers and takeaway hot coffee cups cannot be recycled in Cambodia. If you use these types of containers regularly consider bringing with you reusable containers to reduce the amount of difficult to recycle materials.



Consider a reusable water bottle and large jugs of water or a water filter

We all need water to survive but buying plastic water bottles every single day can quickly create a mountain of plastic waste. The price of a reusable water bottle can offset the cost of plastic ones in a few weeks. Also, the cost of large jugs of water or filters can be shared with neighbors. You can also reuse the single use water bottles just remember bottles should be cleaned frequently to prevent bacteria from building up.

Think about substitutes for these takeaway items

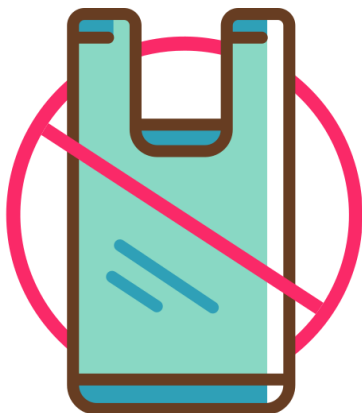
Many businesses now sell biodegradable and compostable takeaway containers, plates, and cutlery. These items work exactly the same way as the products you are used to, but not as harmful to the planet and much easier to manage. This means you won't have to change your lifestyle. Next time you are buying takeaway food share this info with your local seller to see if they are interested in switching.

Reusable items available in Cambodia

- Shopping Bags
- Straws
- Food Containers
- Water Jugs
- Water Bottles
- Coffee Containers
- Coffee Bags
- Bamboo Cutlery

Sometimes you just need to say no

Plastic has become so cheap and varied that it is given away for free in many locations. Straws are provided when you can drink out of a bottle, plastic coffee cups are put in plastic coffee holders even if you don't need it, and different food items are put into separate plastic bags at no additional benefit. If you don't yet have a reusable shopping bag or coffee container, consider saying no to unnecessary plastic waste like straws or plastic coffee holders.



4.2 Reuse

Choose to reuse

A lot of the materials that we use are thrown away after only a single use. Reusing products is important because, even if the original use of a product is no longer possible there are still ways we can create value from old products. The process of turning a product into something new and of higher value is called upcycling.

Composting

With such a large percentage of household waste coming from organic materials, finding ways to reuse that organic material is important. Composting is an effective way to turn kitchen scraps and other organic material like leaves into usable compost that can either be sold or used for farming and gardening. Composting can be done both at the household or community level. There are some downsides to composting including their startup cost, potential for a bad smell near your home, and additional work load needed to maintain the compost. Several in depth guides can be provided if you are interested in starting your own compost.



Biodigesters

Biodigesters are similar to compost in that they use organic waste to create a useful product. Instead of compost for fertilizing plants, biodigesters create biogas which can power household items like a stove. A single household may not have enough organic waste to create a useful amount of biogas; therefore, this should only be done on a larger scale. Biodigesters also have a higher startup cost than composting.

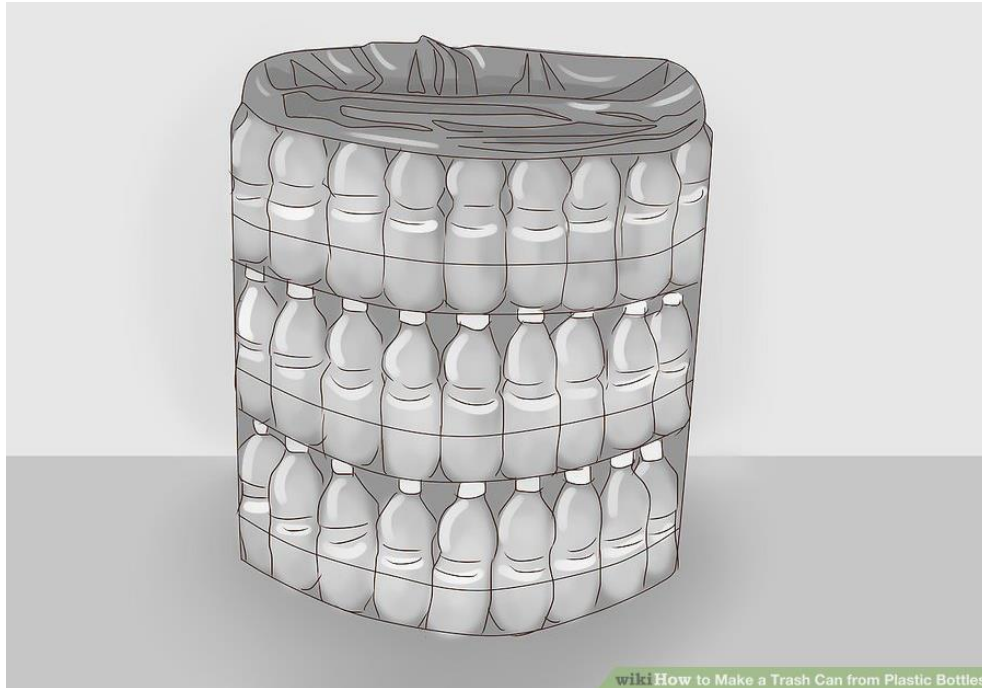
Trash bins from plastic water bottles

For waste to be properly managed there needs to be a place for it to be stored before being collected by the municipal waste management company. Large trash bins can be expensive and difficult to attain. There are techniques available to use plastic bottles to create sturdy, waterproof, and effective trash bins for either home or community use. These bins can help separate different types of waste or just prevent waste from being thrown on the ground.

How to make a trash bins from plastic water bottles

You will need 1. 54 plastic bottles of the same size
2. a knife 3. flexible wire (string or plastic yarn can also work)

1. Cut a bottle cap sized hole in the bottom of 36 bottles
2. Fill 18 bottles halfway with some dirt or rocks. This is your bottom row
3. Put a small hole 10cm up on each side of every bottle
4. Make 18 columns with 3 bottles each
5. Connect the columns using the wire or string



wikiHow to Make a Trash Can from Plastic Bottles

Trash bin made from water bottles

What else can you make with plastic bottles

- Vertical Gardens
- Watering can
- Storage devices
- Fruit Picker
- Candlestick holders
- Sprinkler



Sprinkler made from a water bottle



Fruit picker made from a water bottle

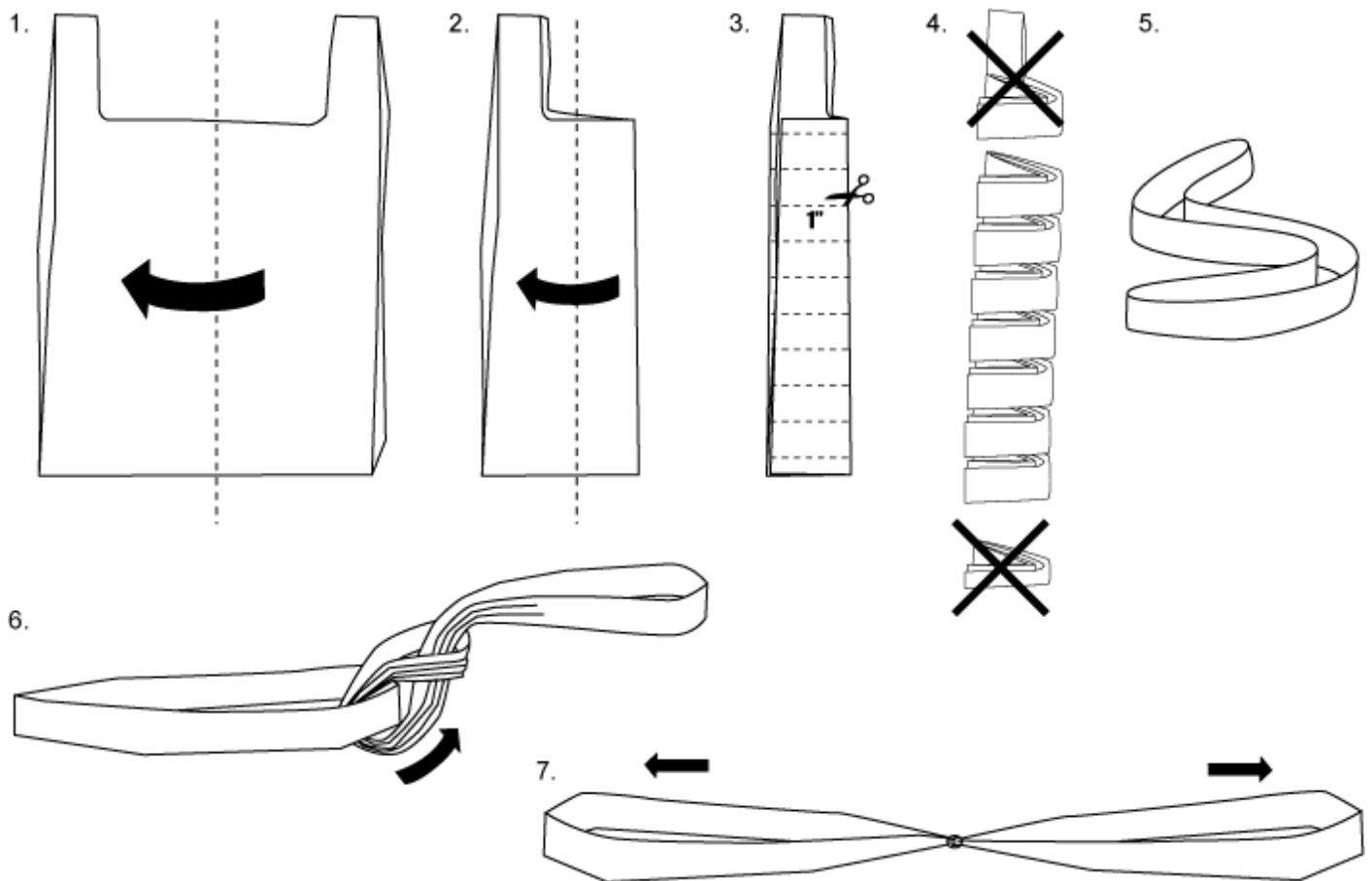


Garden made from a water bottle and other items

Yarn from plastic bags

Plastic bags in general are one of the most difficult items of waste to deal with. Very few waste pickers will buy them, yet every type of seller gives them away when you purchase something from them. With just a few simple steps plastic bags can be upcycled into plastic yarn, which can then be used for almost endless creations. The plastic yarn can be crocheted or knitted using the same techniques as regular yarn. Many of these items can be quite useful and can potentially be sold to make an additional income.

Steps for Making Plastic Yarn



What can be made using plastic yarn

- Sleeping Mat
- Sun hat
- Shopping bag
- Water bottle holder
- Rug
- Laundry basket
- Dog leash
- Bracelet



Rug made from plastic yarn



Hat made from plastic yarn

Tips for using plastic yarn

- Start with something simple like a bracelet
- Try different widths in the yarn to see which works best
- Try to use the crochet and sewing tools you already have available
- The internet has great additional tips to learn more



Shopping bag made from plastic yarn

Fabric from plastic bags

Plastic bags can also be upcycled into versatile fabric. This plastic fabric can be used to make bags, clothes, or used to line certain products that you want to make waterproof. This technique requires a few more tools than creating plastic yarn or a trash bin from water bottles. This may mean that this upcycling technique is too expensive. The advantages to creating plastic fabric is that once it is made it is much more efficient than using plastic yarn and is more versatile since it can be used similarly to regular fabric.

How to make fabric from plastic bags

You will need 1) several plastic bags 2) parchment paper 3) scissors 4) iron 5) ironing board

- 1) Cut two sheets of parchment paper
- 2) Cut the seams and handles off the plastic bags to make plastic squares
- 3) Put 3-8 plastic squares in between the parchment paper
- 4) Iron them together using a low setting and keep moving the iron around
- 6) Check and make sure they fuse together, and you have 1 new piece of fabric
- 5) Use the fabric to create useful items!



Shopping bags made from plastic fabric

4.3 Recycle

Everything has value

The first step should always be to reduce and then to reuse, but if that isn't possible then you should try and recycle before disposing of the product. Each item that we send to landfills has some sort of value to the right person. The difficult part is finding the correct people who value the item you no longer need. Three of the most common items that are collected by local waste pickers include plastic bottles, aluminum cans, and cardboard boxes.

Tips for Recycling

- Keep everything organized. It will be easier to sell items to the local recycling collector this way
- Consider making a community collecting point. If there is not a recycling collector who comes to your community having all the plastic and aluminum recycling in one big pile may incentivize them to come
- Clean out your bottles before getting rid of them so they have a lower chance of being thrown away
- Keep paper products dry
- If the recycling collector in your community doesn't collect a certain item try to see if someone nearby does



Local collection point for recyclable bottles



4.4 Other Tips

Separate your waste

Almost all waste management solutions become easier when waste is separated and stored in bags or boxes. Different communities may choose to separate their waste in different ways depending on the solutions they have created. Some possible categories for waste separation are 1) organic waste 2) recyclable plastic 3) recyclable aluminum 4) paper 5) glass 6) e- waste 7) waste for landfill.



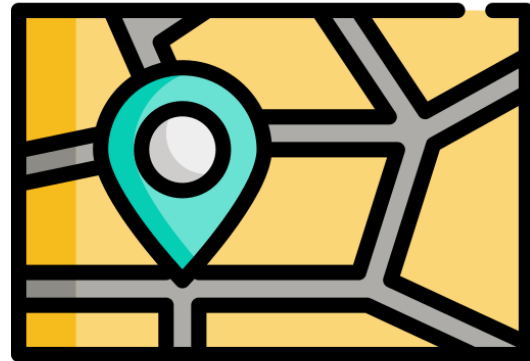
Separate bins for different waste streams at a Cambodian mall

Set a community collection point

Some areas are difficult for the municipal waste management company to enter. Consider designating one waste pick-up location. Each household will be responsible for bringing their waste to this location. This will keep waste from being spread out through the community and make it easier for the waste management company to pick it up.

Steps for setting up a community collection point

- Find a suitable location that is on or near an already existing CINTRI pick up route
- Work with the land owner, Sangkat, Khan, and CINTRI to get this new collection point approved and added to the CINTRI route
- Inform community members of the new collection point and the time CINTRI comes to collect the waste
- Encourage community members to store their trash at home and bring it to the collection point before CINTRI arrives



Tips for setting up a community collection point

- The collection point will not be successful if the landowner is not supportive. Think about ways the landowner can be potentially compensated
- Do not set up a collection point next to a water source, in front of a drain, or under a wooden building
- Large trash bins or similar containers allow the trash to be organized and less likely to be blown away

Do not throw coconuts in the river

Coconuts can take up ten years to biodegrade. Even though they are natural and will eventually breakdown, in the short term they can cause serious problems to local waterways like clogging and increase the chance of flooding.



Provide many trash bins during celebrations

Large celebrations like weddings and house warming parties create a lot of waste. Each table should have at least one small trash bin either under or beside it. This way the trash can be collected with ease and there is less of chance that it blows away in the wind.

Trash bins alone won't fix all the problems

Having a place to put your waste is a great start for organizing and cleaning up, but residents need to be committed to using the resources available.

A small trash pile is easier to manage than a big one

There is no better day than today to start cleaning up, getting ahead, and working towards better waste management in your community.



Overflowing trash bin



Local dumpsite

5. Conclusion

Waste management will continue to be a very difficult challenge for Phnom Penh and the urban poor communities within its borders. These issues will not be resolved without joint efforts between the municipal government, business owners, and community leaders.

This short handbook aimed to provide educational material on the complexity of waste and waste management, potential steps that can be taken to resolve waste management challenges with the municipality, and small-scale solutions one can do at the community level.

More work still needs to be done but with a conscious effort and additional resources communities should be able to create a cleaner and more livable environment for all.