

ORFZ



WASH

## Foreword

In Bhutan, as in most parts of the world, waste is becoming an increasing problem in urban, rural, and even remote areas, posing an escalating threat to the environment and human wellbeing. As practices of importing packaged items and packaging local products are growing, littering has increased together with the use of unsustainable and hazardous waste management practices such as dumping and burning. Dumping and burning waste, in particular of plastics, are causing severe damage to nature and humans as toxins are released as waste degrades after being dumped, and the fumes from burning are highly toxic.

The aim of the Samdrup Jongkhar Initiative (SJI) Zero Waste Project is to try to address this issue at an early stage by influencing consumer practices such that waste can be reduced, by initiating more responsible and sustainable waste management practices that can help preserve the environment and by creating economic opportunities in the region that help support these aims. As a step towards this, SJI is establishing local Zero Waste trainers who have an integral role in creating awareness and promoting Zero Waste strategies and practices in their communities. The training material used by our Zero Waste trainers is here presented and distributed to a wider audience, as there has been an increasing demand from various communities and institutions to start up their own Zero Waste initiatives.

This Zero Waste training manual has been specifically developed for the Bhutanese context, and gives an accessible and user friendly introduction to the concept of Zero Waste and how it can be applied in your community and/or your institution. It can be used in community meetings as well as for training of institutions, ranging from schools, hospitals, government offices, to military institutions and religious bodies. We welcome your feedback on the manual, as our intention is to continuously develop and update its content to make it as relevant and applicable to the society as possible. You can always download the most recent version of the manual from our webpage: [www.sji.bt](http://www.sji.bt). Soon a Dzongkha version of the manual will also be available.

We would like to thank our Zero Waste artist and educator, Ms. Taylor Cass Stevenson – who has made the wonderful illustrations in the manual – for bringing creativity into the Zero Waste Project and for her unstinting commitment and dedication. SJI would also like to thank our donors, CSO Fund Facility (CSOFF) and International Development Research Centre (IDRC), without whose continuous support the SJI Zero Waste Project would not have been feasible. We are also very grateful to the Samdrup Jongkhar Thromde, through the UNDP-Danida ECP mainstreaming CD grant, Department of Local Government, for funding the printing of this manual.

In commemoration of World Environment Day 2013, we hope that the Zero Waste training manual will become a useful tool in promoting more ecologically sound consumer and waste management practices including new economic opportunities in Samdrup Jongkhar as well as in the rest of Bhutan, being it in urban, rural or remote areas. If we can all decide to come together and address this important issue in a timely fashion, then Zero Waste is possible!

Good Luck and Tashi Delek!

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The Samdrup Jongkhar Initiative

[www.sji.bt](http://www.sji.bt)

Samdrup Jongkhar, Bhutan

2013



Many thanks to our donors:

✳ IDRC CRDI CSO Fund Facility

Carmelia

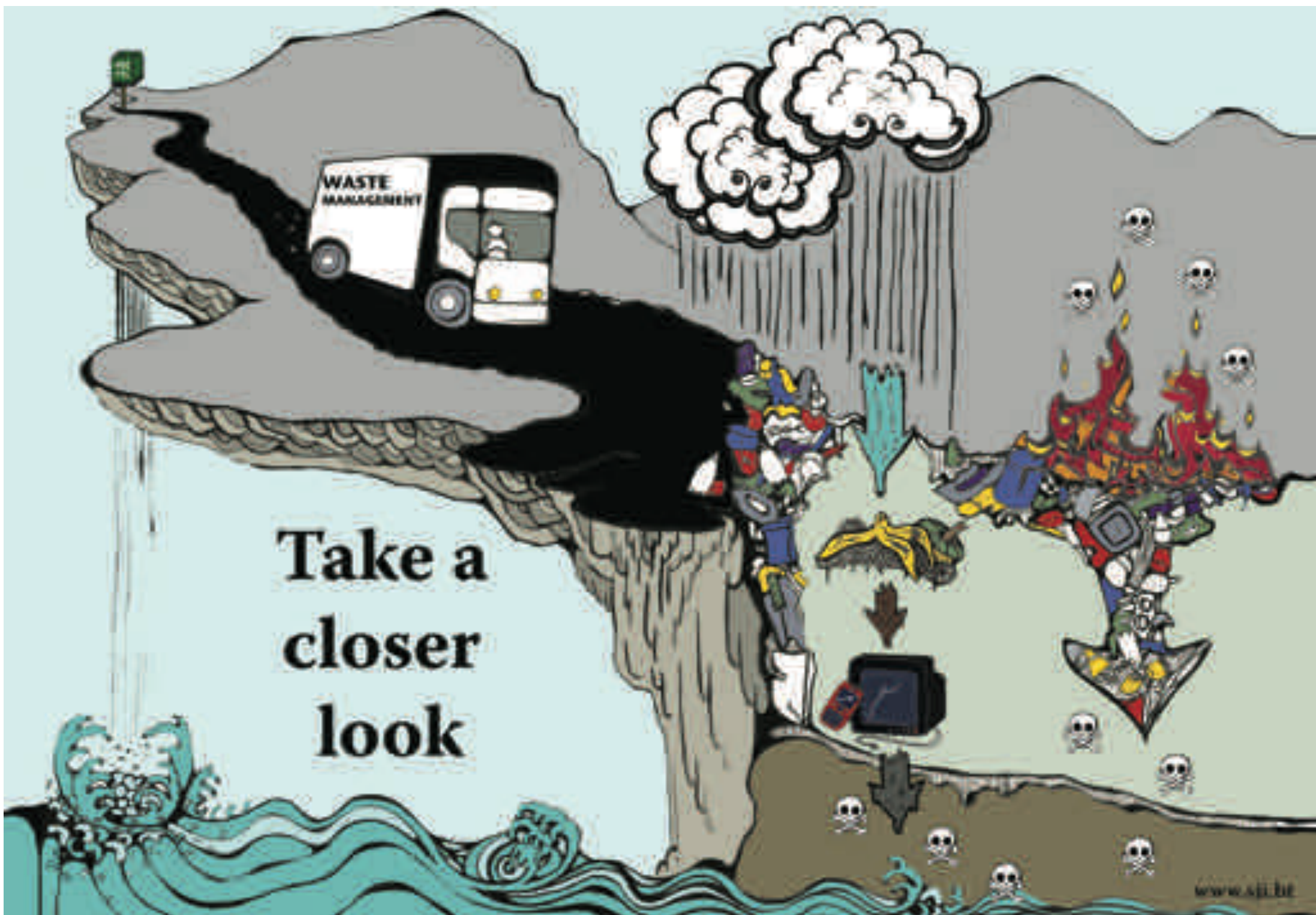
Text and illustrations by Taylor Cass Stevenson





**Get to know your waste**





**Take a  
closer  
look**







**Get informed**



**Think  
about it.**



**Get serious, but make it fun**







**Make your choice**



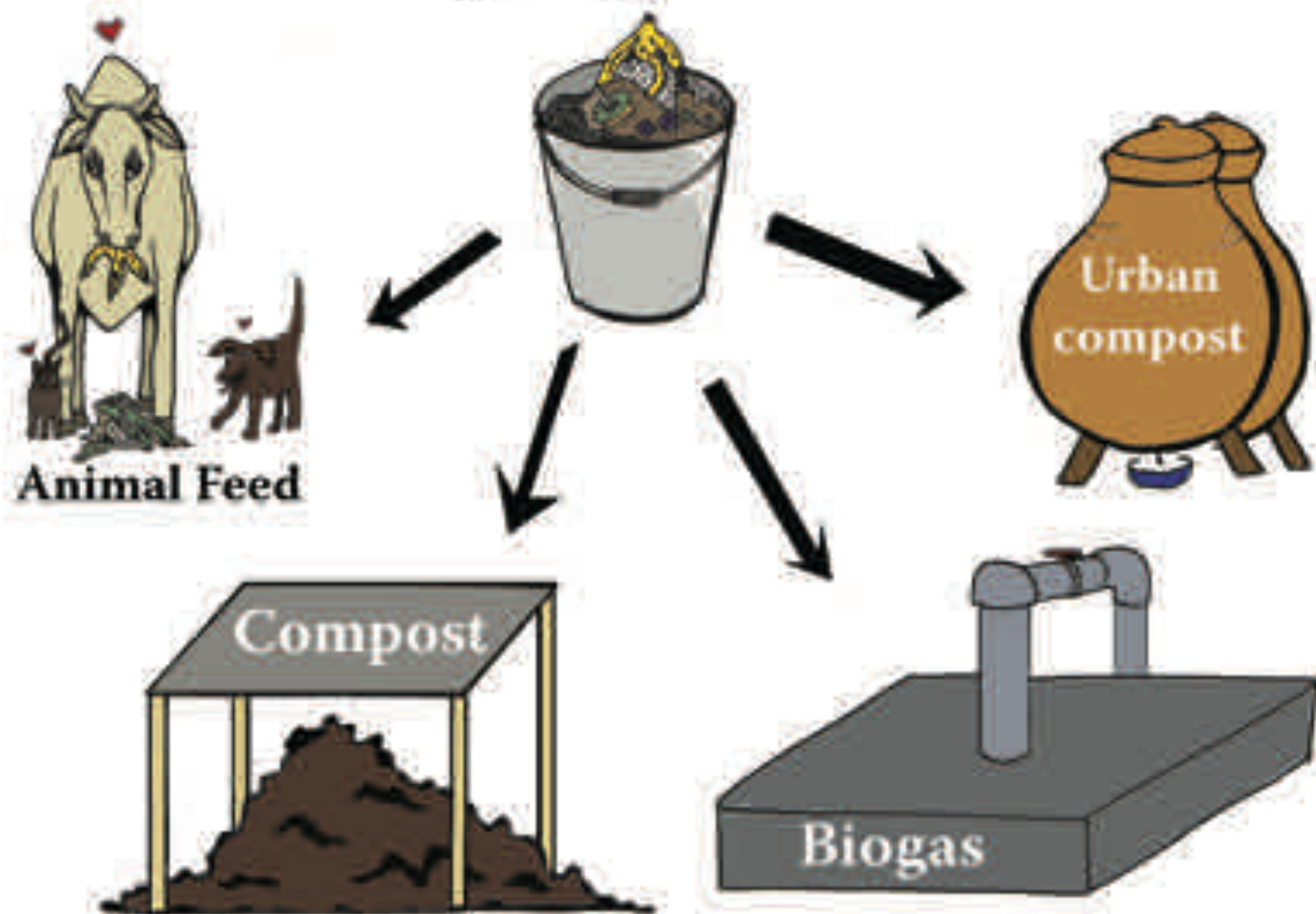
# Manage Your Own Waste

Sorting and storing materials at home may inspire you to find new uses for them





# Managing Food Waste





# How to Make Heap Compost



Don't forget to mix the pile!

## Brown/Dry

- Ashes
- Paper
- Corn husk
- Dry leaves
- Dry hay

## Green/Wet

- Food
- Animal dung
- Grass
- Plants
- Fresh hay

Stinky or too wet?  
Add brown/dry.

Too dry?  
Add green/wet.



# Get to know your partners in composting



Insects in your compost  
are a good sign



## Make new partners in food waste reuse



Invite your  
neighbors to  
join



Learn to **Repair** broken items  
or find someone who can





# Save and Reuse your waste



Wash...



Dry...



Save...

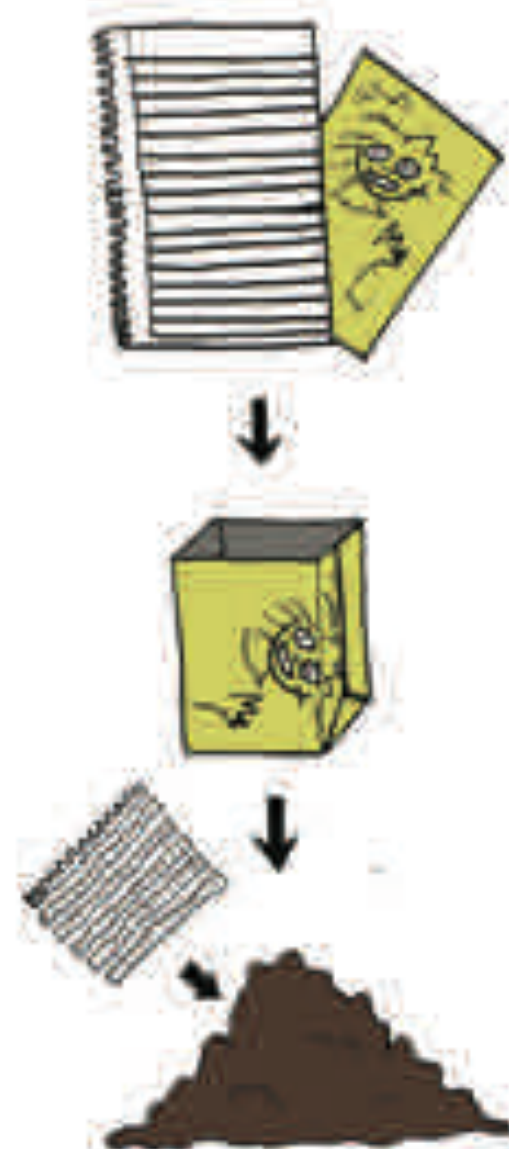


Reuse





# Get Clever with Reuse



# Sell unwanted materials for Recycling





# Use Your Local Resources



Artisan Teacher Lama Chef Farmer Recycler Government Youth Official



Exchange materials and techniques



[www.sji.bt](http://www.sji.bt)



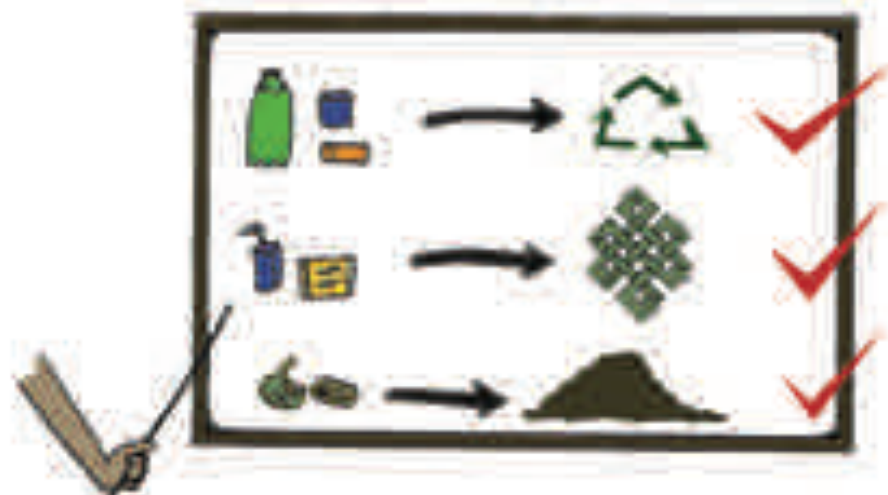
# Host a Zero Waste Meeting



**Have a moderator**  
**Select a Zero Waste trainer**



**Take notes**



**Make a plan...**

**...and follow through**



**Make it easy for  
people to collect  
needed materials**



# **Sort and Store Materials**

**Set up segregation stations**



**Build a Material Recovery Facility  
to sort and store materials**



# Set a Trend



Find ways to avoid packaging. Suggest that shop customers bring their own bags and containers



Sell in bulk





# Support others in their efforts to reduce waste





# Participate

**Develop and advocate for zero waste ideas in your community**



**Present your ideas  
to local leaders  
and the media.**

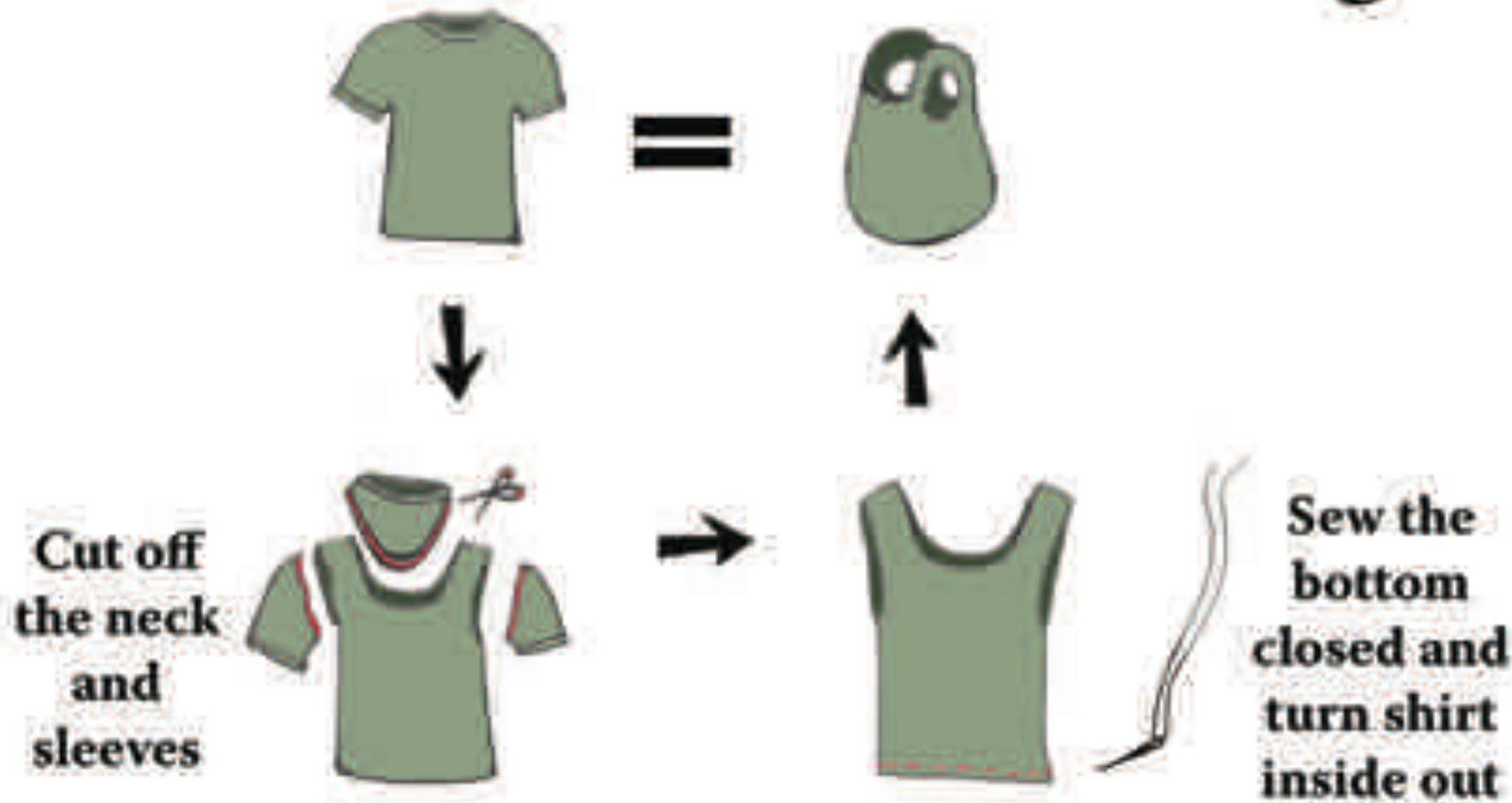


# Have Patience.



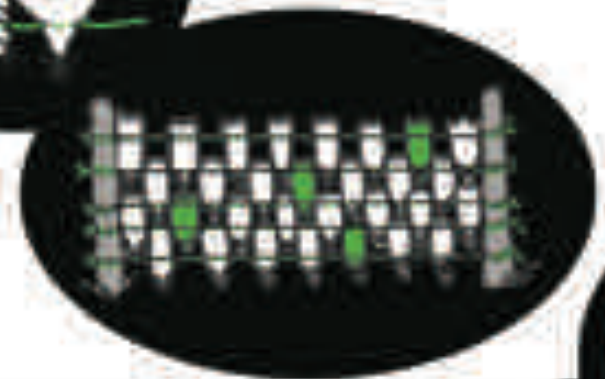


# How to make a t-shirt bag



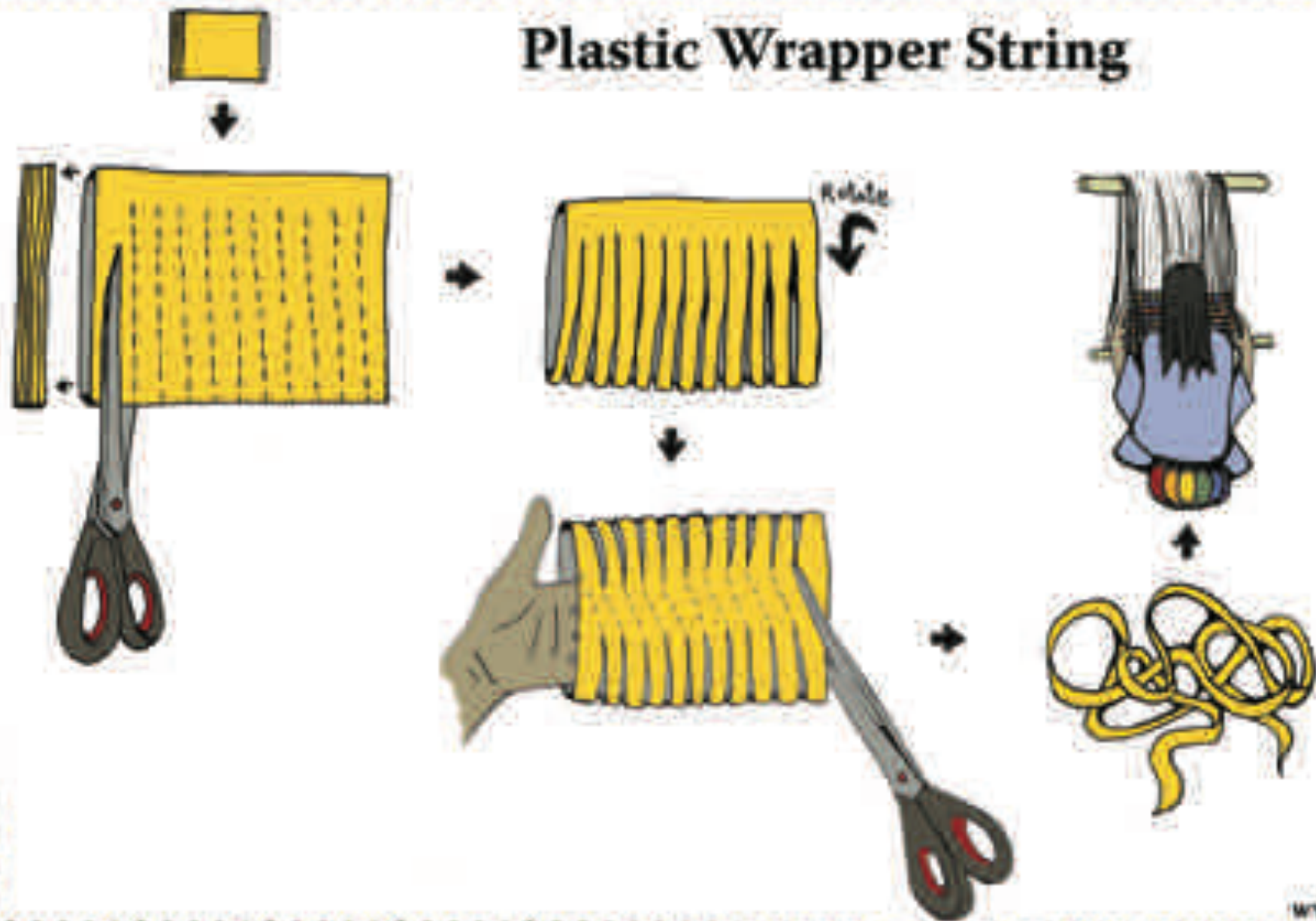


## Multi-use Plastic Bottle String





## Plastic Wrapper String





# How to fuse plastic bags

(This technique is used to make bags, wallets, jackets, shoes and even furniture)



**1** Layer bags (LDPE plastic works best) and cover with a cotton cloth.



**2**



**3**



**4** Make a pocket by folding the plastic over a piece of paper or cloth



**5**




**6**





# Umbrella Cushion





## Materials:

- 





Remove the fabric from a broken umbrella


- 


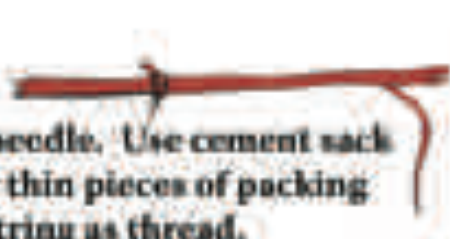

Cut plastic wrappers into thin strips.




Termacol (Styrofoam) pieces are also good


- 

Thread a needle. Use cement sack string or thin pieces of packing string as thread.

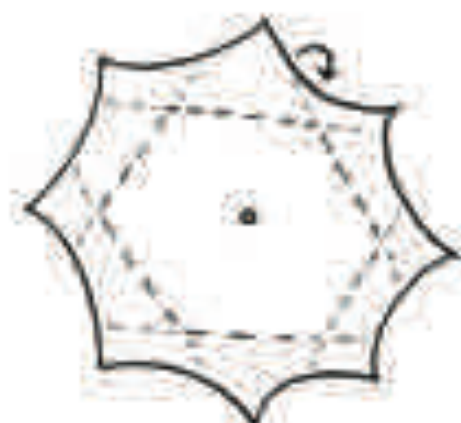

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Cut a fabric scrap into two small circles



9 cm





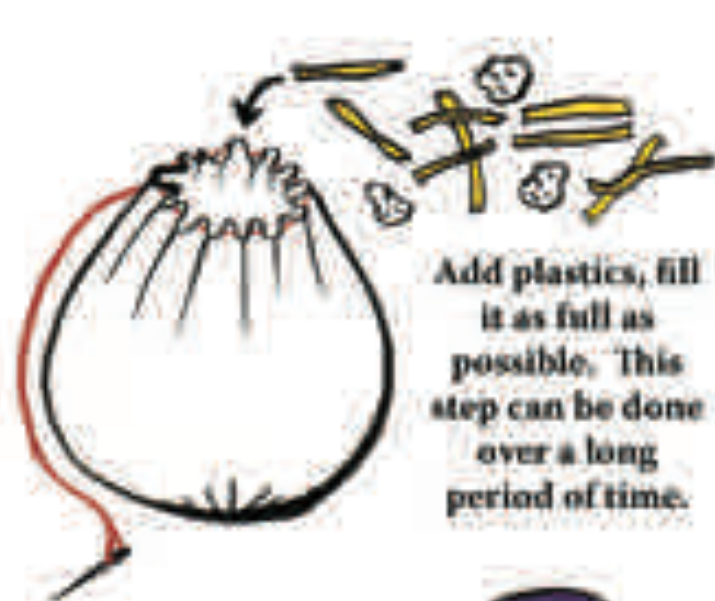
Fold in the edges of the umbrella fabric



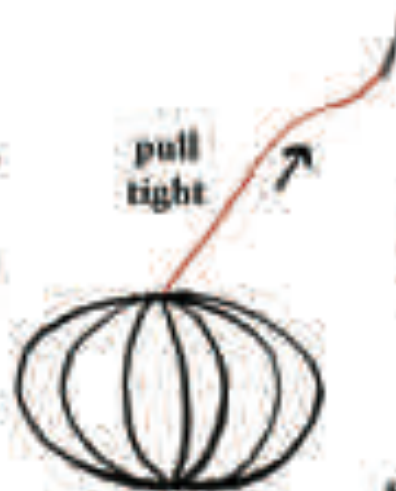
Tie needle onto the edge and sew in and out around the edge of the fabric



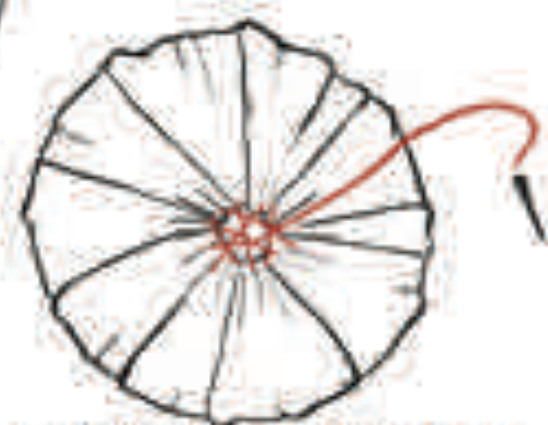
pull the string



Add plastics, fill it as full as possible. This step can be done over a long period of time.



pull tight



Stitch over the hole many times

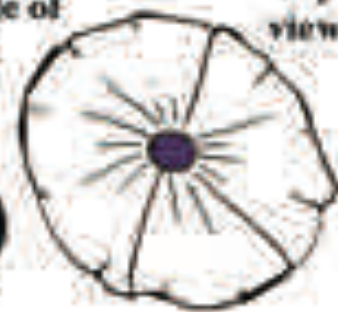


Make two buttons using the same technique. Tie a knot and flatten buttons



Sew buttons over top and bottom holes of cushion

When attaching buttons, sew around underside of the entire button




Top view



## Additional Information:



### Cover

Inspired by the internationally recognized recycling symbol: , the zero waste endless knot image on the cover illustrates the often round about and complicated nature of working towards zero waste. Zero waste is a concept that aspires to stop wasting on multiple levels. In order to stop wasting material resources, individuals and communities must also work to stop wasting of natural and human resources, of opportunities and of all resources in general. This can be a complex process that may involve restructuring systems, changing community practices and adjusting attitudes towards waste.

Waste reduction involves the avoidance of creating materials that may end up as waste. Choosing to buy unpackaged food, using reusable cloth grocery bags or reusable carry containers are prime examples of waste reduction. Reuse involves making material waste useful again by repairing broken items; reusing materials, like plastic bottles, over again; or transforming waste materials into something else, like making a bag from woven wrappers. Recycling involves taking materials to scrap dealers so that they can eventually be reprocessed into new products.



### Get to know your waste

Getting to know your waste involves understanding not just where it goes and where it came from, but what it is made of. Understanding the materials that comprise our waste, and how they react with the environment as they decompose or are burned, offers insight into how they can be better managed and avoided.





## Take a closer look

Material waste is harmful to human and environmental health in a number of ways. While many people are keen to reduce litter through the promotion of waste disposal, it is important to consider the dire consequences of waste dumping and burning. Waste disposal and management may enable people to inhabit aesthetically cleaner surroundings, but it also enables people to forget that waste production is a problem that needs urgent attention if Bhutan is to avoid many of the problems facing the rest of the world.



Decomposing organic waste, for example, produces greenhouse gases like methane, which are associated with ecological problems like global warming. When organic waste decomposes and mixes with electronics and other hazardous waste, toxic leachate is produced, which can easily contaminate soil and ground water and, eventually food, animals and people. When burned, some waste produces many harmful substances such as dioxins, which are known to cause cancer and contaminate air, water, soil and food.



## Think about it

Waste is a problem that should be taken seriously in Bhutan—especially now, while production rates are still manageably low. Waste production is increasing dramatically in Bhutan, and more attention should be given to its reduction. Though waste is a serious problem, and should be treated as such, it is also important to have fun while trying to find ways to reduce waste. Having a good time with waste reduction will both attract the interest of others and make the process more enjoyable.



## Make your choice

Fresh food is not only less wasteful because it is easier to avoid packaging when purchasing it, but it is also healthier. The choices we make as consumers can have a major impact on environmental and human health. But it is also important that business and government support consumers in providing and demanding the availability of ecologically sound products.



## Manage Your Own Waste

Segregating and storing your waste at home will not only help you find other uses for it, but it will show you how much of each type of waste you are producing. This may encourage you to start buying products with less or no packaging, and to buy things that will last longer. Separating your waste will also help to keep things cleaner, so that animals aren't attracted to your home dustbin. After sorting all of your waste for reuse and recycling, you may find that there isn't any left for the dustbin!





## Managing Food Waste

Biodegradable waste is anything which quickly decomposes into the environment, and includes organic (food and plant) matter and paper. Biodegradable waste is one of the most problematic types of waste when dumped alongside other types of waste, and it is one of the easiest waste products to manage at home in a more ecologically sensitive way.

- Feeding food discards to animals is one way to avoid biodegradable waste.
- Composting can provide plants with extra nutrients, and is especially easy to do in rural settings.
- Urban pot or bucket composting is relatively simple to do, and can be done in urban settings where access to soil is limited. Clay pots with a small hole in the bottom to collect leachate (which, when diluted, is a rich fertilizer) or buckets with small holes throughout can effectively compost food waste, especially if cow dung or a few tablespoons of spoiled curry or curd are added each week.
- Biogas is an increasingly popular way to make use of methane gas produced by decomposing organic waste, and can be used to run stoves, lights, etc. Toilet waste can also be fed into biogas systems.



## How to Make Heap Compost

Heap composting is just one way to manage organic waste while also producing rich fertilizer for plants. Mixing about 9 parts dry, brown, Carbon-rich matter (like ashes, shredded paper, corn husks, dry leaves or dry hay) with one part wet, green, Nitrogen-rich matter (like food waste, animal dung, grass, plants or fresh hay) is suitable for making good compost. You will notice that some matter, like bamboo leaves, takes longer to decompose. You will also notice that it is best to chop the materials up as small as possible for optimal composting. Stirring your compost regularly will help the pile “breathe,” which speeds up the process and prevents it from smelling bad. If your compost pile doesn’t work well at first, experiment with adding water or wet materials, or dry materials to get the balance right. The soil in your compost should be about as wet as a wrung out sponge.



## Get to know your partners in composting

Don’t be afraid of bugs, they are what makes your compost pile work! Involving others in your waste reuse efforts is a good way to spread waste zero waste traditions, help the environment and maybe even learn something new.



## **Learn to repair broken items, or find someone who can**

Repair is one of the most important aspects of waste reduction and reuse. Clever communities will know or learn how to fix the things that commonly break down. Organizing workshops to share repair techniques is a great way to spread skills while also building community solidarity. Establishing a demand for repair will also help to create new jobs.



## **Save and Reuse your waste**

Packaging materials may not seem very useful. But if washed, dried and saved, rather than discarded and forgotten about, people are likely to come up with good uses for problematic materials like wrappers and juice boxes. Don't be afraid of washing and holding on to your waste for a while, it is a good way to test your creativity and find new uses for something you once considered useless!



## **Get Clever with Reuse**

Attracting people through reuse art and craft is a very effective way to engage your community, since reuse is one of the best ways to draw people into the fun side of zero waste. Reuse is growing in popularity around the world, so reusing materials to make attractive or useful items may also present new business opportunities.



## **Sell unwanted materials for recycling**

Recycling is a good way to make some money from unwanted materials. Scrap dealers sell materials to places like India and China to be reprocessed into useable materials, and can help communities recycle waste while providing income.

Recycling is not a perfect solution, though. Most recycling is actually “down-cycling,” meaning that the materials’ quality degrades every time it is recycled, eventually resulting in material waste that cannot be recycled. Furthermore, recycling can be a hazardous process, causing considerable air, water and land pollution. It should, therefore, be considered a good option only when reduction and reuse of waste are not possible.





## Use Your Local Resources

Knowing your local resources is a very important start to improving local capacity and networks such that waste can be effectively reduced, reused and recycled. It is also a good way to build community solidarity. Sometimes moving towards zero waste is simply a matter of exchanging materials and ideas, which can be facilitated by knowing what people need or can do in your local community.



## Host a Zero Waste Meeting

Zero waste meetings can be held alongside local community meetings in order to increase awareness and participation. Meetings are most effective under the direction of a good moderator, with the support of a detailed note taker, and with a solid plan that is followed through on. Selecting local zero waste trainers—people assigned to train others on different zero waste strategies—is an effective way to spread waste reduction, reuse and recycling ideas in your community.



## Sort and Store Materials

Establishing waste sorting stations and material recovery facilities are common and basic steps in waste reduction, reuse and recycling. Establishing sorting and collection options for unconventional materials is a socially inclusive way of facilitating reuse and creativity. Including space in material recovery facilities for non-recyclable but potentially reusable items is a good idea. In this case, having water available for people to wash materials prior to storage may be necessary. Simple rainwater harvesting gutters fed into a bucket may suffice (see plastic bottle string tutorial at the end of this manual for a basic illustration of a plastic bottle gutter).



## Set a Trend

Painting reuse and waste reduction as fashionable is a great way to support zero waste movements. Make zero waste popular and fun! Businesses can help set new waste reduction trends by finding new ways of packaging and selling goods, and encouraging customers to participate in more responsible purchasing habits, such as bringing your own bag or reusable jar/container. Buying and selling goods in bulk—meaning in large quantities rather than individually packaged—can make it easy for people to package goods in reusable bags and jars and thereby avoid disposable packaging all together. And it is usually less expensive for businesses to buy in bulk.



## **Support others in their efforts to prevent and reduce waste**

Zero waste demands creativity, open minds and broad community support for people who may think and behave differently in the name of waste reduction and prevention.



## **Participate**

Public participation in democratic governance is one of the best ways to strengthen your country. Advocate for zero waste ideas through the local media by writing an article or letter to the editor, or by calling into a local radio station. Government leaders need help and ideas from every day people. Submitting a letter to local and national leaders will help them know how to best improve waste systems and regulations.



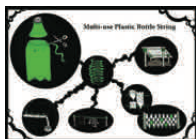
## **Have Patience**

Zero waste takes time. Some strategies may not work at first, or may not work at all. Be patient and keep working at it.



## **How to make a t-shirt bag**

Try holding an old-t-shirt collection drive to amass shirts for a bag making workshop.



## **Multi-use Plastic Bottle String Tutorial**

Plastic bottles are made from very strong (PET) plastic, which can be modified to have many uses. As pictured, the string can be used to attach plastic bottle rainwater harvesting gutters, as a laundry line, as string for connecting plastic bottle fencing, to tie together structures like a compost roof. It can also be used for other activities like weaving and basketry. Come up with your own use for this easy to make resource!





## Plastic Wrapper String

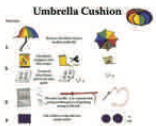
This technique can be used to cut anything from plastic wrappers, to plastic bags, to tetrapack juice boxes. Once cut into a string, these materials can be used for weaving, crochet, knitting, wrapping or other useful craft techniques.



## How to fuse plastic bags

This handy technique is used to make bags, wallets, jackets, shoes and even furniture from common plastic bags and packaging. If the concept of zero waste is deeply considered, one will notice that this technique is not exactly zero waste since it requires electricity to run the iron. Zero waste demands that people begin to notice these inefficiencies.

Running the iron on biogas may be a great alternative! But even if biogas or other forms of alternative power are not available, give this technique a try anyway. Soft plastic bags (sometimes labeled as #4 plastic or LDPE) work best, but other bags and packaging work as well. Bags that are printed and dyed may be more difficult to fuse, but give it a try and see if it works. While this technique shouldn't give off any toxic fumes, since the plastic is not burning but simply melting a little, it is still a good idea to do this in an open space or next to an open window. If your cloth cover starts to smoke, it means that it is not 100% cotton and likely has some synthetic (plastic) content. Use a 100% cotton cloth or paper instead.



## Umbrella Cushion Tutorial

Filling cushions with plastic waste is a great way to use up large quantities of plastic for making something useful. This is a good project to do slowly over time, since the incomplete cushion can be used as storage for used plastic wrappers until enough are collected to sufficiently fill the cushion. Experience tells that plastic wrapper strips are best if well washed and dried, cut thin, and if the cushion is packed as full as possible (the filling will condense over time).

# Good Luck and Tashi Delek!