

PROJECT TOGO

Plastic recycling in climate protection project creates solutions for dealing with waste in Togo.



A typical cargo bike in Togo. Cargo bikes are used to transport almost everything, including garbage, for example in the city of KPALIMÉ.



Plastic recycling in the PROJECT TOGO climate protection project

Together with Trier University of Applied Sciences, natureOffice is developing solutions for waste management in Togo. The basic idea behind the project is to raise awareness among the population and thus contribute to waste prevention. Unavoidable waste is collected in order to protect the environment and make it usable as secondary raw materials.

The realization that there is a problem with plastic waste in our oceans is not new. Our oceans are suffocating in it. Current estimates suggest that around 4.8 to 12.7 million tons of plastic waste end up in the sea every year. To put that into perspective, that's roughly equivalent to one truckload per minute. But where does the waste come from? One of the most common causes is the widespread use of plastic waste and the lack of structures for collecting and processing waste. In emerging and developing countries in particular, significantly less than 50 percent of waste is collected, and in many rural areas, the figure is even lower. The majority of people in these countries are therefore unable to dispose of their waste properly, as the infrastructure for doing so is simply lacking.

WASTE IN TOGO

Togo in West Africa is still in the early stages of consumer development, which is why the amount of potentially recyclable waste (post-consumer waste) is still low. However, Togo is developing noticeably, which is reflected in the amounts of residual and waste materials. For example, there is now a “waste collection system” in Kpalimé. Small cargo bikes are used to collect waste from restaurants, hotels, and private individuals and transport it to central points in Kpalimé. Restaurants and hotels are obliged to hand over their waste. The service is subject to a fee for all users. This system is in place in all larger cities and prefectures. However, experience from other projects in local villages also shows that people are not aware of how to deal with waste streams. Waste – especially plastic packaging – is carelessly thrown away in the countryside. The basic idea behind the project is to raise awareness among the population and thus contribute to waste prevention. Unavoidable waste is collected in order to protect the environment and make it usable as secondary raw materials.



GARBAGE COLLECTION IN THE CITY KPALIMÉ

There is currently no comprehensive waste collection system in Togo. Kpalimé has a municipal waste collection service, but its use is not mandatory. Most households burn their household waste or dispose of it in illegal dumps. This means that valuable recyclable materials are lost without being used. Here are a few questions and answers about waste management in the city of Kpalimé:

How often is the trash collected?

The trash service collects waste in Kpalimé from Monday to Friday. Every registered household is visited once a week.

Whose trash is collected?

The municipality only collects waste from households that are registered with the municipality.

How much does collection cost?

The price for collection varies between 1,000 and 10,000 CFA francs, depending on the size of the household.

Is every type of garbage collected?

The garbage collection service accepts all types of waste that households leave unsorted in their garbage cans. There is no fixed amount of waste that the garbage collection service collects. A price is agreed with the household based on its size, which the household must pay every month regardless of the amount of waste it produces.

How much waste is collected in a given period?

On average, the waste collection service makes two rounds (per day) to dump the waste at the landfill, and each round they collect waste from about 30 houses.

That makes a total of about 300 households per week (Kpalimé has about 75,084 inhabitants). With an estimated 300-400 kg per load, that would be about 3,000-4,000 kg of waste per week (own estimate).

What happens to the waste at the landfill?

Waste at the landfill is sometimes incinerated. How many landfills does Kpalimé have? There is one large official landfill in the municipality of Kpalimé. In some districts of Kpalimé, there are other landfills that are not official because they were created by residents

Do people collect recyclable waste at the landfill? Are there people who collect valuable waste from households?

No one officially collects valuable waste at the landfill. All waste remains at the site and is incinerated from time to time. Nevertheless, there are private individuals who collect valuable waste such as aluminum, iron, PET bottles, glass, and other items from private households and resell or recycle them.



Collecting and disposing of trash





Digression: Plastics

Plastics, also known as synthetics, are part of everyday life for people around the world. They are versatile, robust, and inexpensive to manufacture. Plastics are mainly produced from petroleum and, as a waste product, they pollute aquatic and terrestrial ecosystems. Many everyday plastics are shatterproof, which makes them practical for household use and an excellent material for safe children's toys. The production of plastics has been inexpensive up to now because most everyday plastics are petroleum products. With the scarcity of petroleum, these plastics will no longer be cheap to produce. This is one reason why there is a strong focus on recycling and why scientists are eagerly searching for new plastics made from renewable raw materials or equally renewable sources for common polymers.

plastic waste

Wherever plastic waste ends up, it remains there for long periods of time and pollutes the environment. Polymers obtain many of their useful properties from additives. A global study has determined that 360 million tons of plastic were produced worldwide in 2018. This is supplemented by 30 million tons of recycled material. This results in a total processed amount of plastics of 390 million tons in 2018. The total amount of used plastic goods generates around 250 million tons of post-consumer plastic waste per year, of which 173 million tons are collected. 63 million tons of plastic waste are disposed of improperly, for example in illegal dumps, and 14 million tons are carelessly thrown away (leakage).

Field research in Kpalimé – Show us your trash

In order to gain an overview of the waste generated locally, natureOffice employees in Kpalimé carried out a collection. This allowed them to investigate the availability of waste materials in Kpalimé:

- How much waste material is available? (Quantity)
- What is the composition of the waste material? (Quality)

Various households were specifically visited and asked to participate. In the next step, waste was collected from the participating households every two weeks, weighed, photographed, and a questionnaire on consumption and disposal behavior was completed. In addition to the answers to the questions, the amount of plastic waste generated per collection was also documented.



Reading in the trash

The next section can be described using “reading in the trash,” the approach taken by garbology. Garbology (also known as trash archæology) examines the trash produced by societies in order to learn more about their way of life and draw social and cultural conclusions.

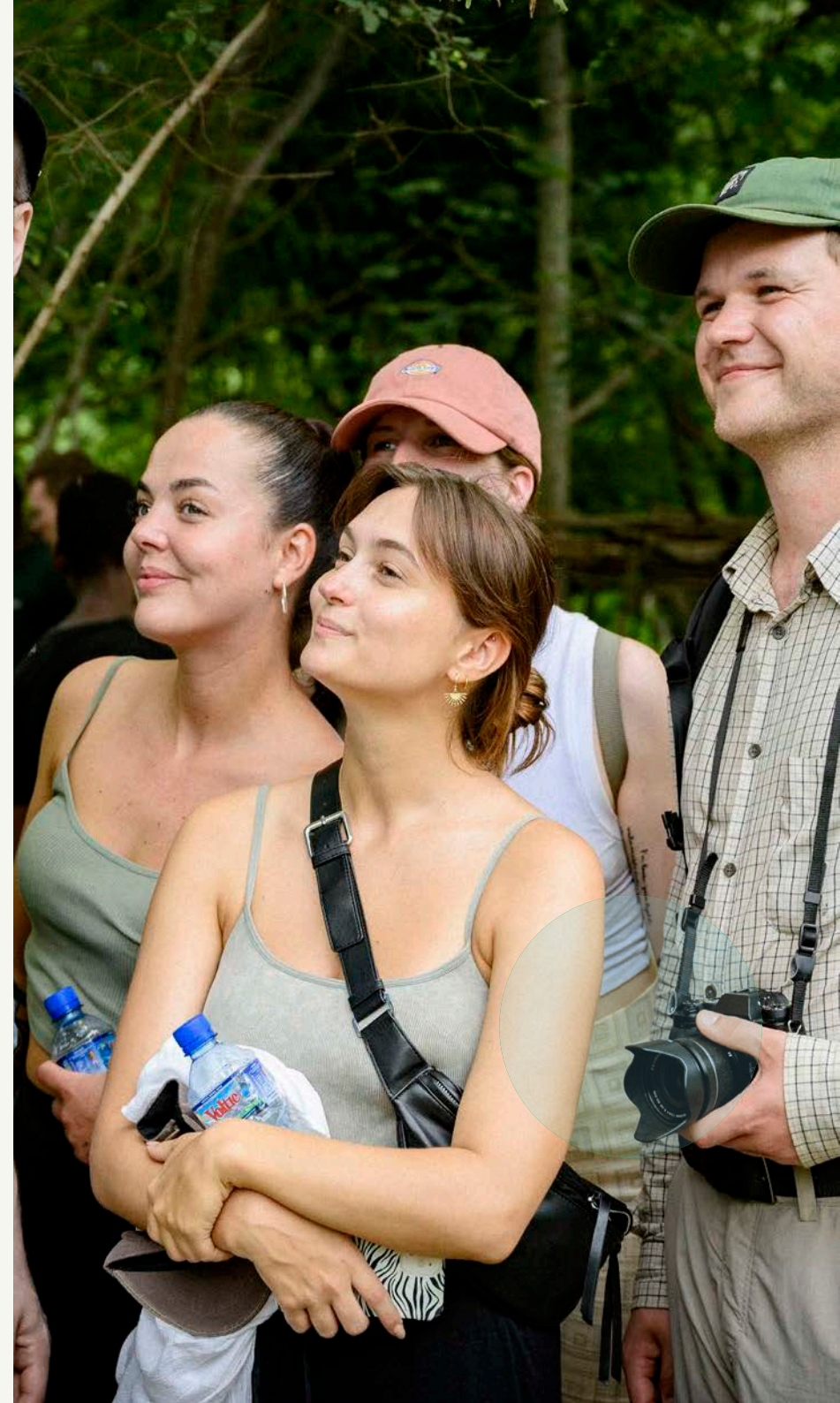


At this stage of the Togo project, the focus was particularly on identifying readily available waste materials that could be used as potential raw materials for subsequent product development. To this end, all 552 images were examined, image snippets were extracted, and waste categories were developed. The resulting categories were reviewed, the volume of the objects they contained was estimated, and the potential of the available material was assessed.

During this process, exciting insights were gathered and a comparison was made to see whether the answers given by households in the questionnaire corresponded to the actual composition of the waste. While examining the image material, it quickly became apparent that black bags appeared in every image (usually in large quantities). This is because in Togo, food is mainly bought at the market and the products are packed in free black bags for transport. Two things make the bags particularly exciting for subsequent product development: the monomaterial (simple, unprinted material) and the sheer quantity, which can be used as a basis for planning. A stroke of luck. In order to examine the bags more closely, several samples were subjected to material analysis at the IKK Hannover.

From plastic waste to recycled product

In the second phase of the project, students from the technical university were asked to develop ideas and processes for recycling and reusing plastic waste in Togo. This resulted in the following ideas and implementations:





Wicker basket

The idea of developing a basket that is durable and robust, while also reducing plastic waste and recycling old plastic bags in a meaningful way, arose at the beginning of the project. When implementing the idea, it was important to the students to find a technique that could be easily applied in any environment. The crochet technique used here can be easily mastered with your own hands. The basket can be used for shopping, but also for transporting items, and reflects the fact that in Togo, things are traditionally carried on the head.

The technique used can be easily applied to other products, and the basket is scalable. In larger dimensions, it could also be used for storing wood, for example. If made smaller and closed, it could also be used for juggling balls.

Knitted rope

The rope was born from the idea of simply making braided jump ropes. The braiding template creates a stable, interwoven strand, turning the simple rope into a versatile, robust rope. It also has a certain elasticity, which further expands its range of applications. Examples of applications include securing goods, on car roofs, at street markets, and similar situations. It can also be used as a clothesline, for hanging items of any kind, and for knotting and connecting objects.

The possible applications can be cleverly expanded, because wherever you need it, the rope is a practical product that can be used in numerous areas and scenarios. Depending on the length and thickness of the rope, it can be used in other braiding and knotting techniques. The advantage of making ropes from plastic bags is also evident in connection with water. It is water-repellent, so it can be knotted into a fishing net, for example. It also offers other possibilities in transport, in addition to securing goods. Loose nets can function as “containers” and be used, for example, to collect plastic waste. Research has shown that rope is an attractive product for the Togolese due to its versatility. Consequently, there is great added value in making rope from plastic bags.





Mat / Bag

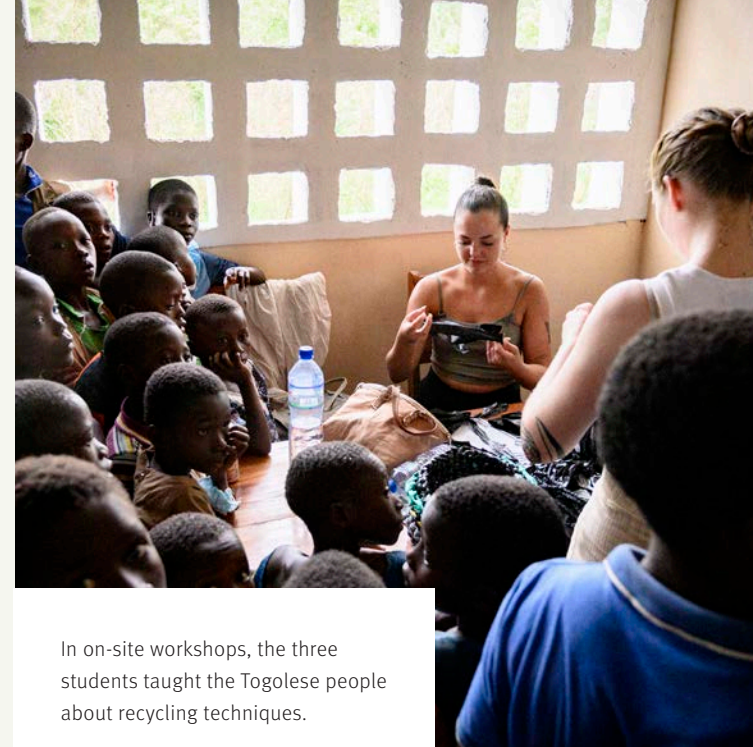
In the course of this project, another technique was used to create a carrier bag. This bag is very robust and sturdy, and at 55x40 cm, it is a good size for shopping.

It consists of approximately 220 medium-sized bags and requires no additional tools. The idea of developing a shopping bag that is durable and robust, while also reducing plastic waste and recycling old plastic bags in a meaningful way, arose at the beginning of the project. When implementing the idea, it was important to us to find a technique that could be easily applied in any environment. The knotting technique used here can be easily done with your own hands. The bag can be used for shopping, but also for transporting items, and is intended to replace disposable plastic bags. The technique used can be easily applied to other products. For example, a doormat was created during the process, which was then transformed into this bag. The doormat offers a sturdy but soft surface and could also be used as a sleeping mat in a larger size. You can also remove the handles from the bag and use the object as a basket. The technique is therefore versatile and can be used for a wide variety of purposes.

Putting the solutions into practice Implementing

The final, but probably most important step of the recycling project awaited the students of Trier University of Applied Sciences in April 2022. Together with natureOffice, they visited the climate protection project and were able to show the solutions they had developed to the local people and train them in the technology for manufacturing the recycled products at the training center in Kotokopé, which was officially opened during the visit.

"As I tried to demonstrate how the technology works, I noticed how quickly the various women and men grasped the hand movements and how others took the time to watch closely and use the materials themselves to try it out. In addition, Denise, a young member of natureOffice, helped me translate a few sentences to support the demonstration of the technology," says student Hannah Konder, describing her impressions of the training. Positive moments that showed that the recycling project and the workshop aroused interest and proved relevant arose from the fact that everyone participated directly and the head of the Chamber of Crafts supported the three students by taking his time to look at everything and simply trying it out.



In on-site workshops, the three students taught the Togolese people about recycling techniques.



Everyone joined in right away and tried to put what they had learned into practice.

An outlook

A particular challenge in the further course of the project will be the transfer and practice of the techniques learned. In the long term, it will be most important to teach the techniques to a manageable number of people through longer workshops in training centers. Once they have mastered the techniques, they can in turn teach others who are interested. Ideally, this will create a momentum of its own, which will further develop the techniques and their areas of application.



We look
forward to
hearing
from you.



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