



Research and Education Centre for Development, Cameroon

Baseline study about facts in waste lead-acid battery recycling in Cameroon

Report

Background

The Lead Recycling Africa Project was initiated in 2014 after various scientists and environmental groups in Germany and several African countries had collected a substantial body of evidence suggesting that unsound lead-acid battery recycling causes severe pollution and has serious public health implications in many metropolitan areas in Africa. Although lead-acid battery recycling has long been practiced all over the world, rapid urbanization, a growing vehicle fleet and an increasing demand for lead in an international context promoting the circular economy has spurred the rapid growth of domestic lead recycling industries in many African countries including Cameroon. There are various known cases where lead recycling had terrible consequences for workers and local communities. Unfortunately, there is as yet no comprehensive picture of the African lead recycling industry in general and the Cameroonian lead recycling battery recycling in particular and its impacts on human health and the environment. Furthermore, the general level of awareness amongst industry, decision-makers and the public in Cameroon is still very low or insufficient.

The objective of the Lead Recycling Africa Project in Cameroon is to identify, monitor and mitigate potentially polluting practices in the lead recycling industries and in the informal sector. Improving the knowledge base on lead-acid battery recycling practices, the project aims at contributing to stimulate public debates about health and safety and pollution control standards at the local, national and international levels.

Below this, the main outcomes of the project activities carried out between August and October 2015 in Douala and Yaoundé. These outcomes are organized into seven main sections as follows.

A Information on the nature and structure of lead-acid battery collection, recycling and disposal (including typical local characteristics)

The field trips in Douala and Yaoundé within the project activity period helped to gather the following information:

Used lead acid batteries are collected from motor-car garages and hardly through batteries retailers. The collected batteries are channeled to Mokolo, a popular slum quarter in Yaoundé (capital of Cameroon) and sell at an average price of 2500 FCFA (\$5US) per unit to either the informal recyclers or collectors that will then sell them to the recycling plants in Douala or illegal export dealers at slightly higher prices. This simple scheme is practically the same in many cities of Cameroon. Below there is a conceptual flow chart diagram of the fate of ULAB material flows:

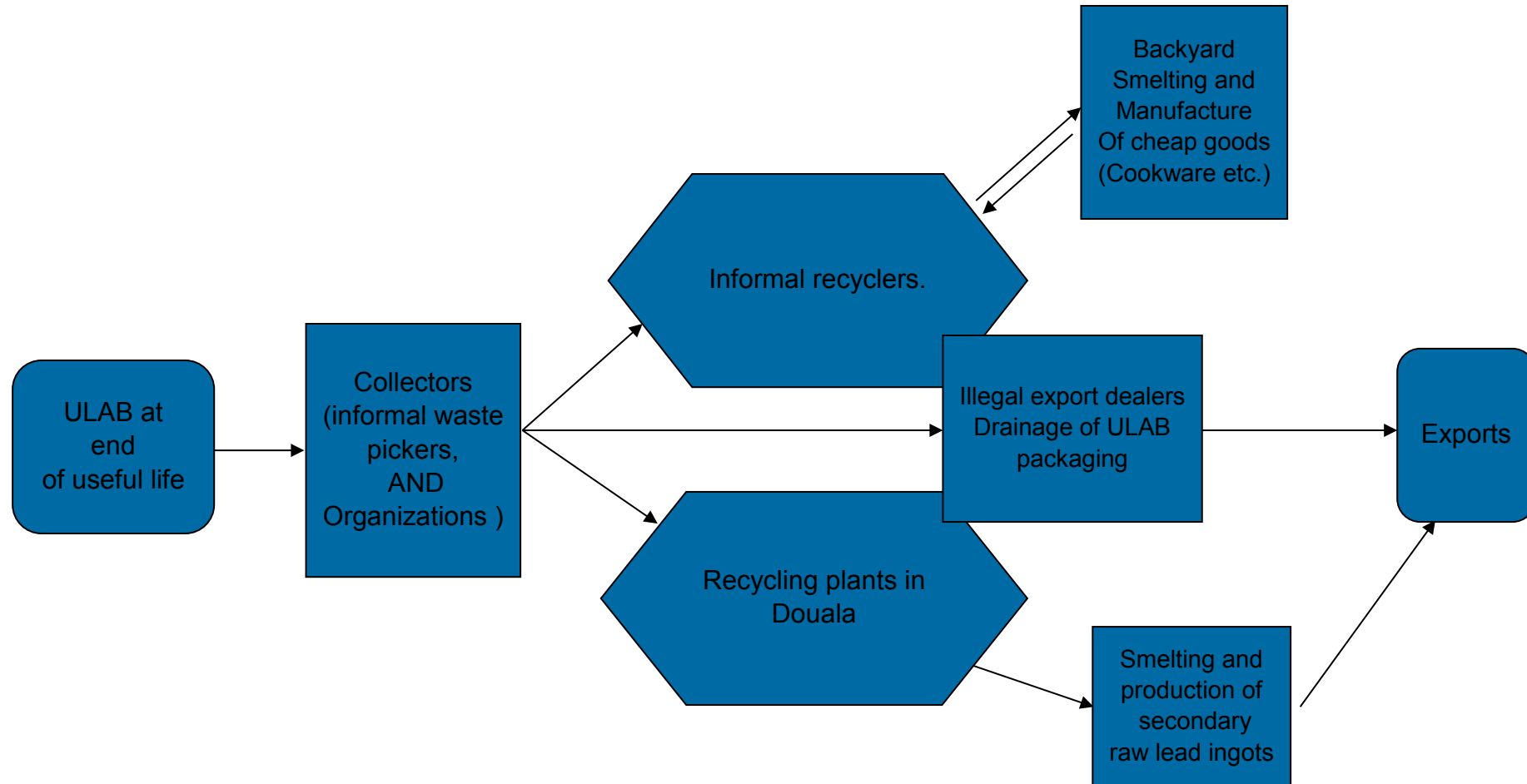


Figure 1: ULAB material flow chart: **Illegal export:** ULAB are either *exported* to Nigeria, in violation of the Basel Convention restrictions concerning the trans-boundary movement of hazardous wastes; or *process* in **Informal backyard smelters and workshops:** The informal sectors' operators can extract the lead (Pb) from them (figure 1A below) through open air smelting and use the recovered lead to manufacture some locally used commodities (barbells for weight lifting equipment (figures 1B below), jewelry, or decorative objects for metallic fences (figure 1C below), or the informal smelters mix lead scratches to the aluminum ones to obtain the melt used in the manufacturing of artisanal cookware pots commonly known as "macocotes" (figure 1D below); or *sell* to **Industrial Smelters** (BOCOM recycling and METAFRIQUE both situated in Douala): A greater number of ULAB are processed into secondary raw lead material and exported for refining and re-use in battery manufacturing.



Photo 1 : fonderie de Pb dans l'informel

Figure 1A: Photograph of lead recovery from ULAB in the informal sector (Mokolo ,Yaoundé)



Photo 2 : matériau d'haltérophilie en Plomb

Figure 1B: Barbell for weight lifting made from lead recovered from ULAB in the informal sector (Mokolo, Yaoundé)



Figure 1C: Lead based decorative objects on the top of a metallic fence



Figure 1D: Remaining plastic cover of a ULAB in a workshop where artisanal aluminium cookware are made (i). Polishing of typical aluminium cookware (ii: Photo by Perry Gottesfeld, 2014)

B Health and environmental awareness of actors with regards to lead recycling

Very few of the questioned retailers and car repairers were aware of the health and environmental hazards associated to lead and acid exposure (figure 2).

- We found out that batteries collectors do not take any precautionary measure for their safety. They carry these batteries without emptying the acid, sometimes in bags that they hang on their back, sometimes directly behind a motor bike and utility vehicles (truck, car) to the various collection transit points (buyers of ULAB well known by individual collectors) like Mokolo in Yaoundé and Camp Yabassi in Douala.

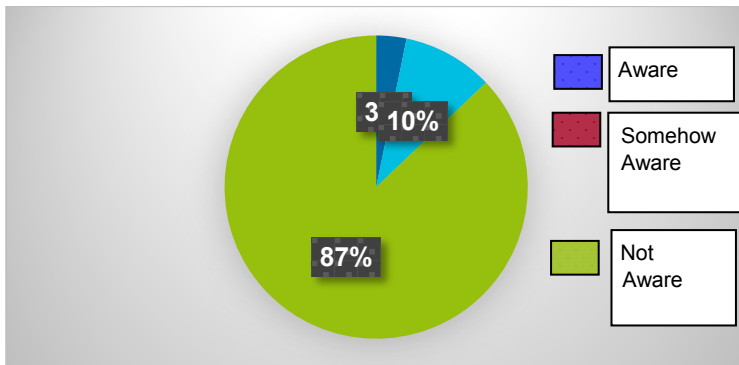


Figure 2: Percentage of people aware of the health and environmental impacts of lead

C Collection system of lead acid batteries

The Ministry of Environment provided a list of hazardous waste collector organizations in Douala and Yaoundé that are potentially organized in a network involved in the collection of used lead acid batteries as well. These organizations are: 2X-Environnement, Mega Business, TFB, Beryo and Mega Green. Their main collection points are automotive repair workshops and big enterprises like Brasseries du Cameroun, ENEO (Power utility company) CIMENCAM etc.



Figure 3: Pile of ULAB near the street in Yaoundé waiting to be transported to a collector

D Practices in a typical Informal Recycling Facility

Before melting the batteries in the artisanal furnaces, informal recyclers or collectors empty the acid content into the gutters to render it less aggressive for the environment through mixing with water. The acid can be drained from the batteries either by breaking them or by opening the plugs and inclining the batteries.

Informal lead recycling workshop or backyard includes an artisanal furnace powered by charcoals or firewood and a ventilation system that bring oxygen for combustion to the furnace through an underground pipe. The melted lead is molded and the shape given to it depends on the customer's demand (cheap jewelries).

E Information on industrial secondary lead smelters within Cameroon (including name, location, management, carried-out processes)

There are two formal secondary lead smelter plants in Cameroon. Both are located in Douala.

1. BOCOM RECYCLING

BOCOM recycling is located in the Bonaberi industrial zone in Douala.

According to the representative of the General Manager of the company, official in charge of the health, environment and safety Department as well as the staff in charge of human resources management, BOCOM Recycling is a branch of BOCOM International that employs 40 workers who work 8 hours per day.

At the day of visit, each worker had personal protective equipment (PPE) as follows: work suits covering their whole body, safety boots and respirators.

According to the management, the workers are constantly informed on good practices as far as their safety is concerned and lead blood tests are carried out on them once a year to control the lead level in their blood. We were neither able to check this information nor to identify the body that organizes or carries out the Blood Lead Level (BLL) tests.

- The plant has a waste water purification network on site and recycles the plastic parts of used batteries for the manufacturing of tiles and paving stones.
- The capacity of the plant is 8 tons of raw lead ingots per day.

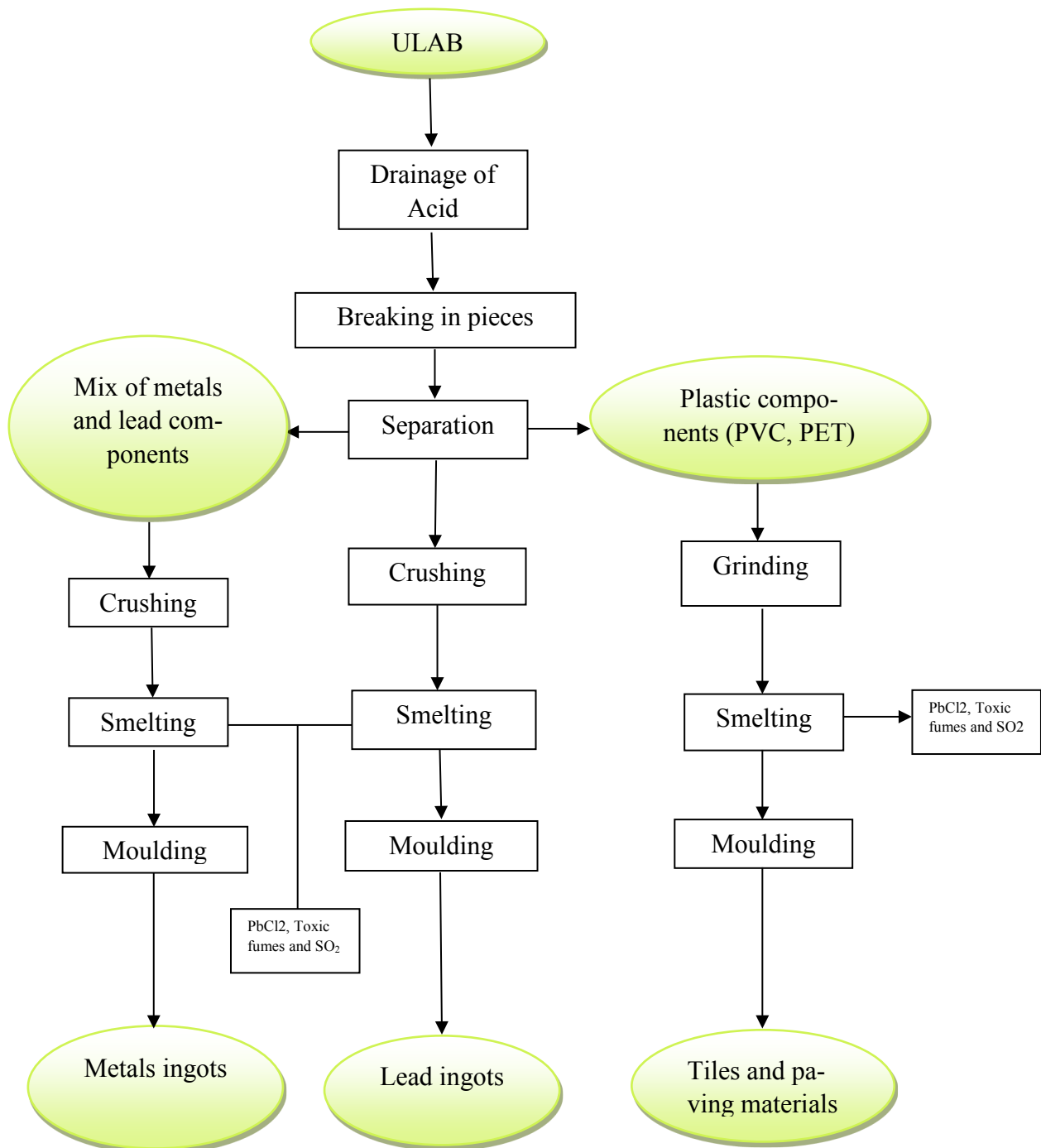


Figure 4: Process of ULAB at BOCOM Recycling

2. METAFRIQUE (formerly known as COMAGRI)

METAFRIQUE is located in the BASSA industrial zone in Douala.

During the field visit in August, we did not succeed to enter into the plant because the ULAB section was under renovation (possibly due to upgrading) according to information received from the management representative. We were invited to come back in September 2015 to visit the plant. However, in September and October the plant was still under renovation and we could not get access to the facility.

F Downstream markets of the lead recycling industry in Cameroon (including typical prices and customers)

Data on secondary raw lead exported from Cameroon in 2011, 2012, and 2013 obtained from the national statistics institution (INS¹, 2014) are shown below. Approximate numbers of total used lead acid batteries recycled for each year were derived from the overall quantity (Q) produced. Quantity produced per facility was not available. The monetary value (V) in millions of CFA and USD are indicated. These raw materials are exported to Europe and Asia.

Exportation of (Secondary) raw lead from Cameroon (INS, 2014)

Raw lead	2011		2012		2013	
Product Code	Q (tons)	V (million CFA)/USD	Q (tons)	V (million CFA)/USD	Q (tons)	V (million CFA)/USD
78.01	1 678	1 600/\$3.2	2 075	1 944/\$3.8	2 075	1 944/\$3.8
Approximate number of used batteries recycled	167 800 units		207 500 units		207 500 units	

¹ Institut National de la Statistique

G Observed community and health impacts

1. Around BOCOM Recycling, though located about 800 m apart from the plant, communities complaint about the dark invading smoke and related unpleasant odors that emanate the plant during the operation times (figure 5).



Figure 5: Views of BOCOM Recycling plant in BONABERI and its chimney

The Government High School Mabanda is close to BOCOM plant. Due to the fact that BOCOM is not the only industrial plant in the area, and in absence of the characterization of the nature of the pollutant in various environmental matrices (air, water, soil) it is difficult to be conclusive whether it is BOCOM that is responsible for the inferred environmental pollution in this area.

2. MATFRIQUE is closer to residential area and the Oyack Government High School. Waste water from this company is released to the environment without prior treatment. This waste water is strongly colored and this may send a message of metal pollution. People eat fish cached from the stagnant water pools. If the water is lead contaminated, diet can be another lead exposition route along with inhalation and direct skin contacts in the workers and family members. Unfortunately there is no available data on water analysis.

In Bassa (Oyack), many people complained about the pollution from METAFRIQUE plant. The neighboring companies like the paint industry also complained (and have raised the issue to the ministry of public health in Yaoundé) about the magnitude of the environmental pollution caused by METAFRIQUE. The Neighboring Company ETA Afric Woods is accusing METAFRIQUE to be the cause of the acid dust deposits on their roots and caused them to rust (see figure 6 below).



Figure 6: ETA Afric Woods roof rusted by acid dust deposits from METAFRIQUE chimney

3. Finally, around and within the informal recycling spots, exposure to lead is very high and affects the entire family members. All the neighborhood communities are also exposed but dwell in total ignorance of the lead hazard. In Dakar (Senegal) informal ULAB recycling practices led to the exposure of about 40 000 people to dust containing lead and have caused the death of 18 children of less than 5 years in 2008 (Blacksmith Institute 2012)

Acknowledgement

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