

# A Congolese Experiment



Alternative Sanitation in Lubumbashi

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(adapted and translated by André Leguerrier)

## Preamble

An experiment that was carried out in the city of Lubumbashi (Democratic Republic of the Congo) in the early 1990s may be a first indication of the potential impacts of the application of the EAUTARCIE concept. This experiment was reported to us by a Congolese priest living in Belgium. To our knowledge, it has never been published. We have not been able to verify the details or extent of this affair. The following description is merely an indication that may shed light on the applicability of our concept on a larger scale.

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## No sewers for the Tabazaïre district (now called Tabacongo)

The original city sewers dating from the Colonial period were replaced and extended to the entire city (600,000 inhabitants), with international aid. Towards the end of the work, it was realized that either due to an underestimation of costs, or for some other reason, there were not enough funds to finance the extension of sewers to the city district then known as « Tabazaïre ». It was thus decided that this neighbourhood of 40,000 inhabitants was to remain « substandard ».

## An information campaign on alternative sanitation

So the Salesians of Don Bosco whose Mission was located nearby took things in hand. They were familiar with the works of Joseph Országh on the [BioLitter toilet \(BLT\)](#) <sup>1</sup>. At first, they organized an information campaign among the population on the health hazards posed by the flow of toilet wastewater through the streets, from flush toilets and latrines. During this campaign, the public was invited to see and try the BLTs that had been installed at the Mission. The aim was to show that:

- These toilets could be placed inside a home;
- Used as directed, they didn't smell bad;
- Their use and operation wasn't complicated.

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<sup>1</sup> See video presentation on Youtube: [https://www.youtube.com/watch?feature=player\\_embedded&v=zUTaiFltH58](https://www.youtube.com/watch?feature=player_embedded&v=zUTaiFltH58).



## The first tests

The next step was to place these toilets, for free, in a few dozen volunteer households to test the toilets in real conditions. It was an opportunity to finalize plans for the mass production of these toilets in the Mission's educative workshops. The toilets were to be used by large families, and fitted with a 50-litre tank (as receptacle for the toilet effluent). The tanks were provided by the nearby mining company Gécamines. In fact, the tanks were salvaged plastic drums with tight fitting lids that had been used for the transportation of chemicals at the factory. Meanwhile, missionary fathers closely monitored the experience of those households trying out a BLT. This way, they were able to refine the explanations that were eventually included in a second information campaign on sanitation and BLT dry toilet use in the neighbourhood. One of the arguments used to prompt the use of the BLT instead of flush toilets was the reduction of the water bill.

## The mass production of BLTs and cellulose litter

This « alternative » sanitation campaign eventually created many meaningful jobs even though that was not the original intent. Indeed, the mass production of these toilets provided work in workshops. The stakeholders were called upon to provide a financial contribution for the endeavour. The expansion of the Mission's composting area and food gardening area also mobilized the local workforce. Many of the households abandoned the flush toilet in favour of the new dry toilet. Thanks to the help of the neighbourhood's youth volunteers (or near-to volunteers), thousands of BLTs were installed. Many of these were set up in the home, but most were installed in a garden outhouse. Apparently, certain Muslim families placed a small wash basin for their ritual ablutions next to the garden BLT. Spurred on by the nurses at the district's medical clinic, some Christian families did the same, for hygiene purposes. A water-filled container placed at stool height was used to fill the wash basin for hand washing. It was also necessary to organize the manufacture and supply of carbonaceous cellulose litter material. The litter was made at the Mission with such raw material as: tall grasses chopped and shredded, sawdust and shavings from the millwork shop, shredded cardboard with packaging salvaged from the dump (by neighbourhood kids, in exchange for a modest wage). Even local manufacturers contributed to the making of the litter, providing carbonaceous residues from coconut and cotton seed transformation. An average 50 litres of litter per week was needed for each family.

## Selective collection of human manure (or « humanure »<sup>2</sup>)

Teams of youngsters handled the collection of drums filled with humanure. They pushed two-wheeled carts loaded with bags of litter and clean empty barrels from the Mission to the households, and from there transported a load of filled drums and emptied litter bags to the composting area.

A large amount of humanure was thus gathered and its composting also required manpower. Prior to composting, gardening and farming waste materials were added to the humanure. Besides providing fertilization for the Mission's food garden, compost was sold to other families dependent on food crops for the local market. Vegetables produced locally were collected at the Mission by women who sold these, mainly on the city market. The money raised from the sale of compost and

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<sup>2</sup> « Humanure » is a neologism that was first coined by Joseph Jenkins in 1994 in his book « The Humanure Handbook : A Guide to Composting Human Manure ». His « Humanure Toilet » and our « BioLitter Toilet » are identical as they apply the same principles.



vegetables served to compensate the teams collecting BLT effluent and those handling the compost and preparing the litter at the composting centre.

## Sanitation like no other

The Tabazaïre district thus didn't have sanitary sewers. The runoff of domestic wastewater in the streets was now practically void of toilet effluent (i.e. black water) since BLTs had been installed. To channel this runoff, the local youth were mobilized to help repair and refit the existing street gutters. During the dry season, families were encouraged to use soapy water to irrigate household garden plants. For the most part, the gutters remained dry, except during the rainy season. Then, rain mixed with household soapy water was conveyed outside of the neighbourhood. The gutters were quickly colonized by dense vegetation that even acted as a filter and a decorative element in a neighbourhood where there were no sidewalks and only dusty or muddy dirt roads. It was observed that the water draining out of the district was already clear. It is unfortunate that this water was never analyzed, because in the almost total absence of toilet effluent, such water would contain very little pollution, neither from nitrates nor phosphates. It would also have been interesting to analyze this water's bacterial content.

## Cholera epidemics

For the next three years, there were two cholera outbreaks in the city of Lubumbashi, causing many casualties, especially among children. Experts from the World Health Organization (WHO) noted that the Tabazaïre district was relatively well spared by the epidemic despite what were considered as « unsanitary » conditions (from the lack of sewers). The WHO experts couldn't understand it.

Yet the fact is easy to understand. In tropical regions, no city sewer system is capable of fully absorbing torrential rainfall events that can befall the city on certain days during the rainy season. For hours on end, sewers will overflow, discharging black water into the streets where children play. Meanwhile in the Tabazaïre district, as the water flowed in the gutters, sometimes overflowing even on the street, there was little health risk to the population as the water contained almost no toilet effluent. When using a BLT, there is no production of black water. Human dejecta (or humanure) are held in the BLT, awaiting their removal to the composting area.

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## Conclusion

The economic calculations that should be considered fundamental have never been applied to this type of sanitation. However, we can advance estimates. A BLT, even a luxurious designer version doesn't cost more than a standard flush toilet. In addition, no drain, sewer or sewage treatment system is required... The money saved from the exclusion of these expensive systems can otherwise be used to construct proper sidewalks and even a bicycle path. Children could go to school with their roller boards (sustainable urban mobility!). To collect stormwater and greywater runoff, it is cheaper to install pervious stabilized concrete gutters<sup>3</sup> instead of sewers. Such gutters should not be made watertight : they should actually disperse some of the water (sometimes soapy water) directly in the soil. You can even cover the gutters with perforated concrete slabs for

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<sup>3</sup> See image at <http://www.eautarcie.org/images/esoviz-arok.jpg>.



practical purposes. The water collected this way can be conducted to a wetland outside the city. In the absence of black water, even soapy wastewater (i.e. greywater) will spontaneously clarify under the effect of light and air. The greywater issuing from a peri-urban neighbourhood can thus effectively be treated before being discharged into the nearest watercourse. Finally, drug residues contained in humanure are virtually broken down by composting.

The result is a peri-urban neighbourhood that no longer pollutes water...

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Mons (Belgium), January 11 2013.