

SDSN

**E-conference on Resource Recovery
from Sanitation for Food Security and
Soil Health**

**Waste flow in West Africa: case study of Ouagadougou, capital city of
Burkina Faso**

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Definitions

Waste (or **wastes**) are unwanted or unusable materials.

Waste is any substance which is discarded after primary use, or is worthless, defective and of no use.



A **by-product** by contrast is a **joint product** of relatively minor economic value.

A waste product may become a by-product, joint product or **resource** through an **innovation** that raises a waste product's value above zero. (wikipedia)

Examples include **municipal solid waste** (household trash/refuse), **hazardous waste**, **wastewater** (such as **sewage**, which contains bodily wastes (**feces** and **urine**) and **surface runoff**), **radioactive waste**, and others



Waste generation

Wastes may be generated during:

- the extraction of raw materials,
- the **processing of raw materials into intermediate and final products,**
- the **consumption of final products, and other human activities.**

There are many issues that surround reporting waste.

It is most commonly measured by **size** or **weight**, and there is a difference between the two.

For example, [organic waste](#) is much heavier when it is wet, and plastic or glass bottles can have different weights but be the same size.

On a global scale it is difficult to report waste because countries have different definitions of waste and what falls into waste categories, as well as different ways of reporting.

Based on incomplete reports from its parties, the [Basel Convention](#) estimated **338 million tones** of waste was generated in 2001. For the same year, OECD estimated **4 billion tones** from its member countries.

Despite these inconsistencies, waste reporting is still useful on a small and large scale to determine key causes and locations, and to find ways of preventing, minimizing, recovering, treating, and disposing waste.

Waste in developed nations #developing nations

Developed countries produce more waste per capita because they have higher levels of consumption. There are higher proportions of plastics, metals, and paper in the municipal solid waste stream and there are higher labor costs.

As a nation, Americans generate more waste than any other nation in the world with 4.5 pounds (2.0 kg) of municipal solid waste (MSW) per person per day, fifty five percent of which is contributed as residential garbage.

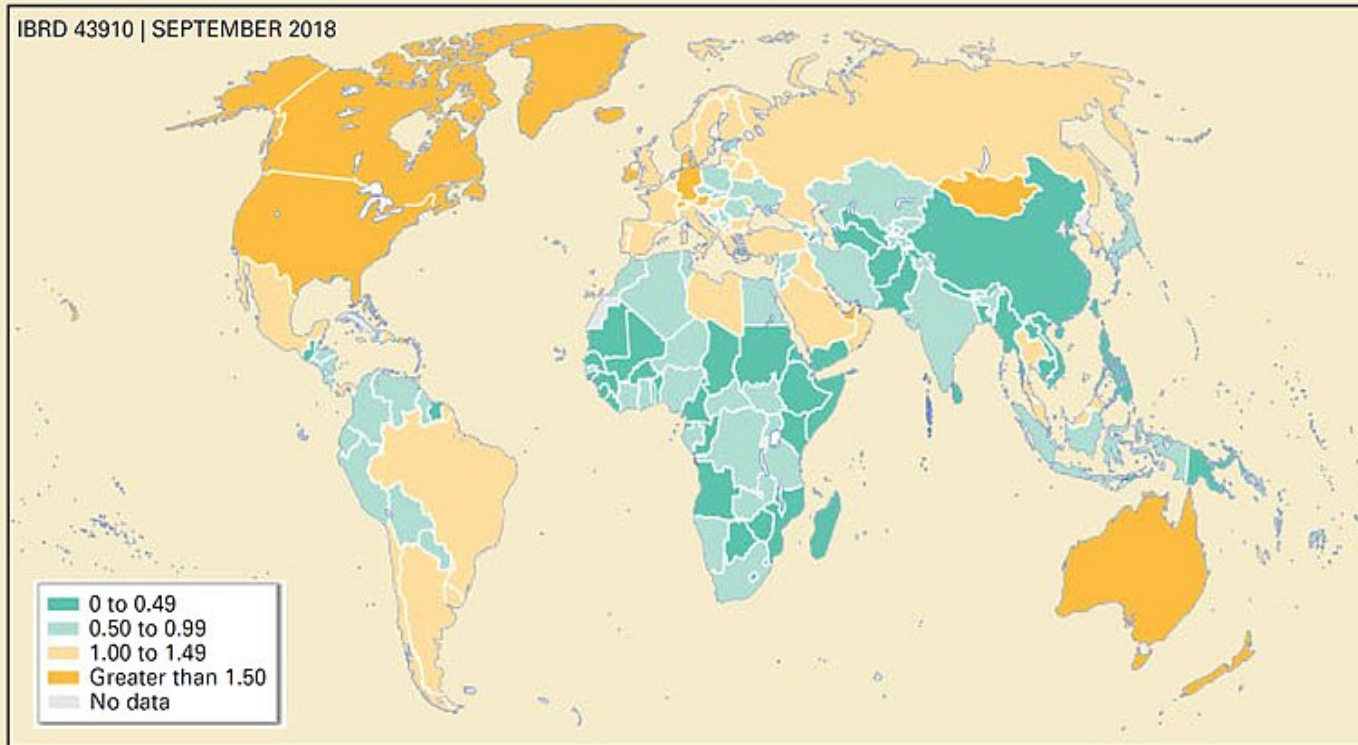
Developing nations produce lower levels of waste per capita with a higher proportion of organic material in the municipal solid waste stream.

If measured by weight, organic (biodegradable) residue constitutes at least 50% of waste in developing countries.

Waste generation per capita

Map 2.1 Waste Generation Per Capita

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Note: kg = kilogram.

The Waste Management Problem in West Africa & the Holistic Solution

Waste Figures and Facts in West Africa –

Solid, fluid, hazardous and non-toxic waste is generated in West African households, offices, schools, hospitals, and industries.

How this waste is handled often depends on its source and characteristics, as well as any local, state, and national regulations that govern its management.

It is an obvious statement that there is not nearly enough being done to resolve the consequences of past mismanagement, lack of innovation and unfortunately, complete apathy.

- 80% of the waste produced in West Africa is household waste. More waste is generated in the urban areas than in the rural areas due to the increase in living standards and the consumption of wrapped and packaged goods.
- Lack of proper infrastructure and fast-growing populations contribute largely to increased waste-related concerns.
- Toxic pollutants are a major environmental concern due to burning garbage. For example: a byproduct of burning garbage is carbon monoxide, a carcinogen that causes cancer.
- Electronic waste is one of the most difficult challenges, as toxicity exposure creates serious health risks to those directly in contact with it.

Waste Management in West Africa

Approximately *500 shipping containers from developed countries* are dumped in Africa each month with the total amount of waste being dumped in Africa estimated at *50 million tones today*.

There is a massive lack of waste management systems (Disposal; Collection; Sorting; Recycling) in all West African countries. *Only 40% of waste in all West Africa is being disposed of in a proper manner, and only 2% is recycled.*

Most of the waste ends up in landfills or dumped into the ocean. This causes severe health and environmental issues including:

- Malaria and waterborne diseases as a direct result of the smell of landfills that attracts flies and the toxins that seep into the soil and water supply.

- Incineration of solid waste products – (burning garbage) which creates a toxic pollution that causes serious health issues

Out of *108 million metric tons* of waste generated in West Africa a year (and growing), about 98 million tons of waste went straight into landfills.

With E-waste being widely reported as the largest issue in West Africa, it creates yet another factor to consider.

E-waste is comprised of waste from cellphones, laptops, air conditioners and refrigerators.

All which contain toxic elements such as mercury and lead, and if not managed properly can be very *dangerous to the environment, local water supply and people* around the vicinity.



Waste stream in Burkina Faso

Like many sub-saharian african countries, Burkina Faso is a devlopping country with following data:

Area: **274 000 square km**

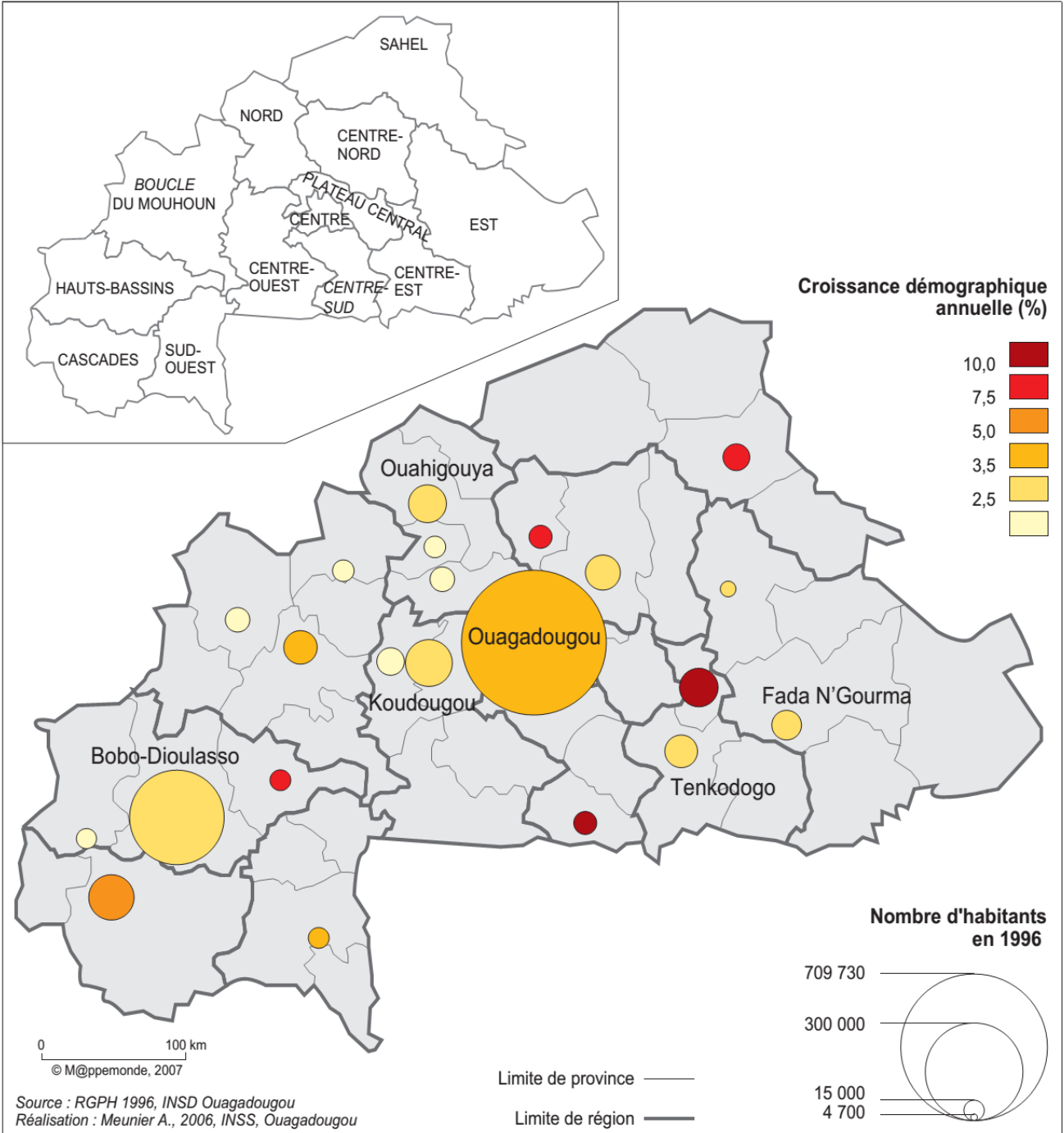
Population: about **20 millions**

GDP/c: **2077 US\$**

Urbanization rate : **25 %**

Economy: **70% agriculture, 15% industry and handcraft; 15 % service and civil servants**

Ouagadougou, capital city of Burkina Faso, West Africa



1. Origine of the waste in Ouagadougou

- **Domestic waste:** Batteries, drugs, bulky waste, rubble, Sewage, Valve water / dry toilets, Peelings, etc.;
- **Waste from companies:** slaughter, commercial, industrial, medical, mining, automotive batteries, oil drain, tires, solar batteries, mobile recycling ,
- **electronic waste,**
- etc.

2. Waste production:

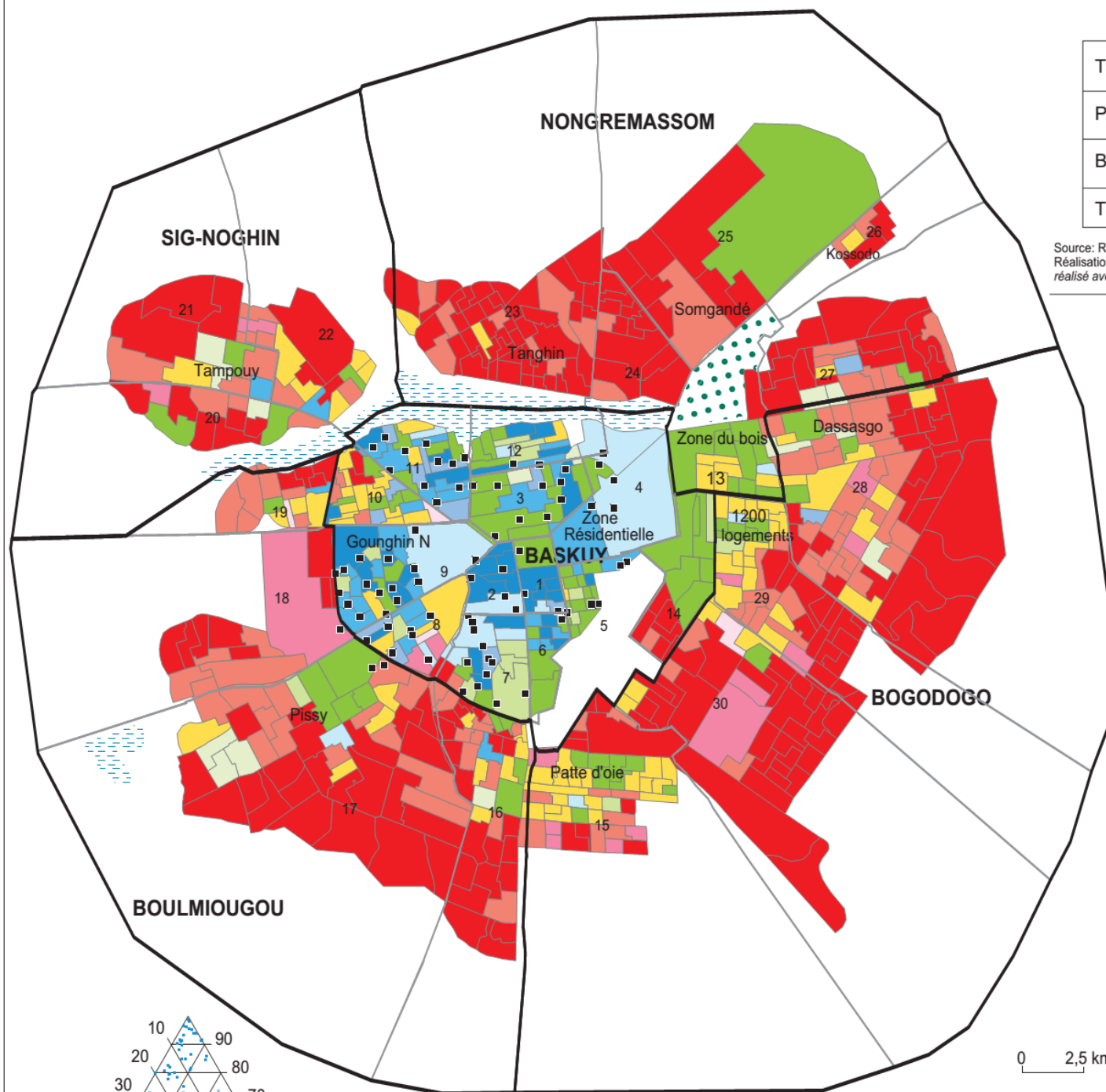
0.7 kg/day/person making about 560 000 tones or 800000 cubic meters of waste produced in Ouagadougou per year.

3. Disposal of the waste

Disposal type	percentage
In street, in ditches	92 %
Garbage bin, trash can	08 %

Only **46% are evacuated** out of the city by private and public actors





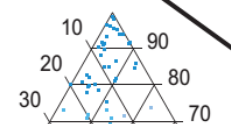
Tas, rue, fossé

Situations moyennes

Typologie (%)												
Poubelle	7,7	29,1	12,1	41,9	17,6	9,7	60,5	88,4	62,7	43,8	32,1	9,9
Bac	87,5	60,8	60,5	42,3	38,9	28,2	28,1	2,9	3,0	10,3	2,5	1,4
Tas, rue, fossé	4,8	10,2	27,2	15,7	43,6	62,1	11,4	8,8	34,3	45,8	65,4	89,7

Source: RGHP, INSD, 1996, Ouagadougou, fond de carte E. Cadot IRD 2002
 Réalisation: Meunier A., 2004, CTEM, IRD, Ouagadougou
 réalisé avec Philcarto, cartographie exploratoire - diagramme triangulaire, <http://perso.club-internet.fr/philgeo>

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0 2,5 km

4. Composition of the waste

composition	percentage	recovering potential
organic	61	Biodegradable
Paper	5	
Plastic	14	Recyclable
Metal	3	
Glass	3	
Leather and ruber	1	
Textile	2	
Inert	6	
Miscellaneous	5	

5. Environmental costs

- ❑ Inappropriately managed waste attract rodents and insects, which harbour gastrointestinal parasites, yellow fever, worms, the plague and other conditions for humans,



- ❑ Exposure to hazardous wastes, particularly when they are burned, can cause various other diseases including cancers. **Toxic waste** materials can contaminate surface water, groundwater, soil, and air which causes more problems for humans, other species, and ecosystems.

Waste treatment and disposal produces significant green house gas (GHG) emissions, notably methane, which are contributing significantly to global warming

6. Social costs

Waste management is a significant environmental justice issue.

- Many of the environmental burdens cited above are more often borne by marginalized groups, such as racial minorities, women, and residents of suburban zones .
- The need for expansion and siting of waste treatment and disposal facilities is increasing.
- There is now a growing market in the transboundary movement of waste, and a significant amount of waste is moved from developed to developing countries like Burkina Faso.

7. Economic costs

- ❖ The economic costs of managing waste are high, and are often paid for by the government; this money could be saved with more efficiency for water/food supply or public education/security.
- ❖ The non treated waste pollute soils and groundwater resources. In Burkina Faso 70% of the population have agriculture as main activity.
- ❖ The location of waste treatment and disposal facilities often reduces property values due to noise, dust, pollution, unsightliness, and negative stigma.

- ❖ The informal waste sector consists mostly of **waste pickers** who scavenge for metals, glass, plastic, textiles, and other materials and then trade them for a profit. This sector can significantly alter or reduce waste in a particular system.
- ❖ other negative economic effects come with the disease, poverty, exploitation, and abuse of its workers



What possible solutions for Burkina Faso and West Africa ?

1 Handmade solutions

Recycling / recovery of certain types of waste (provided by associations, public or private companies), e.g: the valorization of plastics (in school furniture, paving stones, roads, bags, roofs), and agricultural waste (in fuels, insulators ...)



2.composting plants :

During the years 1960-1995, composting facilities were built in many west African countries.

However, most of these facilities are currently closed due to:

- clogging of equipment and frequent breakdowns,
- under-sizing of the receiving pits and the surfaces required for fermentation,
- poor quality compost (presence of many contaminants),
- difficulties in marketing compost,
- significant environmental nuisance (bad smells).
- The high sand content, damages equipment by abrasion.

4. Expected innovations: waste valuations

➤ Composting and biogas,

➤ Biochar,



➤ *recycling and upgrading of organic waste components within the framework of regional industrial symbiosis (agroecology)*

Indeed the previous solutions failed because of a non-complementarity of actors/sectors.

This weak symbiosis made the costs of transport and compost production unsupportable by cities (public and private actors and consumer). There was no regional or ecological approach.

But such an approach is possible: cities absorb products (crops, vegetables and proteins) from peri-urban and rural areas.

The consumer's waste is not completely evacuated and that produces pollution and insalubrity.

An ecological organization of activities between the three components (City, suburban and rural) would be effective.

for example peri-urban gardening is based on the overuse of chemical fertilizers and pesticides.

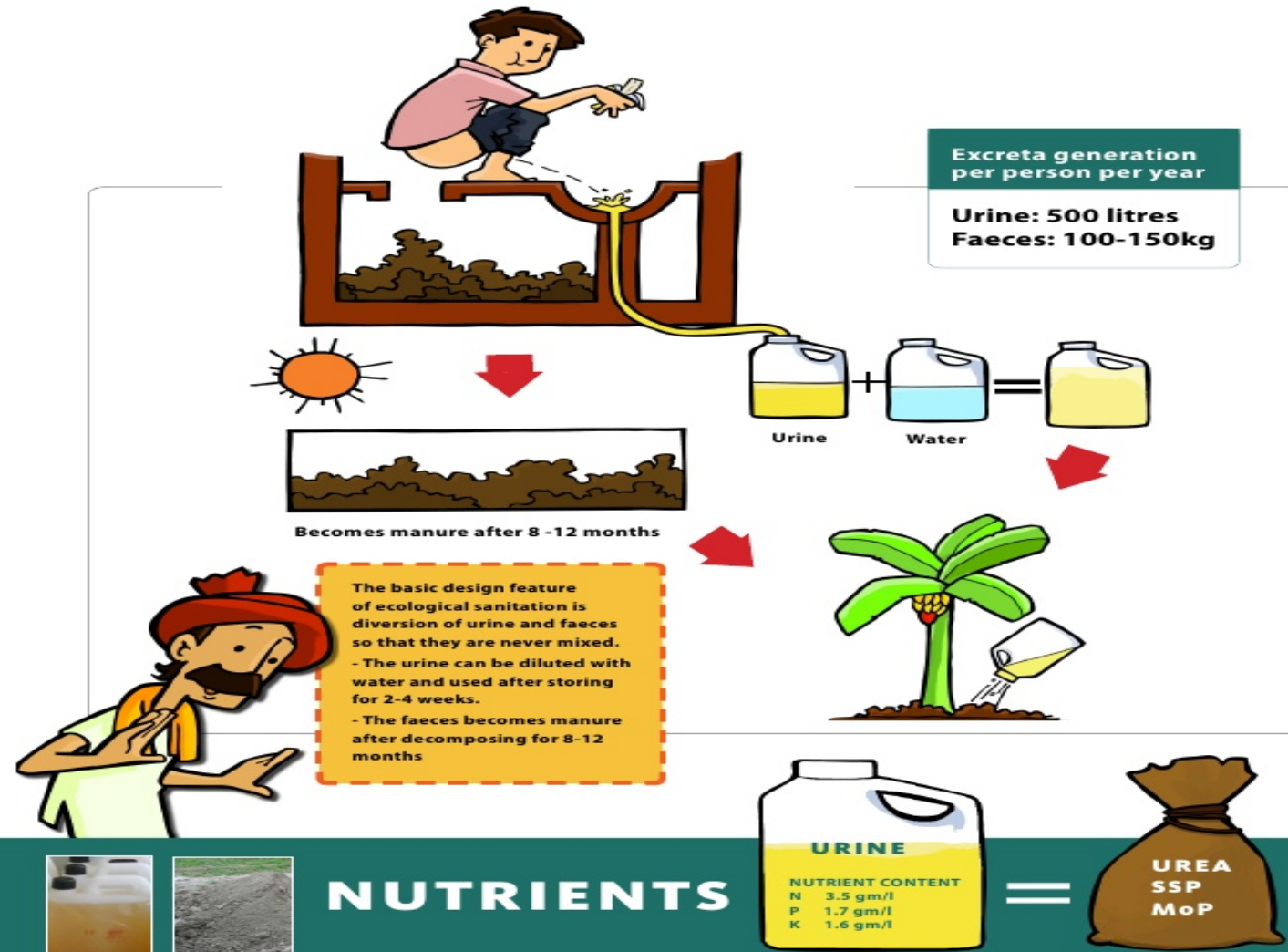
An agroecological gardening promotion would consume more composts/excreta, urine and biochar (which products would become profitable for the producers) both in peri-urban and rural areas.

In addition, the recycling of the other components of the waste could make it possible to provide work to the populations of the cities.

Ecosan innovation !?

**ECOLOGICAL
SANITATION**

**source separation of
SOLID and LIQUID waste**



Many thanks for your attention !