

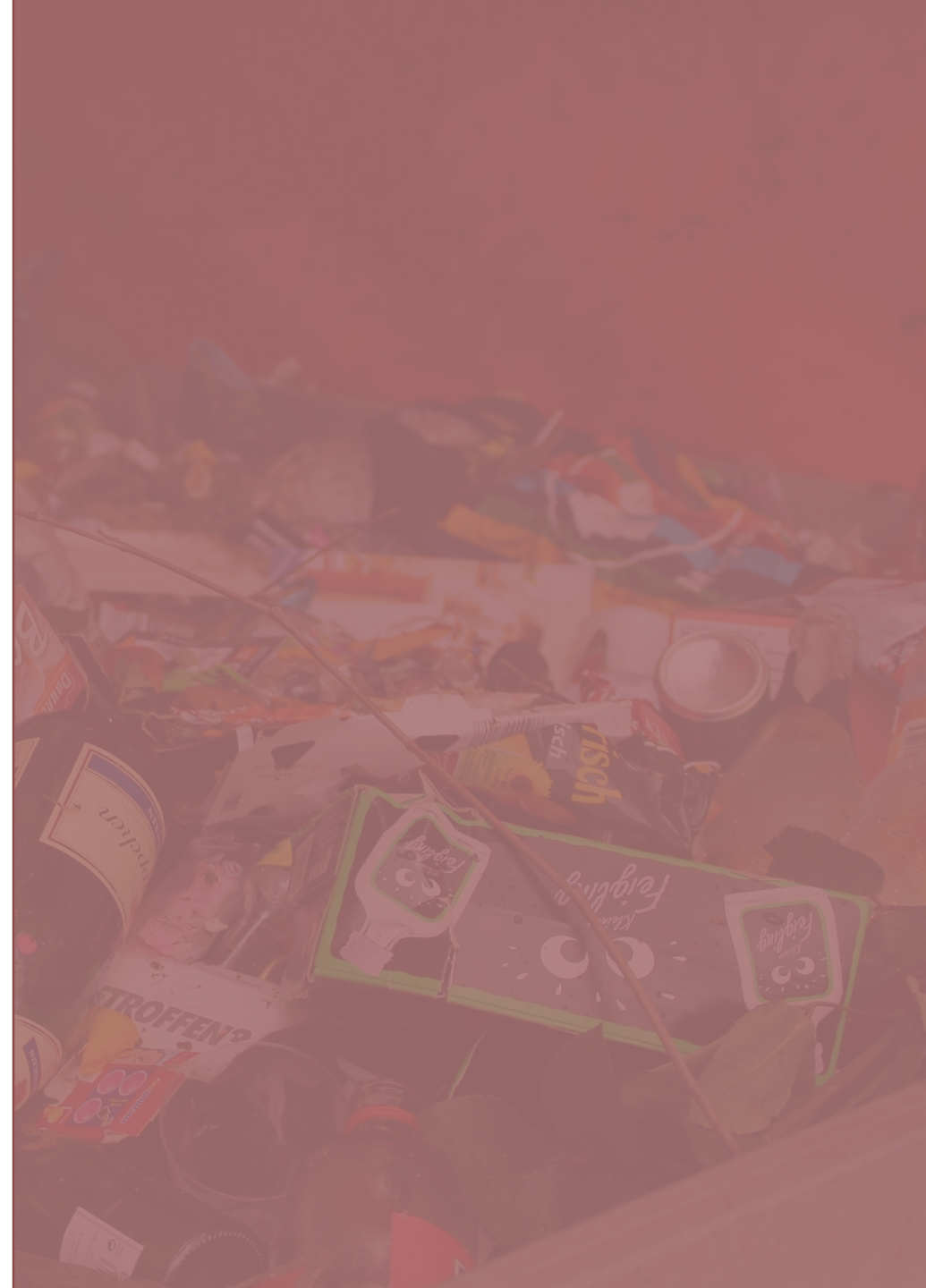
Project: "Promotion of BAT/BEP to reduce uPOPs releases from waste open burning in the participating African countries of SADC sub-region"

Module 6

The role of the private and informal sectors in waste recycling

Table of contents

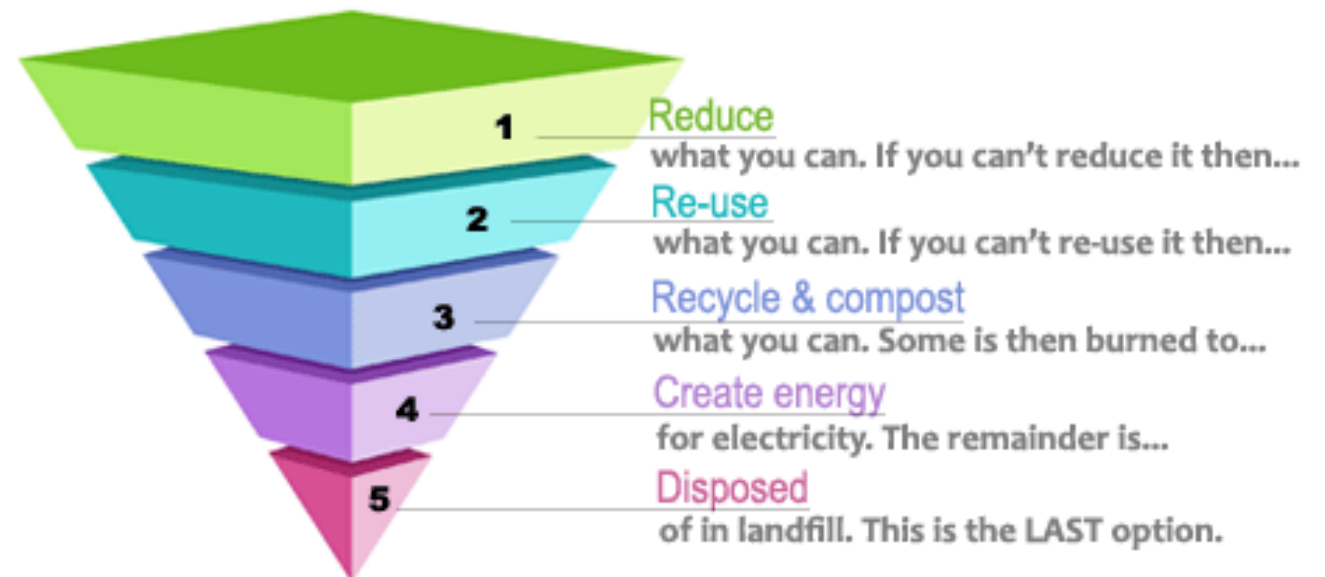
- I. Introduction
- II. Waste collection
- III. The informal sector
- IV. An effective recovery chain
- V. The involvement of the private sector
- VI. Extended producer responsibility



The role of recycling in SOLID WASTE MANAGEMENT the waste hierarchy

The waste hierarchy provides a priority order in waste management:

- a) prevention
- b) preparing for re-use
- c) recycling
- d) other recovery, e.g., energy recovery
- e) disposal



I. Introduction

The waste hierarchy sets recycling – i.e., the recovery of materials from waste – as part of a larger Solid Waste Management (SWM) system.

Efficient Recycling becomes possible when there is a chain of operations and plants that:

1. begins with the separation of waste in homogeneous materials of a sufficient quality to be reprocessed into secondary materials
2. can include informal manufacturing based on unprocessed recyclables; such as weaving of rugs from textile waste
3. ends with the selling of these materials (for the production of new goods) into a relatively stable market
4. While we focus on the above, generally more informal steps, secondary manufacturing and selling of products derived from recyclables may also be counted as recycling steps

II. Waste collection



The chain of operations and plants that allow an efficient recycling begins with the segregated collection of selected waste fractions



II. Waste collection

The relevance of waste collection in recycling

To increase recycling, SWM legislation can define numerical targets (quantified goals) either for segregated collection or for recycling.

For example, the EU Framework Waste Directive to facilitate or improve preparing for re-use, recycling and other recovery operations, waste shall be subject to separate collection and shall not be mixed with other waste or other materials with different properties.

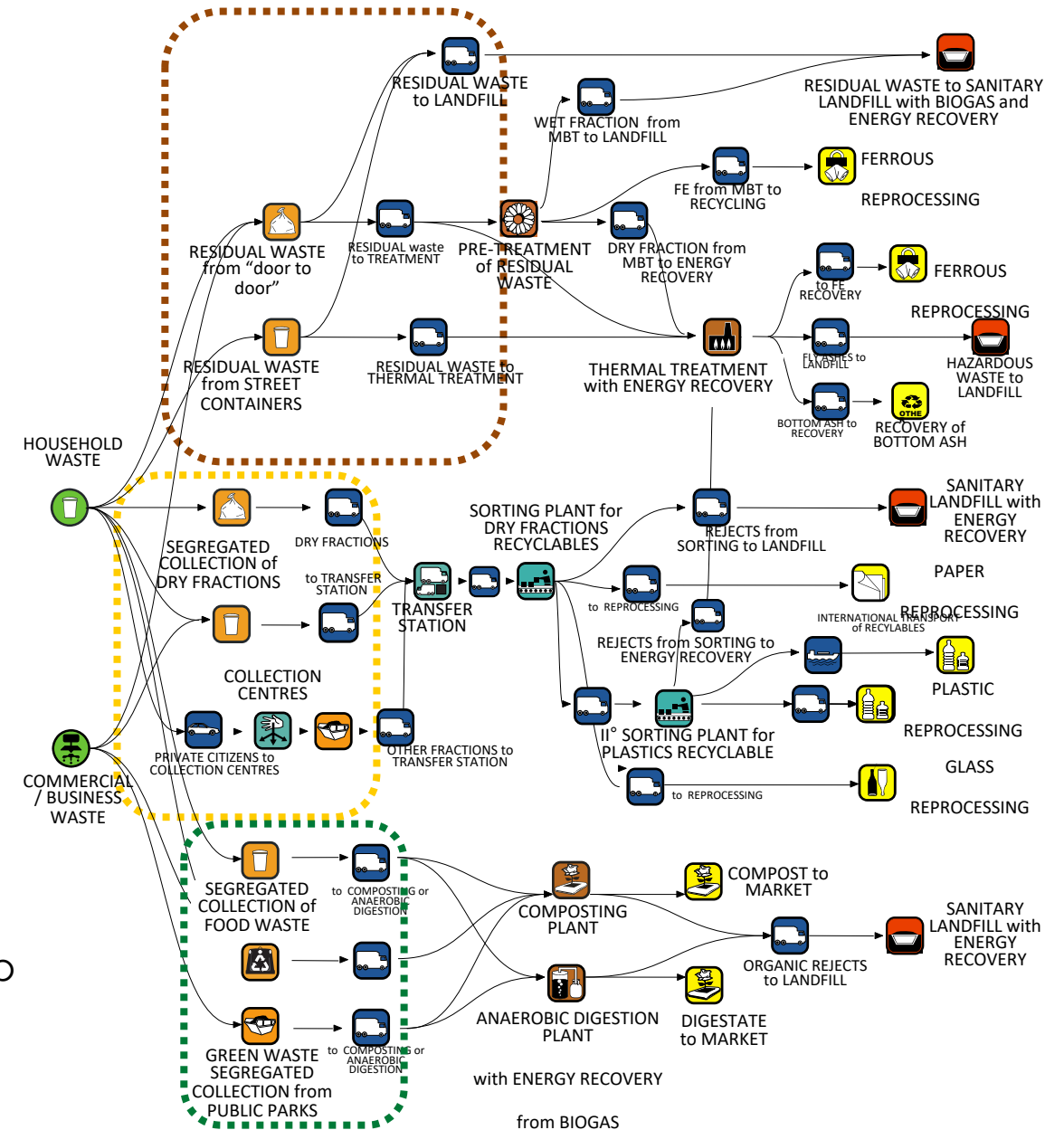
By 2025, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 55% by weight;

By 2035, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 65% by weight.

The relevance of waste collection in recycling

The possibility of recycling selected waste fractions depends on the organization of collection.

Collection is not only performed for health protection; it is the initial step of an effective SWM system



II. Waste collection

Formal actors intervene when there is return of investments in recycling plants

The actors that will perform recycling are strictly related to the level of development reached by a specific SWM system.

- **Collection service:** the capability of the formal sector (either public or private) to provide a service to all waste generators (household, commercial premises,...) evolves with the national income and the ability to collect service fees.
 - **Recovery chain:** the main constraint for the development of the recovery chain is the availability of funding for investing in the plants.
- Formal actors from the private sector intervene when there is the possibility of return for the investments made in the recovery chain.

II. Waste collection

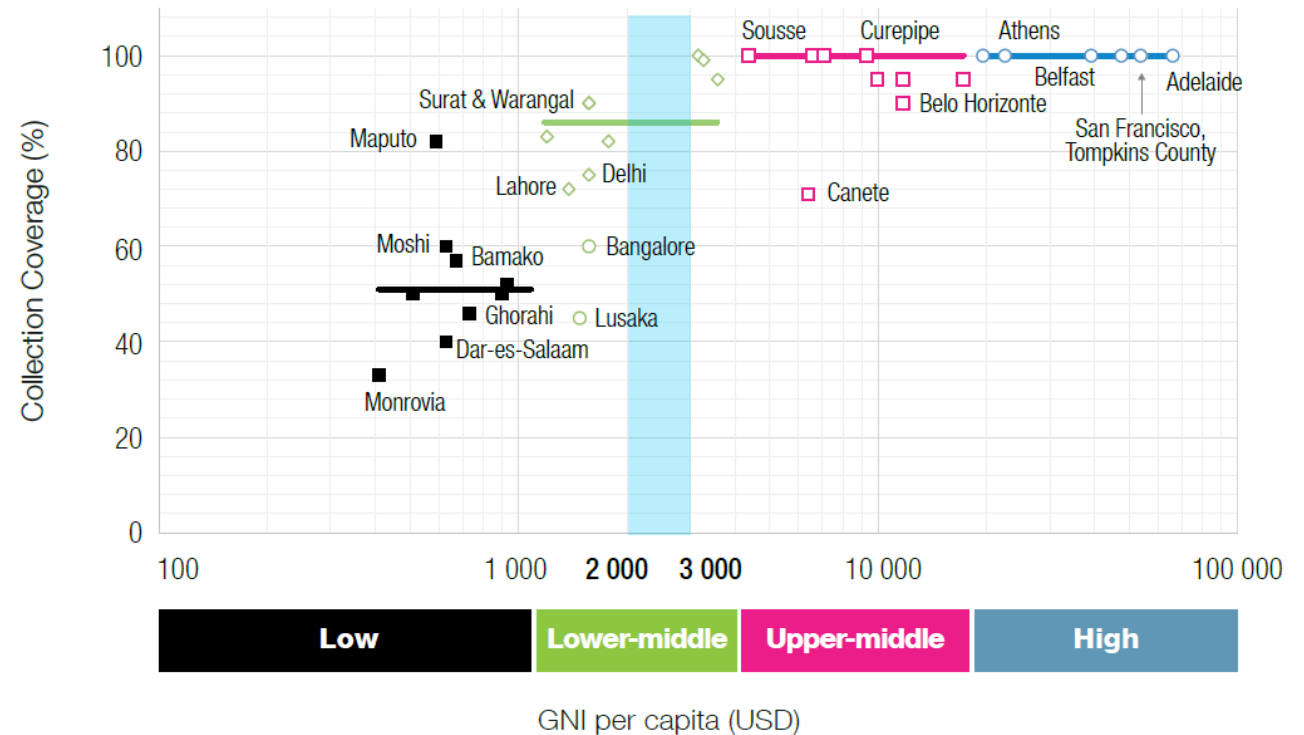
Data compiled from 125 countries give the average collection coverage in:

- low-income: 36 – 43 %
- lower-middle: 64 - 68%
- upper-middle: 82 – 85 %
- higher income: approaching 100% LOWER THAN 100% □ illegal dumping

On a regional basis, it has the following ranges:

- Africa (25% to 70%)
- Asia (50% to 90%)
- Latin America and Caribbean (80% to 100%)

Figure 3.9 Collection coverage for selected cities by income level



The role and relevance of the informal sectors in waste recycling

II. Waste collection



When there isn't an
industrial recovery chain...



Waste pickers searching for material at a landfill in Pune, India.
Inclusive Cities Study - Synthesis Report by Zoe Elena Horn January 2011

II. Waste collection

The relevance of waste collection in recycling

When collection is poorly organized, it reaches a low coverage and the recycling chain is not organized as part of a larger effective SWM system. There is then room for non-regulated recycling activities such as open burning to be carried out.

Sometimes informal workers receive a payment from households, intermediate traders or commercial premises.

Workers manually perform the separation of dry recyclables, that then enter a non-standardized, even if somewhat industrialized, recycling chain or are exported.

The separation of dry recyclables could also be performed as an extra activity by workers that work under a collection contract with a Local Administration.



III. The informal sector

Who are the informal workers?

Informal 'collectors' and 'recyclers' range from private person collecting recyclables to middlemen gathering recyclables, to organized traders of recyclables. Most informal waste workers deal with municipal solid waste. But they also address specific waste streams, in particular electrical and electronic waste in Countries that receive import.

Due to the informal nature of their work, statistics on the informal sector are limited. In 2013, the International Labour Office (ILO) estimated that only one fifth of workers in the SWM and recycling industry are in formal employment. Although little data exists, a significant number of workers involved in recycling and waste management are women, often working at the lower end of the informal economy, among the poorest part of the population.



III. The informal sector

Who are the informal workers?

When the term 'informal' was introduced in the 1970s it was used to refer to a sector of the economy seen as residual and temporary. Today, there is recognition that the informal economy is neither temporary nor residual.

There are no universally accepted definitions, but the following framework can be adopted:

- **The Informal Sector** refers to employment and production that takes place in unincorporated, unregistered enterprises.
- **Informal Employment** refers to employment without social protection: own-account workers; contributing family workers; i.e., employees not covered by legal protection or social security.
- **The Informal economy** refers to all units, activities and workers so defined and the output from them.

Informality exists across a continuum of rights and regulations, such that informal workers may conform to regulatory requirements in some respects (e.g., paying daily fees), but not in others (e.g., operating from insecure space).

III. The informal sector

Who are the informal workers?

Informal workers drive recycling activities when no public policy is in place. They can reach up to 15-20% recycling level: they substitute for a lack of efficiency and effectiveness when SWM system is weak.

Their role is essential in the beginning of the development of a more effective SWM system.

Their contribution is valuable to society and should be carefully considered and incorporated in the development of the service provisions



III. The informal sector

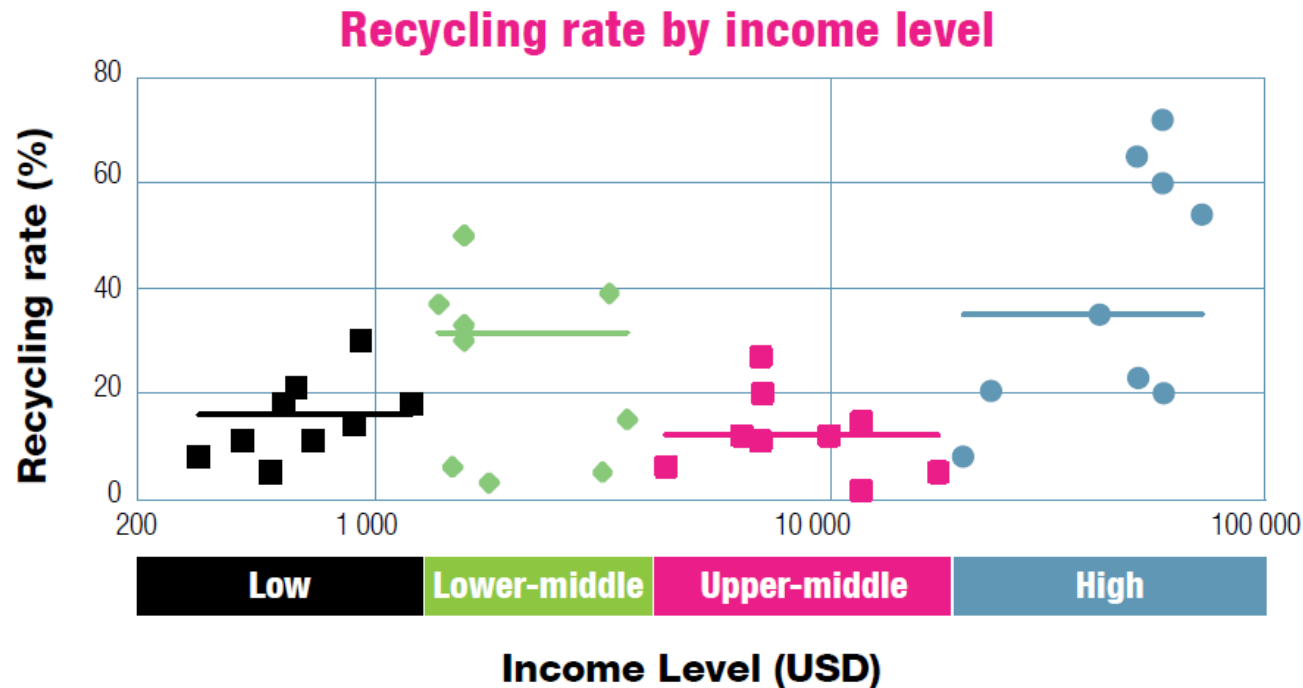
Informal workers operate in several phases of a non-effective SWM system

In a non-effective SWM system, informal workers operate in several waste management phases:

1. They collect waste from households / commercial / industrial premises where they perform the segregated collection mainly of:
 - card-board, aluminum cans, easily marketable plastics
 - industrial recyclables waste: such as plastic drums, wooden pellets, card-board,...
2. At transfer stations and at non-sanitary landfills they recover the more marketable waste fractions: mainly plastics, aluminum cans and other metals.
3. Mainly for plastics, they can perform some form of non-standardized, industrial practice of recycling.

III. The informal sector

The contribution of the informal sector to Recycling is significant



GLOBAL WASTE MANAGEMENT OUTLOOK (UNEP-ISWA) SEPT. 2015

Developing countries often have good recycling rates due to the informal sector.

Developed countries have rebuilt rates in the past 20-30 years from a low base.

3Rs (Reduce, reuse, recycle) cut the investment needed in sound treatment and disposal facilities.

III. The informal sector

Informal workers operate in several phases of a non effective SWM system

In SWM systems where the collection of waste is well organized informal workers can be present at landfills. These activities need to be regulated by municipalities.

Recycling activities could be given a dedicated restricted area of the non-sanitary landfill, where sorting can be made easier and cleaner conditions can be guaranteed. Trucks should be instructed to offload the waste in a specific area, to facilitate the sorting.

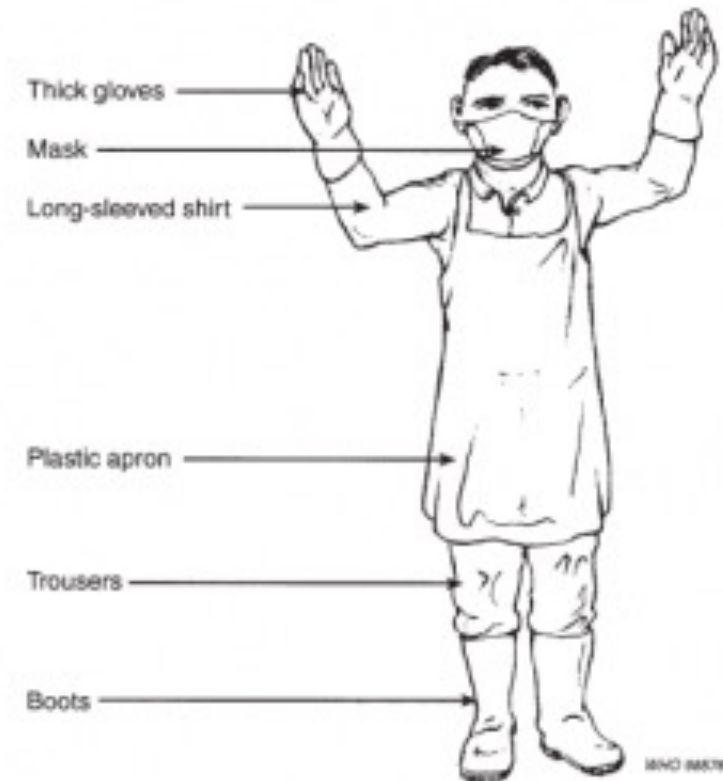


III. The informal sector

Informal workers operate in several phases of a non effective SWM system

The workers of the informal sector could be organized, registered, trained in safe practices, given an identification card.

Personal Protective Equipment for a safer sorting of recyclables should always be provided.



III. The informal sector

The segregated collection when there is not an industrial supply-chain of recovery

Waste pickers contribution – women, children and men – is essential for low and middle-income countries and emerging economies:

- it warrants a high recycling level: up to 30%
- it is a source of income for poor citizens and unskilled workers
- when appropriately recognized, it can contribute to workers' social organization.

Every national and local SWM strategy must include these workers among the relevant actors and design specific supporting policies.



III. The informal sector



These pictures offer an example of a relevant non-standardized, industrial practice of recycling and re-processing

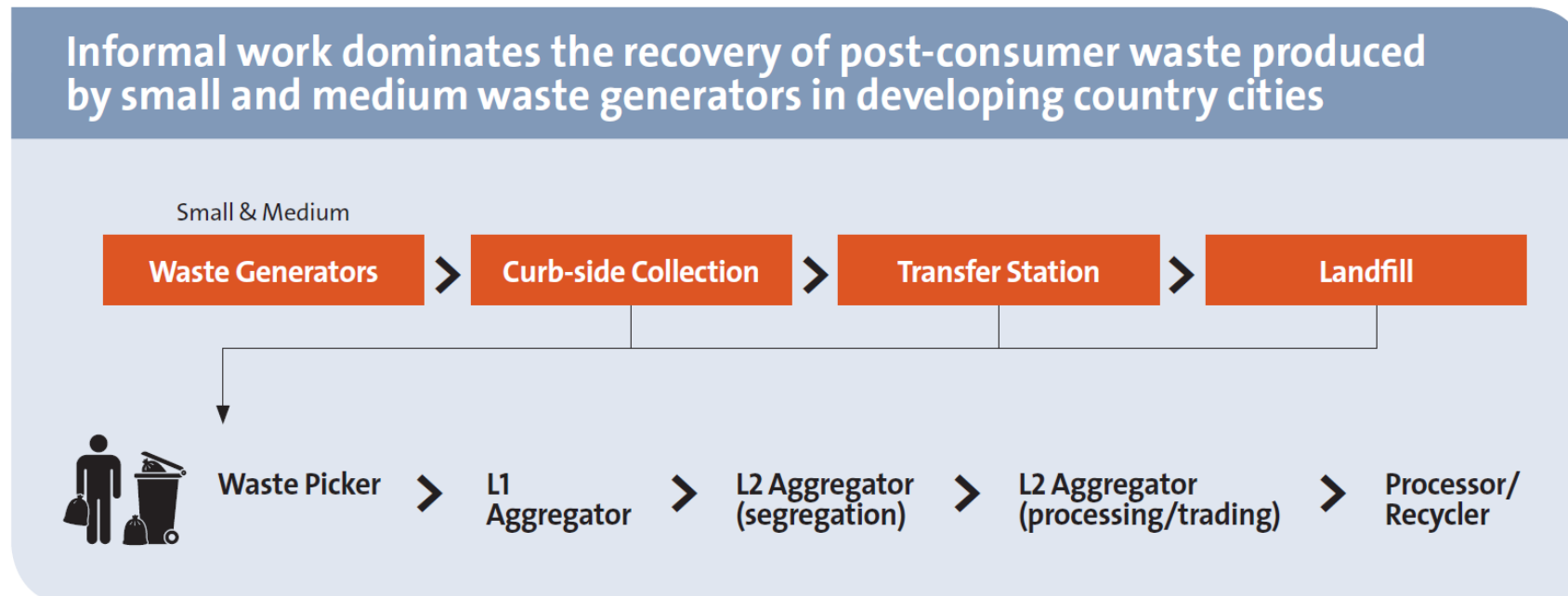
Institutional support must be given to adopt BEST PRACTICES to improve industrial operations.

In this case, the enterprise operating is a Cooperative and it produces boards for school desks.



III. The informal sector

Informal collectors and recyclers are part of a larger recovery chain



In the middle of the chain are dealers who amass and redistribute recyclables (L1, L2 ,...); they can be informal local traders or small/medium enterprises with a more global connection to the markets.

III. The informal sector

Social and legal policies must address the recognition of informal workers

Despite their environmental and social contributions, waste pickers are often not legally recognized as workers. They suffer from:

- Hazardous working environment and lack of occupational safety and health.
- Low earnings and weak position vis-à-vis middlemen.
- Exclusion from municipal waste management systems: increasingly, informal workers are being displaced from dumpsites or excluded from bidding and contract processes of SWM due to the adoption of capital-intensive technologies (e.g., industrial plants for recycling and new disposal systems) and the privatization and outsourcing of SWM to relatively-large private companies.
- Social stigma and discrimination: informal workers often belong to socially disadvantaged and vulnerable groups (e.g., migrants and refugees, unemployed, women, children, persons with disabilities, and ethnic and religious minorities).

III. The informal sector

How the role of informal workers can evolve

BEST PRACTICES

In response to these challenges, waste pickers have set up cooperatives and other social and solidarity economy organizations, especially in Latin America and South Asia.

A core function of the informal sector's cooperatives and other organizations is to formalize the role of waste pickers as public waste service providers.

Some waste pickers' cooperatives directly provide their members with essential services, such as finance, insurance, housing, childcare and education.

At the same time, they can also negotiate with governments to extend social protection to waste pickers, particularly when they provide waste management services under formal contracts with the public sector.

III. The informal sector

BEST PRACTICES

Mooi River Recycling Cooperative in South Africa provides their members and non-member with training on waste sorting and hazardous waste handling.

The members also receive extensive education on waste recycling, skills training on processing of various types of waste, training on business administration, computer literacy and management, as well as protective clothing and recycling equipment.

Through the cooperative, established in 2009 with the support from an NGO, waste pickers successfully partnered with the local government (Mpofana Municipality) and obtained legal recognition at the Mooi River local landfill.

III. The informal sector



<https://www.goodnewsnetwork.org/the-cloud-lifts-indias-waste-pickers-off-trash-piles-without-ending-recycling/>



<https://globalrec.org/newsletter/struggles-and-victories-waste-pickers-on-the-frontline-august-september-2014/>

**The conditions for the
industrialization of the recovery
chain by private actors or public-
private partnerships**

IV. An effective recovery chain

The role and financial involvement of the formal economy increases with the evolution of a SWM system

With increasing national income, the structure of the SWM system begins to change, including:

- more public funding (national or local) is available to organize waste collection and collection coverage increases → there is no room for unregulated recyclables pick-up
- more public funding (national or local) is available to better manage landfills (and waste gets covered) → no scavenging is possible
- Collection centres for sizable waste (furniture, electronic waste,...) are organized and guarded → selected streams of waste are not available anymore
- Recycling is performed in industrial plants that require technical skills
- Composting is performed in plants that require technical skills
- Private funding for specific investments becomes available usually for Public-Private partnership or industrial plants, initially funded by public funds.

IV. An effective recovery chain

The role and financial involvement of the formal economy increases with the evolution of a SWM system

With increasing national income, the structure of the SWM system begins to change:

→ the role of the 'private formal' sector in collection and management of plants becomes more relevant.

What are the interactions between the formal and the informal waste sectors when a SWM system begins to evolve?

Recycling is a competitive supply chain, with a limited and highly variable market: there are tensions between the informal and the formal waste sectors on sourcing recyclables.

The formal sector can mobilize funds for investments, higher skilled personnel and reach a wider range of markets.

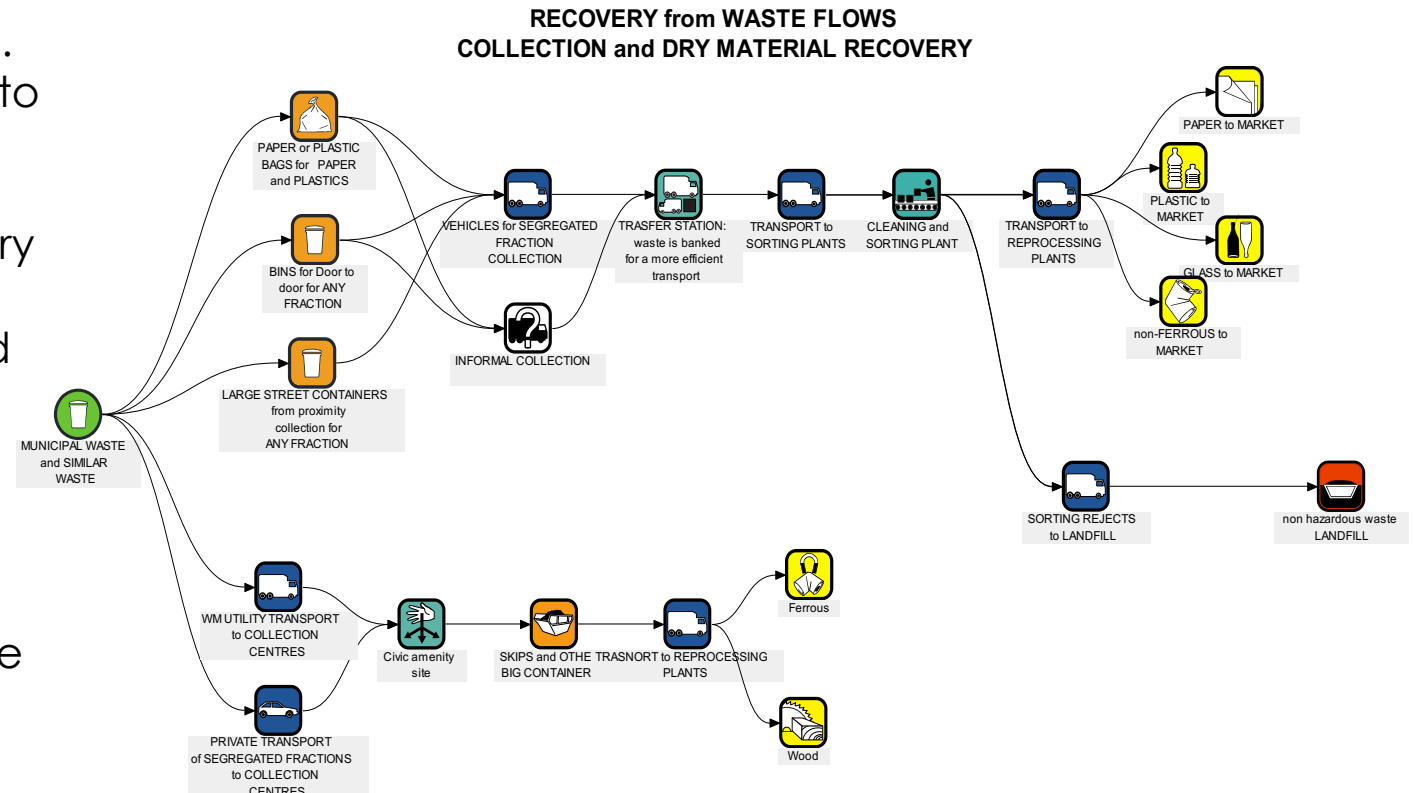
- Inclusive social and training policies need to be set in place to manage the transition of the informal sector into a more structured SWM system and into formal working conditions.

IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise

Waste is collected in segregated fractions. Segregated fractions can be transported to transfer stations where they are bulked to undergo further transport to cleaning and sorting plants. Sorting plants' processes vary from completely manual to semi-automated. Manual workers cleaning and separating is always essential in guaranteeing quality.

Homogeneous fractions are then transported to reprocessing plants. Reprocessing plants cover an ample range of production: glasswork, paper mills, aluminium and scrap iron foundries. Reprocessing can require export.



IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise

Effective SWM is expensive

The recovery of materials from waste is an industrial sector which has been growing worldwide in the last three decades; the substitution of materials recovered from waste in production cycles results in the saving of raw resources and energy, thus reducing emissions, use of natural resources, environmental impacts.

But the creation of an industrial chain for the recovery from waste requires investments and the ability to trade recyclables within a stable market.

Prices of recyclable waste fractions are highly variable and depend on the prices of the corresponding raw materials.

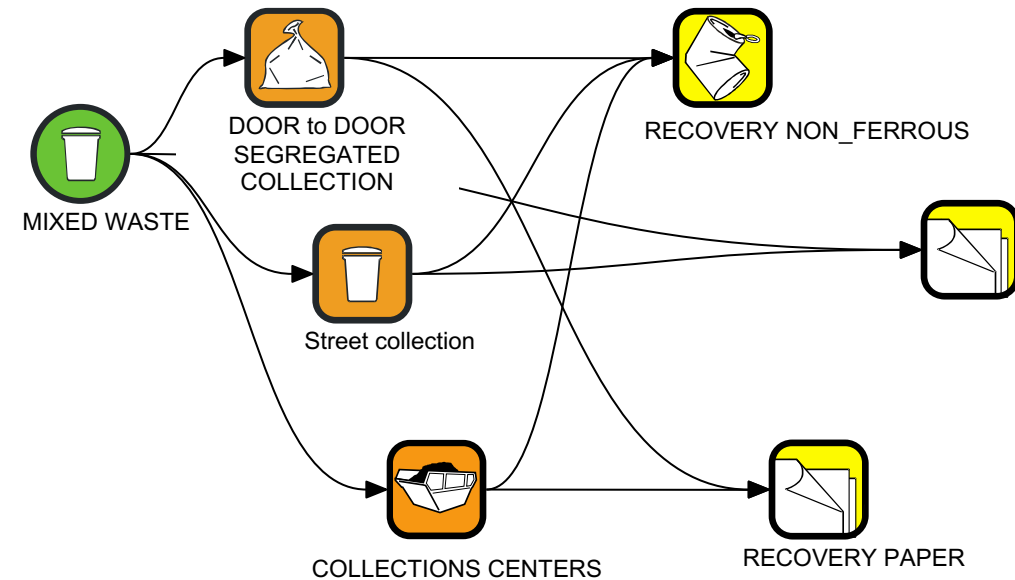
Revenues from recycling are in the positive side of a balance sheet; but for the municipalities the revenues from the sales of recyclables do not cover the cost of segregated collection and of ensuring transportation to sorting and reprocessing plants.

Thus, even in simple WM systems, the value recovered from material from waste is not going to substitute for the need to collect service fees from households and other waste generators.

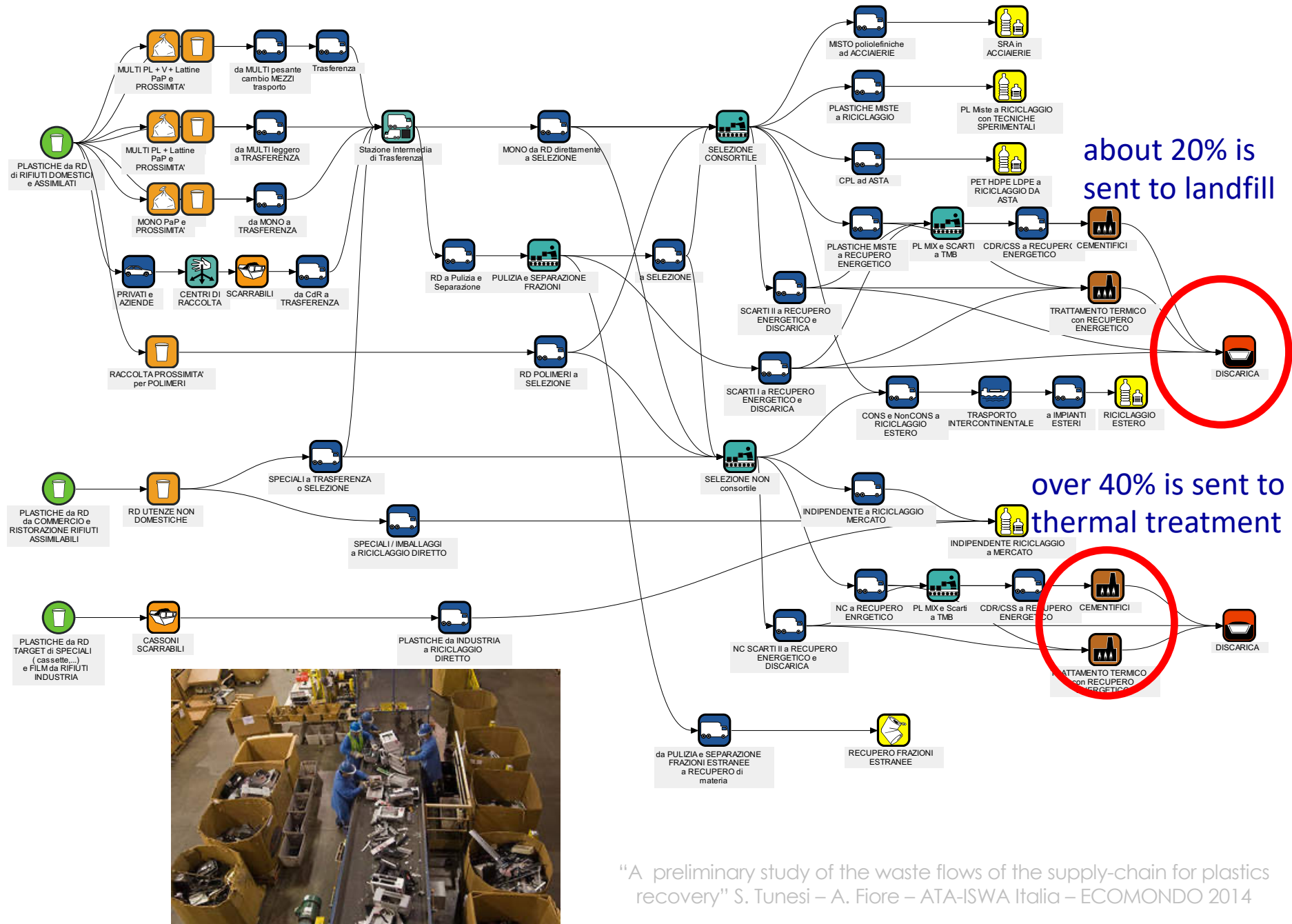
IV. An effective recovery chain

WASTE MANAGEMENT DOES NOT END (is not solved) with segregated collection (MATERIAL RECOVERY)

The idealized vision of the materials recovery supply-chain



How the supply-chain for plastics recovery actually looks like



"A preliminary study of the waste flows of the supply-chain for plastics recovery" S. Tunesi – A. Fiore – ATA-ISWA Italia – ECOMONDO 2014

IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise



A homogeneous waste fraction from segregated collection is bulked and loaded on conveyor belts



IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise



IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise



Several operations are carried out to clean and sort waste which is going to be sent to different reprocessing operations



IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise



Sorting plants always require at least one section with manual operations



IV. An effective recovery chain

How an effective recovery chain works: it is an industrial enterprise



After sorting plants there are
Reprocessing plants: example plastics



Granulated
reprocessed
plastics



IV. An effective recovery chain

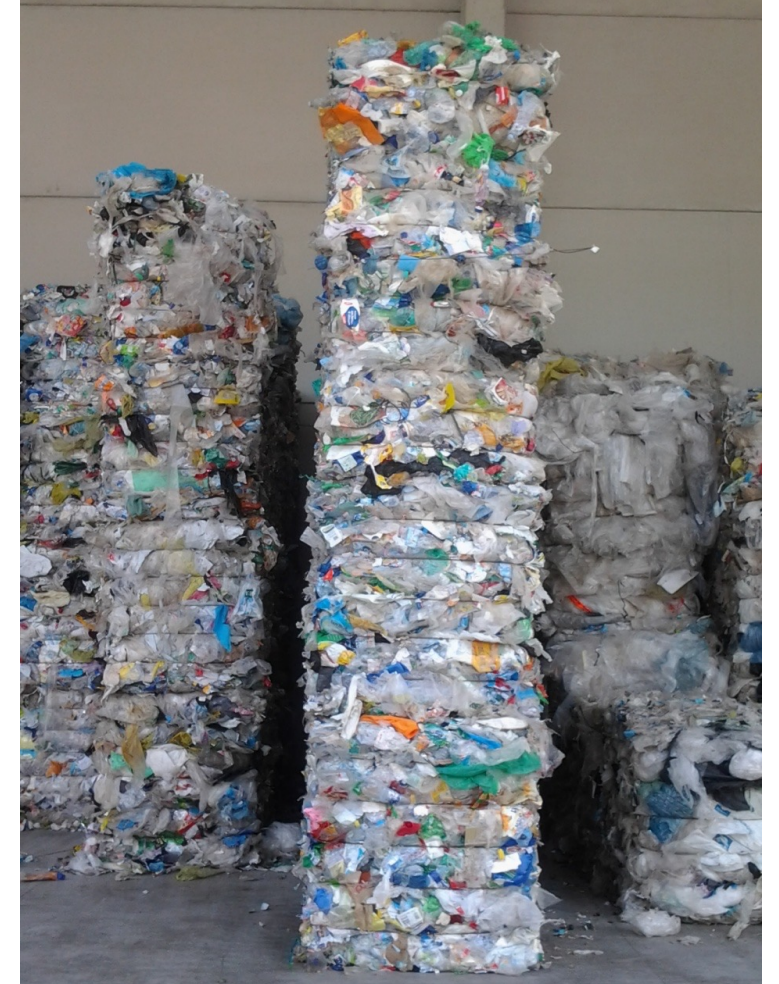
CASE STUDIES: Several Failures

There needs to be a market and materials must be clean for the recycling chain to function



IV. An effective recovery chain

Clean, single fraction (paper, plastics, aluminum cans,...)
recyclable bales sent to RE-processing into secondary
materials



**Institutional conditions that
favour the involvement of the
private sector and relevant case
studies**

V. The involvement of the private sector

The involvement of the private sector requires specific institutional conditions

For private actors to intervene there must be a clear and stable institutional and legislative framework and continuity must be ensured beyond political terms of office:

- ✓ legislative definitions are clear
- ✓ the functions and responsibilities of each institutional tier are well defined and do not superimpose
- ✓ SWM objectives and targets, decisions on the building of facilities and plants, incentives and taxes are stable in the medium term, ensuring the return for investment in infrastructures for both public and private actors
- ✓ land must be made available to locate plants
- ✓ times for permit release are short and kept within the timing set by the legislation

V. The involvement of the private sector

The involvement of the private sector requires specific institutional conditions

there is a relatively high level of trust in public institution which operate transparently:

- ✓ public institutions ensure a good level of control and health/environmental monitoring of SWM practices;
- ✓ decision makers involve all relevant actors - including the informal sector- in public debates over choices and design solutions;
- ✓ strict regulation and leadership are provided at the national level with regard to operating standards at waste treatment facilities;

V. The involvement of the private sector

Case study: Kenia - Nairobi connecting informal waste pickers with the industry for reprocessing

A private, for-profit company established 2014, generates shredded and hot washed flakes from post-consumer polyethylene, polypropylene and PET in different colors, with the plastics flakes being sold mainly to local plastic converters.

Its corporate identity embraces the idea of waste pickers as “invisible heroes” of informal SWM, enablers of a Circular Economy and that their social marginalization and economic exploitation need to be addressed.

The basic idea is to abandon the traditional value chain of informal recycling based on multiple middlemen and replace it by a direct fair trade-like relation between the individual waste picker and the recycler (formal economy).

V. The involvement of the private sector

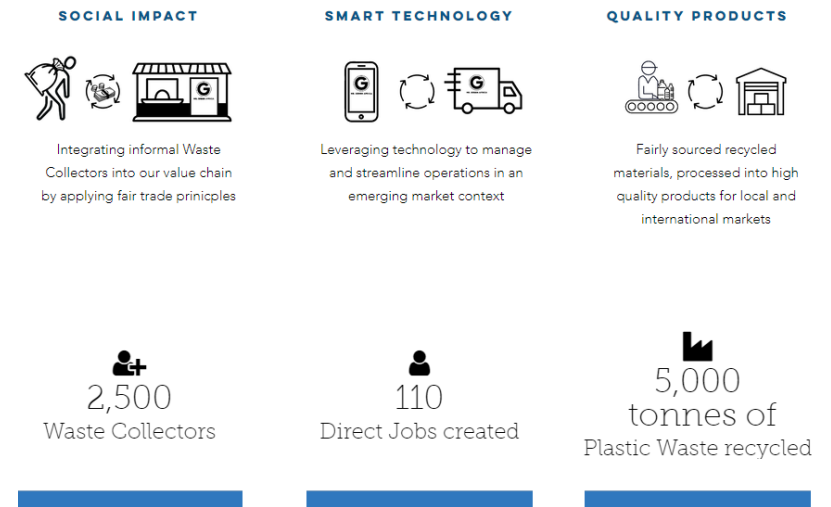
Case study: Kenia - Nairobi connecting informal waste pickers with the industry for reprocessing

The company set up trading points throughout Nairobi where waste pickers sell collected plastic wastes to the company's buying clerks. The trading price is fixed at 9 Kenyan Shillings (KSh) per kilogram plastics, not subject to market price volatility.

Every picker is registered in the company's mobile application, that records and analyzes supplier productivity and reliability.

Pickers trading regularly with MGA are eligible for loyalty program that grants a premium price in exchange for meeting monthly supply targets.

Interaction with company's agents allows for training of the waste pickers on which types of plastic to collect, while the company maintains a relatively steady supply of pre-sorted plastics fractions.



V. The involvement of the private sector

Case study: End-of-life tires (ELT) recycling lessons learned from Botswana

An analysis of the state-of-the-art of ELT recycling in Botswana teaches relevant lessons.

First of all, the analysis highlights the relevance of building a complete and effective SWM legislative framework to ensure the assumption of responsibility of the relevant stakeholders.

The study also identified the following deficiencies that do not apply only to Botswana:

- Inadequate understanding of the processes of ELT management by decision-makers and practitioners
- Lack of a systemic and consistent policy
- Lack of engagement by all stakeholders (in particular tire industry) to establish alternative solutions and implement best business practices
- Lack of specific technical and organizational Guidelines
- Absence of engineering applications of ELT and recovery processes
- Lack of up-to-date methods and tools to update tire data and trends
- Lack of public awareness and capacity building programs
- Lack of government monitoring and control of SWM

VI. Extended producer responsibility

Extended producer responsibility schemes

EPR are an important instrument of the Circular Economy.

EPR schemes have been established by Governments since 2001, with the aim of making producers responsible – both from the organisational and the financial perspectives - for the environmental impacts of their products along the whole product chain, from design to the post-consumer stage.

An ample international experience shows that to involve the relevant private actors in the management of selected waste streams, Extended Producer Responsibility (EPR) Schemes needs to be made mandatory by the legislation.

VI. Extended producer responsibility

Extended producer responsibility schemes

Several choices need to be made when setting the regulatory framework for the implementation of EPR schemes

WHICH ACTORS THE NATIONAL REGULATION MUST INVOLVE AND GIVE SPECIFIC RESPONSIBILITIES TO
IS THE EPR VOLUNTARY OR MANDATORY
TYPES OF WASTE COVERED BY EPR
THE NUMERICAL TARGETS FOR EACH TYPES OF WASTE RECOVERY (COLLECTED PERCENTAGE OF POTENTIAL) AND TIMELINE
METHOD OF WASTE RECUPERATION: various forms of take-back requirements are the most commonly used instrument, accounting for nearly three-quarters of the schemes implemented. it must be underlined that take-back schemes require the organization of the segregated collection for each of the waste targeted (but can operate via multiple fraction handlers, including municipal recycling schemes).

VI. Extended producer responsibility

Extended producer responsibility schemes

Several choices need to be made when setting the regulatory framework for the implementation of EPR schemes

ARCHITECTURE OF THE SCHEME: In most case, producers have established Collective EPR systems managed by specifically formed Producers Responsibility Organizations (PRO)

FEES TO BE PAID BY INVOLVED ACTORS: Involved companies pay for an EPR fee on the basis of the types and amount of products they put on the market.
The contribution paid by each producer and importer and the contribution given to interested Local Municipality for each type of waste must be defined by transparent accords.
The collected fee can cover all or just a part of the cost for collecting, sorting, recovery and awareness raising campaigns.

If intermediate handlers are involved, the responsibility for reaching the collection targets should still be with the PROs.

DATA REGISTERS: monitoring the performance of the schemes is necessary to assess its validity

VI. Extended producer responsibility

Example of a Producer's Responsibility Organization for plastics packaging

Packaging cycle



Contract agreements



Financed by
fees



VI. Extended producer responsibility

Case study: analysis of EPR scheme for ELT in nigeria

The basic scheme for the materials and financial flows is presented:

Producer's Responsibility Organizations (PRO) are one of the most adopted architecture for EPR schemes: they set up the equipment and the Centers for the selective collection of a specific waste stream

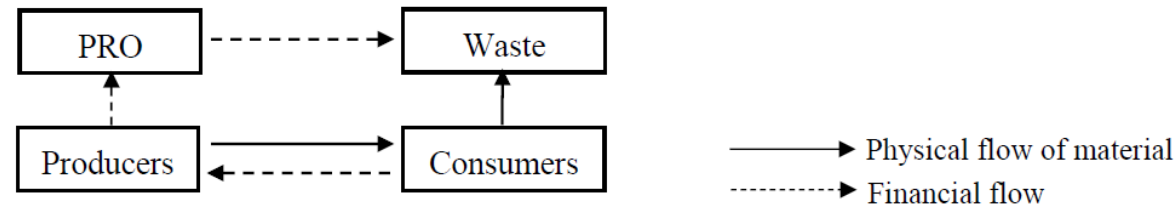


Figure 4. Basic EPR scheme, after [15].

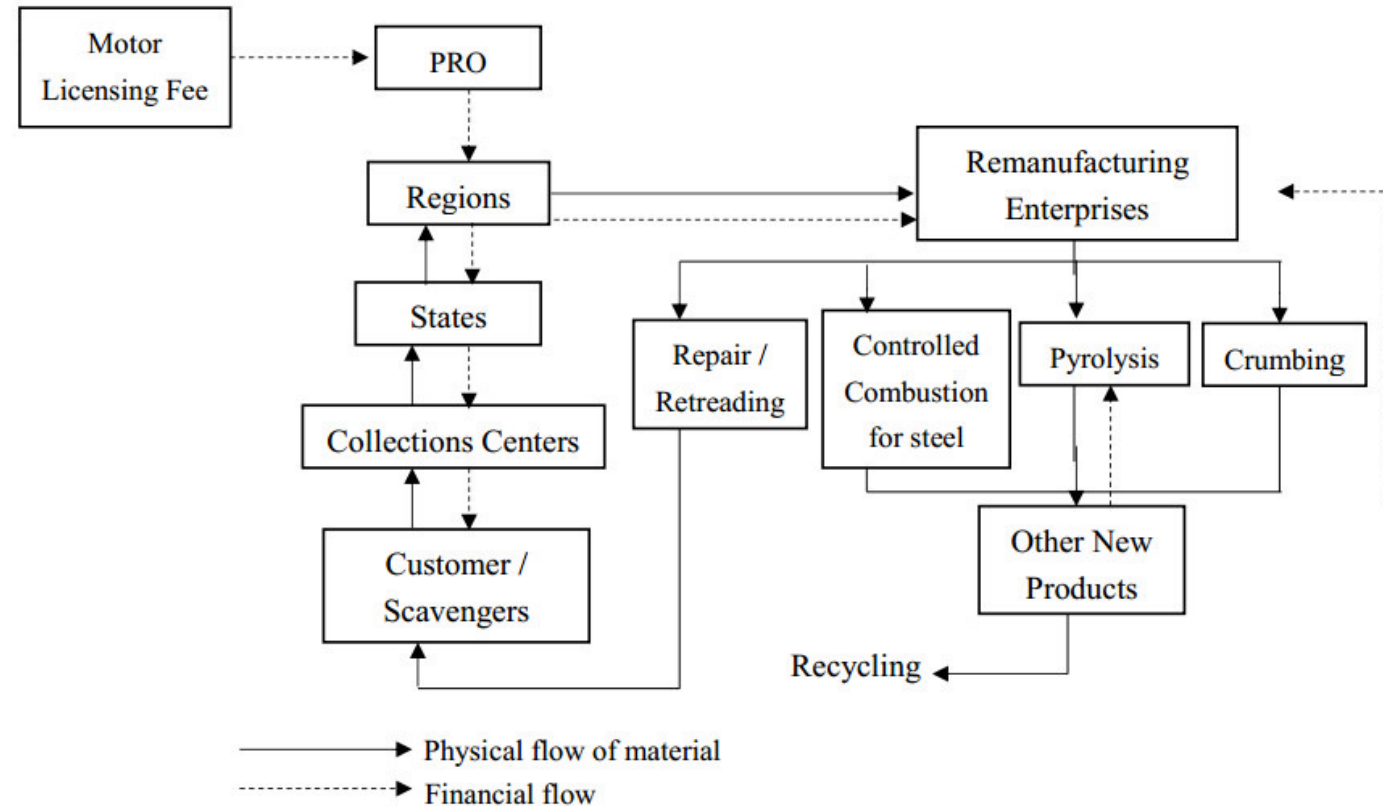
At present “Nigeria does not manufacture, retread or recycle tires. Recovery of ELTs across Nigeria with the sole aim of shipping it abroad (for reprocessing) will greatly add to the cost of logistic thereby limiting cost-effectiveness of the management.”

VI. Extended producer responsibility

BEST PRACTICE

Nigeria proposed structure of EPR for tires

The organisational scheme proposed in this study shows very well the complexity of setting up an EPR scheme: many tiers of government and administrations are involved; many actors of the private sectors must financially contribute to the whole life-cycle of their products.



"Implementation of circular economy principles in management of end of-life tyres in a developing country (Nigeria)"

Okafor C. et al., October 2020. AIMS Envir. Sc.

VI. Extended producer responsibility

BEST PRACTICE

EPR of tires in NIGERIA reflections on the approach needed

To efficiently operationalize EPR scheme in circular management of tires in Nigeria, the following concerns must be critically addressed:

1. How can producers be mandated to be responsible for their post-consumer tires, since 100% of new tires in Nigeria are imported?
2. Since 80% of tires used in Nigeria are mostly imported from Asian countries, where EPR is not yet a standard practice, who will be responsible for the management of the ELTs?
3. 74% of all vehicles imported are used cars, with tires probably used or worn out. Also, most of the tires purchased by Nigerians are decommissioned or end-of-life tires imported/smuggled into the country.
4. How will the producers, even if they have an EPR structure, manage such third-party transaction?

Thank you for your attention!