



Engineers Without Borders

Improving Technical Recycling Capacity in Developing Countries



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ENGINEERS WITHOUT BORDERS

VISION & MISSION

Examples of Projects in Plastic recycling

- How do we recycle?
- Paving stones in Burkina Faso
- Waste management in Madagascar
- Kinshasa (new project)

PARTNERSHIPS

What is ISF (Engineers without Borders)

- A Belgian NGO active since 1990
- Officially recognised NGO since 2000
- Fights against poverty in the world with projects
 - supporting **local initiatives**
 - with **appropriable** technical solutions
 - self supporting technical and economically on a long term

VISION & MISSION

- ⇒ IWB acts supporting local initiatives
- ⇒ Project initiated BY the community
- ⇒ Local request
- ⇒ We launch the project when we have the FUNDING

➤ Intervention of IWB :

- Remote
- In the field

Through a wide network of engineers, technicians and students

VISION & MISSION

➤ 3 main fields of activities :



How do we recycle?

Recycling is a chain with several operations

1. Collection: the bags are collected throughout the city. Several tons per week are be treated to be competitive on the market
2. Preparation of the material: sorting, cutting, scrub => will allow the raw material to be used in machines without damaging them
3. Shredding
4. Washing and drying
5. Agglomeration
6. Industrial sales as raw material (pellets sorted, washed and clean) for manufacture of finished products



1. Collecting the wasted bags

- population pick up the plastic in the streets together with their neighbors, into markets, on bus stops, in the gutters, ...
- They sell to the recycling shop.
- This step creates a lot of jobs. (several hundred)



2. Shredding confetti

goal: facilitate handling, washing, drying



3. Washing and spinning



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4. Drying



5. Agglomeration

For soft plastics (Electricity is required)



ISWA



6. Quality control, sale and delivery



Autoblocking Paving Stones

Burkina Faso

- Fusion of Plastic wastes with addition of sand
- No Electricity available



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AUTOBLOCKING PAVING STONES



Rem : Contributions of Total and HeidelbergCement

AUTOBLOCKING PAVING STONES : REPLICATION

- 4 jobs for ladies without education
- Production 5 m²/day
- Competitive vs conventional concrete paving stones



Contribution of Cimburkina (HeidelbergCement group)



WHAT IS TECHNICALLY NEEDED

Machines at very low prices (recovery equipment, ...)

Technical simplicity (difficulty manufacturing parts, lack of technical qualification) mainly developed by North and South engineers and technicians

As much as possible, no be depending of the electricity because of lack of electricity.

Easy to be copied by the South → **appropriable technologies are needed**



WASTE MANAGEMENT. MADAGASCAR

CONTEXT

Growing urbanisation

No ad-hoc infrastructure for waste management

- Proliferation of wild dumps
- Big problems of public health

2011. Fianarantsoa. Madagascar.

- 200 000 inhabitants
- 60 tons of wastes/day



A waste collection point downtown in 2012.



PROGRAM 2012 – 2015

-





Ménages producteurs de déchets



Précollecte



Bac de collecte



Transport jusqu'au site du CTVD



Collecte des déchets

Centre de Tri et de Valorisation des Déchets (CTVD)



Tri



Compostage



Déchets ultimes stockés de le Centre d'Enfouissement Technique (CET)
*ici provisoire



Autres filières de valorisation (plastiques durs, plastiques mous, métaux,...)

WASTE MANAGEMENT. MADAGASCAR

DOWNTOWN



Before the program, wastes around the refuse bins on hundreds of meters



Refuse bins cleaned up and rebuilt

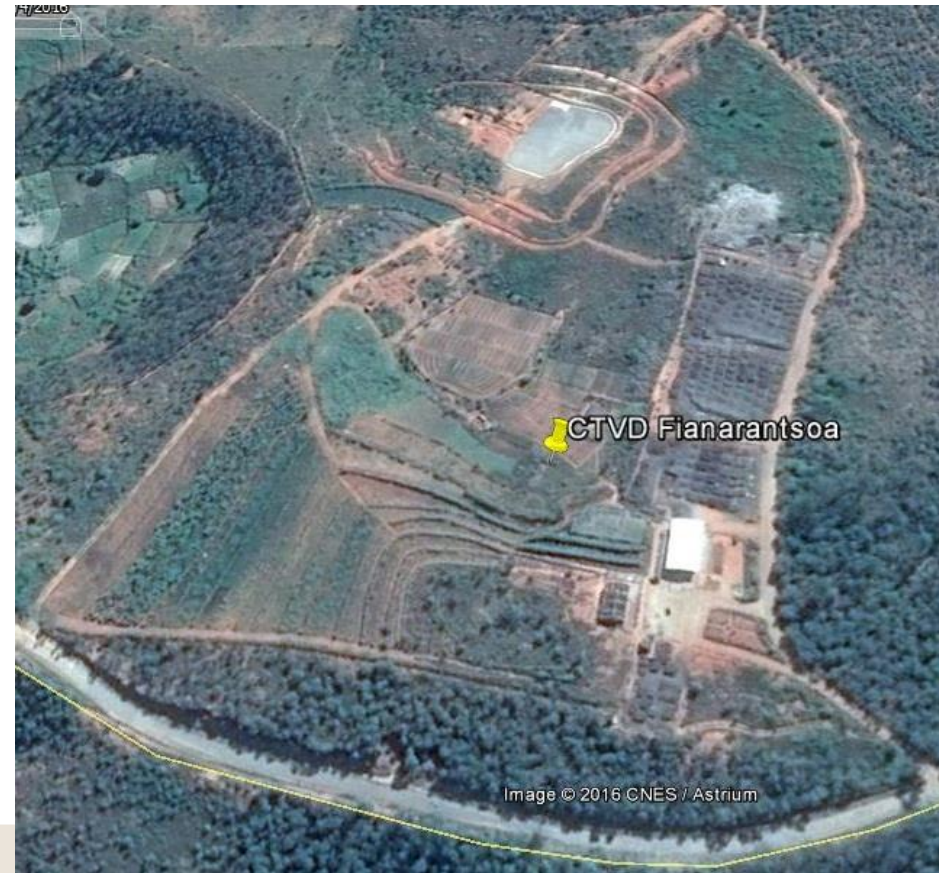


Daily collection of the refuse bins

WASTE MANAGEMENT. MADAGASCAR

TCVW (Technical Centre for Valorisation of the Wastes)

- Composting
- Landfill
- Vegetable Production



WASTE MANAGEMENT. MADAGASCAR

TCVW : Compost



- Platform of 5 000 m²
- Production de 300 T/month
- 20 sales points and contracts with farming organisations

	No compost (kg/m ²)	With compost (kg/m ²)
Carrots	2,50	5,75
Spinach	4 à 6	10 à 13
Salad	3	13,50
Aubergine	6	16

WASTE MANAGEMENT. MADAGASCAR

TCVW : Landfill Site

- Opening : juin 2016
- Total Capacity : 30 000 m³
- For 20 years exploitation



WASTE MANAGEMENT. MADAGASCAR

RESULTS

- 30 t/day collected and treated
- General clean-up of the town
- Long term strategy (20 years)
- Technical Centre of Valorisation of the Wastes and Landfill



Site operational

- 4 trucks
- 60 Waste bins
- 100 jobs (27 sorting, 30 collection, 32 composting, agriculture ...)
- Compost production



WASTE MANAGEMENT. MADAGASCAR

- **Partnership PRAYON – IWB**
 - Prayon : a producer of fertilizer
- **Analysis of compost & soil**
 - 4 samples of compost & soil
 - Analysis of Prayon
 - PH
 - nutriments
 - density
 - metals
- **Proposals to improve the compost**
 - Following the needs of the soil
 - Predilection for sustainable & local solutions

Wastes. Kinshasa. Democratic Republic of Congo

BANDALUNGWA : one of the 24 communities of Kinshasa.

- Deterioration of the Country (wars, poverty)
- Growing urbanisation
- Proliferation of wild dumps
- No waste management structure
- Bandalungwa : 273.000 people



Wastes. Kinshasa (community of Bandal. DRC)

Plastic bags abandoned or burned

- Obstruction of sewers
 - Water stagnancy
 - Proliferation of water diseases
- Bad absorption of rainy waters
 - Inondations
 - Erosion of the soils
 - Degradation of the roads
 - Paralysis of the urbanagricultural production
- Death of animals eating them



Wastes. Kinshasa (community of Bandal. DRC)

- Incinerations badly controlled
 - Fumes harmful for health
- Long term pollution (low biodegradability)



CHALLENGE : developing of a low cost management of plastic bags
generating employment

Wastes. Kinshasa (community of Bandal. DRC)

- 3 centers for sorting and valorisation of plastic bags
 - in each one a mixer
 - bags are transformed in paving stones
- Mixer developped by ISF is already in operation in Burkina Faso
 - Local organisation call ISF
- Technology transfer : 5 local craftsmen trained in for replication in other communities



Wastes. Kinshasa (community of Bandal. DRC)

People involved :

- 273.000 inhabitants of the city will benefit of the sanitation
- 30 plastic bags collectors (10/site) and their families will benefit from income
- 12 responsables of recycling centers (4/site) and their families will benefit from income.
They will manage the centers and paving stone production
- 5 craftsmen of other communities of Kinshasa formed to the replicability of the engine
- Alls takeholders involved : authorities, private companies, craftsmen selling equipment (carts, wheelbarrows, ...)

Wastes. Kinshasa (community of Bandal. DRC)

Budget (€)

total Cost	143.892
Budget given by Brussel International	103.070
Funding to be found	40.822
IWB funding	20.411

PARTNERSHIP WITH PLASTICS Cies

Why Companies would you support IWB?

- Substantiate your commitment
- Federate your personnel around a cause
- Confirm the image of your implication

And of course :

- Improve directly living conditions of thousands of people
and allow them to achieve their projects and go out of poverty



PARTNERS



Avec le soutien de
LA COOPÉRATION
BELGE AU DÉVELOPPEMENT



TOTAL



AdEsse Medica



Thanks for your
attention !

Questions ?

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