

Business cases in solid waste management

Grinding of hard plastic waste to produce flakes



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Young people in Mali often lack decent employment opportunities, leading to high levels of unemployment. Funded by the European Union, a consortium of ICCO, WASTE, APEJ, led by SNV, is implementing the Value Chain Development and Youth Employment in Mali (EJOM) project. The project takes place in the four regions of Kayes, Koulikoro, Gao and the district of Bamako, all areas where young Mali people face systemic employment challenges.

WASTE's interventions in the project focusses on setting up small businesses in solid waste management and improving existing ones to help them to grow and create employment. Participants of the EJOM training programs are asked to prepare a business plan. To assist the development of these business plans, WASTE developed a series of 4 illustrative business cases in solid waste management to serve as inspiration:

1. Primary collection of household waste
2. Primary collection of household waste and sales of recyclables
3. Grinding of hard plastics to produce flakes
4. Paving tiles out of low-grade plastics

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1. Grinding of hard plastic waste

1.1 Key characteristics

Waste input type:	Hard plastic (PE/PP): jerrycans, chairs, buckets, others
Product:	Flakes (preferably washed and of one colour)
Value offer:	Adding value to the plastic waste by processing the plastic waste into a semi-final product which can serve as raw material for the plastic manufacturing industry. Washing can be done before or after the shredding of the plastic. Flakes of one colour have a higher price in the market than mixed colour flakes.
Organisation:	Business
Scale of business:	Small- to medium scale (500 kg/day up to 3 tons per day)
Investment needed:	1.6 mIn CFA (50 kg/hr) Tools, shredder and transport (Crank shaft, main shaft, blades, housing of blades need to be imported from India)
Market:	Plastic product manufacturers in Bamako: SIMPLAST, SINPA, etc
Examples implementation:	Salifou Coulibaly, Bamako
Risks/challenges:	Global price of oil influences the price of the flakes. Low oil price results in low prices for flakes. Important to have the right licence for operating the business.
Health and safety:	Dust masks are necessary for the workers involved and take into account the safety measures. A number of accidents have occurred when operators have used their arms or legs to apply downward pressure on the feed material. Such dangerous practices should not be permitted. There should be no need for any such action on the part of the operator if appropriate shredder and cutting tools are used to draw the material into the shredding chamber.
Key success factors:	Local plastic manufacturers need to be present and able to compete with imported plastic products.
Social impact:	The business will create income and jobs
Environmental impact:	Valuable resources are saved from dumping.
Economic impact:	The business will generate a substantial number of jobs: indirect jobs in the collection of the plastic waste and direct jobs in the processing site itself.

1.2 Place in the value chain

In waste management systems we identify two important chains that are interlinked: the service chain and the value chain (see figure 1).

The **service chain** is about providing services to remove waste from their point of generation to a (dump) site where they are burned, buried or stored. These services are traditionally a **public sector** activity; and removal and disposal of waste are considered a public responsibility but can be outsourced to private service providers.

The **value chain** of solid waste (organic and inorganic waste) involves activities that add value to waste in such a way that, as a result, products can be sold to customers. To start a business in waste management it is important to know where your business is situated in the waste management system. *Who are your suppliers? Who are your clients?*

In the case of producing recycled plastic flakes out of plastic waste the place in the value chain is in the recycling step. Suppliers of plastic waste are waste pickers or sorting centres; clients are plastic manufacturing companies that mix virgin plastic with recycled plastic flakes to manufacture plastic products.

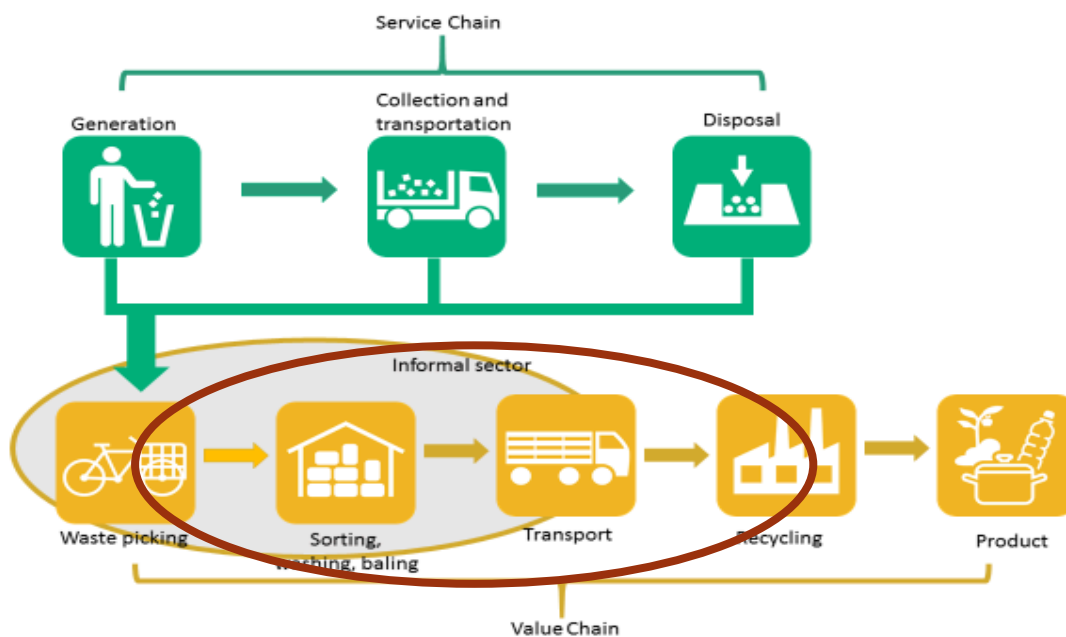





Figure 1: Schematic overview of service chain and value chain in solid waste management

2. Analyse de rentabilité de production (Avril 2019)

Input material: Hard plastic waste items : jerrycans, chairs, buckets, others	Market: plastic manufacturing companies	Products: PE or PP flakes	
Investment (CAPEX)	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">Shredder (50 kg output/5.5 kW) (831,464 CFA)</p> <p>Investment total: 1,625,000 CFA (2,500 euros) – Tools, shredder and transport (Crank shaft, main shaft, blades, housing of blades need to be imported from India)</p>		
	Business plan (full capacity)		
profit-loss			Per month (CFA)
	Sales Production et vente de 8,800 kg/mois (400 kg par jour) pour 250-300 CFA/kg		2,200,000
	Expenses <ul style="list-style-type: none"> • Raw material (plastic waste (75 CFA/kg)) • Salaries(20 workers) • Electricity charges (total 5.5 kW, 8 hours/day, 153 CFA/kWh) • General (rent, telephone, transport, maintenance, etc) • Depreciation (Life time of 5 years) 		660,000 800,000 148,104 150,000 27,083 1,785,187
	Total expenses		1,785,187
	Result per month		414,813

2.1 Profit and Loss statement and break even point

The table below shows the profit and loss statement of the plastic flake production process. This profit and loss statement is based on the actual data in Bamako, February 2018 (see assumptions below). The payback period is the length of time an investment reaches a breakeven point and the business starts to make profit. In this case the break even point will be reached after **2 years** supposed that all produced flakes can be sold for the indicated price of 250 CFA per kg. A thorough market assessment is vital before starting this enterprise: how many flakes can you sell for what price?

Business case 3 year	Year 1	Year 2	Year 3
Profit and Loss			
Revenues	18,480,000	22,176,000	26,400,000
Operating Costs			
Payroll	9,720,000	10,206,000	10,836,000
% of revenues	53%	46%	41%
Raw materials	5,544,000	6,652,800	7,992,000
% of revenues	30%	30%	30%
General & Depreciation	2,124,996	2,124,996	2,124,996
% of revenues	11%	10%	8%
Water & Electricity	1,244,073	1,510,660	1,777,248
% of revenues	7%	7%	7%
Total Operating Costs	18,633,069	20,494,456	22,730,244
% of revenues	101%	92%	86%
Result	-153,069	1,681.544	3,669.,56
Accumulated cash flow	-153,069	1,528.475	5,198,231
Repayment of investment of 1.6 mln FCFA	0	1,528,475	96,525
Profit (after 2.03 years)			3,573,231

Assumptions

- 22 working days per month, 8 hours per day
- Capacity year 1: 70%, capacity year 2: 85%
- All products are sold
- Price of electricity is based on: grilles sur les tarifs de EDM 2019: Tranche 2 above 200 kWh per month: 153 CFA/kW (including 18% TVA).