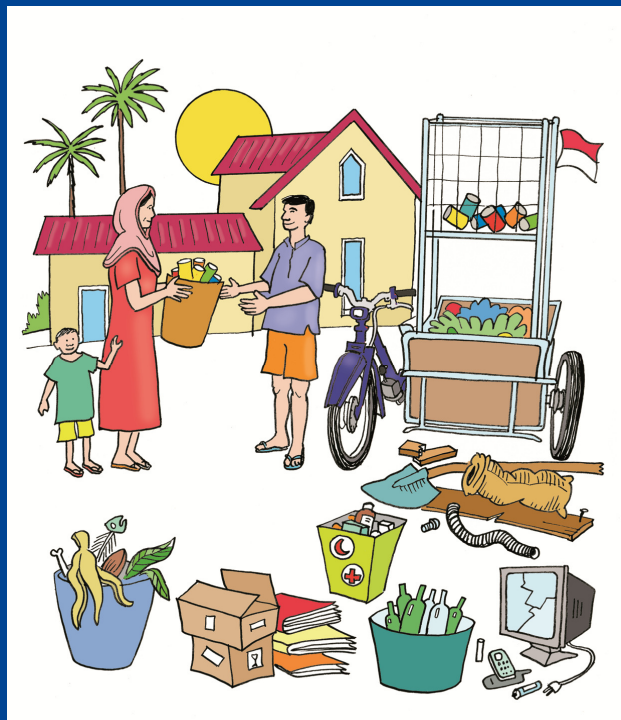


SOCIO ECONOMIC SURVEY OF SCAVENGERS IN ACEH, INDONESIA:



A DEEPER INSIGHT INTO THE INFORMAL RECYCLING SECTOR

September 2010

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ABOUT TERRE DES HOMMES ITALY

Terre des Hommes Italia is a non governmental organization based in Milan and is a member of the **International Terre des Hommes Federation**. The organization carries out humanitarian relief and international development projects in the sectors of **education, mother and child health, income-generating activities, water & sanitation, child protection and rehabilitation**, to the benefit of thousands of children, their families and communities all over the world.

Terre des Hommes Italia has operated in Aceh since January 2005.

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ABSTRACT

In the post-tsunami area of Aceh, **UNDP's Tsunami Recovery Waste Management Programme** (TRWMP) is playing a key role in the process of recovery.

Through the Waste Management Livelihoods Programme, which commenced in May 2007, UNDP's TRWMP is **supporting the emerging recycling sector** by distributing working equipment and delivering small grants to SMEs, CBOs, and NGOs. Recycling has proved to be a great opportunity for many individuals in term of income generation. It also plays a key role in reducing waste going into landfills.

This paper explores details of the research work carried out on the Municipal Solid Waste (MSW) recycling sector in Aceh by **Terre des Hommes Italia** in the framework of **UNDP's Waste Management Livelihoods Programme - Round III (2009-2010)**. The aim of the survey was to get a better insight of the **informal recycling sector** and socio-economic situation and role in municipal solid waste management of « recyclists » in Aceh.

The findings of the survey go to confirm the **increasingly important role** those « invisible entrepreneurs » - **waste pickers, scavengers, itinerant buyers, sorters** – are playing, both in economic and environmental terms.

DEFINITIONS

For the purpose of this paper, **Terre des Hommes Italia** is using the following definitions:

Informal sector:

In 1972, the International Labor Organization (ILO) introduced and developed the concept of Informal Sector. Since that time, several authors, and ILO itself, have used various definitions.

For the purpose of this survey, Tdh-I is using the following definition of Informal Sector:

"Ways of doing things characterized by (a) ease of entry; (b) reliance on indigenous resources; (c) family ownership; (d) small scale operations; (e) labor intensive and adaptive technology; (e) skills acquired outside of the formal sector; (g) unregulated and competitive markets."

Recyclists:

Recyclists is a generic term to refer to those waste workers who are scavengers, waste pickers, itinerant buyers and sorters.

INTRODUCTION

After the earthquake and **tsunami of 26 December 2004**, many local governments in Aceh were facing an enormous challenge with respect to cleaning up of large parts of their territory and removing debris from a wide coastal stretch.

During 2005-2006 a substantial part of waste and debris was removed and dumped in and around local dumpsites. Efforts were made to re-use and recycle parts of the waste materials as best as possible.

Concerted Indonesian and international support was organized to strengthen the service delivery capability of the Sanitation and Park Departments. A variety of waste handling and transport means were made available and temporary task forces were organized to clear the devastated areas. The need for a future-oriented waste management approach became apparent.

UNDP's Tsunami Recovery Waste Management Programme played a major role in this recovery process. Phase 1 began with US \$ 14.4 million marked for disaster recovery activities, including creating immediate employment, restarting essential services, clearing debris and recovering recyclable materials for use during the rehabilitation and recovery process, as well as resuming municipal waste collection across eight districts in NAD-Nias to reduce potential environmental and health-related risks. During Phase 2 (effective September 2007), the programme aimed to safeguard investments by building sustainability into programme interventions with an additional US \$ 9.98 million grant to extend the project to the end of 2009 and expand to a total of 13 districts. Phase 3 for US \$ 15 million currently extends the project to the end of 2010 and enables construction of three priority permanent landfills together with limited essential rehabilitation works elsewhere.

In 2009-2010, the programme continues to be relevant, delivering on its development objectives.

Through the Waste Management Livelihoods Programme, which commenced in May 2007, **TRWMP** also targeted the **collection and processing of recyclable wastes**. Giving **support to SMEs, NGOs and CBOs** through the distribution of working equipment and the delivery of small grants, the programme contributes to boost the recycling sector in Aceh. Recycling has proved to be a great opportunity for many individuals in term of income generation. It also plays a key role in reducing waste going into landfills.

Despite its potential, both in terms of economic and environmental benefits, since no special support from Government has been forthcoming until now to encourage clean and organized recycling in Aceh, a great part of it still remains in 2010 an activity within the informal sector.

This paper explores details of the research work carried out on the MSW recycling sector in Aceh by **Terre des Hommes Italia** in the framework of **UNDP's Waste Management Livelihoods Programme - Round III (2009-2010)**. The aim of the survey was to get a better insight of the informal recycling sector in Aceh and of the socio-economic situation and role in municipal waste management of « recyclists », those invisible entrepreneurs – scavengers, waste pickers, itinerant buyers, sorters – engaged within the **informal recycling sector in Aceh**.

FINDINGS

PART 1. The Recycling Sector in Aceh

Recycling

Any **waste minimization strategy** involves **recycling**, a process by which reusable materials are recovered from the waste stream and transformed into new products or materials.

Recycling typically involves a **wide range of private actors** who segregate, collect, transport, sell and purchase recyclables. Their main focus is on **turning trash into cash**, by adding value to discarded material.

The operations of adding value take various forms. For the purpose of this paper, **Terre des Hommes Italia** refers to the following table adapted from Scheinberg (2001a) and from Community Institutional Development (CID), Cairo, private communication.

Extracting and Adding Value Process	Explanation
Collection	Identification and picking of items or collecting mixed waste allows the sector to acquire the waste and turn it into a resource. Most primary materials recovered from refuse, such as paper, plastics, rags, metal, glass, and food leftovers, constitute a commodity as they all have a market price.
Sorting	Main process that increases the value of the waste recovered. The deeper the sorting differentiation, the higher the value of waste. For instance, if plastic is grouped into one major category, its value is lower than when it is further separated into sub-categories of hard and soft, then HDPE, PET, LDPE, etc. Sorting according to colour, size, shape and potential use or re-use of the materials so as to meet the end-users quality specifications
Volumes	Additional volume adds value: larger volumes command higher per-unit prices. The greater the quantity, the better bargaining power the trader has. For small quantities, transactions costs, such as checking quality, arranging transport and paying the seller, reduce the profit margin. Industrial feed stocks are massive in volume. It follows that storage space is required.
Pre-processing Small Manufacturing	For instance: washing, changing in shape-cutting, granulating, compacting, baling Creation of micro-enterprises that use the special skills of informal recyclers to transform recycle into articles traded directly to the community and being affordable by the poor.
Market Intelligence	Proximity to markets where informal recyclers and traders conduct business allows for the flow of information which allows decisions to be made on accurate market prices, competitors, trading partners, etc
Trading	In informal or formal markets. Links to the secondary materials network are crucial. Traders should be financially capable to add and conserve value of recycle. Difference between buying and selling should also provide buffer against risk

Source: D.C. Wilson (2005)

In Aceh, for several reasons, including a major population density and an almost direct link by road to Medan¹, **recycling activities are more intense** in the districts of Aceh Besar, Pidie, Pidie Jaya, Bireuen, Aceh Utara and cities of Banda Aceh and Lhokseumawe. All of them are located on the East Coast of Aceh.

¹ Medan is the city where recycling factories process most of the material collected in Aceh.

Structure of the recycling sector

The structure of the recycling sector in Aceh is characterized by a **chain of working relationships** between a **wide range of stakeholders** geographically diffused across every district of the province. In almost every major community, one will find people collecting and trading recyclables, on a part-time or full-time basis, to make a living.

This structure is hierarchical, with increasing specialization and decreasing number as we move upwards. At every stage of the transaction, waste is sorted more specifically in order to assort the most valuable components. It can be compared to that of a **pyramid** in which a large number of individuals, small and medium-sized enterprises representing the **informal recycling sector** form the **base of the pyramid** and a smaller number of larger, more sophisticated firms legally registered and representing the **formal private sector** occupy the **top**. Regardless of a firm's position in the pyramidal structure, all perform **vital, inter-related activities** and are reliant upon each other for the smooth, efficient functioning of the collection, processing and recovery of valuable materials.



End Users

Firms that use recyclables as a raw material component in the production of semi-fabricated or fabricated industrial or consumer products. Some are based in Indonesia, others abroad.

Wholesalers

Companies that process and prepare industrial tonnages of recyclables for sale on domestic and international markets. Most of them are based in Medan or Jakarta.

Dealers

SMEs and micro-enterprises. Those legally registered under Indonesian law represent the **formal recycling sector of Aceh**. They include medium and big dealers, employing between 20 to 120 people. They buy and process recyclables in varying degrees (sort, segregate, bale, shear, cut, grade, etc.) for sale to larger, usually domestic wholesalers/processors. They are based in Aceh.

Collectors

Own-account, self-employed or affiliated workers representing the **informal recycling sector of Aceh**. They include 1/ the **scavengers** and **waste pickers** who mine garbage heaps,

landfills and bins for recyclable wastes, put recyclables into large plastic HDPE sewn bags, and load them onto cycles, cycle-rickshaws or even on their backs; 2/ the **itinerant buyers** who purchase recyclables from residential, commercial or institutional sources and transport them to junk shops or intermediate processing facilities for sorting, cleaning, cutting and baling. They are based in Aceh.

Generators

Households, industries, businesses, institutions that generate waste in Aceh.

Relationships

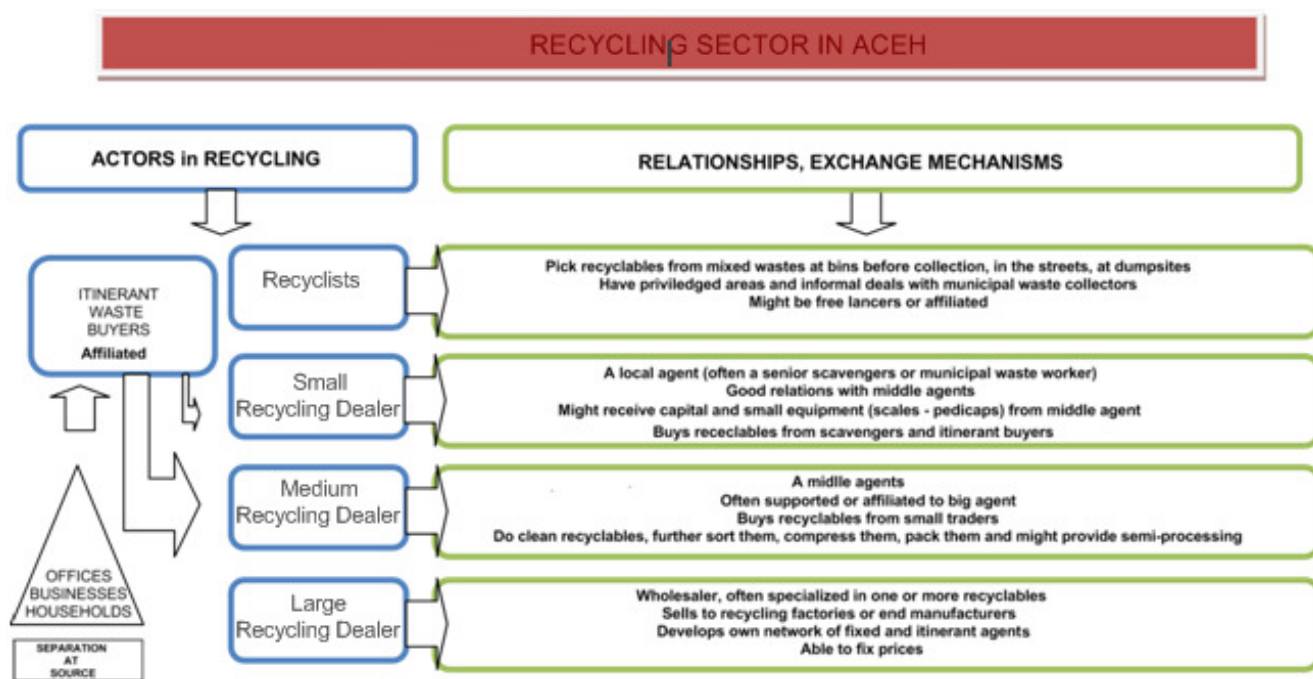
While **segregation at the source** is a vital precondition for a workable recycling system as it ensures a level of recyclable waste quality capable of meeting the demand of the recycling factories and end manufacturers, waste generators in Aceh are generally disinclined to segregate wastes at source and pass this **responsibility to recyclists**.

Recyclists are the first link in the long chain of recycling. Many of them work in groups based on family bonds, kinship and simply companionship borne of living in the same area. As we have already seen, their main activity consists in the collection of valuable materials from mixed waste, which are then sold to **small recyclable dealers** or **junk shops**.

Small dealers and junk shops buy almost all kinds of waste, such as paper, plastics, metals (aluminium, iron, copper), glass, etc. and perform some sort of primary sorting and cleaning before selling the material to **medium/large dealers**. There is considerable specialization of materials at this level as medium/large dealers prefer to work with more exclusive materials (i.e. plastics, metals) in order to reduce competition among themselves.

Medium/large dealers perform further sorting, cleaning, cutting and semi-processing. They own machinery and equipments like grinding machines, compactors, pick-ups, etc. Their storage capacity is generally high. They can hold waste for weeks at a stretch to fetch higher price. Due to the larger quantity they trade, they are in a better position than small dealers to negotiate prices with the larger **wholesalers** based in Medan or Jakarta.

At various levels, recyclable dealers are engaged in relationships that are **mutually beneficial**. In order to ensure adequate supplies and retain their hold over the market, the older, well-established dealers often pay **advance capital** to smaller dealers who face space and capital constraints. Larger wholesalers might also provide financial advances to medium/larger dealers to ensure adequate supplies in hours of need and demand.



Types and Volume of Marketable Material

Field observations have revealed that there are five main categories of marketable material collected and traded in Aceh: **plastics, papers, metals, glass, and rubber**. Each category is divided in sub-categories based on the type and form of the material collected.

There are **varying estimates of the quantity of waste recovery** taking place. Whichever estimate is correct, there is little doubt that this sector **significant contribution to the overall waste management process** in Aceh. Moreover, it provides employment opportunities to numerous people.

Interviews among **50 SMEs** give a total amount of recyclables sent to Medan in **2009** amounting between **15 and 20 000 tons**.

Market Price Mechanism

The price of a particular item is governed by the way the recycling market operates. The deciding factor is usually the current demand for the material and the inflow of collected material into the market.

- If the material is in excess, then the recycling factories decide the price.
- If the material is scarce, then the dealers dictate the price.
- In a neutral situation, market fixes the price depending on demand and supply.

In most cases, the price of the virgin materials affects the pricing of the recycled material. If the virgin material and waste material have same or nearly the same prices, then the face value of that particular recycled material is bound to fall in comparison to the virgin material. In contrast, if the virgin material witnesses a price rise, then often the recycled material prices also rise. This price rise, however, may not be proportional to the price rise of virgin material.

Periodic fluctuation in the prices is observed. Some of the large recyclable dealers, who have surplus holding and storage capacities to store the waste, wait until the demand rises and hedge market prices.

Market prices are also influenced by the **quality of recyclables**. Recycling factories are looking for clean and uncontaminated materials. The quality of recyclables in Aceh is relatively poor due to the fact that a great majority is collected from mixed waste and not from segregated sources.

Prices for materials collected in Aceh are fixed by the recycling factories based in Medan or Jakarta.

To have an idea of **prices**, which circulated in **2009-2010**, please see **Annex 2**.

PART 2. The Informal Recycling Sector in Aceh

Activity

In Aceh, the main activity of the workforce engaged within the informal recycling sector consists in **collecting and trading recyclables**, and is characterized by:

- Unregulated and competitive market
- Small scale operations with individual or family ownership
- Ease of entry
- Reliance of locally available resources
- Labour intensive and adapted technology
- Absence of access to institutional credit or other support and protection

Coverage area

This activity is taking place both in rural and urban context. Of the 270 recyclists interviewed by Terre des Hommes Italia, **48%** operate in **rural context**, **52%** in **urban context**. About **3%** operate **both contexts**.

Coverage Area	Unit	Percentage
Urban	141	52%
Rural	129	48%
Total Scavengers	270	100%

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Sources

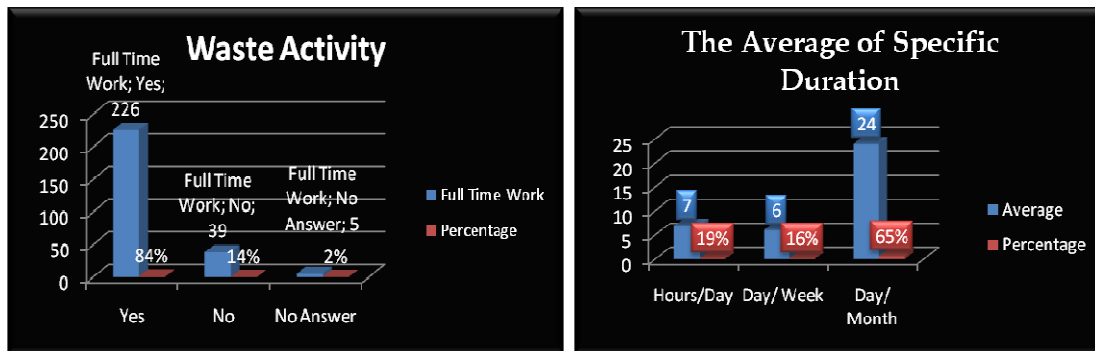
The great majority of recyclists collect recyclables from **households, markets, offices, workshops and local communities (73%)**. Only **27%** of them collect material from **streets, transfer points (public bins) and landfills**.

Sources	Unit	Percentage
Households	132	28%
Villages	137	29%
Dumpsites	83	18%
Workshops, Offices and Markets	76	16%
Public bins	12	3%
Roads, Streets	26	6%
Total	466	100%

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Working time

For **84%** of those interviewed, recycling is a **full-time job** performed **7 hours/day, 6 days/week, 24 days/month**.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Types and volumes of material collected

Recyclists in Aceh collect all kinds of waste material that has a **market value**. The material collected belongs to **five great families** of recyclables: plastics, metals, glass bottles, papers and rubber. **87%** of the recyclists interviewed collect **plastics, 76% metals, 77% glass bottles, 58% paper and cardboard, 38% rubber**. All categories are divided into several **subcategories** based on type of virgin materials and forms. The **most dominant material** collected is represented by **plastics**.

Items	Unit	Percentage
Plastics	235	87%
Metals	205	76%
Glass Bottles	209	77%
Rubber	102	38%
Paper	156	58%
Not Found	7	3%

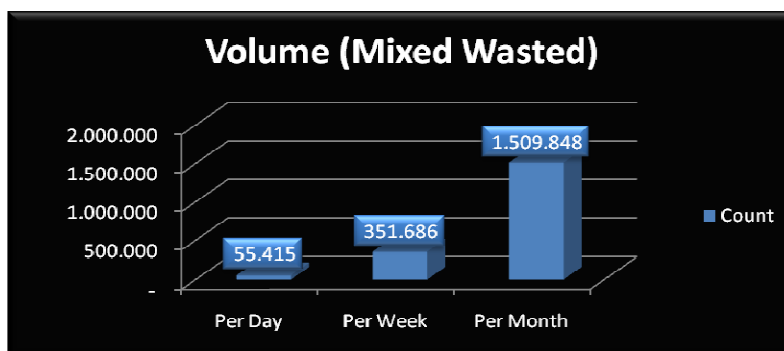
Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

SUBCATEGORIES	
Dirty Aqua cup	BB bottle
Clean Aqua cup	KPL bottle
Aqua bottle	Battery
Frutang cup	Infuse plastic
Aqua gallon lid	Tin
Mix plastics	Aqua gallon lid
Plastic PP	Parlon Pipe
Beverage can	ETC (Sack Plastic)
Box paper	ETC (Rubber Slipper)
Magazine paper	ETC (Key Block/ Babet)
HVS paper	ETC (Engine Aluminium)
Iron	ETC (Radiator)

- Aluminium
- Engine aluminium
- Brass
- Copper
- Used Zinc Roof

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Based on Terre des Hommes Italia survey, it is estimated that each recycler in Aceh collects between **50 and 250 kg of recyclables/day** depending on the mode of transportation. The **270 recyclists** interviewed collect a total of **55.415 kg of recyclables/day**.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Employment

The more common forms of employment are the following ones:

1. **owner-employers of micro enterprises** (i.e. *Junk shops*), which employ a few paid workers, with or without apprentices;
2. **own-account/self-employed workers**, who own and operate one-person business, who work alone or with the help of unpaid workers, generally family members and apprentices;
3. **dependent workers**, paid or unpaid, including wage workers, unpaid family workers and apprentices.

Among the 270 recyclists interviewed, **70%** are **affiliated** with or **employed** by local waste dealers. Only a few of them are **freelancers (30%)**.

Those who are **affiliated** generally receive, on a day-to-day basis, **capital** from the company for operational costs and to buy recyclables from residents, offices, markets, or small junk shops in their area of competence. They also receive some **basic equipment and tools** to perform their task, like a small scale, bags, a motorcycle (becak) and in some cases a car or a pick-up. These tools remain the property of the agent.

	Capital	Unit
	Rp 10.000	1
	Rp 25.000	1
	Rp 30.000	3

Rp	35.000	8
Rp	50.000	5
Rp	60.000	1
Rp	65.000	1
Rp	70.000	1
Rp	80.000	2
Rp	100.000	2
Rp	200.000	16
Rp	250.000	3
Rp	280.000	1
Rp	300.000	16
Rp	400.000	2
Rp	500.000	10
Rp	560.000	1
Rp	600.000	2
Rp	700.000	8
Rp	1.000.000	4
Rp	1.500.000	3
Rp	1.700.000	1
Rp	2.000.000	4
Rp	4.000.000	1
Rp	5.000.000	2

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Recyclists who are **employed** by a company are those who are on its **payroll**. Generally they include specialized workers, for instance those who use compactors, grinding machines, etc. SMEs in Aceh generally have **few employees and many affiliated workers**.

People

The great majority of people engaged within the informal recycling sector in Aceh belong to one of the following categories:

1. **Itinerant buyers**, often affiliated to a local trader, who buy recyclables from households, offices, businesses;
2. **Street pickers** who collect recyclables from mixed wastes on the streets or in bins (TPS) before collection;
3. **Scavengers** who collect recyclables from mixed waste at dumpsites;
4. **Small recyclable dealers** who buy recyclables from scavengers, street pickers, municipal waste collection crew, and itinerant buyers.

Most of them work without any official protection and recognition, nor are they covered by any social security system.

Based on **questionnaire surveys among 270 people**, the socio-economic conditions of **recyclists** (categories 1, 2, 3) looks like this:

Origin & Age

Most of the recyclists interviewed are **Acehnese people**. Only few of them are from Medan or Sabang.

The great majority of recyclists (**85%**) are born between **1961 and 1990**, while **13.5%** are born between **1950 and 1960**, **3.5%** before **1950** and **2%** only after **1990**.

Reason to engage in recycling

Recyclists typically engage in recycling because:

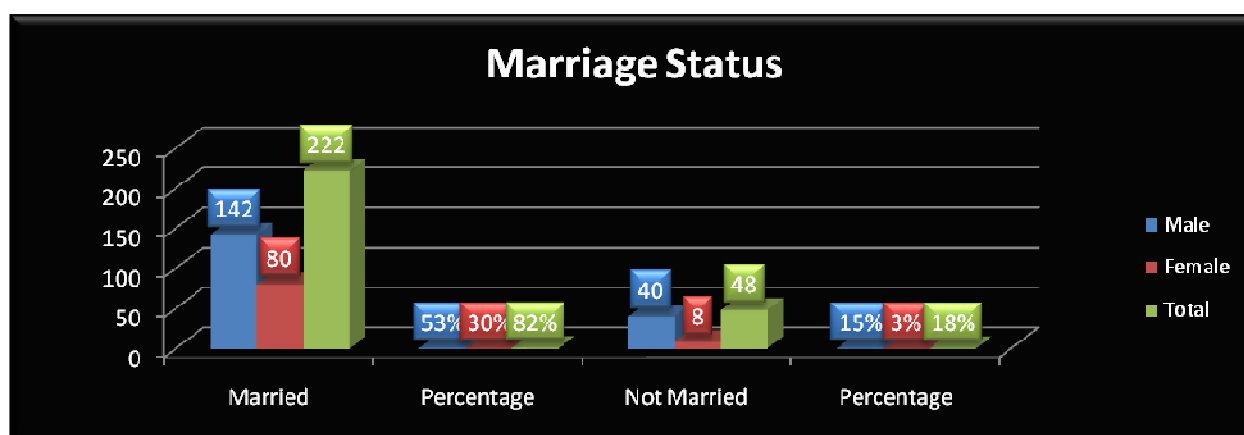
- it brings **enough money for the family (35%)**;
- it is easy to start with almost **no investments and limited risks (21%)**;
- it requires **few skills (18%)**;
- there are **no other jobs available (12%)**.

Reasons to engage in recycling	%
No answer	4
Enough money for the family	35
Easy to start (no investment/no start-up risk)	21
Few skills required	18
No other job available	12
Other reasons	10
Total	100

Source: *The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)*

Civil status

Most of the recyclists interviewed (82%) are **married people with children**.

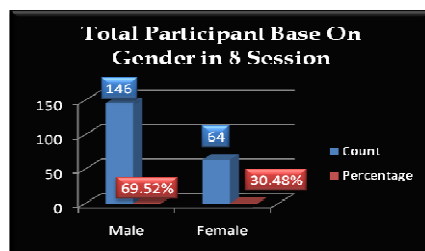


Source: *The Scavengers Questionnaire Data Base, Terre Des Hommes (2010)*

Gender distribution

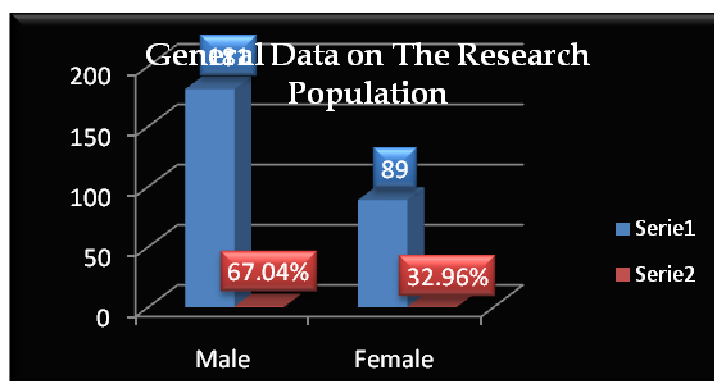
Based on the questionnaire surveys and field observations, gender distribution within the informal recycling sector in Aceh is quite similar to gender distribution observed among

participants in the training courses for scavengers organized by Terre des hommes Italia between March and May 2010.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes (2010)

In Aceh, estimates show that **recycling is a male activity (70%)**.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes (2010)

However, we observed a **specialization by gender** within the same sector. While **men** are more typically involved with **collecting and trading recyclables**, **women** are more likely to perform **sorting and cleaning**, and **keeping records of accomplishment**.

The main reason for this trend seems to relate to the time that women, especially married women or women with children can effectively dedicate to the job. **Sorting, cleaning and keeping records** are more flexible activities than collecting recyclables and can occupy a **part-time**. They also **require less mobility**, allowing women to stay home or bring their small children² with them on the working place.

Working Time

Most of recyclists interviewed speak about a **full-time job (84%)**, including **6 working days/week**. For the others (**14%**), it consists of a **secondary activity** that brings a complement of cash money to cover family needs. Only 2 % of those interviewed did not have a clear answer.

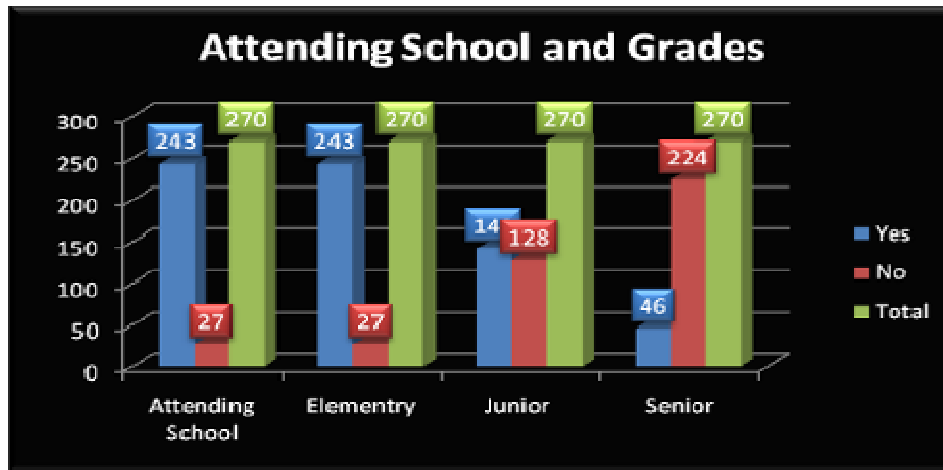
Activity Status	Full Time Work	Percentage
Yes	226	84%
No	39	14%
No Answer	5	2%
TOTAL	270	100%

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

² Education is compulsory and most kids in Aceh go to school. Only small ones stay home.

Education

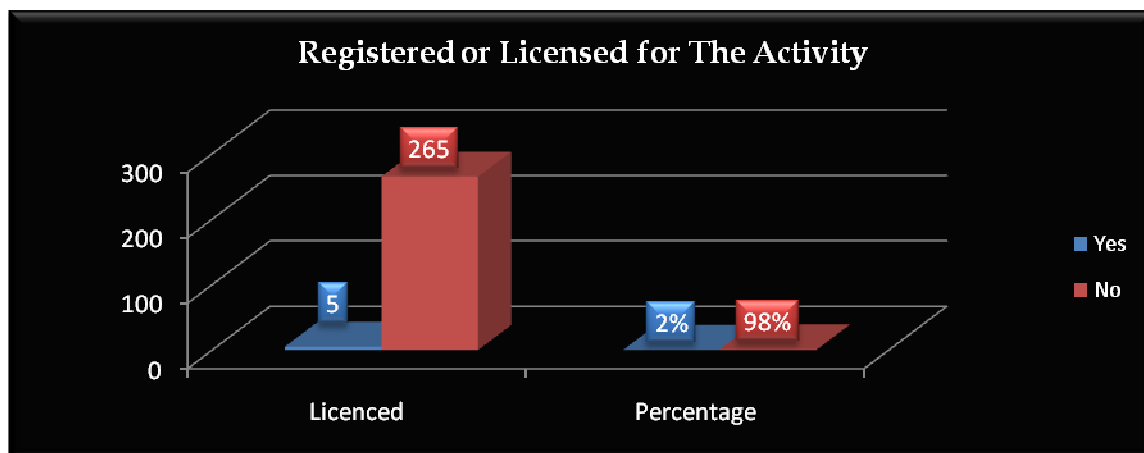
Most of recyclists have received a **basic education**. The great majority can **read and write**. Only few of them are illiterate. Almost **90%** of them have attended **elementary school** while **53% junior school** and **17% senior school**. However, their culture is oral and they generally consider paper work as a waste of time.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Registration/License

To run their business, most of the recyclists interviewed declare they **do not need any permit or license from the government to operate (98%)**.



Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

One explanation for this trend is that most of them are **affiliated** to or **employed** by local dealers, who in turn are registered companies under Indonesian law and buy a license from local governments to operate in the solid waste management sector. Others are just **not aware of the MSWM legal framework**. The Solid Waste Management Act, which regulates the waste management sector in Indonesia, is still very new (2008).

Years of operation

About **80%** of those interviewed have started to collect and trade recyclables **after the tsunami**. Among those who started their business before, a senior recyclist began to operate in **1978**.

Incomes

Based on the answers received from **126 respondents**, the **average income/hour/person** for a recycler in Aceh is around **10,500 IDR**. A full time recycler, working 7 hours/day and 24 days/month can earn an average of **1,764,000 IDR/month** (almost **\$200**).

Of course, depending on the coverage area, availability of recyclables, equipments and tools, there is much differentiation among recyclers as the following graph, based on the answers received from **187 respondents**, is showing.

Per day/IDR	Unit	Percentage
1,000,000 - 600,000	5	3%
500,000 – 300,000	9	5%
299,000 – 150,000	14	7%
149,000 – 100,000	7	4%
99,000 – 50,000	61	33%
49,000 – 20,000	53	28%
19,000 – 10,000	38	20%
Total	187	100%

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

When asked about their **perceived wealth status**, **71%** of **men** interviewed consider having a **fair** status, against **22%** considering it **poor** and **7%** **good**. In turn, **60%** of **women** consider having a **fair** wealth status, against **30%** considering it **poor** and **9%** **good**.

Perceived Wealth Status

Male	Poor	40	22%
	Fair	128	71%
	Good	13	7%
	Total	181	100%
Female	Poor	27	30%
	Fair	53	60%
	Good	8	9%
	Not Found	1	1%
	Total	89	100%

Source: The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)

Occupational and Environmental Health Risks

In Aceh, the health-related underpinnings of solid waste management still need to be addressed. The minimal regulatory framework for environmental protection and occupational health and safety is generally not enforced at the level of people and businesses that operate in the recycling sector. Waste produced by the SMEs of the recycling sector is often burned openly or dumped nearby the working place; habitats for insect breeding accumulate in open areas; occupational safety measures for workers are almost ignored. Most recyclers operate without gloves or masks. They also operate in open spaces without any protection from harsh climatic conditions (heat, rain, etc.). To complicate the exposure risks, the personal hygiene of

recyclists is often inadequate. It might be that a side effect of handling waste demotivates people to maintain proper hygiene. For sure, employers in the waste & recycling sector do not typically provide washing and cleaning facilities to their workers.

Some of the **more commonly occupational health and injury issues** reported by the recyclists interviewed are the following ones:

- **Back and joint injuries** from lifting heavy waste-filled containers and bags;
- **Respiratory illnesses** from ingesting particulates, bio-aerosols, and volatile organics during waste collection, and from working in dusty and sometimes smoky conditions, at dumpsites for instance;
- **Infections** from direct contact with contaminated material and rodent bites;
- **Puncture wounds** leading to tetanus and hepatitis;
- **Headaches and nausea** from anoxic conditions where disposal sites have high methane, carbon dioxide, and carbon monoxide concentrations;
- **Lead poisoning** from burning of materials with lead-containing batteries, paint, and solder;
- **Car or motorbike accidents.**

Among recyclists, **waste pickers and scavengers** who collect mixed waste from the street, public bins or dumpsites **are the most exposed** to illness or injuries. They report injuries in the form of **cuts and bruises** from glass, metal sharps, broken bottles, etc.; **injuries caused by animals**, rodents, snakes and bites and stings from other vermin; infections and **allergic disorders**, especially of the respiratory tract; and **poisoning** from empty containers of chemicals, sometimes used for storing food or water. **Skin allergies, respiratory infections, ophthalmic diseases, stomach problems** are other commonly reported diseases.

When asked about their **perceived health status**, the sample of recyclists interviewed by **Terre des Hommes Italia** answered the following :

Male	Poor	29	16%
	Fair	95	52%
	Good	57	31%
	Total	181	100%
Female	Poor	14	16%
	Fair	44	49%
	Good	30	34%
	Not Found	1	1%
	Total	89	100%

Source: *The Scavengers Questionnaire Data Base, Terre Des Hommes-Italia (2010)*

CONCLUSIONS

Through an investigation of the recycling sector in Aceh, **Terre des Hommes Italia** attempted to provide a deeper insight of the socio-economic conditions of those invisible entrepreneurs, the recyclists, who occupy the lower layer of the recycling hierarchy. In investigating the informal sector, uncertainties arise for several reasons. The first one is that any analysis of the recycling sector in Aceh is hampered by a lack of data. Second, the sector is volatile. Third, the information provided by recyclists and local dealers is not always reliable. Therefore, this overview should only be considered a snapshot.

In investigating the workforce engaged within the informal recycling sector in Aceh, **Terre des Hommes Italia** concluded that the sector **involves many individuals** and brings **significant social, economic and environmental benefits**. It reduces the costs of formal waste management systems as it contributes to **reduce the quantity of waste for collection**. It also **minimizes the volume of waste sent to landfills**. These economic and environmental benefits are achieved at **no direct cost to the tax payers and local governments**.

From a macroeconomic perspective, **Terre des Hommes Italia** considers that recycling is well adapted to an Acehnese context where one can find **abundant supply of working force, but scarce capital**. It provides **employment and livelihood to many people** who would not be able to find another source of income generation. Through sorting, cleaning, cutting or aggregating recyclables into commercially viable quantities, recyclists **add value to waste material** that would otherwise pollute the environment or occupy space in landfills. **Potential profit margin is the main selection criteria**, although this also depends on accessibility and convenience.

Recycling also provides a **steady and reliable supply of secondary raw materials for the manufacturing industry**³ which can replace expensive imported raw materials.

There are also social benefits associated with the informal recycling sector. In Aceh, recycling is often a **family-organised activity (86%)**. As a result, it **reduces individual vulnerability** by providing a level of social and economic support.

Of course, considering that the **recycling sector is only at an early stage in Aceh**, further efforts should be developed by government, international agencies and NGOs, to answer the **problems** that recyclists are facing, namely **recognition of recycling as a livelihood strategy, occupational safety and health risks, lack of vocational training, and a lack of support**.

Organising and training recyclists is a very effective way to upgrade their ability to add value to collected materials. **Forming recyclist cooperatives and associations** can greatly enhance their position. They can then negotiate as a discrete entity with the local authorities and or SMEs to handle recycling activities, which in return can become more legitimised and socially acceptable.

³ The manufacturing industry is unfortunately still based outside Aceh, in Medan or Jakarta for instance.

A further problem to be addressed is the **quality of recyclables**. As we know, manufacturers need uncontaminated and clean material. Collecting recyclables from mixed waste, as it is typically practiced in Aceh, is a clear limitation to quality (and better price). **Segregation at the source** (households, markets, offices, etc.) should be encouraged by all means, starting with schools.

There is also a need for further **research** on the structure and organization of the recycling sector in Aceh. **Market studies** for the types of recyclables collected in Aceh are necessary too, as well as those on the profitability of recycling operations. University departments with headquarters in Aceh should be involved and results should be shared with a wide range of stakeholders to **develop more inclusive and transformative approaches**.

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