

Integration of the informal sector in PET bottle collection and recycling

South Africa – Ecuador – Colombia



Case studies about involvement of the informal sector
in the collection of PET bottles

Author:
Sophie van den Berg

Comments to:
svdberg@waste.nl

26 June 2014

Contents

1	Introduction	3
2	Global collection and recycling of PET bottles	4
3	South Africa	5
3.1	Introduction	5
3.2	Legislation.....	5
3.3	Collection and recycling.....	6
3.4	Informal sector	7
3.5	Conclusions	7
4	Ecuador.....	8
4.1	Introduction	8
4.2	Legislation.....	8
4.3	Collection and recycling.....	8
4.4	Informal sector	10
4.5	Conclusions	10
5	Colombia.....	11
5.1	Introduction	11
5.2	Legislation.....	11
5.3	Collection and recycling.....	11
5.4	EKORED.....	12
5.5	Informal sector	13
5.6	Conclusions	14
6	Lessons learned.....	15

1 Introduction

RWS Environment¹ is carrying out the Government to Government programme for the RVO², they support several municipalities and organizations on waste management issues in Colombia. One of the activities involves the support of the National Business Association of Colombia (ANDI). ANDI represents the private sector interests and more than 110 businesses from different sectors of industry are member. ANDI expressed its wish to organize a workshop about waste policies regarding packaging materials on April 9, 2014 in Bogota and included a part in the programme about integrating the informal sector.

RWS Environment requested WASTE to analyze and present case studies showing involvement of the informal sector waste collection and recycling generated from packaging. Case studies from South Africa and Ecuador were selected to be presented during the workshop in Bogota. South Africa because it has similar characteristics to Colombia and a strong developed recycling industry without support of government policies. Furthermore, South Africa has a large community of waste pickers. Ecuador was chosen because it had just recently implemented a deposit fee on used bottles resulting in very high collection rates of PET bottles.

A mission took place from April 1 to April 10 to analyse the proposed case studies and to present the results at the workshop of ANDI in Bogota on April 9. In both Ecuador and Colombia various stakeholders in the (PET bottle) recycling chain were visited and interviewed: waste pickers, sorting centres, recycling industry and government.

Although the original case study from South Africa looked at the whole recycling sector, this report will be focussing on one packaging material only: PET bottles. Chapter 2 introduces the global collection and recycling of PET bottles in a general way. Chapter 3,4,5 describe the situation regarding PET bottle collection and recycling in the three different countries: South Africa, Ecuador and Colombia. Chapter 6 ends with the lessons learned from this research.

¹ Rijkswaterstaat Environment is part of Rijkswaterstaat, the executive agency of the Dutch Ministry of Infrastructure and the Environment

² Rijksdienst voor ondernemend Nederland = Netherlands Enterprise Agency

2 Global collection and recycling of PET bottles

Global consumption of Poly Ethylene Terephthalate (PET) packaging is forecasted to reach 19.1 million tonnes by 2017, with a 5.2% increase per annum. Bottles for water, carbonated soft drinks and other beverages account for 84% of global PET resin demand³. This increase in consumption will also cause an increase in generated waste PET bottles. PET can take hundreds of years to degrade but the potential for recycling is high because PET is of the polyester family and can be easily identified and separated into monostreams.

Discarded PET bottles are collected, baled and delivered to a PET Recycling Plant, where they are colour sorted, washed, granulated, re-washed, extruded and cut into recycled PET (rPET) pellets. rPET pellets are then used all over the world to manufacture many new products :

1. fibre for polyester carpet
2. fabric for T-shirts, long underwear, athletic shoes, luggage, upholstery and sweaters
3. fibrefill for sleeping bags and winter coats
4. industrial strapping, sheet and film
5. automotive parts, such as luggage racks, headliners, fuse boxes, bumpers, grilles and door panels
6. geotextiles (road stabilisation)
7. ceiling insulation
8. composite timber products
9. new PET bottles and containers for both food and non-food products

Industry commitment

Most European countries have implemented **Extended Producer Responsibility (EPR)** systems by law. EPR is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact of a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal. This policy approach differs from **Product Stewardship (PS)** when producers themselves agree they need to take responsibility for their products, to decrease the problems from specific products in the solid waste stream.

In Latin America various recycling plants of PET bottles can be found, not only producing flakes out of used PET bottles but also pellets suitable to process new bottles (bottle-to-bottle recycling plant). A driving force behind these investments are developments as announced by Coca Cola: in 2015 all packages should contain at least 25% recycled material⁴.

Waste pickers

In many developing countries and emerging economies used PET bottles are collected by waste pickers from dumpsites, households or from the waste bags in the streets. Most of them have low incomes, mainly because industry does not purchase recyclables directly from them as the collected amount of one person is below the minimum volume an industry demands. Also the materials still need to be sorted, cleaned and baled, adding other labour costs for the purchaser. The middlemen doing this obtain high profits by paying low prices to scavengers⁵. Huge opportunities exist for both parties when industry can work with waste pickers directly without interference of intermediaries.

³ Zhang, Hua and Zong-Guo Wen, The consumption and recycling collection system of PET bottles: A case study of Beijing, China, Waste Management (2013)

⁴ <http://eleconomista.com.mx/industrias/2012/06/11/coca-cola-reciclara-30-sus-botellas>

⁵ Medina, Martin, Social inclusion in Mexico's PET Plastic Recycling

3 South Africa

3.1 Introduction

South Africa is an emerging economy with an economic annual growth figure of 3% in 2013. The number of inhabitants in South Africa amount to 52 million people. The focus of waste management in South Africa is changing. No longer is the emphasis on the disposal of waste, but rather on avoiding its generation and minimizing and recycling the waste stream wherever possible. Despite the economic growth in South Africa, about half of the population still lives in poverty⁶ and it is estimated that 85,000 waste pickers make a living from collecting and selling waste materials from open dumpsites and from the streets.

With regard to PET bottles, growth of PET usage in South Africa is approximately 10% per annum⁷ which explains the increased interest in PET recycling. This chapter will first review the existent legislation and how this effects the informal sector and the PET bottle recycling sector, next collection and recycling of PET bottles in South Africa are analyzed and how PETCO⁸, without governmental support, has reached high recycling rates. The chapter ends with conclusions drawn from these investigations.

3.2 Legislation

Industry commitment/ Extended Producer Responsibility

South Africa has a policy on Integrated Pollution and Waste Management in place and a comprehensive National Waste Management Strategy and Action Plan to implement that Policy. The Waste Act from 2008 establishes Extended Producer Responsibility (EPR) as a regulatory mechanism and it empowers the Minister of Environmental Affairs to require certain industries to develop Industry Waste Management Plans. The Packaging Council of South Africa (PACSA) presented the draft Industry Waste Management Plan to the Department of Environmental Affairs (DEA) in August 2011. It has the goal to increase recycling rates but it still needs to be approved by government.

The PACSA plan proposes that the paper and packaging sectors don't need to start from scratch and develop a revolutionary new plan, but should build on the impressive recycling results that have already been achieved in the sectors.

Waste pickers

In the Waste Act of 2008, the role of waste pickers is not recognized, there are no regulations in place to promote the social and economic inclusion of waste pickers in formal municipal waste management systems. However national and local governments are aware of the importance of the work of the waste pickers and are looking for ways to include them in formal waste management systems⁹.

The Green Economy Accord commits to improved waste recycling re-use and recovery and to identify and promote recycling projects to bring small entrepreneurs in the informal economy into viable commercial activities with improved working conditions.

Municipalities

The management of domestic waste in South Africa currently faces many real challenges. In terms of the South African Constitution (Act No. 108 of 1996), waste management service delivery is a local government responsibility. Local authorities are encouraging recycling initiatives as one of the strategies not only to reduce waste but also to sustain the

⁶ <http://www.rvo.nl/onderwerpen/internationaal-ondernemen/landenoverzicht/zuid-afrika/mvo/sociale-aspecten>

⁷ http://www.petco.co.za/ag3nt/system/what_is_PET_03_sa.php

⁸ PET plastic recycling South Africa

⁹ Personal conversation with PETCO

environment and to create economic opportunities for the poor. Municipalities need to provide logistics and are free to arrange these activities.

3.3 Collection and recycling

As no legal framework is available to facilitate the set up of a sustainable collection and recycling system, the various material stream organizations have undertaken initiatives dedicated to increasing recycling rates in the country based on formal agreements with the government. PETCO is the organization responsible for the collection and recycling of PET bottles and has achieved impressive results over last years as can be seen in table 1. PETCO has increased its collection from 16% to 47% in 2013 and while PET consumption in South Africa has doubled.

	Recycling achievements and target (as set by PETCO)			
	2004	2012	2013	Target 2017
PET bottles	16% (9,840 tons)	45% (50,274 tons)	47%	58%

Table 1: Achievements and target of PET bottle collection and recycling

In South Africa the PET bottles are recycled into local end-use and not exported to China as is done by many other countries in Africa. The largest end use market for post consumer recycled PET is the fibre market but bottle-to-bottle plants are installed producing food grade pellets. The producer of bottle grade PET in South Africa is HOSAF with 120 000 tons per annum capacity of which 70% is used in the manufacture of beverage bottles.

PETCO

PETCO was established in December 2004 as a Pty Ltd Company with the specific objective of promoting and improving the waste management and recycling of post consumer Polyethylene Terephthalate (PET) products on behalf of all stakeholders in the PET industry in South Africa.

PETCO is headed by a board made up of representatives of Coca-Cola, the bottlers, resin manufacturers, converters and retailers. A key challenge was the establishment of sustainable and equitable funding mechanisms for an industry-wide effort. A unique levy system has secured the voluntary buy-in of industry players. This PET recycling levy is collected at source by resin manufacturer HOSAF who add the recycling levy of R275 per ton of resin purchased. The resin manufacturers pass the levies on to PETCO every month. This enables PETCO with a fund to finance its activities.



Figure 1: collection of waste bottles by Bicycle (source: PETCO)

PETCO aims to minimize the environmental impact of post-consumer PET on the South African landscape by:

1. Achieving sustainable growth in Polyethylene Terephthalate (PET) plastic recycling;
2. Supporting existing and encouraging new PET collection and recycling networks;
3. Promoting consumer education and awareness programmes.

3.4 Informal sector

In South Africa, waste pickers are beginning to organize themselves -- associations, cooperatives, unions and micro-enterprises at the municipal level, even a national association is taking shape.

Many waste pickers work on the open landfills, it is estimated that 85,000 people make a living as waste pickers.¹⁰ There is a national waste pickers' organization: South African Waste Pickers Association (SAWPA) but as it was established only recently a lot of work still needs to be done in formalization and strengthening of the organization.

However, two important milestones have been reached:

1. In 2012, key municipalities in KwaZulu Natal – uMgungundlovu District Municipality, Msunduzi Municipality and the uMkhanyakude District Municipality – all recognized the importance of waste pickers and have commenced or have already built materials recovery facilities (MRF) for waste pickers to provide for safer working conditions
2. In 2013, the Ministry of Environmental Affairs (DEA) visited SAWPA partners in Brazil and Colombia to learn about inclusive solid waste management and the waste pickers' movements in these countries.



Figure 2: national meeting of waste pickers in Johannesburg (2012)

3.5 Conclusions

The main conclusions for South Africa are:

1. South Africa has impressive results in recycling rates although no legislation has been implemented to back it up yet. With regard to the collection of PET bottles PETCO has managed to obtain very good collection rates.
2. The organization grade of waste pickers in cooperatives is still very low making them the most vulnerable in the recycling chain.
3. The recycling industry is looking for ways to improve their cooperation with waste pickers.
4. Governments start to recognize the importance of integrating waste pickers in their solid waste systems.

¹⁰ <http://urbanearth.co.za/articles/waste-pickers-south-africa>

4 Ecuador

4.1 Introduction

Ecuador counts a population of 14 million people and an economic growth of 5%. The national government is very actively involved to modernize the solid waste management system in Ecuador and is in the process of adapting a new Waste Law. With regard to the collection of PET bottles an interesting deposit fee was implemented last year boosting the collecting rates of used PET bottles to above 100%.

In this chapter first the relevant legislation will be reviewed, next collection and recycling of PET bottles will be described and also the impact on the informal sector. At the end of the chapter conclusions based on this research are presented.

4.2 Legislation

Waste pickers

Ecuador is in the process of developing a new solid waste act which is expected to be approved in the second half of 2014. This act will have a special focus on the integration of waste pickers in the solid waste management system. An agreement already has been signed between the Ministry of Environment, the Ministry of Economics and Society and the national waste pickers' organisation to promote the social and economic inclusion of waste pickers in formal waste management systems.

Extended Producer Responsibility

With regard to PET bottles in November 2011, a special legislation was developed to implement a deposit fee of 0.02 US\$ on every PET bottle with the goal to decrease the pollution and promote the recycling process. All bottlers in the country increased their price of a bottle with 0.02 US\$. This is calculated in the end price of bottles filled with carbonated soda, water or other drinks. With these fees a fund is set up used to pay the collectors of the PET bottles a price of 0.02 US\$ per bottle.

4.3 Collection and recycling

ENKADOR and INTERCIA, the two leading recycling companies in Ecuador have installed collection and sorting centres on strategic places in the country. These centres are certified to pay the deposit fee for every used bottle handed in and collect the fee again from the SRI (Servicio de Rentas Internas).

The implementation of the deposit fee caused that more PET bottles were collected from within the country and even were imported from abroad (which is prohibited). The collection rate increase up to 112%, see table 2. As no fee is paid by the bottlers from abroad import of used PET bottles is not favourable because the fund cannot cope with these extra amounts of collection fees it has to pay.



Figure 3: Collection, sorting and baling center of INTERCIA

	Recovered bottles 2013 (March 2012 – December 2013)
PET bottles	112%

Table 2: Collection rate of PET bottles

Both big recycling plants in Ecuador ENKADOR and INTERCIA installed a bottle –to-bottle plant and are producing food grade resin suitable to use for bottles again.

Name of Recycling factory	Location/region	Capacity	Installed technology/ end product
ENKADOR	Sangolqui (near Quito)	2000 kg/hr = 14.000 ton/year= 1,400.000 bottles/day ¹¹	SOREMA: bottle to flake EREMA: flake to bottle
INTERCIA	Guayaquil	40,000.000 bottles/mes ¹²	Bottle to flake STARLINGER: flake to bottle

Table 3: Installed recycling capacity of PET bottles in Ecuador.

ENKADOR sells transparent flakes for a price of 970 US\$ per ton¹³ to Colombia, USA, UK and Canada.



Figure 4: Hand picking section in bottle-to-flake PET bottle recycling unit of ENKADOR

¹¹ <http://www.recypet.com.ec/quienes-somos/>

¹² <http://intercia.com/index.php/es/noticias/106-reportaje-sobre-intercia-en-revista-equilibrio-verde>

¹³ Information from ENKADOR May 2013

4.4 Informal sector

At this moment in Quito about 5000 waste pickers are present from which 500 are organized in different waste pickers' organizations¹⁴. Social inclusion of waste pickers is a priority issue in the new solid waste law and an agreement is already signed to promote various activities to promote the social and economic inclusion of waste pickers in Ecuador.

In Quito, various pilot projects are implemented to promote separation at source in households, some with very good results. In one of the visited projects it was said that the implemented deposit fee resulted in more people entering the collection of bottles. Although the income of waste pickers increased by collecting more bottles, the competition also increased as more people and schools started to collect bottles. And another issue mentioned was that because of the higher value of the bottles, households were not willing to give the bottles to the waste pickers for free as they did before.



Figure 5: In the separation project "La Delicia" elderly (waste pickers) found a job as part of the social inclusion policy of the government.

In the value chain, the waste picker is always the most vulnerable. Various people expressed their doubts whether waste pickers were paid the 0.02 US\$ per bottle. Unfortunately the time of the mission was too limited to find proof for this statement.

4.5 Conclusions

The main conclusions for Ecuador are:

1. The implementation of the deposit fee of empty PET bottles has very good results in the collection of the bottles. This shows that by giving a value to waste material, it is possible to boost collection rates.
2. A detailed research study is needed to investigate whether the waste pickers profit enough from the implementation of the deposit fee.
3. Better control at the border is needed to prevent import of empty PET bottles.

¹⁴ ESTUDIO DE LA SITUACION SOCIO- ECONOMICA DE LOS RECICLADORES Y SUS ORGANIZACIONES EN LAS CIUDADES DE QUITO, CUENCA, GUAYAQUIL, PORTOVIEJO, MANTA Y LOJA, 2009

5 Colombia

5.1 Introduction

Colombia is an emerging economy with an economic annual growth figure of 5% in 2013. Approximately 46 million people live within its 1,1 million square kilometers. Solid waste generation is documented to be around 32,000 tons a day, of which at least 50% are organics and the waste stream is reported to be growing at a rate of 4% to 8% per year.¹⁵ Colombia is in a transition from open dumping to a modernized waste management system and focuses on eliminating illegal dumpsites, promoting the use of regional landfills and enforcing the formalization of waste pickers in formal waste management systems.

This chapter presents a brief description of relevant legislation, collection and recycling of PET bottles in Colombia, the informal sector and conclusions coming from this research.

5.2 Legislation

Industry commitment/Extended Producer Responsibility

For Colombia, municipal solid waste is an important waste stream that needs capacity building in different areas. There has been an integrated solid waste policy since 1998, which needs to be further elaborated and specified in the field of waste prevention, reuse, recycling, and recovery. In particular, regulations need to be developed for separation at source, selective collection, transfer stations, and material recovery facilities (MRF). There is a need to develop policies and regulations that involve the private sector in the financing of the integrated waste management, taking into account the Extended Producer Responsibility (EPR) principle.

Waste pickers

Informal recycler organizations in Colombia have been fighting for recognition for many years and in 2011 gained a major victory in the constitutional court stating that waste pickers should be included in the city's solid waste management system. Colombia is searching for methods and systems how to integrate the informal sector into the formal waste management systems in such a way that all parties benefit.

5.3 Collection and recycling

Informal waste pickers operate at the first step of the recycling value chain, collecting recyclable materials and bottles from households, waste bins or containers. In Bogota for example, the collection system has been organized by different waste picker organisations. Each waste picker has been assigned a route and at 4-5 am they walk this route with their small cart, wheelbarrow or "zarra" (bigger hand- or horse-cart).

The Bogotá waste pickers sell their collected materials to 1400 sorting centres varying in size from small to large. At these sorting centre the materials are weighed, and the recyclers are paid in cash. The sorting centre then sorts and pre-processes the materials (by baling, shredding, crushing, or other densifying operations) before sending them in larger quantities to the intermediaries who aggregate, store, and transport the materials to sell directly to the end-use recycling industry.

¹⁵ Aluna Consultores (2011) Estudio Nacional del Reciclaje y los Recicladores, CEMPRE



*Figure 7: After the households waste pickers are the first link
In the value chain*

ENKA is a polyester fibre producing company. ENKA was founded in 1964 with 7 Colombian companies and the Dutch Algemene Kunstzijde Unie (AKU). But only in 1993 ENKA founded a recycling plant for internal recycling of polyester waste.

In 2009, ENKA installed a modern PET bottle recycling line with a capacity of 1 ton per hour (11,000 tons bottles per year). The equipment is purchased from Europe (Starlinger/ENDEMA). PET bottles enter in the installation with etiquettes and caps still in place. Firstly, hand sorting takes place on a conveyer belt to remove PVC bottles. In the bottle recycling lane the bottles are grinded; the grinded particles are washed and separated in PET and other plastics; the clean PET flakes are transformed into pellets in an extruder. These pellets are used in the adjacent hall to process fibres.

ENKA recently installed a bottle-to-bottle line to produce certificated pellets to be used by Coca Cola for the production of bottles. This installation requires a higher input of used PET bottles.

5.4 EKORED

EKORED is the leading collector of PET bottles in Colombia. EKORED was founded in February 2013 as a spin-off of ENKA, its mother organization. Plastic bottles are collected in centres throughout Colombia. At these collection centers, compacting machines are applied to reduce the volume of the plastic bottles to keep transport movements and costs to a minimum. In cities where EKORED does not have its own collection centers, the company has strategic partners to collect the material and reduce size. After a sorting and baling process EKORED sells the baled PET bottles to ENKA, which turns it into textile fibers. ENKA established recently a PET bottle to bottle facility and requires three times as much raw material than before.



Figure 8: Sorting and baling equipment at the EKORED sorting center

5.5 Informal sector

In Colombia, the first organizations of informal recyclers were formed in the middle of the 1980s when many municipalities decided to close their dump sites and disposal was regionalized in sanitary landfills. Waste pickers were no longer allowed to enter the upgraded landfills, and so they lost their access to collect recyclables and sell them. At that time the National Association of Recyclers (ANR) was created, initially composed of 27 organizations. Also regional associations were formed and in 1990 the organization named ARB: the Association of Recyclers of Bogota was created. The Colombian movement of waste pickers has been vital as an example for the development of other waste picker organizations in Latin America.

At this moment in Bogota there are reported to be 13.000 informal waste pickers active in the sector. Approximately 30% of this group is organized in waste picker organizations. In Medellin 3,680 informal waste pickers have been documented. Informal waste picker organizations in Colombia have been fighting for recognition for many years. In 2011, Colombian waste pickers were the first in the Americas to win a major victory in the constitutional court. The decision requires that waste pickers be recognized and included in the city's solid waste management system, especially in recycling activities.

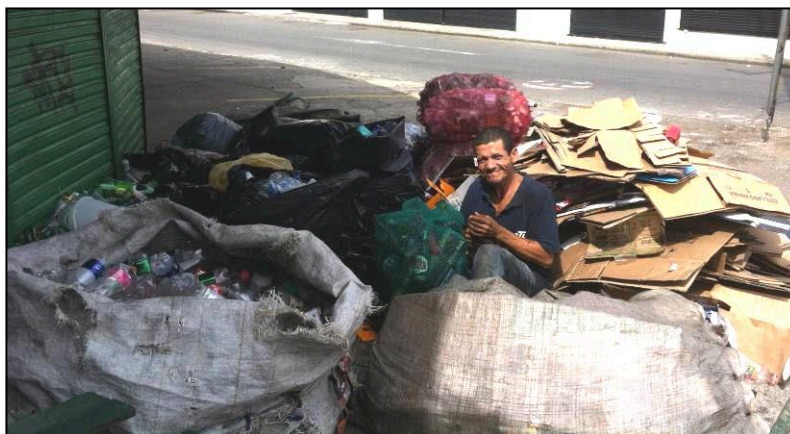


Figure 9: This waste picker is sorting the recyclables he collected in one night (Medellin, Colombia). Value of the collected materials amount approx. 11 euro

Case study in Bogota: Waste picker organizations are direct suppliers of recycling industry

In Colombia waste pickers organizations are starting to work with the Recycling industry without interference of middlemen. In this way it is possible for them to negotiate higher prices than with intermediaries involved but it also means they have to comply with certain requirements such as a quality and amount.

Three waste pickers' organisations in Bogota representing about 3000 waste pickers applied to be a supplier of used PET bottles to EKORED. EKORED only works with big suppliers who are able to deliver an amount of 9 tons of used PET bottles (sorted, without etiquettes and cap, baled) so this was really a challenge for the waste pickers organizations. Another challenge was to find the correct way how to negotiate with industry. As the waste picker organizations were used to fight for their rights they had to change their attitude to positive negotiating without demanding. Also working with deadlines to deliver the promised materials was quite new for them.

*The main lesson learned by the waste picker organizations is that negotiating with industry is different from negotiating with the national or local government. Now it is not about defending their rights but about commercializing products. From these experiences the waste pickers are obtaining entrepreneurial skills like negotiating and working more efficiently. And interesting to notice that they are adapting to a more business orientated sector with more professionalism ready to partner with industry.
(Source: CEMPRE Colombia)*

5.6 Conclusions

The main conclusions for Colombia are:

1. Compared to South Africa and Ecuador, Colombia has the highest grade of organization of waste pickers in cooperatives.
2. This gives industry opportunities to work directly with waste picker organizations.
3. First experiences of cooperation between industry and waste picker organizations show good results and can serve as an example for other initiatives.

6 Lessons learned

Collection of PET bottles

There is no uniform globally collection system for PET bottles and the system differs per country. An important issue here is the existent legal framework backing up the collection system with the implementation of a levy/fee to set up a fund to finance the collection system with the necessary infrastructure, awareness campaigns and training of waste pickers. Comparing South Africa, Ecuador and Colombia, Colombia is lagging behind in setting up the necessary legal framework.

Integration of the informal sector

On the other hand Colombia is a front runner regarding organization of waste pickers and legislation regarding integrating waste pickers in formal waste systems. This gives (recycling) companies and industry opportunities to work directly with waste picker organizations and rule out middlemen. In Colombia first experiences (see case study) show that both waste picker organizations as industry need to adapt themselves to find ways to work together satisfactory over a longer period of time. Benefits for the industry are higher recycling rates and a guaranteed supply of raw materials. Benefits for waste picker organizations are a higher and more stable income, access to safety measures and health insurance.

Role of the (local) government

Local government can facilitate the integration of waste pickers in formal waste management systems by organizing the formal sector into legal structures and guaranteeing them regular access to waste materials. Furthermore municipalities or NGOs can provide (business) training and improve working conditions (such as identity card and access to health insurance).

Value chain

The PET bottle value chain shows that the informal sector has an important role in the addition of value to the used PET bottles. After the households the waste picker are the first link in the chain and the most vulnerable. Each single process in the value chain has its own characteristics and can vary strongly depending the specific situation in each country. Waste pickers are an important work force with knowledge of sorting, collecting and baling the PET bottles into raw materials suitable for the recycling industry. In the value chain of PET bottle recycling the collection is often the bottle neck and to boost recycling rates it will be important to socially and economically include waste pickers in the system.