

Sustainable Development in Solid Waste Management of the Metropolitan Region of Curitiba

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*“Posso fazer uma correção?
A gente não é catador do lixo, a gente é catador de material reciclável
Lixo é tudo que não tem aproveitamento,
Material reciclável sim!”*

*<“Can I make a correction?
We are not waste pickers, we are pickers of recyclable materials.
Waste is what you can’t re-use
But with recyclable materials you can!”>*

Tião Santos¹

¹ President of *ACAMJG - Associação dos Catadores do Aterro Metropolitano do Jardim Gramacho* <Pickers’ association of the Metropolitan Landfill of Jardim Gramacho> in Rio de Janeiro, participant of the documentary “*Lixo Extraordinário*” <The waste land> of Vik Muniz, debating at the famous “*Programa do Jô*”, the João Soares programme in the most known Brazilian channel *Rede Globo*.

EXECUTIVE SUMMARY

Background

The city of *Curitiba* in 2010 was prized as the most sustainable city in the world by the Globe Forum of Stockholm. Many international institutions and scholars have recognized it as an 'Ecological Capital' of the developing countries, for its recent (the past 20 years) environmental and social policies.

Curitiba is the capital of *Paraná*, a Southern state of Brazil. In the second half of the twentieth century, it has experienced one of the fastest population growths within an urban of the Nation. The massive scale of migration into the city, affected mostly the peripheral area of the city and its surrounding metropolitan region, where many rural poor settled down.

The Metropolitan Region of *Curitiba* (MRC) is composed by 26 municipalities. Poverty is mostly concentrated in the periphery and the surroundings towns of the city.

In regards to the solid waste management (SWM), *Curitiba* is known for its municipal recycling programme *Lixo que nao è Lixo* <waste that is not waste> and social programmes involving poor people based on the exchange of food with recyclables (e.g. *Câmbio Verde*). Moreover, the opening of a waste Sanitary Landfill in 1981 was considered innovative according to sustainability fundamentals at that time.

Beyond the formal system, waste is managed by a massive hidden informal sector and most of the recycling in the metropolitan area is carried out by informal agents.

Many of the urban poor pick waste as a survival strategy. In Brazil, they are called *catadores de papel* <paper pickers> and they usually collect waste with rudimental carts.

There are no accurate numbers of informal pickers in the MRC but the informal reality in waste management and the economy they move is expected to be of large scale.

When looking at SWM in the developing countries, many cases demonstrate the existence of a large informal sector composed by individual agents contributing in a recycling cycle of discarded materials of a society. In addition to positive environmental benefits, the pickers work can result in natural resources saving, cleanliness of the urban area etc. However, the workers themselves suffer from bad working and living conditions, exploitation as well as social exclusion. On the basis of the Sustainable Development concept, the main challenge of these countries is how to deal with this informal sector, achieving efficient recycling and improving pickers' working conditions and livelihoods.

Research Design

Waste management studies have started to become the focus of scholars discussing sustainability issues but the informal waste management sector is still a scarcely researched topic. The literature on municipal solid waste management (MSWM) does not generally consider the informal sector in its totality but it looks at the various segments is composed by, singularly.

The aim of this Research is to give a holistic view of the informal sector, looking through the SD dimensions (society, economy and environment) and analyzing the inter-relations between them.

In particular, the main research question behind this study is to identify the level of SD in the informal waste management sector in the MRC. To do this, it is fundamental to analyze the working conditions, living conditions and recycling efficiency of the pickers. Moreover, the other stakeholders involved in waste management and potentially affecting these three aspects need to be also analyzed in their influence. Based on these objectives, the research sub-questions were formulated in order to fully understand the main research question.

Firstly, the structure and the main actors of the informal and the formal waste management sectors will be familiarised with and analyzed. Secondly, the structure of the informal sector will be analyzed in its influence on picker's working conditions. Thirdly, of all pickers' bad working conditions will be explored in how they affect the conditions of life, especially on health matters.

Fourthly, the focus will be on how the work and the living conditions of the pickers affect the environment. Fifthly, the role of pickers' political movement (*MNCR*), generally acting as a syndicate, will be studied in its influence on pickers' conditions, especially considering the associations' formation goal it achieved. Sixthly, the relationship of the pickers with the local government will be outlined in order to see how it is favouring SD in waste management. Seventhly, third party actors as NGOs and Judiciary, will be analyzed in their action impacts on pickers' work and lives and consequently on environment.

In order to analyze all the areas of influence and answer the research questions different research methods were used. Case analysis on different metropolitan areas and towns in the world was conducted in order to create some references on the issues studied. During the fieldwork period, observation was used as main initial technique, in order to analyze the different stakeholders and focusing on the pickers' activities and meetings. Open interviews with pickers and others actors (*MNCR's* representatives, public official, NGOs representatives) were held to know more in depth their positions, power relations and perceptions in the SWM system. The main bulk of the data was collected through semi-structured questionnaires conducted in nine different associations in five towns of the MRC. The questionnaires were based on observation and open-interviews and are the milestone of the research. Their purpose was to collect more quantitative and precise data on the informal reality.

Lastly, the findings of this study will contribute to the theories of Sustainable Urban Development that have recently put more attention on waste issues, on informal pickers and on the so-called SWM studies.

Furthermore, the results of the Research will enrich the knowledge on informal waste management and on pickers' organization in associations. The Brazilian case is showing a rare one in the world.

Moreover, the analysis provided by this research will help governments and organizations in formulating policies and actions for larger and safer integration of the informal pickers into the formal system, in order to achieve sustainable development in solid waste management. However, the study carried out, to effectively recommend policies, requires implementation of a larger analytical exploration of SWM and its informal sector.

Summary of Results

By looking at the entire solid waste management system, it became apparent that most of the domestic waste² produced in the MRC goes to the metropolitan sanitary landfill.

Review of the recycling sector, even if precise data are not reachable, demonstrates most of the activity is carried out by the informal sector.

Analyzing the municipal programmes and landfills, different environmental irregularities and deficiencies in their operations became apparent. In this context, the work of the pickers achieved increased importance toward environment conservation.

The informal sector is composed by many agents, through which the recyclable materials pass and are sold. It has a hierarchical structure where the informal pickers stay at the lowest stage and gain

² Solid Waste is composed by recyclables materials and organic remnants that originates from private homes or apartments.

the least, whereas who is in the upper stage gains the most (at every passage the price of the materials increases).

The exploitative and illegal nature of the informal sector results in exploitation and poor working conditions for the pickers. The picking activity is labour-intensive, time-consuming, working rights are not respected and much hard physical efforts are needed. Moreover, upgrading is hard as finding an alternative legal employment.

Low income and bad working conditions affect pickers' life conditions, pickers live in poor areas lacking basic living facilities. Most of the pickers work in unhygienic conditions, increasing the exposure to pathogens and health hazards. Different risks and health problems due to their work were found and deficient health assistance was observed. Moreover, social assistance for particular groups of people is also lacking, such as disabled or pickers' children.

Looking at the origin of the pickers, was found that 1/3 of them are from the city and those coming from outside were generally part of the second-generation of the urban immigrants.

Moreover, when looking at the MRC, majority of the pickers are women and 1/5 of them are single mothers sustaining their families just thank to the picking activity. Their incomes demonstrate that they earn less compared to their male colleagues.

Pickers in general also suffer from lack of official recognition and social exclusion and discrimination.

Thanks to the support of various stakeholders as NGOs, picker's political movement, judiciary and in some cases municipal councils, better work and life conditions are achieved through association formation.

These associations bring different positive benefits for pickers, such as safe employment, better income, better working conditions, recognition of the work, and learning new skills. Better work and conditions affect also positively the result of their activities, meaning recycling becomes more efficient.

Associations of pickers still face challenges like low material prices, poor equipment, bad quality of donated waste, lack of collaboration in the group, low awareness on the movement's issues and in some cases lack of support of the local authorities.

However, overall the associations' formation is a recommended and effective action for improving pickers' conditions. In the MRC, the concern is low related to the numbers of all the pickers existing in the entire urban region.

Conclusion

The existence of an informal sector that carries the recycling activity in the MRC brings positive benefits to the urban environment. Anyway, the main actors of this sector suffer from many drawbacks. Based on the concept of SD, the improvement areas have been identified within the following: social aspects, as working rights, living conditions, and social assistance of the pickers. Based on the experience of the associations and the data gathered during fieldwork, improvement within working conditions, livelihoods and recycling efficiency of the sector was found feasible. In the MRC, potential for achieving sustainable waste management in the informal sector was assessed, thanks to the involvement of various stakeholders aiming at same targets.

In order to achieve these objectives, formalization of the informal sector, integrating it into the formal waste management system, is considered necessary. The integration also implies a reform of the formal sector, toward a more environmental sound management.

Different stakeholders act directly on the integration process, through the support of picker's association creation, these include the NGOs acting as an intermediate and the Municipal Councils. Moreover, there is the judiciary, which functions as a monitoring actor of the local government's action. The Political Movement of the pickers makes pressure on the governments on different level, State and Federal ones. The Federal or State government can favour integration process through some decrees that aim at protecting this category of workers, prioritizing their role in municipal

waste management and for waste donation by different entities. Private companies involvement in municipal SWM, ought to be partnered with the pickers, through an intermediate action of the Municipal Council.

Overall, bottom-up initiatives (as from the MNCR and NGOs) need to meet top-down policies. The new Governance system has to be transparent and the civil society aware of the process and subject to environmental education programmes.

The process of integration of pickers in the formal waste management should focus on improving working conditions, livelihoods, recognition of their work and implementing social inclusion. In this way, in addition to improved working and living conditions for the pickers themselves, the urban environment will also benefit for more efficient recycling.

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Finally, I sincerely hope *catadores* will gain their rights as well as better future and recognition for the efforts and benefits they bring to the whole society.

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Abbreviations

AE – *Aliança empreendedora* <Entrepreneurial Alliance>
BNDES – *Banco Nacional de Desenvolvimento Economico e Social* <National Bank for Social and Economical Development>
CBO - Community based organizations
CL - *Compra do lixo* programme
CLT – *Consolidação das Leis do Trabalho* <Work laws consolidation>
COMEC - *Coordenação da Região Metropolitana de Curitiba* <Coordination of the Metropolitan Region of Curitiba>
CV – *Câmbio Verde* Programme
EA – *Estre Ambiental S/A*
EC – *Ecocidadão* <Ecocitizen> Programme
FAS – *Fundação de Ação Social* <Social Action Foundation>
IAP – *Instituto Ambiental do Paraná*, <Environment Institute of Paraná>
IBGE - *Instituto Brasileiro de Geografia e Estatística* <Brazilian Institute of Geography and Statistics>
HDI - Human Development Index
HDR – Human Development Report
LqñèL – *Lixo q não è Lixo* <Waste that is not Waste> Programme
MDG – Millennium Development Goals
MRC – Metropolitan Region of Curitiba
MST - *Movimento Sem Terra* <non-land movement>
PP – Public Prosecutor
PPP – Public-Private partnerships
SD – Sustainable Development
SMMA – *Secretaria Municipal do Meio Ambiente* <Municipal Secretary of Environment>
SWM – Solid Waste Management
UFRGS – *Universidade Federal do Rio Grande do Sul* <Federal University of Rio Grande do Sul>
UFRJ - *Universidade Federal do Rio de Janeiro* < Federal University of Rio de Janeiro>
UN – United Nations
USD – Urban Sustainable Development
UNDP – United Nations Development Programme
WDR – World Development Report
WCP – Waste and Citizenship Programme

Acronyms

Catadores – *Catadores de materiais recicláveis* <informal pickers of recyclable materials>
Consortium – *Consortio Intermunicipal Para Gestão de Resíduos Sólidos Urbanos*
L&C Institute – *Lixo e Cidadania* <Waste and Citizenship> Institute

Currency conversions

1 R\$ (Brazilian Real) \approx 0,4318 Euro
1 R\$ \approx 0,61 US \$
100 R\$ \approx 44,98 Eur
100 R\$ \approx 61,42 US \$
545 R\$ (the minimum Brazilian wage) \approx 235,33 Eur
545 R\$ \approx 347,98 US \$

Conversions valid the day 10th of August 2011

1. Introduction

This chapter will present the research background and motivation, study relevance objectives, the research questions and area, methodologies taken to complete the study, and finally, the outline of the Thesis.

1.1 Research Background and Motivation (of the topic choice)

The research has been conducted from February to of May 2011 and based on the previous fieldwork and internship completed between February and May of the previous year in the city and urban region of *Curitiba*.

The fieldwork of last year analyzed basic services and infrastructures lack in low-income areas (specifically the neighbourhood of *Guarituba* in *Piraquara*³) and its impacts on public health and the surrounding environment. Waste management amongst all other basic services (sewage, water provision, electricity, and housing), was chosen due to its appearance as the most prominent in the informal reality of the Metropolitan Region of Curitiba (MRC). It has revealed the existence of a massive informal sector taking charge of high recycling rates of the metropolitan area's waste.

The multidimensional and hidden reality of this sector, considering the evident positive benefits on the environment and the unfair circumstances in which the workforce lives, has raised the investigative interest. Additional interesting factors include the fame the city has as being one of the most sustainable in the developing world for its policies on social and environmental issues implemented over the last 20 years as well as the numerous and various actors at stake and a system of economic interests and gains.

Moreover, waste management studies have started to be in the eye of scholars discussing sustainability issues. The role of informal actors in recycling city's waste has received increasing attention because of their role in keeping cities more clean and 'green'. However, the literature on municipal solid waste management (MSWM, see box 1) does not generally consider the informal sector in its entirety, it looks at the various specific ecological, economical, social and health segments, separately. The various dimensions of Sustainable Development that waste management system can be looked through, are related, and affect each other. Hence the importance of not omitting any relevance to their reciprocal correlation resulting in the existing system.

All these factors lead to the motivation of conducting a study that could combine all the aspects of the SD of the SWM in the metropolitan area of *Curitiba*, focusing on the informal reality.

³ One of the poorest municipalities of the MRC.

1.2 Study Relevance

The perspective of the research results will be both comparative and relation-oriented. It analyzes the relationships between the different SD dimensions, sectors, and stakeholders of the Solid Waste Management System, revealing the different influence areas and consequences of them. It will also evidence similar dynamics in other research cases as well as inspire other areas of research.

As the informal urban sector is still a scarcely researched topic, this study will allow an analytical exploration of the subjects and serve as a trigger for expanded research and comparisons while also considering the data limitation. The study of informal pickers of the MRC would be a good reference case to compare with other cities, such as in Brazil or elsewhere. Particularly, the more advanced organization in associations, cooperatives and throughout the movement claims and conquests makes the Brazilian case an important reference for the others.

The results of the Research will, *inter alia*, contribute to the theories of Sustainable Urban Development that is recently putting much more attention on waste issues, on informal pickers and on the so-called SWM discipline. The results will be disseminated through this Final Research Master Thesis, eventual academic publications, presentations, and collaboration with Brazilian institutes and NGOs. The results of this research will be put at the disposal of civil society, Brazilian and international, hopefully shedding some light on a, sometimes intentionally, neglected issue.

Moreover, the analysis provided by this research will help governments and organizations in formulating policies and actions for larger and safer integration of the informal pickers into the formal system. Actual policy designs must be based on the replication of much larger and more intensive studies.

1.3 Study Objectives and Research questions

Solid Waste Management in the Metropolitan area of *Curitiba* is not easily describable because of the existence of an informal sector that is difficult to investigate. The study gives a holistic view of the Solid Waste Management, sketching the functions of both formal and informal sectors.

In particular, the research will be focusing more on the informal sector, as the informal agents carry the majority of the recycling activities in this urban context.

The research aims to evaluate to what extent the informal sector of this Metropolitan Region solid waste management system is sustainable, by analyzing its social, economic, and environmental aspects and the inter-relations between them.

In order to fully understand the role and the conditions of the informal sector workers, the formal sector needs to be analyzed as well. Thus, the formal municipal system, its programmes (and actors and interests at stake) and political and judicial issues will be considered in this study.

Concerning the informal sector, its functioning and segments will be outlined in addition to how it affects the waste pickers working conditions. Their poor working conditions and difficulties will be described in order to show they affect their living conditions.

Because of the poor living conditions and work of these actors, some benefits for the environment are produced. To what extent these impacts affect sustainability of the city and how it can improve (for instance by association formation) will be presented.

Among different actors at stake, the role of pickers' political movement and its impact on their conditions and associations formation will be considered.

Additionally the municipal authority's influence on pickers' conditions and urban environment preservation will be studied.

Finally, the third party actors as NGOs and Judiciary, with different roles and powers will be studied looking at the effects they bring to the pickers' work, and lives and consequently, the environmental benefits.

In order to achieve the objective of this study a main research question was formulated:

- *To what extent is the informal sector of Solid Waste Management sustainable in the Metropolitan Region of Curitiba?*

In addition, a number of sub-questions were created in order to further understand and answer the main research question:

- *How does the solid waste management work in the metropolitan region of Curitiba (which are the main actors responsible for it)?*
- *Including its pricing and sales process, how does the informal waste sector work? To what extent does it affect pickers' working conditions?*
- *To what extent does the activity carried on by the informal waste pickers, affect their living conditions?*
- *To what extent does the work of the informal pickers favour sustainability in the urban environment?*
- *To what extent does the political movement (and the formation of associations) of the informal pickers affect their activities (and lives)?*

- *To what extent do the relations between the informal pickers and the municipal waste managers favour a sustainable development of the informal SWM in the MRC?*
- *To what extent other actors (as NGOs and Judiciary) affect sustainability and the pickers' conditions in the MRC?*

The first two sub-questions will be considered in chapter three, the other three in chapter four, and the remaining two in chapter five.

1.4 Research methods

The whole study employed different research methods.

Firstly, case analysis of other urban contexts in the developing countries (see table 7.17 in the appendix) was conducted. The purpose of this analysis is to create a thematic background for the research and evidence similarities or differences in comparison with this study. The final aim is to enrich the SWM discipline and show indications deriving from different cases, attempting to find potential solutions for sustainable SWM systems (focusing on the informal sector).

Secondly, an analysis of secondary source documents was conducted in the case of the MRC itself, during the whole research period. These desktop surveys comprised other researches, laws, municipal programme pamphlets, statistics, academic articles, legislation, policy documents, reports, newspaper articles, etc. The aim of this analysis is to get a wider and more precise picture of the case of the MRC as well as extracting information from previous researches related to the same topic.

Thirdly, as initial fieldwork method, the observation technique was used. This process included following the pickers in their collection, separation, sale of materials, associations meetings, formation courses, and political movement meetings. Moreover, open meetings of the “waste and citizenship” forum, at the Public Prosecutor headquarter and a meeting of the *Conresol*⁴ were attended to observe the roles and positions of the actors at stake (table 7.3).

Direct field observation of the informal actors was the optimal way to investigate their activities, getting to know on a deeper level their working conditions, difficulties faced and especially their perceptions. The observation method is a suitable tool to get information without the risk of biasing them or invading their spaces (Patton, 2002, p.307). It allowed for explanations and clarifications of their apprehension and built up the confidence to get information from respondents during the next phase of interviewing, fighting reluctance and timidity of some interviewees.

Fourthly, based on the observation stage, open interviews with pickers were conducted in order to collect opinions and life-stories. Direct observation was used to provide evidence for their working conditions and activities in order to corroborate responses from interviews. These two methods also helped in justifying which issues are to take into consideration while designing a questionnaire for the pickers.

Furthermore, open interviews were held with different stakeholders as NGOs supporting and accompanying pickers or concerned about environmental issues, political movement members representing the pickers, experts and officials at the Environmental Secretary of the Municipal Council of *Curitiba*. This was done, to get to know the different positions (of support or not to the pickers), perceptions, and roles of the various actors in the whole waste system more in depth.

Fifth, different field visits were paid (table 7.2 in Appendix) to different places including the metropolitan area landfills, municipal waste programmes, a PET treatment plant and associations of pickers in the urban region (ten in total, in five different municipalities). This method was used to have a view of the whole process of the waste management (collection and final destination) and analyse the stage of sustainability of these services.

Sixth, to get more precise and quantitative type of data on the informal reality, in order to construct some statistics, semi-structured questionnaires were adopted. The questionnaires were held in nine different visited associations (table 7.1 in Appendix and map 1.1) reaching 94 pickers⁵ (29 in the city of *Curitiba*, the rest 63 in the surrounding towns of the metropolitan region). The questions concerned different issues as, demographics, households, work characteristics, health issues, political awareness and knowledge on movement, personal perspectives on work (difficulties and positive aspects), on life-changes and on public authority (for the questionnaire, see the Appendix).

Additionally, for all the associations (table 7.16 in Appendix), the same standardized questions were asked to key-informants, generally the presidents or those having the leading role in

⁴ Waste Inter-municipal Consortium of the MRC.

⁵ Interviewing was held in the period between the 21st of February to the 4th of May 2011.

the associations. The objective of these questions was to obtain information on: history of the association, number of employees, directory board roles, quantity and quality of material to be separated, type of materials, prices, type of buyers, picking routes, participation at movement events, paying INSS, emitting fiscal receipt, partnerships and relationship with the municipal council (see Appendix).

Because of difficulties in getting in contact with marginalized people and having a clear picture of this informal sector, the solution of contacting the associations and use their information as a starting point was considered as the most feasible way for conducting the analysis.

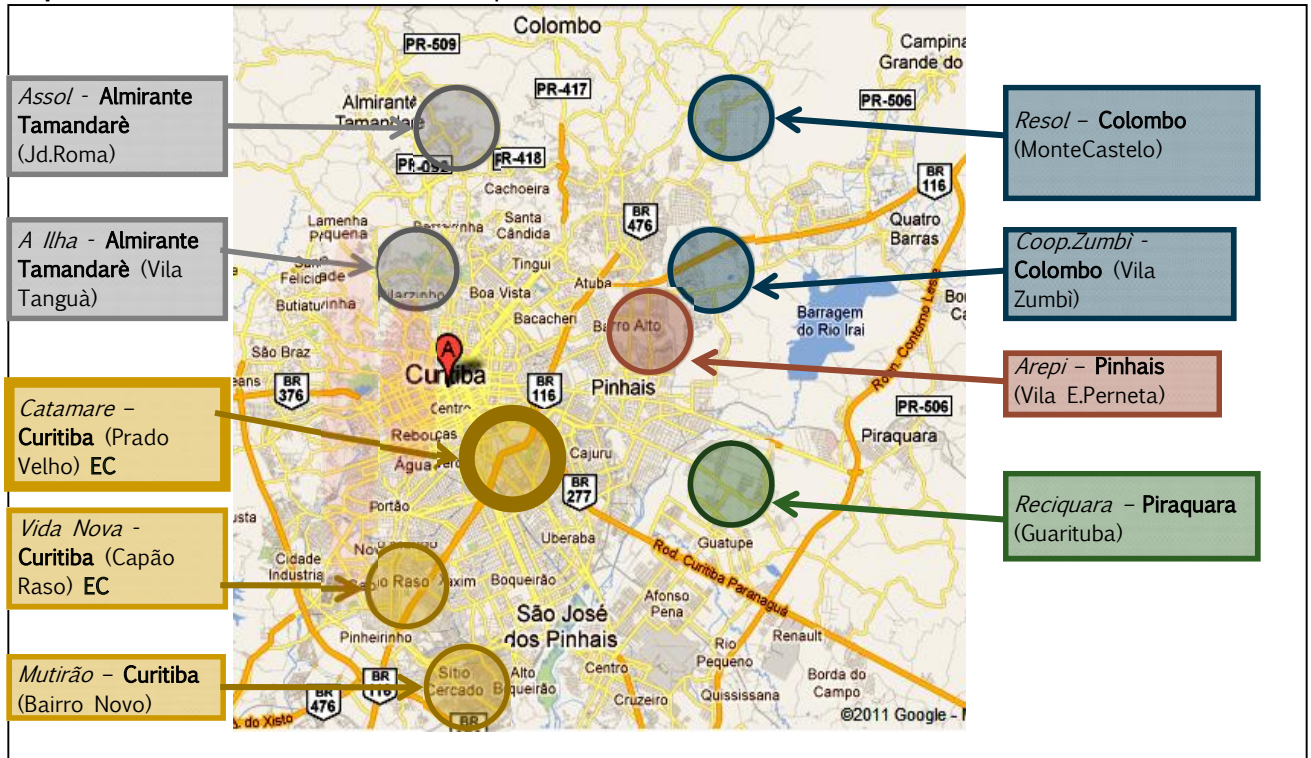
This choice was in some way random because of the difficulty in accessing this type of workers. Anyway, to get as much representative data and see the differences between them, associations located in different towns of the urban area and being supported by different NGOs were considered. Lastly, some particular associations were chosen for specific stories (see box 10) showing the different stages or formation and the difficulties they face. At the association, the method of snowball was employed, in order to choose as many people as possible and in order to not have any subjective influence or bias on the responses. Anyway, it has to be kept in mind that the results even if try to be as representative as possible, were taken in different associations of the MRC. Thus, they still do not represent the larger type of *catadores* (individual and competitive activity), but those that have been able to achieve some self-organization in associations characterized by cooperative type of work (getting better economic and work conditions).

By using a combination of methods (observing, document analysis, interviewing) will be used different data sources to validate and cross-check findings (Patton, 2002). The resulting findings indeed come from semi-structured questionnaires, open interviews, secondary source documents, and research analyses, observations, and field visits.

The findings of the questionnaires and interviews will be presented in the following chapters in an integrated approach, combining elaborated quantitative and qualitative data. Quantitative data (through graphs and tables) is useful as to get clearer idea of the scale of some observations and a precise understanding of an academically unknown reality. Qualitative data (open declarations and visit descriptions) is fundamental due to the richness of the reality, which is full of differences and contradictions. Gathering quantitative data is shown to be the best option for comparative studies, to make generalizations, being more reliable and guiding for future policies (Hulme, 2007). The positive aspects of qualitative data are that they can provide holistic interpretations, access to difficult issues, give deeper insights and a richer social picture. Qualitative data is used also to put the reader closer to the investigated population's perceptions (Hulme, 2007, p.13). Finally, integrated quantitative and qualitative research advantages provide better quality data, deeper understanding of reality and is suitable for more effective policy guidance (Hulme, 2007).

Nevertheless, how representative is the elaborated data is open to question. As such, findings should be taken as hypotheses to be confirmed by larger-scale and long-term studies in the future. Hence, they can be used just for very broad comparisons (something that will be attempted in the final discussion chapter).

Map 1.1 – Location of the Research area pickers' associations



All the associations, apart of *Catamare* (thicker circle), are either localized in the periphery of the city of *Curitiba* or in the metropolitan surrounding area. The different municipality appertaining is shown by the different colour of the text box. The symbol *EC* symbolizes the presence of the municipal project *Ecocidadão*.

1.5 Limitations during research

The research and fieldwork have been carried without no difficulties and limits.

First of all, the informal nature of the sector rendered complicated to have precise information (to be formulated in quantitative data). For instance data on numbers of pickers and on scale of the economy they move, is unknown.

Moreover, the difficult conditions in which pickers live do not really facilitate an easy access to them. Many of them are found working on the city's streets and not always willing to speak, as they can be scared in giving some declarations when consulted. For this reason using the associations as references helped to better structure the research and interviews. The suggestion to contact pickers of the associations was also given by pickers themselves belonging to some associations.

Secondly, visiting and interviewing at the associations was not without difficulty either. Having been often cheated made many pickers hold back towards people and especially strangers. Trust needed to be built over a period of time, for this reason to have key contacts, as social assistants or NGOs was fundamental to be introduced into the pickers' associations/cooperatives. In addition, more than one visit for every association was needed, the first one aiming just to be made known and to explain the research project itself. It is needless to say that the majority of the low-income areas visited, if not all, was somewhat risky so to get always contact of somebody working in the associations and making some sort of appointment, was necessary. This was not always easy due to the lack of organization and timetables in some associations.

Thirdly, shyness and low self-esteem were shown while interviewing. Many asserted ignorance and were unsure of their usefulness before even starting the interviews. Illiteracy, low understanding, or willingness to reflect also posed limits during the interviews. This factor led to the need of stimulating interviewees to think more, especially when dealing with open questions.

Fourthly, on the matter of the language, it was fundamental to learn Portuguese during the first fieldwork study and exceptionally useful to get to know low-income Brazilian realities: the humility, shyness and different way to express and refer to things (compared to other social classes), more closely. Indeed even if very simple Portuguese language was used in the questionnaires, while conducting them some specific words were not understood. For this reason, switching some terms, such as 'reside' and 'live with', was important during interviews. For instance, when asking about a Federal decree, instead of pointing the decree number in the question, the content of the law and the fact that the ex-President Lula signed it before leaving its charge (December 2010), was referenced instead.

Fifthly, sometimes limits in comprehending question brought some difficulties in data elaboration. Differing opinions and declarations on the same issues (even by people belonging to the same association) also created some complications. Moreover, bias on delicate issues (legality of housing etc.) can have occurred. Anyway, anonymity was guaranteed due to the delicate nature of the issues.

Despite these limitations, all the associations had leaders who were well informed and willing to talk and after a number of visits, in most of the associations a very welcoming attitude was shown.

Sixthly, the illegal pattern of a part of the informal sector rendered it almost impossible to contact and catch dealers (only two phone-interviews, see box 7) and industries dealing with pickers, due to time limits. Contacting some public officials, making appointments and getting some important information was hard. It was noticed that some sort of hidden reluctance in giving clear information, existed.

1.6 Regional context: the city of Curitiba and its Metropolitan Region

Curitiba, is the capital city of the southern Brazilian state of *Paraná*.

It has 1,8 million inhabitants (IBGE 2010, see also table 1.4), and the whole metropolitan region presents 3,3 million residents⁶. The urbanization rate is at 90,7 %, higher than the National one (84 %, *SIS*, 2010). Indeed, as many other cities in developing countries, it has experienced a rapid urbanization in the second half of twentieth century (Macedo, 2009). During the 1970s, the urban population doubled, growing from 550 thousand to 1.1 million. In that decade, Rabinovitch (1992) asserted that *Curitiba* experienced the fastest growth compared to other cities in Brazil.

Beyond the demographic growth, in the 1970s and 1980s physical and economic growth of the city was also rapid.

The *Parananense* Capital has been known in the last 20 years as the ‘ecological capital’⁷ of the developing countries. Different actions to reform the city, especially in the 1970-1980s decade, have been taken by the city’s mayors: in the field of public transportation and traffic, urban design, city planning, green spaces, urban watershed management, research on urban issues, environmental education and waste. Moreover, various social programmes have been implemented, in fields of employment, health and education.

Twenty-six municipalities compose the Metropolitan Region of *Curitiba* (MRC), see map 1.3, generated through the law 147/73. The whole territory of the urban area is around 15,5 thousands square kilometres, its boundaries touch the state of *São Paulo* and of *Santa Catarina* (see map 1.2).

Map 1.2 – Metropolitan Region of Curitiba and its boundaries



In the MRC there is an institute responsible for the coordination and support of the Metropolitan area, the *COMEC*⁸, formed in the 1960’s. It works as an administrative secretary, responsible for the technical and operational aspects of the Metropolitan area. Among the issues it deals with, some of them are basic sanitation, urban planning and infrastructures, traffic and public transports, and environmental issues (in particular the hydric resources).

⁶ Curitiba alone concentrates 57 percent of the total urban population in the metropolitan area and together with 10 other abutting municipalities, namely, *Almirante Tamandaré*, *Araucária*, *Campina Grande do Sul*, *Campo Largo*, *Colombo*, *Fazenda Rio Grande*, *Pinhais*, *Piraquara*, *Quatro Barras*, and *São José dos Pinhais*, clusters over 90 percent of the total RMC population (Macedo, 2009).

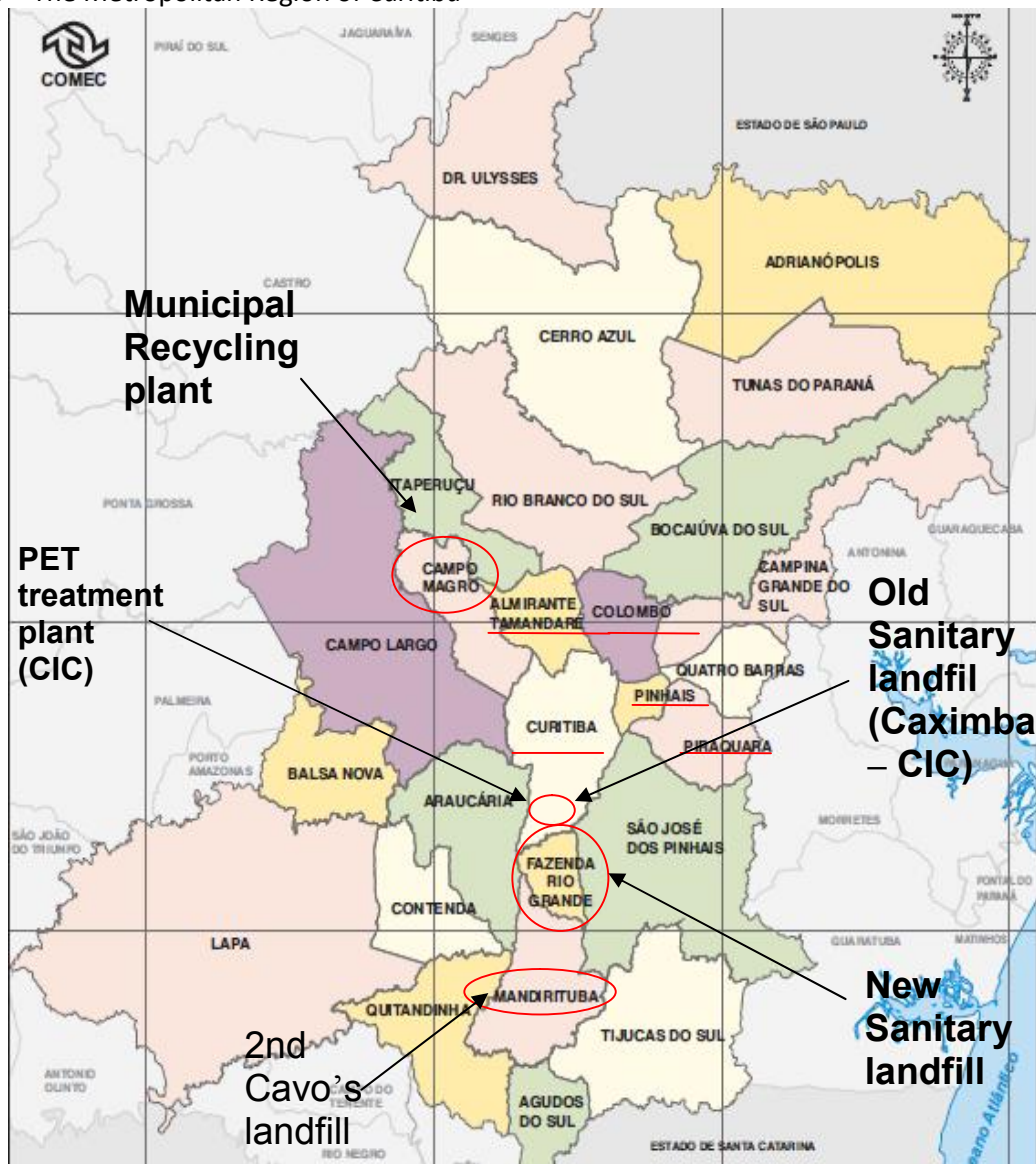
⁷ The US’ newspaper *Reader’s Digest*, in 2007 ranked *Curitiba* as the best Brazilian city where to live. The last international prize for sustainable measures was gained in April 2010, the ‘Globe Award Sustainable City’ for being the most sustainable city in the world, given by the Globe Forum of Stockholm (Sweden).

⁸ *Coordenação da Região Metropolitana de Curitiba*.

Beyond this main organ for management of the metropolitan area, the 26 Municipal councils of the MRC act in the metropolitan planning. In the Municipality of *Curitiba* the Secretary for Metropolitan issues – SEAM <*Secretaria Municipal de Assuntos Metropolitanos*> was created. Its task is to coordinate *Curitiba's* municipal council action with those of the other 26 municipalities and works as technical support to IPPUC⁹. Beyond the local level, there is an association of the municipalities of the MRC – ASSOMECC which is also important in the metropolitan management, a political institution chaired by the Mayor of *Curitiba* (Albuquerque et al., 2009).

The political and political parties always affected the relationships between the institutions responsible for the management of the metropolitan region. The presence of different political parties ruling in the municipalities brought some discontinuities in the implementation of inter-municipal joined actions (UFRJ, 2005).

Map 1.3 – The Metropolitan Region of *Curitiba*



Regarding the issue Solid Waste Management, the *Consórcio Intermunicipal Para Gestão de Resíduos Sólidos Urbanos (Conresol)* <Intermunicipal Consortium for Management of Urban Waste> was formed in the year 2001. The objective of the Consortium is to organize actions and activities for

⁹ *Instituto de Pesquisa e Planejamento de Curitiba* <Planning and Research Institute of *Curitiba*>.

managing the treatment and final destination of solid urban waste (deriving from private houses). The procedure is called *SIPAR*¹⁰, integrated system of waste processing and recovery.

The MRC, as many metropolitan areas in the world, presents very different realities and socio-economic contexts. In the 1970s-1980s, different big companies (Petrobras, Volkswagen, Renault, Chrysler) were established in different municipalities of the metropolitan area bringing economical gains. In the city of *Curitiba*, specifically the economic sectors got extended and intensified thanks especially to the service sector expansion. This concentration of economic activities in some areas caused alteration of the economic profile of the metropolitan area. Large disparities between municipalities were formed. Related to Poverty rate, in the city of *Curitiba* poorer neighbourhoods are found in the south. Looking at the whole metropolitan area, poverty rate rises raise as far from Curitiba's centre we go in space (see map 1.4).

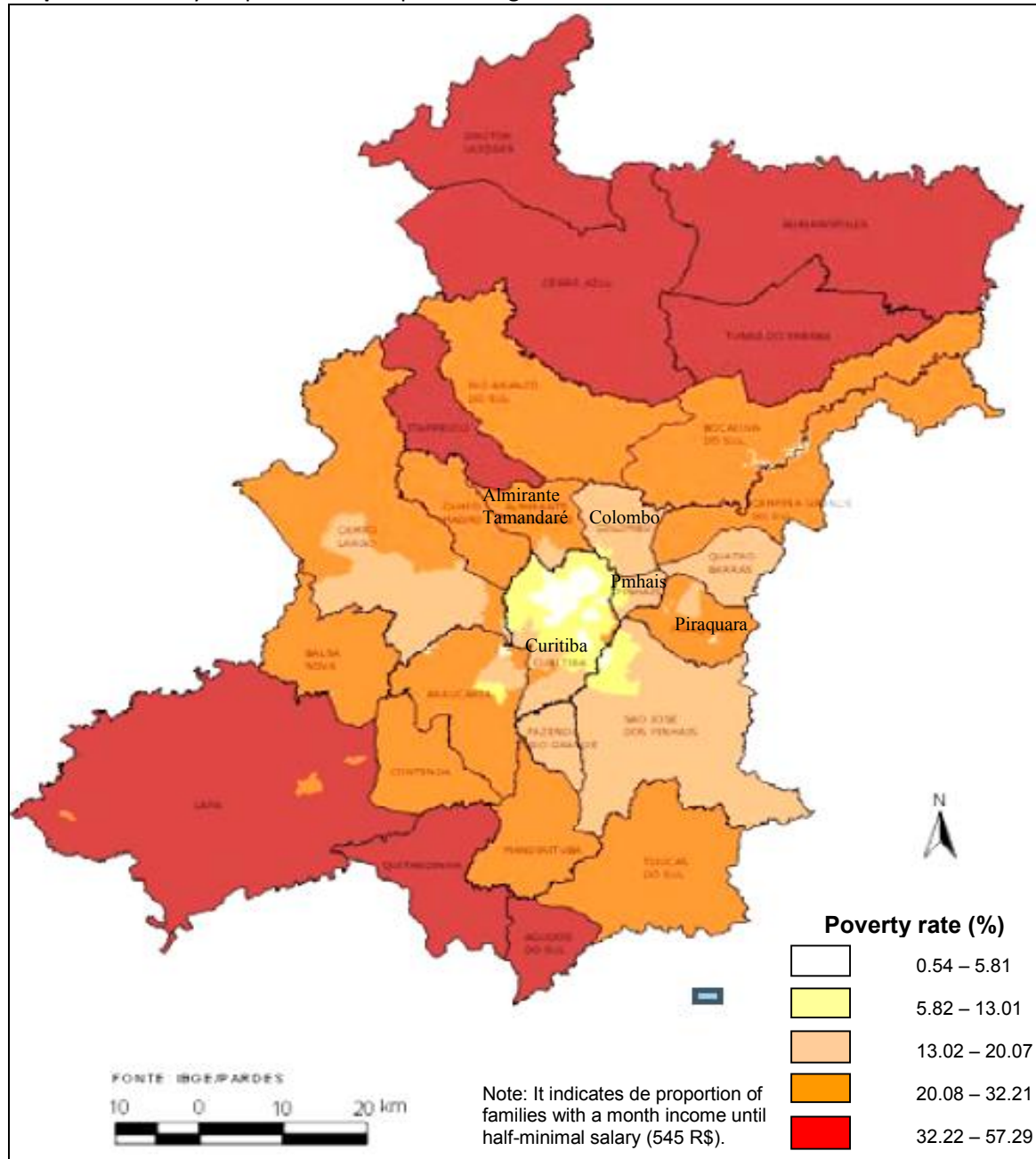
In the year 2000, the MRC had 829.000 families (13,39 %) with income until of half of the minimal salary¹¹ (COMEC, 2006 in Macedo, 2009). Even if poverty is mainly found in the periphery and surrounding towns of *Curitiba*, in the Capital and the most integrated towns (as *Pinhais*, *Almirante Tamandaré*, *Colombo*, *Piraquara*, *São José dos Pinhais*) the highest concentration rates of poverty are found (composing the 70,19 % of all the poor families, Ipardes, 2003).

In relation with the state level, while 17 % of all Brazilian households earn less than one minimum wage, in *Paraná* that number is 33 % (Maceli, 2009).

¹⁰ *Sistema Integrado de Processamento e Aproveitamento de Resíduos*.

¹¹ Which is the standard indicator to refer to people living in substandard housing.

Map 1.4 – Poverty Map of the Metropolitan Region of Curitiba



Source: Observatorio das metropoles, Universidade Federal de Rio de Janeiro, 2000

Looking at the GDP per capita of all the 26 towns belonging to the MRC, of the five towns of the research area, *Almirante Tamandaré* and *Piraquara* are the poorest ones (see also map 1.4). Following is *Colombo* being quite poor, whereas *Pinhais* and *Curitiba* are doing well, the latter having the highest GDP of the whole metropolitan area and the fifth considering the whole Brazilian nation (IBGE, 2010). *Pinhais* has a high GDP per capita and has the second lowest poverty rate of the MRC essentially due to the strong presence of an industrial area but also in this municipality are found many low-income living areas. *Curitiba* even if it is the richest municipality of its metropolitan area, compared to all the other 25 towns, presents one of the highest income inequalities. Indeed it possesses the 29,73 % of poor families of the whole metropolitan area (Ipardes, 2003). For details of the towns of the MRC considered in the research, see table 1.4 and for location see map 1.3.

Table 1.4 –Research area Municipalities characteristics

Towns	Population size (N° of inhabitants)	GDP at current price (thousands R\$) (2008)	GDP per capita at current price (R\$)	Poverty rate ¹² (%)	Index of Gini ¹³
Almirante Tamandaré	96.739	479.424	4.955,85	25,30	0,48
Colombo	241.505	1.630.344	6.750,77 R\$	18,80	0,47
Curitiba	1.746.896	43.319.254	23.696,43 R\$	9,10	0,59
Pinhais	112.038	2.447.206	20.919,15 R\$	14,60	0,49
Piraquara	86.012	389.803	4.531,97 R\$	24,90	0,50

Source: IBGE – Cidades@ & IPPUC

The strong urbanization rate in the city and its metropolitan area brought an increase of 1,850,360 inhabitants between 1970 and 2000 (IBGE 2001 in Macedo, 2009). This growth led to an increase of demand for about 570,000 dwellings (with the average family being 3,25 persons, *ibid*).

As in all other metropolitan regions of Brazil, the MRC has experienced higher growth rates in the periphery than in the core. In case of low-income immigrants, they generally invade vacant land left in the urban areas. Most invasions took place in the municipalities surrounding the capital city.

Related to the housing matter, of the owned houses in the MRC, 10,2 % (about 250,000 people in 811 areas *COMEC*, 1997) do not possess at the same time the land, this means that the settlement is situated in an irregularly occupied area. The most serious cases are in *Colombo* and *Piraquara* (Ipardes, 2003, see also table 1.5).

The indicator of inadequate housing is defined as lack of infrastructures (potable water, electricity, basic sanitation, waste collection service). In the MRC, 81,9 thousands households showed this deficit in infrastructures (Ipardes, 2004). In some areas of the city of *Curitiba*, the rate of inadequate housing is as high as in the most deficient municipalities.

Table 1.5 – Percentage of population living in informal settings, town of the research area

Municipality	Informal dwellings	Person per dwelling	Population in informal Settlements	% of urban population
Almirante Tamandaré	4,8	4.27	30,4	28.08
Colombo	6,2	4.19	26,2	17.02
Pinhais	2,3	4.17	9,6	11.17
Piraquara	4,2	4.17	17,5	56.19
Curitiba	32,3	3.75	121,3	8.03
Total (MRC)	61,6	3.96	243,997	10.60

Source: COMEC, 1997 (Macedo, 2009)

All these data demonstrate that many inequalities are found in the MRC and that peaks of poor living conditions can be found in the richest municipalities.

¹² Data referring to year 2000 (Source: IPPUC, 2008).

¹³ The Gini coefficient is a measure of the inequality of a distribution, a value of 0 expressing total equality and a value of 1 maximal inequality. Data referring to year 2000 (Source: IPPUC, 2008).

1.7 Outline of the Study

With Research objectives, questions and methods in mind, an outline of the Thesis will be given.

In Chapter 2, discussion about the theories of sustainable development and urban development will be given to provide with the basic knowledge on the concepts and theories underpinning this study. Moreover, literature on solid waste management and the different cases dealing with waste issues and informal pickers will be reviewed.

In Chapter 3, the first two sub-questions will be answered while describing the formal and the informal sectors and actors involved in the metropolitan area's waste management system. It will describe the municipal waste landfills operations, formal recycling programmes and the informal side of waste management, showing the consequent conditions of the workers.

Chapter number 4 will be looking more deeply into informal pickers' issues, presenting the results from the questionnaires and surveys carried out on demographics, living conditions (health problems), work characteristics, political movement gains and struggles. This is to give a general view of the associations' state of being in the MRC and to also see how their formation improved pickers' conditions and awareness.

Chapter 5 will report on the results looking at the local government perceptions and relationship with the informal pickers, the other stakeholders' role (as the NGOs and the Public Prosecutor) and their impact on pickers' state and so urban environment.

Chapter 6 will provide a discussion and interpretation of the results, comparing the main findings of this research with those of the cases analyzed in chapter two. This is done in order to find differences and similarities between the cases, aiming some generalizations on the issue and finally give some policy recommendations for a more sustainable waste management.

2. Review of Literature: Sustainable Development issues and Solid Waste Management Systems in the Developing World

Introduction

This chapter will be focusing on the theories and thematic issues to form a conceptual basis for the following chapters of this Thesis. Moreover, analysis of the literature on different cases in the developing world will be done. These include examples in Hanoi, Accra, Victoria Falls town, New Delhi, Lahore, Colombo, Mexicali¹⁴, Enugu¹⁵, Ilorin¹⁶, Dar es Salaam, Bandung¹⁷ and the two Brazilian towns of *Teodoro Sampaio* and *Tarumã*. Others will also be considered in order to deepen the knowledge on waste management.

Moreover, research and papers on Sustainable Development (SD), Sustainable Urban Development (SUD), and Solid Waste Management (SWM) will be overviewed to give to the study a theoretical framework.

The first part of this chapter will focus on the SWM studies' knowledge level. Following that, main concepts (see box 1) and the basics of Sustainable Development, Sustainable Urban Development, and Sustainable Solid Waste Management will be discussed.

In the third part waste cycle and solid waste management issues will be dealt with, taking as references the different analyzed cases.

The fourth part will look at the role of the informal sector in the SWM. Consequently, the issues presented will be: the chain of recyclables and economical aspects (prices and exploitation, fifth part), the origin of picking and the pickers' social status (sixth), their life conditions (health issues, as seventh), positive consequences of picking (environment conservation and job creation, eighth), informality and the formal sector (ninth) and the possible formalization process (tenth).

The framework given will be the fundamental conceptual basis for the evolution of the Thesis in the following chapters on the case of the Metropolitan Region of *Curitiba* (MRC) and for making comparisons in the final discussion chapter. This will be done, with the final aim of enriching the so-called research on the informal sector and discipline on Solid Waste Management and producing some references for policy recommendations for system improvements (i.e. formalization of the sector).

¹⁴ In Mexico.

¹⁵ In Nigeria.

¹⁶ In Nigeria.

¹⁷ In Indonesia.

2.1 Solid Waste Management studies

Solid Waste Management studies variously focus on technical aspects (Holmes, 1984), systems analysis (Sudhir et al., 1997), economic aspects (Cointreau, 1994), and social dimensions including the role of community-based and informal operators (Furedy, 1992, Assaad, 1996 in Van Horen, 2004, p.757). Developing countries do not generally conduct SWM stream-analyses because of ignorance of the proper methods involved and lack of funding (Idris et al., 2004, p.106).

Ultimately, waste issues are becoming more pressing in the academic world concerning development studies. The literature and research on solid waste management in developing countries as Baud asserts,

“[...] has developed from two main concerns: the concern for public sector reform (including privatisation issues), and the concern for sustainable development in the urban context” (Baud et al., 2001, p.3).

As Mitchell adds, “Indeed, sustainable urban development is one of the emergent issues found in recent literature concerned with informal waste-recovery activities”(Mitchell, 2008, p.2020).

Critical issues related to collection, disposal methods, and dumping sites for municipal solid waste remain unsolved in many large cities (Idris et al., 2004, p.105). As explained by different authors, SWM-techniques in developing countries include mainly open dump sites, land fills, open burning, reuse/recycling and conversion. Among these reuse, recycling and conversion have generated relatively little attention (Adeyemi et al., 2001, p.93).

In the SWM, as shown in the related studies, both the public and the private sectors are present. Moreover, a substantially large informal sector is responsible for carrying out non-official recycling activities, done so by the so-called waste informal pickers.

The informal waste pickers are those subjects that decide to sustain their living through waste picking, separation, storage and sale of recyclables. This informal sector is also composed also of other actors, including intermediaries that gain from the nature of the system by taking advantage of the powerless pickers and generating a hierarchic system. The informal pickers of waste do not suffer only due to the exploitation and bad working conditions, but also from health problems resulting from the job, dependence on market forces, starvation and social discrimination.

Acknowledging this reality makes it clear that the scope of SWM will have to expand in the future and in complexity. Related to the environment, in the case of informal picking, the role of the pickers carrying on this activity is stressed by many authors as highly favourable for the sustainability of a city environment (Mitchell, 2008), as well as for the public health and society in general (Hayami et al., 2006). For this reason, urban development is one of the emerging issues found in recent literature concerned with informal waste-recovery activities (Mitchell, 2008). In relation, Baud (et al.) concludes that:

“A major gap in the current literature on SWM in developing countries is that the system is rarely investigated in its entirety, and assessments combining ecological, environmental health and socio-economic considerations are still largely absent” (Baud et al. 2001, p.4).

Due to this, this Research looks at waste management issues, especially in the informal sector and is composed by looking at the various dimensions suggested via the SD concept (social, economical and environmental issues). These themes will be discussed in the following paragraphs, taking as reference similar cases in various cities and towns in developing countries.

Box 1 - Definitions of some main concepts

In this section, some main concepts are given to help the reader in going throughout the following text.

Domestic waste: Solid Waste comprising garbage and rubbish (such as bottles, cans, clothing, compost, disposables, food packaging, food scraps, newspapers and magazines, and yard trimmings) originates from private homes or apartments. It may also contain household hazardous waste. It is also called household waste or residential waste (Sembiring et al., 2010).

SWMS: Solid Waste Management System is formed by the different activities that comprise formal collection, transportation and disposal and as well informal collection, trade, re-use and recycling (Baud et al., 2001, p.3). It is an important health service and an integral part of basic urban services (Ahmed et al., 2004). It is composed in the majority of the developing countries by a formal sector and an informal one.

SWM cycle: It is the process composed by the phases of waste generation, storage, collection, transportation, treatment and disposal (Squires, 2006).

Formal sector: The sector recognized officially by legal authorities. When talking about formal economic activities, they include tax payments, trading license possession, registration and regulations respect, being included in social welfare or government insurance schemes (Haan, Coad, & Lardinois, 1998 in Wilson et al., 2006, p.797).

Informal sector: The sector does not have any type of regulation by legitimized institutions. When referred to economic activities they are also characterized by: non-permanence, casualness, carried on in small-scale by little capitalised establishments, which in general rely on household or individual labour. They exist and operate because of market forces or other socio-economic factors (Ali in Ahmed et al., 2004). In developing countries, the size of this sector is predominant because of poverty, unemployment, and underemployment.

A characteristic common to both sectors is market variability.

Informal pickers: It is the term that will be mostly used (apart of all the definitions or categorizations given by the authors in the different cases) to refer to that kind of individuals that exert the activity of waste picking in the urban context via separation and sale with the aim of getting an income and livelihoods by this. Hence, it is small-scale, labour-intensive, largely unregulated and unregistered, low-technology manufacturing activity.

Public sector: Generally means municipalities or government corporations. They are institutions under specific limitations and rules. These make innovative changes to happen with more difficulties (Ahmed et al., 2004).

Working conditions: Refers to the working environment and to the non-pay aspects of an employee's terms and conditions of employment. It covers such matters as the organisation of work and work activities; training, skills and employability; health, safety and well-being; and working time and work-life balance (*USlegal*, 2000).

Poverty: Being a multidimensional concept, poverty is not easy to define. As a result, policy prescriptions for tackling the problem can vary according to how poverty is defined. In general, it is defined as a state of economic deprivation. Anyway, as Gallopin states, is far more than an economic condition, it extends to all aspects of individual life and include physical weakness and sickness, lack of access to most essential services, lack of information and limited control over resources (Gallopin, 1994, p.9). Moreover, there can be other approaches to define poverty.

Impoverishment: Dynamic and active process of getting 'poor' (Gallopin, 1994).

2.2 Sustainable Development, Sustainable Urban Development and Sustainable Waste Management

Among the various concepts, it is important to especially look at the wider concept of sustainable development (also with a focus on urban environment). In this section, SD concepts will be discussed more extensively, by taking into consideration the waste management issue.

Concerns for the environment and views over humankind's places within are ancient (Bell et al., 2008), however, larger attention to ecological issues and to the limits of world resources started only in the 1960s¹⁸. Discussion over the dilemma of prevailing short-term thinking prospects within international affairs field and, in particular, over concerns regarding unlimited consumption of resources in an increasingly interdependent world, started. In 1972, the Club of Rome published 'The Limits to Growth', a study in which the authors predicted that unless a major change in the physical, economic, or social relationships that govern world development occur within next 100 years, society will run out of the non-renewable resources on which the industry depends¹⁹.

Further, the sustainability idea as we know it emerged in a series of meetings and reports during the 1970s and 1980s. In 1987, the UN-sponsored Brundtland Commission²⁰ released 'Our Common Future'²¹, a report that captured widespread concerns about the environment and poverty in many parts of the world. It said that economic development cannot stop, but it must change course to fit within the planet's ecological limits²². It also popularized the term sustainable development, defining it as:

"The development that fulfils the needs of the present generations without compromising the ability of future generations to meet their own needs" (Brundtland Report 1987, in Gallopin, 1994, p.V),

a term and concept at that time, mainly handled by economists, policy-makers or scientists.

After many important meetings defining SD and interrelated issues, the Rio de Janeiro UN-Conference on Environment and Development-UNCED²³ (the Earth Summit²⁴) in 1992 solidified the popularity of the concept.

The 1992 World Development Report (WDR) entitled 'Development and Environment' attempted to extend the earlier concepts of development to a fuller consideration of the environment and of a policy framework aiming at sustainability. Rio produced two international agreements, two statements of principles and a major action agenda for sustainability at worldwide level, which was accepted internationally, the Agenda 21²⁵ (for the 21st century). For further information on the set of action proposals of the Agenda 21 that have to be adopted by the international community for a more sustainable world, refer to box 3.

Nowadays, sustainability issues are more dominant and accepted by civil societies, while SD as a concept has become fashionable and popular. In contrast, however SD also has a broad concept and lacks a wide consensus meaning that it has many interpretations (around 160 declared ones), Bellen (2002 in Albuquerque, 2009)

¹⁸ In fact, at that time, a small international group of professionals from the fields of diplomacy, industry, academia and civil society met in Rome, invited by the Italian industrialist Aurelio Peccei and the Scottish scientist Alexander King.

¹⁹ <http://www.clubofrome.org>

²⁰ The World Commission on Environment and Development.

²¹ Called also Brundtland Report.

²² <http://www.sustreport.org/background/history.html>

²³ The next UN conference on SD took place in Johannesburg in 2002. In that event, private enterprises and NGOs received stimulation for making partnerships.

²⁴ It brought together the heads or senior officials of 179 governments, the largest-ever meeting of world leaders.

²⁵ The official strategic document for sustainable development approved at UNCED in June 1992.

The main scope of the concept of SD is generally described as bringing together ecological, economic and social developments. It started from the idea that future generations will suffer from some human-induced environmental changes such as: depletion of natural resources, loss of biodiversity, and non-degradable waste disposals (Tellegen, 2006, p.11). SD is the guarantee of a continuity of human society and the external environment, based on a different type of relation between the society and nature (Bellen, 2002 in Paulista et al., 2008, p.187). Sachs (2004) proposes that the concept is made up of social inclusion, environment conservation and economy sustained in time (Paulista et al., 2006, p.186).

Gradually in time, preserving economic and social capital has been considered of no less importance than preserving the ecological one (Tellegen, 2006, p.12). The way of seeking a form of regulation is oriented via the definition of the SD dimensions and their correspondent dimensions (reflected in some indicators²⁶) (Paulista et al., 2008, p.187). The indicators on socio-economic aspects take the form of quality of life employing multiple factors that look at basic (e.g. food and shelter), physical (e.g. clean environment), and cultural needs (e.g. social relations) (Purvis et al., Earthscan, 2004, p.113). Quality of life embodies the satisfaction of material and non-material human needs (as health) and the fulfilment of human desires and aspirations (Gallopín, 1994, p.2).

The Human Development Reports (HDR) published by the UNDP during the 1990s attempted to reassert the importance of people in the development process. Human development is seen as a process of widening people's choices and increasing their level of well-being. The 1990 HDR so created the Human Development Index-HDI²⁷. Moreover, a new way of thinking about SD was introduced by the Dutch National Institute for Public Health and Environment (RIVM), in which it defined that sustainability refers to quality of life and its maintenance in the future (RIVM, p.5, in Tellegen, 2006, p.13).

The eight Millennium Development Goals²⁸ (MDGs) aimed to be achieved (by the year 2015) by the UN member states (on which 193 agreed on) have also as central scope to encourage development by improving social and economic conditions in the world's poorest countries.

The idea of maintaining quality of life will be central in the concept of SD on which this thesis will be developed. Indeed, Sustainable Development will be considered as the achievement of social inclusion (by improvement of health, participation, education, living facilities), environment preservation and economic conditions (better incomes) improvement goals.

When looking at the concept of Sustainable Urban Development, some basics change. Principally, when the urban context is considered, it is meant that we are referring to the built environment (i.e. constructed by people).

SUD is based on the notion that many cities impose such environmental costs that the long-term future of their environment and people may be at risk. That is because cities are the main centre of economic activities, thus the base of actual consumption-production patterns (R. Potter, 1998). Environmental degradation is associated not only to wealth production, but also to the creation of poverty (M. L. de Souza, 2000). The environmental problems are all those which affect negatively the quality of life of the individuals in its interaction with the urban environment (ibid, p.117). A study made by Gilberto Gallopín (1994) on relation between impoverishment dynamics and environmental degradation is presented in box 2.

²⁶ SD indices were divided in 3 main perspectives: ecological (as the carrying capacity²⁶ of an ecosystem), economic (as measures of income considering the environmental costs) and socio-economic.

²⁷ The HDI taking into consideration life expectancy, educational standards and income is used by different organisms to identify inequalities and forecasts social needs.

²⁸ They include Eradication of poverty and hunger (1), Universal primary education (2), Promotion of gender equality and women empowerment (3), child mortality reduction (4), Maternal Health improvement (5), Combat HIV/AIDS, malaria and other diseases (6), Environmental sustainability (7), Development of a global partnership for development. Source: <http://www.un.org/millenniumgoals/>

In developing countries, concerning SD, there has been a shift from the environmental focus as on issues of natural resource depletion and resource management to issues of pollution (the so-called 'brown agenda'), with a predominantly urban focus (UNCHS, 1996, in Baud et al., 2001). Currently, more than 50 % of people live in cities, as reported in 2011 by UN-Habitat. Moreover, between the years 2010 and 2020, 95 % of global population growth (766 million) will be made of urban residents (690 million), and the majority of it (632 million) will occur in developing countries (UN-Habitat, 2011).

The World Bank has produced a 'Brown Agenda' that deals with the environmental problems associated with urban contexts in low and middle-income nations, so that improvements to the natural environment are considered in conjunction with those in the quality of life in the urban setting (Baud et al., 2001). The agenda consists of two main components: one associated with environmental health issues; other with problems related to rapid industrialization (Potter, 1998). The agenda stresses the importance of local and national governance to enforce environmental legislation. It is not only a matter of technological changes or pollution, but also on social and political differences and the vulnerability and responses to the solutions of the different social classes. In general, the poorest end up bearing the costs²⁹. Thus in the discussion on SUD, increased attention should be given to the poorest people, as they are the most at risk for environment exploitation and mismanagement. Furthermore, in Baud's study, the Brown Agenda is defined as,

"[...] the immediate and most critical environmental problems which incur the heaviest costs on current generations, particularly the urban poor in terms of poor health, low productivity and reduced income and quality of life: lack of safe drinking water, sanitation and drainage, inadequate solid and hazardous waste management, uncontrolled emissions from factories, cars and low grade domestic fuels, accidents linked to congestion and crowding, and the occupation of environmentally hazard-prone lands, as well as the interrelationships between these problems (Bartone et al., 1994: 10–11, in Baud et al., 2001, p.4).

Special focus in this Thesis on the urban poor will be paid.

Agenda 21 is usually applied at the national level by governments, but it has also been designed for cities, where it is called 'Local Agenda 21' (Purvis et al., 2004). The programme started in 1995 as a response to Chapter 28 of Agenda 21, which calls on local authorities to undertake participatory processes for and with their communities (UN-habitat, 2011).

Sustainable Development in Solid Waste Management has to be considered too. Waste is one of the major outputs of the cities (Ioavino, 2009) and waste disposal is a big environmental problem for many cities in developing countries. These environmental issues cause concrete health problems due to the steep increase in waste production. The effects on health are more difficult to be discovered and therefore deeming waste indeed as an invisible 'pollutant' (L. Benton-Short, 2008). In Idris words: "These problems will have negative short- and long-term impacts on the environment and the safety of the general public³⁰" (Idris et al., 2004, p.109).

SWM is an urban service, which is responsibility of municipal governments, however most administrations in developing countries fail to provide the service for large parts of the population (Pfammatter, 1996 in S.M. Kassim et al., 2006). Difficulties are provoked by steep urban population growth accompanied by the diminishing of financial resources (ibid, p.770). Other problems affecting the deficiencies in solid waste management, as a public service are gaps in technical knowledge, general competence and environmental irregularities in their operations.

²⁹ For instance, lack of infrastructures, high rate of disease infection, pollution (in the air, food and water), congestion and physical hazards (like fires, floods or landslides) commonly affect negatively the poor urban dwellers.

³⁰ Referring that waste disposal is one of the most important environmental and health issues in the developing countries of Asia. He testifies for instance that solid waste one of the major environmental problems in Thailand (Idris et al. 2004, p.105).

Moreover, the importance of SWM is now recognised at international, national and community level. Agenda 21 addresses the issue of sustainable management of solid waste (Kassim et al., 2006, p.769) and the Millennium Development Goals focus on poverty reduction, and on waste strategies for improving recycling rates (Wilson et al., 2006, p.797).

Sustainable development is the second major source of inspiration for many analyses of SWM systems in the developing countries (Baud et al., 2001, p.4). This attention to wrong waste disposal and so to pollution problems implicitly carries a conception of sustainability.

In this sense, as declared by Baud (et al., 2001), SWM studies within this framework have dealt with the contributions of various actors able to improve environmental performance and urban livelihood strategies. Thousands of people in developing country cities depend on recycling materials from waste for their survival (Wilson et al., 2006, p.806). In Wilson's words, "Over the last 20 years, there has been a growing recognition of the economic, social and environmental benefits of the informal sector in waste management" (Wilson et al., 2006, p.805).

In addition, the growing environmental problems related to waste production, public service deficiencies and the existence of such a wide informal sector bridging these gaps in waste management require governance systems to be more sensitive (Van Horen, 2004). As asserted by Wilson (et al., 2006, p.770),

"[...] one of the major challenges in solid waste management in developing countries is how best to work with this informal sector to improve their livelihoods, working conditions and efficiency in recycling".

Therefore, with in mind the target of a sustainable waste management, it is necessary to focus on the informal sector widely present in developing countries. This is done aiming at an optimal governance system able to overcome the difficulties the involved actors in this sector face, to improve the social aspects (such as rights and working conditions), the environmental (more efficient recycling) and the economic ones (such as better incomes). This is also underlined by the need of local governments to implement policies that look at social inclusion (Sembiring et al., 2010). Once these targets are achieved in developing countries, it can be asserted that a sustainable waste management of the informal sector has been addressed.

Finally, all the aspects considered clearly calls for an integrated approach to deal with the problem comprehensively. SWM literature generally lacks in analysing SWMS in a holistic view, combining the ecological, economic and social aspects of it. This Thesis will give a multidimensional study of the issue keeping in mind the basic concepts of SD and SUD and especially of sustainable waste management.

Box 2 – Gallopin’s Theory on Impoverishment and Environment degradation

Gilberto Gallopin uses in his study a systemic approach, having the aim of broadening the scope, which is including connections between social and environmental dimensions. In his systemic approach, he analyzes the linkages between sustainable development and impoverishment processes, attempting to give a basis for pursuing more integrated ways for poverty eradication. More specifically, “eradicate poverty by moving into sustainable development” (Gallopin, 1994, p.VII). As he remarks, very little is said about the relationship between the environment and the society in most social poverty theories (Gallopin, 1994, p.11).

Gallopin coins the definition of socio-ecological system, which is any system composed of a societal (or human) component and an ecological (or biophysical) component. In the case of an urban ecological while the system is largely artificial, it still has a biophysical dimension.

He states,

“In general interactions between society and nature take place through two sets of activities: human actions that impinge upon the natural ecological systems and the ecological effects generated in nature (spontaneously or in response of human action) that impinge upon the social system” (Gallopin, 1994, p.19).

This is relevant to show how poverty (or better impoverishment) and environmental degradation affect reciprocally each other. Socio-ecological systems are thus always in a state of change.

Importantly, he adds that poverty is both an effect and a cause of environmental degradation.

For instance taking the example he gives on rural poors, it demonstrates that the lack of income and so the low consumption per capita, affect negatively their health and level of satisfaction, in addition lacking of the access to means of production it causes an overexploitation of the environment, resulting in phenomena as soil erosion, deforestation, depletion of fisheries etc. (Gallopin, 1994, p.53).

One of the mechanisms of impoverishment indicated by Gallopin for instance in the urban context is degradation of the urban and peri-urban environment resulting from industrial pollution, urban disintegration, lack of maintenance of urban infrastructure and services, and fast and chaotic urban growth (Gallopin, 1994, p.16).

The environmental degradation associated with poverty in Gallopin’s words is basically due,

“[...] to the poor’s lack of options (lack of access to means of production, such as land and equipment, lack of access to commerce, lack of education, low or no access to public services, and marginalization from decisions that affect them)” (Gallopin, 1994, p.24).

(Gallopin, 1994, pp.72-84).

Box 3 - Agenda 21 highlights

- A "Implement mechanisms for popular participation – particularly by poor people, especially women – in local community groups, to promote sustainable development".
- B "Give communities a large measure of participation in the sustainable management and protection of the local natural resources in order to enhance their productive capacity".
- C "[...] where necessary develop adequate infrastructure, marketing systems, technology systems, credit systems [...]. High priority should be given to basic education and professional training."
- D "Establish...a network of community-based learning centres for capacity-building and sustainable development".
- E "[...] measures to ensure that women and men have the same right to decide freely and responsibly [...]. Strengthen preventive and curative health facilities, which include women-centred, women-managed, safe and effective reproductive health care and affordable, accessible services [...]. "
- F "Provide the poor with access to freshwater and sanitation".
- G "Provide access to primary education".
- H "Establish new community-based mechanisms and strengthen existing mechanisms to enable communities to gain sustained access to resources needed by the poor to overcome their poverty".
- I "Consider making available lines of credit and other facilities for the informal sector and improved access to land [...]".
- J "Empower [...] women through full participation in decision-making".
- K "Promote or establish...grassroots mechanisms to allow for the sharing of experience and knowledge between communities".
- L "Generate remunerative employment and productive occupational opportunities compatible with country-specific factor endowments [...]"
- M "Improve technology of production to make resource use economically more efficient [...]"
- N "Empower community organizations and people to enable them to achieve sustainable livelihoods."
- O "Rehabilitate degraded resources, to the extent practicable, and introduces policy measures to promote sustainable use of resources for basic human needs (that is other human-induced ecological change) [...]".
- P "Adopt integrated policies aiming at sustainability in the management of urban centres."
- Q "Undertake activities aimed at the promotion of food security [...]".
- R "Support research on and integration of traditional methods of production that have been shown to be environmentally sustainable."
- S "Actively seek to recognize and integrate informal sector activities into the economy by removing regulations and hindrances that discriminate against activities in those sectors."
- T "Member states [with...] non-governmental organizations, should make poverty alleviation a major priority [...] by food aid, and support and special emphasis on employment and income generation".

(Gallopín, 1994, pp.66-69).

2. 3 The Solid Waste (Cycle) Management System

This section will discuss the wider issues of the waste cycle and its management in developing countries. This will be done by reviewing various cases on the waste management operations (collection, disposal and eventual treatment) of the developing world analysed by different scholars.

As in Wilson's words, determinate socio-economic conditions prevail in the developing countries as, "[...] rapid population growth, migration to urban areas, lack of sufficient funds and affordable services and generally a low-skilled labour force, [...moreover...] solid waste management systems are often poorly run and operate to low standards" (Wilson et al., 2006, p.798).

Many critical issues related to collection, disposal methods, and dumping sites for municipal solid waste (MSW) remain unsolved in many large cities of developing countries (Idris et al., 2004, p.105).

Only around 50 % - 80 % of waste is collected by official services in cities in developing countries (Medina and Dows, 2000 in Wilson et al., 2006, see also table 2.1).

Table 2.1 – Municipal Collection services

Cases	% of collected waste or of population benefitting from this service
Philippines (Idris et al., 2004)	70 %
Bangkok (Idris et al., 2004)	60-80 %
Vietnam (Idris et al., 2004)	60 %
Hanoi (Idris et al., 2004)	87 %
Dar es Salaam (Kassim et al., 2006)	50 % (30 % of population)
Accra (Boadi et al., 2005)	20 % of population
Colombo (Van Horen, 2004)	17 % of population

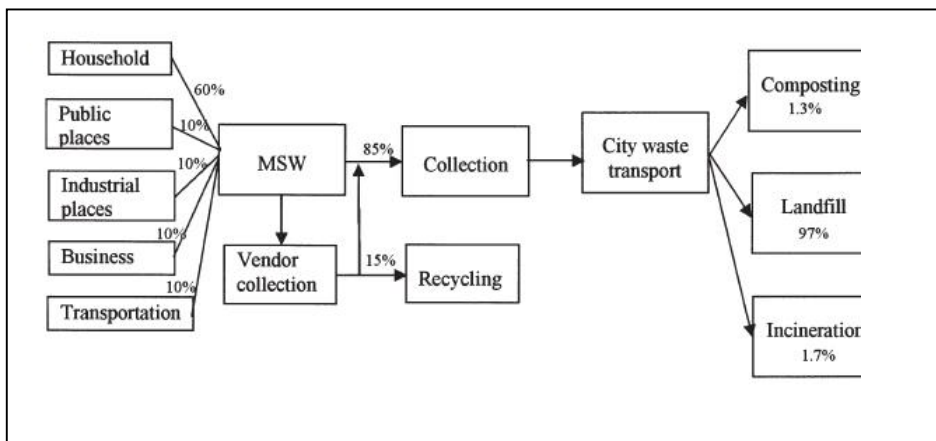
The collection service of domestic waste can be provided either by public or by private entities or public-private arrangements (as in Colombo see Van Horen, 2004) whereas in general the industrial waste is generally dealt and processed by private companies. The existence of private enterprises entering in SWM activities is justified by the fact that a gap in service delivery and a demand, exists.

In Lahore for example, the majority of households' waste is collected through public services but 10 % of it is dealt by three private companies (Batool et al., 2008). In Mexicali, the waste coming from households and institutions is managed by the public Sanitation Department while two private companies treat waste generated by industries and business, even if a part of it is sent directly to Mexicali's landfill (Ojeda-Benitez et al., 2002, 278). In Brazil, in the small town of *Tarumã* the service of public space sweeping is carried out by enterprises that are outsourced and the rest by the municipal authority itself. The private sector often works alongside with the public sector in low-income countries (Ahmed et al., 2004).

Furthermore, the disposal of waste also shows deficiencies in the municipal service in terms of sustainability issues. Domestic waste open dumping is the most used final disposal method (see table 7.17 in Appendix) either in landfills or irregular open sites. Another common treatment but still not so popular in developing countries is incineration³¹. In his analysis of Asian countries' waste management, Idris (et al., 2004) for instance showed that the majority were using the landfilling method. In figure 2.1, he showed the waste cycle (from generation to final disposal) and how waste is managed in China, putting the percentage of materials generated and for each type of treatment.

³¹ For example in the case of Vietnam, it is for the 50% part of the management (Idris et al., 2004).

Figure 2.1 – Estimated waste stream route in Chinese cities



Source: Idris et al., 2004, p.106

As said, in many cases, the treatment of the waste in landfills is not very environmentally sound and presents many disadvantages in its functions, becoming a latent health and safety for the whole surrounding community and environment.

In Colombo as shown by Van Horen (2004, p.759), domestic waste is dumped in an untreated landfill which has already exceeded its capacity a long time ago. In Mexicali, as explained by Ojeda-Benitez (et al., 2002, p.278) once the waste is buried, no monitoring tests are done on the quality of groundwater or accumulated gases in the landfill, and no tests have been performed on any former disposal sites.

As Boadi (et al., 2005) and colleagues notice in Ghana, the grease produced in the landfill due to organic matter can easily pollute underground water and pose major environmental health threats. Grease production, has in many cases already been associated with the contamination of aquifers that are underlying the landfills (Boadi et al., 2005, p.35). In Brazil, 90 % of pollution is due to organic materials present in landfills; it pollutes water, contaminates the ground, and underground (P. Pereira, 1999, Junkes, 2002 in Fagundes, 2009).

A sanitary landfill exists in the town of *Teodoro Sampaio*. This type of landfill facility, in contrast with the non-regular or controlled ones, aims at environmental, public health protection and the enhancement of population security and well-being of population (as defined by FEAM, 2002 in Fagundes, 2009, p.167). Looking at its technical aspects, this landfill has an impermeable bottom as well as a grease-drainage, treatment and removal systems. Moreover, controls by a company of technology for environmental sanitation³² were created. However, in practice some irregularities in the operations were found, as un-covered waste and re-opened old dumps to be re-filled with waste³³. Moreover, it was discovered that health products remains were illegally discharged in the landfill³⁴ (without any treatment). Illegal residues as tires were also found, which can collect rainwater, so be potential sources for breeding particular dangerous mosquitoes, as *dengue*³⁵. In the end, also this case presented irregularities, environment contamination³⁶ and public health threat (Fagundes, 2009, p.166). For this reason, Fagundes (2009) is saying that the analysed landfill resembles open waste dumps. In general, the word “landfill” is preferred and widely used due to the

³² *Companhia de Tecnologia de Saneamento Ambiental* – CETESB.

³³ This meaning that the landfill already reached its maximum capacity, before the expected utile life expired.

³⁴ Even if they were found in a separate fosse, it has to be kept in mind that these kinds of remains are more risky as source of pathogenic microorganisms.

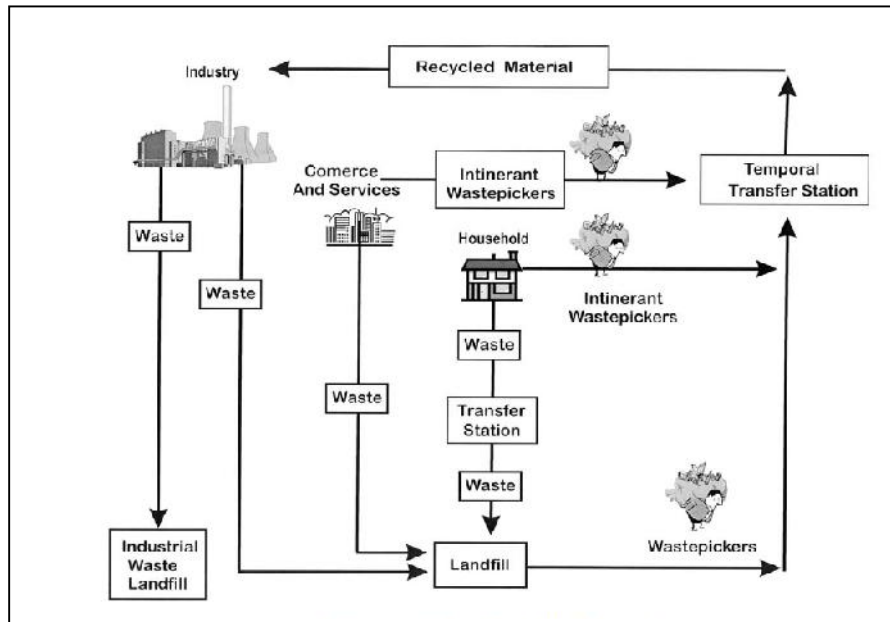
³⁵ Also known as *breakbone fever*, is an infectious tropical disease caused by the *dengue* virus. It is transmitted by several species of mosquito. Incidence of *dengue fever* has increased dramatically since the 1960’s, with around 50–100 million people infected yearly.

³⁶ In this type of landfill, pollutant gases are also produced.

fact that the operational characteristics of a sanitary landfill are unclear and presenting irregularities, thus in common language it has not a strict definition (Idris et al., 2004, p.107).

Considering another 'waste cycle' figure, Ojeda-Benitez and her colleagues describe the case of Mexicali in Mexico, also considering also the recovery of recyclables (figure 2.2).

Figure 2.2 - Flow of recyclable materials by the informal sector



Source: Ojeda-Benitez et al., 2002, p. 283.

Mexicali's waste management system consists of three phases: collection, transference in some stations and final disposal (landfill). In each of these phases, only a small quantity of recyclable materials is recovered. An essential contribution to the existence of de-facto recycling process in materials discarded by households, commerce, and industries is thanks to the role of informal pickers. The role of pickers is even more fundamental when considering that Mexicali does not have a solid waste management plan, "[...] until now all known possible options have not been applied, such as: reduction at origin, recycling, and waste reusing" (Ojeda-Benitez et al., 2002, p.282).

In the cities considered in the case analysis, most are lacking an official recycling service provided by the municipal council (see the table number 2.2).

Table 2.2 - Formal recycling service existence in the studied cases

Cases	Municipal recycling programme existing or not
Mexicali (Ojeda-Benitez et al., 2002)	Not
Colombo (Van Horen, 2004)	Not*
New Delhi (Hayami et al., 2006)	Not
Hanoi (Mitchell., 2008)	Not
Victoria Falls town (Masocha et al., 2006)	Not
Ilorin ° (Adeyemi, 2001)	Not
Enugu °° (Nzeandibe, 2009)	Not
Chinese cities (Idris et al., 2004)	Not
Accra (Boadi et al., 2005)	Not
Tarumã (Fagundes, 2009)	Not *
Teodoro Sampaio (Fagundes, 2009)	Not**
Lahore (Batool et al., 2008)	Not***
Dar es Salaam (Kassim et al., 2006)	Yes****

° In Nigeria.
 °° In Nigeria, capital of Enugu state.
 * It is consisted of separation by some informal pickers in a municipal recycling plant but it does not exist a collection of separated items.
 ** In 2006, in a municipal law, was presented a plan of recyclable materials collection.
 *** As in any other major cities in Pakistan.
 ****Presented in the SWM strategy reform, but not clearly defined

Among the considered cases, *Tarumã* is the only has a 'screening' plant and composting³⁷ where solid waste is separated. The result is a material which will be reintroduced in the industrial process, transforming the material in a new product (Fagundes, 2009).

In addition to the largely diffused non-existence of recycling municipal programmes, many cities do not have composting³⁸ facilities (table 2.3).

Table 2.3 - Municipal composting service

Cases	Existing municipal composting programme
Mexicali (Ojeda-Benitez et al., 2002)	Not
Colombo (Van horen, 2004)	Not*
New Delhi (Hayami et al., 2006)	Not
Hanoi (Mitchell, 2008)	Not
Victoria falls Town (Masocha, 2006)	Not
Ilorin (Adeyemi et al., 2001)	Not**
Enugu (Nzeandibe, 2009)	Not**
Chinese cities (Idris et al., 2004)	Not***
Accra (Boadi et al., 2005)	Not
Tarumã (Fagundes, 2009)	Yes ****
Teodoro Sampaio (Fagundes, 2009)	Not
Lahore (Batool et al., 2008)	Yes *****

* Compromise to do it in Wattala Nighborhood.
 ** Apparently as in all Nigerian, cities.
 *** In a really small portion, 1,3 % for the whole country.
 **** Yes in the recycling centre exists this facility
 *****A very small proportion, carried out by private companies.

It has to be kept in mind that in both of the tables, the cases refer to different years (as filled in the table).

Finally, negative factors affecting environment degradation are the bad waste habits of the communities themselves. Bad habits due to lack of municipal waste services for instance are burning or burying individual waste, as shown by Boadi and Kuitunen in Ghana (2005) and by Kassim (et al., 2006) in Dar es Salaam.

³⁷ In Portuguese: *Usina de triagem e compostagem*.

³⁸ This simply means the biological process of decomposition of organic materials composed by vegetal or animal remains (Fagundes, 2009).

Moreover, households that have inadequate access to dumping facilities, put their waste in water bodies or in any available open space, which gradually transforms into a waste mountain. This behaviour affects even more widely these areas' environment and the water contamination increases during the rainy season because of flooding low-lying areas close to waste disposal sites (United Nations Environment Programme, 1996 in Boadi et al., 2005). Disposed waste can be also become an obstruction to drainage channels (Kjellen, 2001 in Boadi et al., 2005).

Negligence of urban residents, which do not believe that waste management responsibility is shared, is even more counter-active to environment conservation and public health, added to the acknowledged scarce attention of municipal authorities (Adeyemi et al., 2001, p.93, Boadi et al., 2005). In Boadi's words:

“Indiscriminate disposal, burning and burying of solid waste, pose major environmental and health threats through pollution and through the breeding of pathogenic organisms” (Boadi et al., 2005, p.33).

All the negative externalities to urban environment conservation due to deficiencies or irregularities of the municipal programmes and facilities and to the harmful habits of the communities, add relevance of the role of the informal recycling activity for a sustainable waste management.

2.4 The Informal Waste Management Sector

As Ojeda-Benitez affirms,

“ [...] the process of recovering recyclables is a complex structure of multi-level systems involving waste generators such as households, businesses, institutions and industries and continuing with systems for collection, separation or recovery, buying and selling of recyclables, final disposal and transformation, use of recyclables” (Ojeda-Benitez et al., 2002, p.275).

This quotation gives a clear image of the 'waste recycling cycle' that generally occurs in all the analyzed urban areas.

The recycling process involves both formal and informal sectors where most of the waste recovery is carried out by informal pickers that sustain their life with this un-official activity. Recovering recyclable materials is not a new concept, its origins are indicated by Bartone (1999 in Ojeda-Benitez et al., 2002, p.279) back to ancient urban societies, which recognized the intrinsic value of waste.

As demonstrated by Van horen in the majority of developing countries' cities, different actors as the itinerant collectors, scavengers and micro-enterprises play an important role in the multilayered informal sector of waste recycling (Van Horen, 2004, p.769). The entrepreneurs or enterprises involved, do not pay taxes, do not have trading license, and are not included in social welfare or government insurance schemes (Haan, Coad, & Lardinois, 1998 in Wilson et al., 2006, p.797).

Masocho shows the possible aims of informal waste picking, with a study on the city of Victoria Falls in Zimbabwe, dividing them in subsistence, exchange, sale and income generation (Masocho, 2006, p.839).

Most of the physical activity of collection and separation of recyclables in the informal sector is carried out by poor individuals. Jaramillo (1999, in Ojeda-Benitez et al., 2002, p.277) describe them as, “[...] a small group of individuals walking the streets with a bag over their shoulders and another group that collects in open air dumps and/or landfills”.

The materials picked by these informal workers can be taken to different sites. A very large number of them pick waste directly at the landfill, as in the case in Manila, Mexico City, Cape Town, Bangalore, Guadalajara, Rio de Janeiro, Guatemala City and many others (additional cases are shown in table 2.4) (Bernache, 2003 in Wilson et al., 2006). Working conditions of the pickers exerting the activity in the landfills are even worse than those working in other type of areas.

Table 2.4 - Informal pickers picking in the landfills

Cases	Waste pickers working in the landfill
Mexicali (Ojeda-Benitez et al., 2002)	Yes*
New Delhi (Hayami et al., 2006)	Yes
Hanoi (Mitchell, 2008)	Yes
Rio de Janeiro (2011)	Yes**
Victoria Falls town (Masocha, 2006)	Yes
Ilorin (Adeyemi et al., 2001)	Yes
Enugu (Nzeandibe, 2009)	Yes***
Accra (Boadi et al., 2005)	Yes
Tarumã (Fagundes, 2009)	Yes
Teodoro Sampaio (Fagundes, 2009)	Yes
Dar es Salaam (Kassim et al., 2006)	Yes
Bandung (Sembiring et al., 2010)	Yes

* The operations of the landfill are under municipality responsibility but at the same time, 120 *scavengers* informally take waste.
 ** Information got during fieldwork.
 *** After the landfill was created, no controls at the entrance were done.

A second possible option for collection of waste are public spaces, namely areas where mixed waste is thrown such as on the streets, improvised dumps or in communal bins (Masocha, 2006, Wilson et al., 2006, Hayami et al., 2006 and Fagundes, 2009). The third option is to pick materials from individual households that donate it (Van Horen, 2004 and Hayami et al., 2006).

Another widespread practice is to collect waste from trucks employed by municipal councils (Masocha for Zimbabwe, 2006, p.839), and is observed in many countries (e.g. in Mexico, Colombia, Thailand and the Philippines Wilson et al., 2006, p.799). In Brazil, Fagundes (2009) says that informal pickers collect from households' bins before the arrival of the municipal waste trucks.

Moreover, waste can also be bought by the pickers from different sellers, as households, shops, industries (Hayami et al., 2006). Wilson (et al., 2006) defines the door-to-door pickers, the itinerant waste buyer. The buying of materials, in Van Horen's view, represents a win-win situation for both households and itinerant collectors because households receive payment for the sold goods, and collectors receive payment when they sell to buyers of recycled items (Van Horen, 2004, p.762).

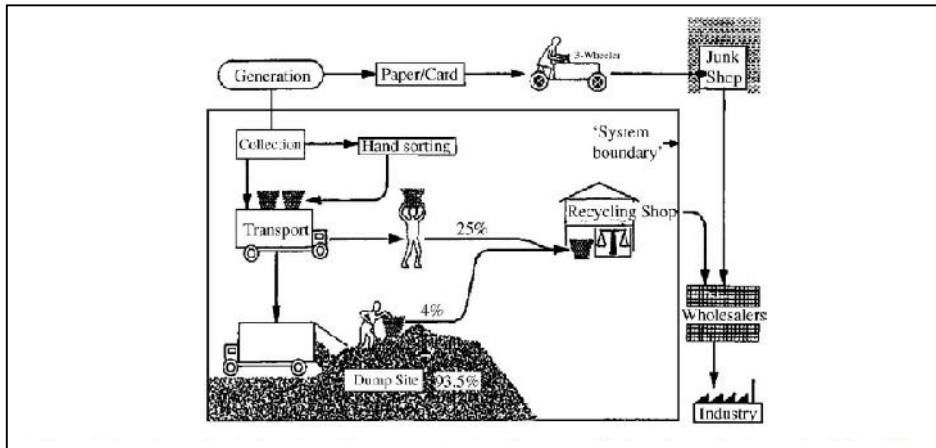
In fact, the selected waste materials are separated in different containers and then sold to intermediaries, waste harvesters, collectors, traders and wholesalers (Masocha, 2006, p. 839). There also exist intermediaries who sell/buy in shanty shops where materials are brought by people, but are usually very small-scale operations (Ahmed et al., 469). In Lahore, for example it was discovered that around 400 junk-shops exist (Batoool et al., 2008). In Brazil, as shown by Fagundes (2009), pickers are related to junk-shops' owners by renting a cart from them, a fundamental means for the collection.

The intermediaries can be considered as a higher-grade waste-collector *who* is interlinked with the industries and firms (Hayami et al., 2006). The itinerant/stationary waste buyers are any actor that can store significant quantities of material to supply to industries (Batoool et al., 2008). Indeed, the final buyers of this chain are the industries, which re-treat these materials in their industrial processes. As affirmed by Ojeda-Benitez:

“Recyclers are companies dedicated in a formal way to the transformation of salvaged materials into new ones, that is, from recovered materials with no commercial value into new products or raw feed stocks for certain industrial processes” (Ojeda-Benitez et al., 2002, p.280).

As Wilson (et al., 2006) explains the secondary materials collected by informal recycling are normally traded locally. End-users are likely local industries, but can also include craftsmen and artisans. Figure 2.3 is a flow chart, showing the chain of passages and sales of materials in the informal sector, including all the actors at stake in the process (intermediate dealers generally stays between the pickers and the end-users).

Figure 2.3 – Example flow chart of an informal recycling system, showing four types of informal recycling



Source: Wilson et al., 2006, p.799.

As Ahmed (et al., 2004) shows, there are two types of recycling industries: small-scale and large-scale ones. The former buys materials to be used as raw ones for the activity of manufacturing saleable goods. These operations are self-sustaining, depending on the demand of the product. In contrast, the latter buys materials in bulk for their manufacturing processes. This type of industries existence depends on market forces but their profit-oriented activities affect city’s sustainability (Ahmed et al., 2004).

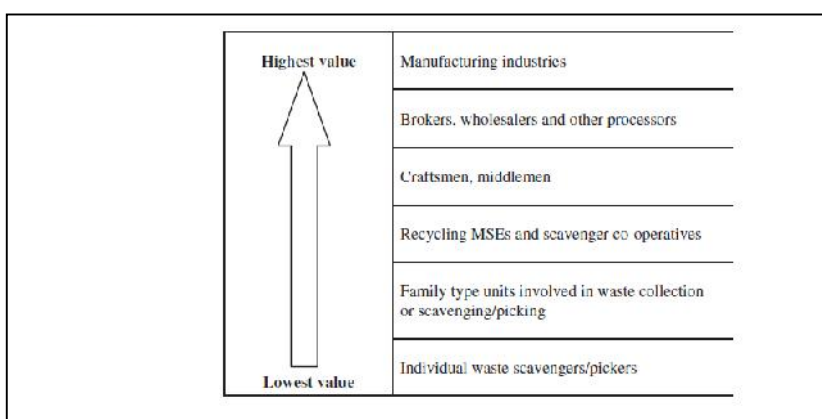
In conclusion, the recycling chain of materials, composed by different passages and involving actors at different stages is initiated thanks to the activities of informal pickers. However, despite their significant contribution to the recovery and recycling process, the role of these informal actors in the Municipal SWM is still not acknowledged, and its profits continue to be scarce (Caceres, 1996; PRECEUP, 1996, 1998, Hernández et al., 1999, Van Beukering et al., 1999, Fujita, 2000 in Ojeda-Benitez et al., 2002, p.281).

2.5 The Chain of Materials and the Economical Exploitation of pickers

The cleanliness of a city and the recycling of materials brought by the informal collectors is definitely a positive contribution to urban sustainability. Different factors, as the informal nature of the system itself, lower the positive impacts of this non-official activity and most importantly generate negative working conditions and exploitation of this category of workers.

Thanks to the work of these informal collectors, a cycle of sales and passages of recycled materials is started. This recycling network (cycle) takes the form of a hierarchy (see the figure 2.4 made by Wilson et al., 2006). The figure shows the hierarchy existing in the informal waste sector, giving relevant insights on the different levels and thus power relations.

Figure 2.4 – Hierarchy of informal recycling



Source: Wilson et al., 2006, p.800.

The higher level the material is traded at corresponds to a greater added value, and thus the price level at which is sold. The Informal pickers generally belong to the lowest level of the hierarchy, which reflects their income.

In Hanoi the hierarchical system is composed by a complex three-tiered network of informal waste actors,

“[...] pickers (city-based waste pickers, dumpsite pickers, and junk buyers), intermediaries (receivers, dumpsite depot operators, and sidewalk depot operators) and dealers” (Mitchell, 2008, p.2020).

From her study, Mitchell shows that just under half of waste intermediaries were once informal waste collectors (more specifically, junk buyers) prior to opening their own shops (Mitchell, 2008). As shown by Hayami in New Delhi, the hierarchy of characters is composed at the lowest level by the pickers that start working for some collectors and then the third level is composed by the dealers. After years of apprenticeship, the pickers can become collectors, rent a cart from a dealer and sell the materials at a higher price (having in exchange some guarantees from him, Hayami et al., 2006, p.48). In both the cases of Hanoi and New Delhi a sort of social upgrade (even if little) can be observed.

More substantially, as assessed by Hayami (et al., 2006, p.52), “The problem of pickers is that their poverty is not transitory”. This happens because they cannot access ‘social assets’ made of network connections which are critically important for upward mobility in developing economies (Jagannathan, 1987, Nakanishi, 1991, Banerjee, 1983, 1991, 1995 in Hayami et al., 2006, p.54).

Moreover, Hayami (et al., 2006, p.53) illustrate that, “[...] as long as a collector uses a dealer’s cart and receives credit from him, the collector is obliged to submit all his collections to that dealer”. The contracts made between the dealers and the pickers are highly personalised, multi-dimensional and long-term transactions among informal-sector agents. This is another factor that hinders the social mobility.

These examples give an image of this system made by passages, actors and power relations that is common in the informal world of the waste sector. In general, this framework negatively affects the working conditions of the pickers.

“The implications of this scheme for waste collectors are obviously negative and, if the scheme gets rolled out across the city, could be economically devastating as it would seriously hinder waste collectors’ ability to earn an income” (Mitchell, 2008, p.2027).

As shown in figure 2.4, the informal pickers receive very low incomes due to their low position in the trade hierarchy for recycled materials. They are often badly exploited and paid very low prices for the collected materials³⁹.

One of the consequences of low incomes is that pickers need to work for long periods of time. In Victoria Falls Town, the high time-investment gives little guarantee of getting marketable wastes, 53,8 % of the respondents indicated that they work for 5–6 days per week and rest of the people, to round other works’ incomes, for a day or two per week, particularly Sundays. Looking at working hours, 31 % of the respondents indicated that they work for 4–6 and 7–9 hours per day, 15,4 % work for less than 4 hours a day while 15,4 % work irregularly (Masocha, 2006).

Considering the cases of the Brazilian towns, in *Tarumã*, where 100 % of the workers exert its separation activity in the municipal recycling plant, they worked around 8 hours per day and in *Teodoro Sampaio* due to informality and so less organized work, 77 % of workers reached the working rate being more than 8 hours per day (Fagundes, 2009).

However, pickers are not necessarily the poorest, as Medina (2000) says (Wilson et al., 2006). In New Delhi Hayami (et al., 2006) shows how most of them have incomes below the poverty line. When looking at the case of Victoria Falls, Masocha (2006) finds that the majority (84,6 %) felt that “their income was quite satisfactory”. When it was asked to qualify their responses, 61,6 % of the

³⁹ This is particularly true in markets where only one buyer exists (Wilson et al., 2006, p.801).

respondents said that their income per month was higher than the one “earned by most unskilled workers in the town such as housemaids and gardeners” (Masocha, 2006, p.845). In *Tarumã* 53 % of the interviewed declared receiving a monthly salary of around 2-3 minimum wages, in *Teodoro Sampaio* 53 % got a salary of 1 minimum wage and 74 % one of approximately 1-2 minimum salaries (Fagundes, 2009, p.173). Nzeandibe (2009) for Enugu showed that pickers earned more than the minimum wage of about US\$ 50 monthly⁴⁰ (see table 2.5 on this case).

Table 2.5 – Comparison of waste picker’s monthly income and the minimum wage in Nigeria (\$)

City	Income	Minimum wage
Port Harcourt	153.0	75
Nsukka	48.3	35
Enugu	99.3	35 ^a
Onitsha	84.9	35

Source: Nzeandibe, 2009, p.96.

The Flexibility of prices put another relevant disadvantage for the pickers. The purchasing prices vary depending on supply and demand of the product (domestically and abroad). The reason for escalation of prices can be due to increased demand and limited supply of some type of recyclables (Batoool et al., 2008), whereas the opposite in case of decreasing prices. This poses a problem for those dedicated, informally and formally, to buying and selling recyclable materials, because it creates uncertainty about which type of material should be invest in, in time and money, in order to make a profit (Ojeda-Benitez et al., 2002, p.281). It can happen that sellers are forced to keep a certain material for long time before introducing it in the market again.

Looking at the cases analysed by Fagundes (2009) of *Tarumã* and *Teodoro Sampaio*, she clearly shows the price differences between the two towns, at different points of the chain of sales. In *Tarumã*, a sort of sale-auction of recyclable materials organized by the municipal authority exists while in *Teodoro Sampaio* the sale is completely informal. It can be seen that for some materials at the first sale round (by a picker to an intermediate), the prices are the same in both of the towns, but in the second sale round to intermediates in the latter case, the prices increase. This divergence of values demonstrates that in the informal sector the material cost increases towards the end of the chain.

Furthermore, in the case of *Tarumã* there is no collection of recyclables, while a separation of solid waste after the domestic waste is collected by the municipal service is in place. In this way the value of the materials are lowered by the fact that they are contaminated with organic matter, losing its quality at sale (Fagundes, 2009).

Even when prices are flexible due to economy trends, in some cases different groups of pickers sell at the same price⁴¹. For instance, Adeyemi (et al., 2001) shows the very uniform level of prices at which the pickers sell (table 2.6).

⁴⁰ They thus earn more than US\$1 a day prescribed by Millennium Development Goal 1 related to poverty reduction.

⁴¹ Analyzed at same moment of time.

Table 2.6 – The prices of waste materials in Ilorin, Nigeria (Per kg)

Waste categories	Price (N)	\$ per kg*
Rubber materials	N25.00	0.31
Plastic materials	N5.00	0.06
Iron materials	N1.50	0.02
Aluminium materials	N20.00	0.25
Copper materials	N50.00	0.63
Bottles	N10.00	0.13

(*At an exchange rate of N80 to 1US \$)

Source: Adeyemi et al., 2001, p.95.

To sum-up, exploitation in the Informal recycling occurs because of low levels of economic development in developing countries. Poor income and low prices for products and services create viable profit margins from collecting and selling secondary raw materials. If alternative employment opportunities and associated wages were higher, picking waste would be less financially attractive (Porter, 2002 in Wilson et al., 2006, p.802).

Nevertheless, after some time it might be that urban expansion has enlarged some waste collectors' routes, and the increasing urban population has altered the quantity of waste collected for some and therefore changing their livelihoods (Mitchell, 2008, p.2027). Moreover, flexibility of the prices can also be a factor that favours informal pickers' work and income. It strongly depends on their ability to garner the full price for increasingly valuable waste.

As shown by Wilson (et al., 2006) a general rule is that the less organised the informal recycling sector is, the less the people involved are capable of adding value to the materials they collect (in negotiating with the dealer), and the more vulnerable they are to exploitation.

Cases of organization such as by formation of micro and small enterprises (MSEs) involving groups of informal pickers of up to 10 (micro), or 20 (small) people, operating with low capital investments, shows that can improve the negotiation abilities and processing of the collected materials.

The way of organising and training informal recyclers into MSEs is very effective in upgrading their abilities (Haan et al., 1998 in Wilson et al., 2006). Thanks to the use of creativity and innovation and responding effectively to market needs (Ahmed & Ali, 2004 in Wilson et al., 2006, p.798), they could 'circumvent intermediate dealers' and so increase significantly their incomes. Introducing their activity in a formalized system would render their work more legitimised and socially acceptable. As Fagundes (2009) shows the best form of working and so, working conditions in Brazil occur when associations or cooperatives of informal pickers are formed.

To conclude, the informal pickers are most vulnerable also because they do not have an organized network that supports their work. A general improvement of the working conditions can be clearly seen when a formal frame of management is set and organizational abilities are upgraded, giving major attention to the picker's claims. As Adeyemi (et al., 2001) points out informal pickers could be inserted in the formal management, being also able to recover also parts of it. The following section 2.10 more fully tackles this topic.

Before looking at how pickers can be integrated in the formal SWM system, their origin and social characteristics in living in informal and marginalised realities, need to be analyzed.

2.6 Informal waste picking and pickers' Origin and Social Status

This section will focus on the origin of the informal picking activities and factors that facilitated its formation. Furthermore, the social and migrational aspects of the actors involved will be discussed, considering also their current social status in the societies taken in examination.

The recent strong urbanization occurring mainly in the developing countries due to migration from rural areas brought massive quantity of individuals to the cities. It is reported that urban population in developing countries is increasing at about a rate of 50 million per year (Kassim et al., 2006, p.770). In Vietnam, as Mitchell (2008) explains, economic growth dragged by a globalizing world has been a catalyst for urbanization. Globalization brought economic prosperity on one side but on the other, also much disparity. As Van Horen remarks:

" [...] fragmentation of urban services and infrastructures leads to increased social polarization and inequality" (Edwards, 1991, Castells, 1996, Graham and Marvin, 2001 in Van Horen, 2004, p.767).

Indeed, in many industrial and developing countries there is a growing disparity in the distribution of income indicating that a large portion of people is impoverished (Gallopín, 1994, p.14).

In these unequal societies, new residents attempted to find a way to sustain themselves in their own way. The lack of opportunities and capacities of the immigrants pushed them to seek of different types of labour in the city.

Furthermore, as pointed out by Idris in his study on Asian countries, waste generation increases occurred proportionally to rises in population and urbanization (Idris et al., 2004, p.104). The combination of all these factors drives the existence of a category of people working informally in waste picking. In Ahmed's words:

"Millions of poor people in the teeming cities of the developing country support[ing] themselves and their families by directly or indirectly participating in waste collection and recycling". (Ahmed et al., 2004, p.469)

Wilson reports that throughout urban areas of the developing world up to 2 % of the population in Asian and Latin American cities depend on waste picking to earn their livelihood (Medina, 2000 in Wilson et al., 2006, p.798). However, precise numbers of the size of population involved in the informal picking sector is hard to estimate⁴².

Looking at the majority of cases examined, informal picking of waste at the lower grade is generally chosen by rural newcomers to the cities (Idris et al., 2004, Wilson et al., 2006 and Van Horen, 2004). Hayami (et al., 2004, p.45) in his analysis says that 90 % of collectors that came from rural areas. The same is pointed out by Nzeandibe in Nigeria saying that, "Informal recycling [...] provides jobs and livelihood to mostly recent rural migrants (Medina, 1997, Nas and Jaffe, 2004 in Nzeandibe, 2009). Mitchell with her assistants surveyed 575 pickers and interviewed 44 in the capital of Vietnam and proved that "[...] many occupations migrants enter into, when they arrive in Hanoi, is informal waste collecting" (Mitchell et al., 2008, p.2020).

As noticed by Hayami (et al., 2004) and via shown data, it seems that waste collection is a relatively easy profession for new migrants from rural areas. However, actual recovery and re-sale of most of the recyclables is a very arduous activity. As Nzeandibe in his Nigerian study explains although waste workers are often un-educated, they possess skills both directly related to waste recovery, as well as for locating markets and potential customers (T.C. Nzeandibe, 2009, p.98).

Moreover, thanks to Mitchell's study demonstrating the fact that in Hanoi four out of five waste collectors entered into the waste business through friends and/or relatives, adds the 'contact-network' factor to be considered as necessary facilitating factor for starting this activity (Mitchell, 2008, p.2022).

⁴² In Ahmedabad city, in West-India is demonstrated that over 20,000 women are working as paper pickers (Salahuddin and Shamim, 1992 in Ahmed et al., 2004, p.469), whereas in Delhi, up to 150,000 waste pickers act in the municipal corporation (Chaturvedi, 1998 in *ibid*).

In general, the portion of people starting this activity is made of poor and marginalised social groups who finish picking waste with the target of income generation or of basic everyday survival. Thus, this is an adaptive response due to income scarcity lived by disadvantaged populations (Wilson et al., 2006).

Furthermore, was found that informal recyclers are often part of discrete social groups or minorities (Ibid, p.798). As Ahmed (et al., 2004) states, looking at the Indian cities, this group is made mostly of those most vulnerable and marginalised such as women and children. In Nigeria 61 % of the total is composed of teenagers that have difficulties in finding a proper job (Adeyemi et al., 2001). In Lahore, the pickers are mostly children, illiterate and poor (Batool et al., 2008, p. 296).

In general, the level of education of the pickers is low. For instance Masocha in Zimbabwe shows that slightly more than half (53,8 %) attained primary level education while 23,1 % had the secondary education (Masocha, 2006, p.842). In Adeyemi's studies, the majority of pickers were teenagers who possessed primary school leaving certificates while the remaining had little or no formal education (Adeyemi et al., 2001, p.94). In Brazil, Fagundes shows that a large part (47 % in *Tarumã* and 38 % in *Teodoro Sampaio*) concluded just 4 years of education.

Looking at gender issues, the cases vary considerably. In Nigeria, over 70 % of the *waste* scavengers were male (Adeyemi et al., 2001, p.94). In Nzeadibe's study (2009, p. 96), he stated that this is a 'gendered occupation' as all of the interviewed were male⁴³. The same for Zimbabwean case, in the town of Victoria falls all scavengers interviewed at the landfill site were males aged between 19 and 44 years⁴⁴ (Masocha, 2006, p.842). In Brazil, Fagundes (2009, p.171) notes that this work is carried out by both the genders: in *Teodoro Sampaio* majority (61 %) were male while in *Tarumã* were female.

Generally, the informal pickers live in communities situated in shantytowns or around dumps. These towns or neighbourhoods are characterised by poor living conditions, limited access to facilities and infrastructures, and no provision of urban services such as water supply and sewage system and absence of social safety networks (Wilson, 2006, p.803). In the study made in New Delhi by Hayami and colleagues (2006, p.64) it was found that pickers' incomes are meagre and living conditions are dreadful even compared to the low standard of India.

Relevantly, Baud and colleagues highlight the marginal social status of the informal pickers, and the discrimination they suffer for this. As declared,

"official attitudes towards collaboration with informal waste-recovery actors is generally overwhelmingly hostile due to the fact that the activities of this group of workers are often socially stigmatized as dirty, unhealthy, chaotic and illegal" (Baud et al., 2001, p.11).

The vision societies have of the poor no matter what they are doing, even if it is providing a necessary service to the society, is in general discriminatory. People usually do not see the benefits and contributions of these actors to metropolitan environment and society (Gutberlet 2008 in Sembiring et al., 2010, p.803). As Drackner (2005) shows, discrimination towards pickers is mainly due to the association they are made with waste (Sembiring et al., 2010, p.808).

At the same time, it can be found that there are some positive sides relative to pickers' social exclusion. As demonstrated in Hanoi it has helped more the pickers in having priority on material picking. In fact, when implying formalization of the collection and giving attention to their case it resulted in a decrease of quantities of their working material (Mitchell, 2008).

⁴³ Aged between 29 and 55 years, married and have school age children (Masocha 2006 in Nzeandibe, 2009, p. 96).

⁴⁴ As many as 53,8 % were aged between 25 and 34, 38,5 % were 19–24 years old while 7,7 % belonged to the 35–44 years age group. Moreover, 46,2 % were single, another 46,2 % were married while only 7,7 % indicated that they were divorcees (Masocha, 2006, p.842).

2.7 Life conditions: Health issues

Based on the life conditions that the pickers generally suffer from and the working conditions they are used to, consequent health issues are analyzed.

As Wilson notes relevant literature on health and accidents of the informal pickers with comparative data is practically does not exist, and also existing studies are suffering for methodological deficiencies. It is widely recognized that further research is needed in this essential study area (Eerd, 1996 in Wilson et al., 2006).

The health risks of the pickers in developing countries are high because of manual handling of contaminated materials with lack of protective equipment, resulting in direct contact with potentially dangerous waste (Cointreau, undated, ibid 2006). Wilson shows a study of Eerd on health effects occurring in the sector of informal recycling (see table 2.7).

Table 2.7 – Health effects reported from involvement in informal recycling (Eerd, 1996)

Reported outcomes of case studies
The overall respiratory illness score for children of waste-picking parents was the same as those with non-waste-picking parents
There was no association between below normal pulmonary function performance and waste picking and current/past smoking
There was no significant relationship between HIV infection /HBV infection and waste picking
Waste picking was not associated with abnormal lung function among respondents
More of the waste pickers reported past health problems than the control group
Waste pickers were in a worse state of malnutrition than the control group
In relation to the average for height and age, both groups were normal, indicating that neither suffered from chronic malnutrition. However, the waste pickers showed a slightly worse average
Many of the waste pickers suffered from chronic backache and many complained of general weakness. Coughs were a chronic problem
Many suffered from injuries like cuts and needle stick injuries
Eye infections and other eye problems were highly prevalent
A few night-shift labourers from a dump complained of suffering from severe hallucinations due to the environment they worked in
Many of the waste pickers suffered from intestinal protozoa and helminthes
The dumps and waste bins were infested with stray dogs and rats. Bites from dogs and rats were quite common
Diarrhoea was extremely common among all waste pickers
Many of the waste pickers complained of having one or more attacks of jaundice in the last year
Many waste pickers suffered from skin diseases

Source: Wilson et al., 2006, p. 804.

As shown by Wilson thanks to his review of various studies:

“Risks from manual handling of mixed waste may come, e.g. from direct contact with broken glass, human/animal faecal matter, paper that may have become saturated with toxic materials, containers with residues of chemicals, pesticides or solvents, and needles and bandages from hospitals. Inhalation of bioaerosols, and of smoke and fumes produced by open burning of waste, can cause health problems [...too]” (Wilson et al., 2006, p.803).

The main health problems afflicting the pickers are mostly respiratory, dermatological problems as well as eye-infections due to exposure to air-borne bacteria and to toxic materials present in solid waste (Wilson et al., 2006, 803). In addition, Nzeandibe in his study shows that informal pickers often suffer from health consequences as bites from mosquitoes, cuts and bruises, body aches, general weakness, and frequent fever. He concludes by saying that pickers, even if they are often unaware of the dangers, are economically dependant on the occupation they do (Cointreau, 2006, Nguyen, Chalin, Lam, & Maclaren, 2003 in Nzeandibe, 2009, p.96).

As seen, informal pickers come from living areas where lack of basic services is common, thus it is also difficult to distinguish between health implications for the work they do and for the living conditions they have.

In many cases pickers work at open landfills, where waste is all mixed: solid materials with organic ones, hazardous components together with non-hazardous. The presence of organic matter and potential high temperature (being the case in tropical or sub-tropical areas) results in fast decomposition and production of bad odours, which becomes counteractive to human health and increases the breeding of disease-carrying vectors like rodents and insects (Laryea, 1997 in Boadi et al., 2005, p.35).

The hazardous components pose many serious health threats including chronic and acute toxicity, cancer, birth defects, explosion, and corrosion (ibid). Moreover, as already seen in the considered Brazilian cases, the wrong disposal of tires in the landfills becomes hazardous, as they can be a potential source of *dengue* mosquito (Fagundes, 2009).

As shown by the study of waste habits in Ghana, wrong storage of waste at home produces houseflies, which are demonstrated as directly linked to higher rates of children diarrhea. In addition, the burning of waste results in a higher incidence of respiratory health symptoms among adults (Boadi et al., 2005).

In addition, it is relevant what Wilson points out as community health risks. They are generated by the informal recycling and can affect both the related communities and the general public. In fact, manual handling of contaminated materials within or near the living space can create very unsanitary conditions, but the degree of this risk is not evidenced (Wilson et al., 2006, p.804).

These problems obstruct in no small way the possibility of sustainable development in an urban context. At the same time, the conditions in which the recycling activity is implemented must be changed to not affect the workers' health itself. If informal recycling activity would be better managed and if investments in health prevention would be raised, health problems would be reduced.

Nzeandibe (2009) and his analysis on the linkages between the waste issues and the MDGs, notes that with better prevention, the goals 6 and 7 related to sanitation, malaria and other diseases would be achieved.

2.8 Positive consequences of informal picking, Environment conservation and Job creation

As seen, in the theoretical section (2.2) of this chapter, poverty is usually related to environmental degradation.

Looking at the study of Gallopin (1994, box 2), pickers' poverty is demonstrated by the lack of options. Moreover, the environmental degradation expressed as 'chaotic growth, disintegration and lack of services' also negatively affects pickers' living conditions.

On the other hand, it can be proved that poverty can bring some sort of relief for environment and social benefits. In the case of informal pickers, Baud states:

" [...] waste collectors can contribute to cleaner urban neighbourhoods, financial viability (of waste management organizations), reduced volumes of disposed waste through recycling, re-use, and composting, and employment creation for predominately poor people" (Baud et al., 2001, p.12).

On the environmental matter, firstly a large quantity of materials (that is not easy to numerate precisely due to the informal nature of the sector) is put in a 'recycling cycle' to be finally re-

processed by the industries. In this way, largely pickers' work is benefitting the entire society in saving natural resources. In the case of the city of New Delhi, Hayami declares,

“Pickers are the poorest of the poor being barely able to eke out subsistence, whereas collectors are at the fringe of poverty. Yet, they are making valuable contributions to society by converting unusable waste into productive resources as well as cleaning the city” (Hayami et al., 2006, p.42).

In terms of saving natural resources thanks to introducing raw material coming from waste into the industrial process some data coming from the different cases, is given (table 2.8, more data can be found in table 7.17 in Appendix).

Table 2.8 – Percentage of recyclables recovered by informal pickers

Cases	% of city's total waste collected by the informal pickers
Jakarta (Ojeda-Benitez et al., 2002)	25 % (90 % of recyclables)
Surabaya (Ojeda-Benitez et al., 2002)	12 % (31 % of recyclables)
Bangkok (Ojeda-Benitez et al., 2002)	5%
Hochimin City (Ojeda-Benitez et al., 2002)	7 % (of total non-biodegradable materials)
Indian cities (Van Horen, 2004)	10-15 %
Mexico (Van Horen, 2004)	10 %
Bangalore (Van Horen, 2004)	15 %
Karachi ⁴⁵ (Van Horen, 2004)	10 %
Cairo ⁴⁶ (Wilson et al., 2006)	80 %
Lahore (Batool et al., 2008)	21,2 % (of recyclables)

The types of collected materials⁴⁷ are commonly plastics, paper, cardboard, aluminium, steel, other metals (as scrap), glass and textiles (Haan et al., 1998 in Wilson et al., 2006) and also sometimes copper, polyethylene, tetra pak, coloured paper, plastic bags, plastic films etc. (Fagundes, 2009).

Currently, there are more opportunities of waste recovery, because, the waste generated by modern society consists of more varied materials, and a large amount of these has value added due to manufacturing processes (Ojeda-Benitez et al., 2002, p.279). In addition, as Idris notices that rapid development and changing lifestyles in growing cities have also affected waste composition from mainly organic (putrescible) waste to solid waste such as plastics, paper, and packaging materials that are complex in nature (Idris et al., 2004, p.104). In Lahore, for instance, paper and plastic material quantities have increased, while glass and iron products have shown a decline due to them being replaced by the former ones (Batool et al., 2008, see also graph 2.1).

Also a small portion composed of organic waste can be re-used as it has monetary, nutrient or energy value and can be used as livestock fodder, soil improvers with agricultural functions and fuel used by industries or municipalities (Dulac, 2001 in Wilson et al., 2006, p.801 and Fagundes, 2009).

Secondly, it was measured that recycling uses much less energy compared to other methods of waste management and compared to the energy needed to process new material (Batool et al., 2008).

Thirdly, as much waste is re-used and treated, as less waste go to landfills (saving valuable space) or incinerators, resulting in less water, soil and air contamination.

⁴⁵ It is found in the South of Pakistan, on the sea-coast.

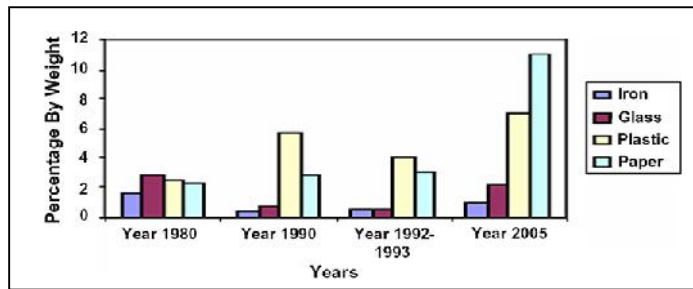
⁴⁶ Thank to the work and expertise of the *Zabbaleen* group, a Coptic Christian minority in Egypt.

⁴⁷ In Asian cities (Idris et al., 2004) different recycling rates are shown (depending on the material type), for plastic (Thailand and the Philippines about 16 %, Malaysia and China about 13 %, whereas Indonesia and Vietnam 8 % and 3 %), paper (around 8 % – 17%).

Moreover, the sector appears to be growing. Indeed Mitchell adds, that the number of migrants undertaking waste-recovery as off-farm (usually temporarily, but also permanently in some cases) employment has significantly increased recently (Mitchell, 2008, 2020). Due to poverty existence and as waste continues being accessible, this sector will never be without potential workforce. In the case, some waste pickers are able to find another work, somebody else is immediately ready to replace them (Wilson et al., 2006, p.803).

In Lahore, as indicated by graph 2.1, it can be seen that the total percentage of recycled material increased dramatically over the 25 years from the 1980 to the 2005.

Graph 2.1 – Percentage of the different types of recyclable materials in Lahore by the informal sector



Source: Batool et al., 2008, p.295.

Another fundamental positive consequence of informal picking is that: “It provides employment and a livelihood for impoverished, marginalised and vulnerable individuals or social groups (Medina, 2000 in Wilson, 2006, p.802).

As previously shown, the Millennium Development Goals⁴⁸ (MDGs) have a major focus in poverty reduction. Indeed, in some countries of the world the contribution of the informal recycling sector towards attainment of these goals could be significant (Coad, 2006, Medina, 2006 in Nzeadibe, 2009, p.94).

One goal, as already affirmed, is about job-creation, being in many developing world cities the informal sector one of the main employers of poor people and the primary means by which goods and services are delivered to the poor (ibid, 2009, p.98). In this sense, informal recycling activities contribute to the eighth goal.

The other goal refers to environmental benefits for the city thanks to the informal recycling, which has a strong linkage with MDG 7⁴⁹ thus creating a production system that respects the obligation to preserve the ecological base for development.

Moreover, society in general benefits, not only for the environmental aspect of waste picking but also for other economic advantages that are brought by the informal pickers (box 4 explains it more in details).

All the positive factors that are caused thanks to informal picking activity’s existence need to be strengthened and enhanced by transparent governance and all the stakeholders involved in SWM system, with a special attention to the role of the local government.

⁴⁸ The Millennium Development Goals adopted by the UN member states in the year 2000 are broad goals for the entire world. They address essential dimensions of poverty and their effects on people’s lives attacking pressing issues related to poverty reduction, health, gender equality, education and environmental sustainability. By accepting these goals, the international community has made a commitment to the world’s poor, the most vulnerable, in precise terms, established in quantitative targets (MDG website).

⁴⁹ On ensuring environmental sustainability.

Box 4 - Economic benefits from informal recycling

Apart from job-creation and environment conservation targets, informal recycling has been assessed of bringing substantial economic benefits to local communities, local governments and industries.

Hayami (et al., 2006, p.41) notes that despite their low economic and social status, pickers and collectors are making important economical contributions to society. They are adding more value than their own income to waste producers' income (such as households and shops) and to the saving of the city government's expenditure for disposing waste. In Lahore, for instance it was measured that 360 households are earning per year 13,610 Rs. (Pakistan Rupee) per year, which equals 160.352 US-Dollars, whereas the 260 junkshops earn 271 million Rs. equalling to 32 million US Dollar (Batool et al., 2008, p.296).

From a macroeconomic perspective, pickers are able to provide a steady, reliable supply of secondary raw materials for local manufacturing industry which can use low-cost, affordable products made from recycled materials replacing the more expensive imported raw materials (Wilson et al., 2006, p.802).

The informal recycling workers are often highly skilled at identifying wastes with potential value:

"They collect materials when they have been discarded as waste and add value to them by sorting, cleaning, altering the physical shape to facilitate transport or by aggregating materials (Scheinberg, 2001a) into a commercially viable quantity" (Wilson et al., 2006, p.801).

To conclude, as Batool (et al., 2008) asserts,

"Planned recycling may be profitable in countries where the high value of recovered materials and low wage cost of recovery and recycling compensate for the relatively small proportions of recyclables waste that can be recovered from MSW (municipal solid waste) [...] (Johnsons et al., 1984; Beukering et al., 1999, in Batool et al., 2008, p.295).

2.9 Informality and Formal system

As asserted in the previous sections the informal nature of recycling activities has many drawbacks for pickers in all spheres of their life: working conditions, health, economic prosperity, and social status. As demonstrated in the other studies, there is a potential of changing the state of these aspects (i.e. informality and bad conditions) through the reform of public collection (Van Beukering, 1997 in Van Horen, 2004) and a broader involvement of the informal pickers into the formal management system.

Van Horen in his studies assesses that between one-third and two-thirds of city populations in the developing countries live in informal circumstances (i.e. outside the legal parameters stipulated by city planners and managers). Moreover, he states that the rate of residents living in irregular and informal areas is growing at twice the rate of growth of the 'formal city neighbourhoods' (Perlman, 1993 in Van Horen, 2004, p.761). In the early 1990s, it was already noticed that between 70 % and 90 % of the new-built houses were built 'illegally', or informally (Hardoy and Satterthwaite, 1989 in Van Horen 2004, p.768).

Baud (et al., 2001) shows a clear image of how the urban SWM practices are managed by different types of people, which they divide it in four determinate main groups:

- The public sector (national authorities, local authorities and local public departments) constituting a central set of players;
- The private sector (large and small registered enterprises carrying out collection, transport, disposal and recycling);

- The Local community and its representatives (NGOs and CBOs⁵⁰);
- The small-scale, non-recognized private sector (waste pickers, itinerant buyers, traders in waste materials and non-registered small-scale enterprises)" (Baud et al., 2001, p.5).

As can be clearly noticed apart from the fourth group, the others are generally part of a formal sector of the SWM, while the third one generally acts as an intermediary between the formal and informal sector.

As Baud (et al., 2001) continues, little attention is given to the potential of this fourth group. In general, local authorities prefer to make agreements with formal entities. Attention and availability is given more to strong contractual arrangements in which informal business or communities do not fall into (ibid). As Wilson adds, the attitude of the formal sector towards the informal one is often very negative, "regarding it as backward, unhygienic and generally incompatible with a modern waste management system" (Wilson et al., 2006, p.798).

Public policies achieve even repression methods against pickers. Nzeadibe in Nigeria recognizes the fact that the official response to informal waste picking and recycling reaches neglecting attitudes, "[...] a practice in which authorities simply ignore scavengers and their operations, leaving them alone, without persecuting or helping them" (Medina, 2000 in Nzeadibe, 2009, p.97). Van Horen for Colombo says that authorities generally turn a 'blind eye' to the informal operators (Van Horen, 2004, 762). With the cases of *Tarumã* and *Teodoro Sampaio* Fagundes tells that informal pickers, even if they are reducing the waste to be collected by enterprises and so promoting the increase of utile-life of the landfills, are not recognized by the public administration and enterprises (Fagundes, 2009, p.161).

As noted by Nzeadibe (2009, p.93), the consequence of ignoring the informal sector could be (and often is) unsustainable interventions which are exacerbating the deficit in urban environmental services provision and support of the urban poor who are depending on waste recovery for their livelihood. It is believed that lack of awareness is the major contributory factor in the failure of most SWM schemes (Addo-Yobo & Ali, 2003 in Kassim et al., 2006).

Moreover, as noted by Van Horen a major weakness in the SWMS, is the economic inefficiency of the overall system. As Nzeadibe says, "[...] the effectiveness of SWM in a city is one of the indices for assessing good governance"(Whiteman, Smith, and Wilson, 2001 in Nzeadibe, 2009, p.93).

Even if 'official' negative sentiments towards informal pickers are expressed, Van Horen notices that,

"[...]with the spectrum of informal operators ranging from those at the margins of survival to those running micro-enterprises, the informal sector activities represent income earning opportunities for a significant number of low-income people. The informal sector therefore exists not only as a survival strategy for the very poor, but it also fills gaps that exist due to the inefficiencies of the formal system" (Van Horen, 2004, p. 762).

Indeed the work of the informal pickers bridges the gaps of municipal programmes. For instance in Dar es Salaam, door-to-door collection by pushcarts is normally practised in unplanned areas not covered by municipal service (Kassim et al., 2006). Having informal pickers cleaning an entire city and metropolitan region without the pretention to be paid or the power to claim it can be an advantage for local authorities to still keep this reality in this informal nature (Van Horen, 2004).

However, in case of formal waste management reform, municipal councils consider involvement of private industries in bridging the public service efficiency gaps. The indisposition toward making contracts with informal small-scale enterprises, waste traders and waste pickers is due to the non-official nature of these entities that apparently is thought to bring obstacles in the rule enforcement (as for sanitary codes and health standards) and so could create sanctions in cases

⁵⁰ Community based organizations.

of malpractices (Baud et al., 2001). Therefore, the tendency to privatize the SWM sector is prevailing, commonly through large-scale enterprises. In general, when it comes to privatization, governments consider just the form of full privatization (Ahmed et al., 2004).

In the case of a new urban policy such as an urban private partner for large project, often result in the creation of more exclusionary institutions. Improved efficiency in waste collection may lead to the unemployment of pickers (Sembiring et al., 2006). As is shown in Bombay, an increased role for the formal private sector produces a reduced role for informal agents, thus a loss of employment and income earning opportunities for the lowest income groups (Van Beukering, 1997 in Van Horen, 2004). In Hanoi when attention to waste issues by local authorities was given those who benefitted were not the informal pickers. Indeed city councils suddenly discovered the wealth generated through recycling and tried to monopolize the resource⁵¹ (Di Gregorio, 1997 in Mitchell, 2008).

Summing-up, the relationship between the formal private sector and informal sector stakeholders results in a competitive relationship.

The negative consequences for informal pickers, due to negligence of local governments and privatization of the sector, need to be overcome. To convince authorities and politicians in involving informal picker in MSWM, is a major challenge. The UN agency is calling on municipalities in each region to create networks of cities to improve their policies in order to fight discrimination and to promote diversity, mutual respect and dialogue (Sembiring, et al., 2010, p.809). This action is also based also on the issues of social inclusion that force municipal councils to fight against social exclusion (ibid, p.808).

As Nzeadibe notices, the importance of the informal recycling sector has not received adequate consideration within the framework of the reforms in solid waste management (Nzeandibe, 2009, p.93). However, looking at the studied cases, some local authorities have started to acknowledge the potential of informal recycling, as Nzeandibe says:

“The main potential benefits were noted to be related to its potential to reduce disposal cost, potential to increase landfill life span, job creation and poverty alleviation” (Nzeandibe, 2009, p.97).

Considering the MDGs (UN, 2005) on poverty eradication, it would be comical to try to move forward by removing the means of livelihood from a major section of the urban poor (Wilson et al., 2006, p.798). Moreover, local governments have traditionally driven by the need to control public health and environment consequences of inadequate SWM systems (Medina, 2000, Wilson et al, 2006). The recycling process started by the informal pickers supports the municipal councils in taking care of these aspects.

By observing all of these factors, it is assessed that it is extremely counteractive to establish new formal waste recycling systems without taking into account the informal systems that already exist (Wilson et al., 2006, p.797). As noted by Baud (et al., 2001), in relation, few governments have started to include this in their political agenda regarding the sector.

One of the objectives of a sustainable SWM is to move ‘up the waste hierarchy’, which would occur by lessening the dependence on open disposal and augment the recycling, as Wilson notes, “it would seem ironic to move forward by deliberately eliminating what can be a rather efficient, existing recycling system” (Wilson et al., 2006, p.798).

In conclusion, it is strongly recommended to not follow the path of the Western countries, which allowed the fade of informal recycling sector and established formal ones to get high rates of recycling (trying to reach the same former rates or even more than those, Wilson et al., 2006, p.802).

⁵¹ In 2007 with URENCO (Hanoi’s municipal waste management Authority) asking in some selected city-areas, to citizens to recycle own waste and destines it to some specific intermediaries.

Including and not ignoring the previously established system by informal appears to be the optimal choice. Local authorities can be 'enablers' by developing legal and regulatory frameworks that permit other actors to develop a wider range of activities in the direction of more integrated sustainable solid waste management systems (Baud et al., 2001, p.12).

2.10 Formalization process: How

As stated previously, formalizing through integrating the informal sector into the formal waste management is the optimal option to correct all negative aspects associated with it such as: bad working and living conditions, social exclusion of the informal actors and environmental degradation for efficient lacking public services.

Formalization is not a simple process though and as already seen, there have been cases that formalization has only brought losses to the informal agents and high costs to the authorities. As Van Horen (2004, p.763) notices also in cases when there is political will and attention on waste issues there is a lack of understanding on how the informal activities could be legitimized and integrated into the formal system without missing that dynamism typical of informality.

The preferable manner in integrating the informal sector into a formal system of management would be to build on the practices and experience and to improve efficiency and the living and working conditions of the informal workers (Wilson et al., 2006, p.797). Various researchers give important insights in the way it is preferable to imply this new type of governance.

As we have seen before, policies towards informal recycling tend to be negatives. This highlights the dilemma faced by decision makers while trying to include the informal recyclers in the SWM (toward inclusive society, Sembiring, et al., 2010, p.808).

As significantly noted by Van Horen (2004, p.770) in terms of employment, environmental effects and public costs, the informal system performed better than the formal (Western) waste collection system. Thus, the activity of informal recycling needs to be inserted and integrated in the municipal recycling system (which it also must be implemented in the case it does not exist, Fagundes, 2009, p.161). The strategy proposed for consideration in Brazilian towns, of *gerenciamento de resíduos sólidos* <integrated management of solid waste> has the objective of preventing pollution, diminishing solid waste generation in landfills and organizing informal pickers of recyclable materials (Fagundes, 2009, p.161) .

It will be listed the different steps and actions which local governments should taken, towards an optimal formalization, based on the studies analysis and the recommendations given by all the considered authors.

First of all, as an initial step, is essential to concentrate attention to the living areas of the informal pickers by improving infrastructures and providing social services such as education and health. This is also strongly related to the United Nations' MDGs and local authorities' commitment. For instance as Hayami notes, having drinkable water supply, regular vaccination and a functioning sewage system, will have wide and immediate effects on pickers' work and income, for example by the reduction of days lost for sickness. Furthermore, education will be necessary to enhance the mobility of collectors upward (Hayami et al., 2004, p.65). However, the permanent poverty in which they find themselves cannot be solved just by these governmental policies. The significant political action has to involve the work of informal recyclers itself, looking at different aspects.

Second of all, it is essential to keep improving the skills of workers (not only in what they do but also in designing new products) to attract wider demand from buyers. As Hayami (et al., 2006) analyzes, worker's training must be strengthened, resulting in industrial extension thanks to research and more market information. The new skills apprehended would help in not only generate income rise and material treatment by adding value to them, but also provide knowledge on other job

opportunities. Nzeandibe (2009) adds that supporting recyclers' work would also consist in grants, strategic advice and guidance for an optimal production.

Third of all, better work efficiency would be assessed in case of registration of the recyclers and as Nzeandibe declares, even employing them. Wilson (et al., 2006) proposes as formal integration the creation of cooperatives of pickers. This issue has received attention in some cases, through the support of MSEs formation and public-private partnerships (PPP)⁵².

PPPs are not easy to be implemented, as between public and private sector there can be some conflicts due to the different goals aimed. For instance, King (2006) mentions two types of conflicts; Property conflicts and Resource conflicts. The first one is explained as the contrast between private interests versus the public good. The second one depends on the fact that business requires raw materials in constant supplies and at the same time requires governments regulating their future productions. This may lead to monopoly or oligopoly action by the business through lobbying in which only few continue benefitting from resources (L. O. King, 2006).

If these conflicts are avoided, the qualities of efficiency, dynamism, access to finance, expertise (as knowledge of technologies and managerial abilities) and entrepreneurial spirit of the business world can be advantaged with the public interest (social and environmental), accountability, job creation, local knowledge and broader planning (Ahmed et al., 2004).

In this way, the roles of the two sectors would be balanced creating a sort of hybrid organization that acquires both payoffs, replacing the traditional character of competition with cooperation and share commitments for same goals (Kolzow, 1994 in *ibid*, 2004).

Ahmed (et al., 2004) demonstrates how these types of partnerships are suitable for developing countries because of a presence of a wide informal sector that should be encouraged to enter the market, and of a poorly efficient, public power and private sector willing to undertake some activities (having the public available to pay). Van Horen (2004) shows that in some cases partial privatization has worked well.

Anyway, in case privatization is favoured and private actors are involved in the SWM, city Council should remain the principal (responsible overall) for provision of the services. In this way, governments possess some degree of power, still saving costs, reducing political interference and lowering coercion models (Baud et al., 2001, p.4). It is important for the public sector to hold control of a part of the service to not let it be usurped by private sector monopoly (Kessides 1993, in Van Horen, 2004, p.769). This would also let the local governments have some power in the involvement of informal actors into the formal management system, aiming at collaboration between informal and private sectors.

Fourth of all, a fundamental policy would render the informal market more transparent, providing public information for instance on price quotations through mass media (Hayami et al., 2004, p.66) or creating institutions monitoring the market. This will also add prevention from exploitation by government employees, including the police (Hayami et al., 2006). On the other hand, Hayami warns from direct interventions of government on price controls, incomes, business licensing and interest rates for the difficulty of being effectively implemented in an informal sector, but also for the risk of being trapped by corruption and rent-seeking (Bromley, 1979; De Soto, 1989 in *ibid*, p.66). At the same time, Van Horen points out that all these policies need to shift away from a tendency of strict regulation and control while flexibility and tolerance need to be increased, enhancing the positive contributions by the informal operators. This would imply in Van Horen's view the possibility to contract small-scale informal enterprises to provide services in (usually low-income) areas, with the support of authorities and the expansion of low-income areas waste service coverage (Van Horen, 2004, p.770). Some suggestions and warnings regarding a proposed flexible model,

⁵² A successful example of recent times, of such PPP experience, presented by the author, is the case of São Sebastião in Brazil where the *Catadores* <pickers> created a cooperative (GTZ, 2004 in Wilson et al., 2006, p.806).

where waste pickers would be trained and mainstreamed into the formal system of waste recovery are given by authors of a research in Mexicali in the box 5.

Fifth, a fundamental action for a successful integration of informal agents into the formal system is the involvement of a third party independent agency, helping and facilitating the whole process (Wilson et al., 2006). In general these agencies are non-governmental organisations (NGOs) and community-based organisations⁵³ (CBOs) rather than any public authorities' segments (ibid, 2006, p.805).

NGOs may enter in SWM activities because of social and/or environmental concerns, for introducing new technologies, extending micro-credit, or simply by being contracted by other entities for implementing a project. Thus, they are driven mainly by their goals than by profit-making (Ahmed et al., 2004, p.470). Also Agenda 21 recognizes the importance of the NGO sector and the fact that its experience at the local level gives it a legitimate say in the design of policies (Gallopín, 1994, p.8).

In PPP formation, an external agency is also facilitating the various hurdles that the process can face, for instance in the transition of the public authority being basically a service provider to a regulatory body, or in enhancing public participation and community awareness, or in avoiding monopoly of the private and the exploitation of vulnerable groups (Ahmed et al., 2004).

As Van Horen shows in the case of Colombo, an NGO is giving technical assistance and is having the role of facilitator within the community involved and as intermediary with the local government. In this case, it has been the initiator of the project of a recycling plant, being so present since the outset of it (having provided the initial bins too, Van horen, 2004, p.765). Apart from this, the NGO has been involved in community awareness programmes (through environmental education projects) and environmental improvement as in the recycling of plastics. The main point is the 'relational resource' (Healey et al., 2002 in Van Horen, 2004, p.765) it is apt to, building networks and being reflective of a 'cooperative autonomy' between the government and the organizations (Sanyal, 1994 in ibid).

However, on the matter of the NGO role, as in cases of too narrow, short-term or rigid viewpoint (common shortcomings) development projects can fail (Gallopín, 1994, p.30).

The ultimate factor, necessary for an optimal transformation and integration into the formal asset is the call for transforming social power into political power. Referring to the target of the eradication of mass poverty, as Gallopín asserts it implies that the dominant power relations in society need to be changed. Indeed one of the impoverishment mechanisms of the pickers can be due to reduction in autonomy to resources' use and in making decisions. This is increasing exploitation or pressures from the powerful and the intermediaries, reducing pickers' control over the means of production while also increasing debts (Gallopín, 1994, p.23).

To change this, there is the necessity not of just an increase in access to resources by the poor, but also the increase of the group capacity to respond and increase awareness (Gallopín, 1994). Thus, at the local level access to information and better understanding of the surrounding environment are necessary to enhance the group's capacity to respond (ibid, p.39). This can be done through the formation of political movements,

"Indeed Grass-roots movements around the world have demonstrated their capacity for innovation and have shown that effective efforts to eradicate poverty, by putting the poor in control" (Gallopín, 1994, p.60).

Moreover, the capacity to respond has to be put side by side with empowerment, which is the capacity of human subsystems to innovate and to induce change (ibid, 1994, 41). Getting in association and collaboration, increases the power to control resources and the surrounding environment (Gallopín, 1994, p.42).

⁵³ They are informal institutions that are formed by members of a community to address a need such as a park, sports facility or community centre (Ahmed et al., 2004, p.470).

In addition, as described by Gallopin poverty eradication must be tackled from different levels, (local and global) and there must be a complementarity among grass-roots, local initiatives and macro policies, between 'bottom-up' and 'top-down' strategies of development, through a multi-level (vertical) coordination (Gallopin, 1994, p.61).

As seen in the case of Dar es Salaam city project for better waste collection, the implementation of the strategy included central government, local government, donor agencies, institutions, private sector, and individuals. As taught in this case, in overcoming the most critical problems, they brought " [...] together in working groups those affected by the problem, those who create problem, and those who an institutional responsibility to manage the problem" (Halla and Majani, 1999 in Kassim et al., 2006, p.772).

In the case of waste management, the PPPs should also be implemented through the involvement of the informal recyclers into the solid waste management policies, considering their views and interests (Nzeandibe, 2009, p.98). In this way general political recognition of the category of these workers and of their work, is demonstrated.

In conclusion, a successful integration process will bring improvement of informal pickers' life conditions as better economic conditions, employment, giving security on livelihoods, poverty eradication and moving up in the hierarchy. Moreover, an improved environment would also be the consequence of better recycling thanks to new-skills learned and to a reduction of material disposed in landfills (Hayami et al., 2006). As such, there are positive incentives for SWMS in terms of socio-economic and ecological sustainability, and public health aspects (Baud et al., 2001).

Box 5 - Proposals for the recovery of recyclables in Mexicali before final disposal and conflict that can arise

- Waste picking can be combined with the hiring of small scale waste collection services.
- Develop collaboration between the municipality and waste pickers, which will also represents an economic advantage for the municipality, because, less waste is taken to the landfills
- Convert them into a cooperative.
- Promote association processes through especially designed courses for waste pickers, improve their technical and management techniques. Thus making them more efficient and competitive in their activity.
- Develop activities such as workshops, campaigns, conferences, pamphlet distribution, radio and TV programs with various sectors of the population for obtaining more participation in classifying recyclable material at its origin, to convince people to give away their material to waste pickers.
- Provide waste pickers with the necessary equipment for their jobs, including strategically located warehouses, taking their bags and classify materials. These places can be the only warehouses and sites for buying and selling to the general public. These places would be managed by the municipality's Sanitation Department, social groups or non-governmental organizations (NGOs) and associations or waste pickers' unions.
- NGOs involvement in the various activities of waste handling, as facilitators of the informal sector, adding credibility to this sector's role in the recovery of refuse.
- Form a work group for selective picking, as a voluntary association of representatives from all levels of administration. This, because of opportunity of creating synergies and scale economies when cooperating at all levels with other administrations to solve problems and take advantage of common opportunities.
- Create a hybrid agency that takes on the tasks of handling municipal waste, as property of the municipality but managed by experts dedicated to the learning and innovation of new strategies, financed by municipal and outside funding institutions.

Taylor (1999) identified some of the conflicts that could arise while trying to develop work collaborations between the informal sector, public sector and formal sector:

- (1) Some parties will question the legitimacy of other actors, particularly that of the informal sector;
- (2) Businesses recently privatized work under pressure to deliver fast and profitable results. This limits the possibilities of exploring collaboration relations with members of the informal sector, community based organizations (CBOs) and NGOs;
- (3) Members of the informal sector may refuse to make formal arrangements with the rest of the parties to comply with registration and commercial and legal requirements, since, on occasion, they have felt that this limits or restricts them in some way.

(Ojeda-Benitez et al., 2002, pp.284-285).

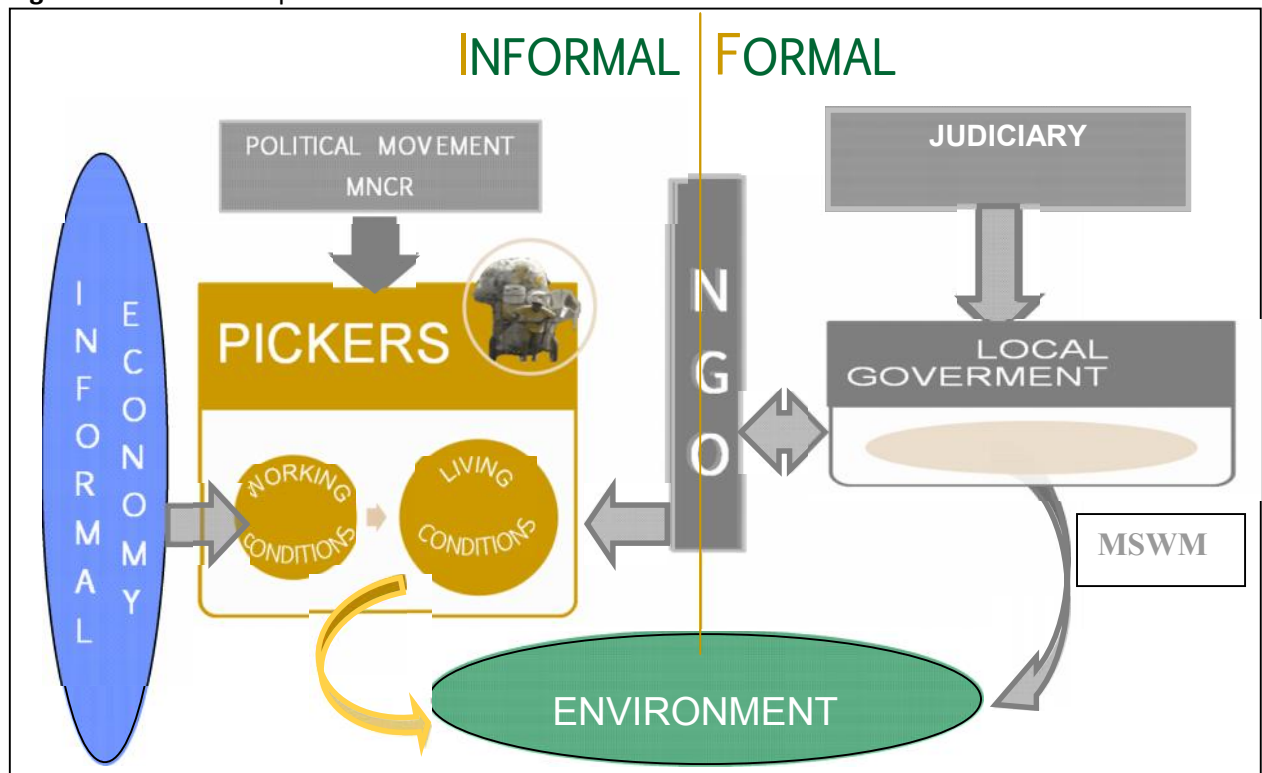
2.11 Conceptual Framework

To better understand the logical flow of the research question and sub-questions, conceptual framework was designed (figure 2.5).

Being the main research question:

To what extent is the informal sector of Solid Waste Management sustainable in the Metropolitan Region of Curitiba?

Figure 2.5 – The conceptual model



A Sustainable informal waste management is achieved when the process is environmentally sound (efficient recycling) and the informal pickers' working conditions and livelihoods are decent (Wilson et al., 2006). In order to assess SD in this sector, a holistic view of solid waste management in the Metropolitan region of *Curitiba* is needed. This is done via looking at the SD dimensions (environmental, social and economical) and their inter-relations.

This leads to the objective of looking at the various areas of influence of the SD dimensions and the stakeholders' roles and relationships in affecting them. Looking therefore at the entire governance system.

Regarding the informal side, in order to analyze the pickers' working conditions, knowledge on how the informal economy works and its price-making system mechanisms, is necessary. Working conditions affect living conditions (i.e. health issues); this is another relation that is analyzed.

The work of poor people affects environment (i.e. starting the picking activity) and the improvement of their working conditions too (the better the conditions the more efficient and wider is the recycling activity). The political movement of the pickers that acts as a syndicate of this category of workers, with its claims and conquests also affects the living and working conditions of the pickers (and so the environment).

Moreover, to understand how sustainable the informal waste management sector is, the formal system (MSWM) needs also to be analyzed by looking at its impact on the environment. Moreover, the actions and policies of the local governments also affect the conditions of the pickers.

In general, local governments are intermediated by NGOs, whose role and influence are important for the objective of the research.

Finally the role of the judiciary, which normally acts as a monitor of local government's actions, need to be analyzed in order to understand its influence on the pickers conditions (and environment).

3. The Solid Waste Management of the Metropolitan Region of Curitiba (formal and informal sectors)

Introduction

The following three chapters will present the findings of the research on solid waste management carried out in the Metropolitan Region of *Curitiba*.

This chapter specifically, will outline the main actors responsible for solid waste management in the specific case of the metropolitan area of *Curitiba*, researched on site.

Both formal and informal sectors composing the SWM in the MRC will be reviewed. From the formal side the municipal recycling programmes and the sanitary landfills which been operating recently, will be described. From the informal side, the analysis will focus on the role of informal pickers in the waste life cycle and their working conditions. This chapter attempts to answer the following two research sub-questions:

- *How does the solid waste management work in the metropolitan region of Curitiba (which are the main actors responsible for it)?*
- *Including its pricing and sales process, how does the informal waste sector work? To what extent does it affect pickers' working conditions?*

Chapter 4 will analyze more completely the different aspects of the informal waste sector, with special attention paid to picker's associations. It will give some important information for the second sub-question presented in here.

3.1 The context of Brazil

This section describes basic regional data and general information on waste issues in Brazil to have a national reference.

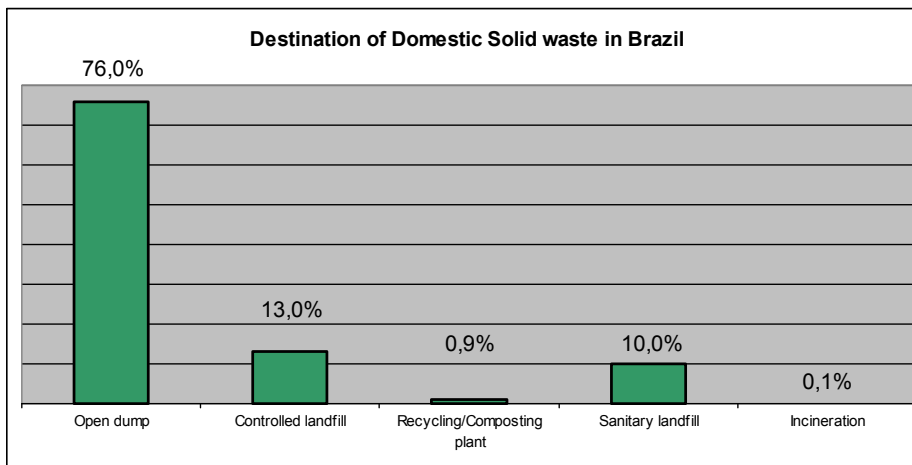
The total Brazilian population is made of 191 million inhabitants (Census 2010, IBGE⁵⁴), of this 82 % is urban (live in the cities) while 37 % of the urban population lives in slums (estimates 2001, UN-Habitat). In Brazil according to IPT/CEMPRE (2000) and IBGE (2002), 241.614 tons of waste are produced every day (Fagundes, 2009, p. 160).

The importance of looking at waste management system is related to the definition of 'decent dwelling' in Brazil. This concept is composed by a simultaneous presence of the provision of services as potable water, regular sewage system (connected to the public network) and direct waste collection in all houses⁵⁵. In Brazil, only 62,6 % of urban residences are equipped with these specific characteristics (IBGE, 2010). It proves that investments are still necessary to provide a proper quality of life for many Brazilians.

Considering Brazilian data specifically on SWM, it is shown that more than 50 % of the municipalities do not fund the execution of these services. A large majority the small and medium-scale municipalities do not possess technical staff qualified for planning, monitoring, and evaluating services or installing costs and financing systems for these services (*Ministério das cidades*, 2003, p. 10 in Fagundes, 2009, p.166).

Waste treatment in Brazil, looking at its final destination, presents some deficiencies in terms of environmental conservation (graph 3.1). Most of the waste is buried in open-sky dumps (in more than 50 % of Brazilian municipalities, around 2.665 towns). Only 23 % of waste receives an adequate treatment, with just 10 % of waste deposited in sanitary landfills (IPT/CEMPRE⁵⁶ 2002 in Fagundes 2009, p.160)⁵⁷. Poor waste collection and treatment has direct impacts on public health and environment.

Graph 3.1



Source:
Fagundes, 2009, p.260

Among the problems that poor waste disposal causes there are ground and water (superficial and underground) contamination, generations of bad odours and the proliferation of pathogens (Fagundes, 2009, p.162). Furthermore, the lack of collection service in Brazil, results in cases of burning waste, burying in open-dump sites and formation of waste dumps in rivers or in open-sky

⁵⁴ *Istituto Brasileiro de Geografia e Estatística* <The Brazilian Institute of Geography and Statistics>.

⁵⁵ It is called direct waste collection when it occurs directly in the residence, while indirect collection is when waste is left by residents in containers or other type of deposits (IBGE, 2010).

⁵⁶ First evaluation made in spring 2002 on municipal waste management services in the Latin American and Caribbean countries.

⁵⁷ Data confirmed in the environment secretary of *Curitiba* website.

sewage (IBGE, 2010). Indeed 0,7 % of the total waste in Brazil is left in water bodies by the residents (Fagundes, 2009).

The lacks (of collection and disposal) left by the municipal authorities are filled by the informal recycling activities, playing a central role for the recycling sector. Informal picking activity carried out by poor people is extensively present in the Brazilian Nation. Data estimations give approximations of 500.000 individuals involved in informal waste picking in Brazil, being responsible for 90 % of total collection of recyclable materials in the big cities (Medina, 2010). These materials reach the Brazilian industries with an estimated economic value of 3 billion US \$. The large demand for recyclable materials is due to their cheaper nature compared to virgin raw material (Medina, 2010, p. 33). The work of these pickers reaches high rates of material recycling in the Brazilian metropolitan areas and towns (table 3.1).

Table 3.1 – Recycling rates in Brazil by the informal activity

Material	Recycling rate (%)
Paper	45 %
Steel cans	45 %
Aluminum cans	95 %
Glass bottles/jars	47 %
Milk/Juice cartons	47 %
Plastics	18 %
Organics	3 %

Source: Medina, 2010.

The main materials picked by the informal pickers are plastic, cans (steel and aluminium), glass, paper and organic. Brazil has the highest rate of cans recovery (95 %) due to informal picking.

The organic material processing (composting) is very low. According to Bley Jr. (2001 in Fagundes, 2009, p.162) 50 % of the Brazilian domestic waste is composed by organic matter (vegetal and animal origin) and 1/3 by recyclable materials. Putting together this data reveals a big lack of a necessary composting service in Brazil. This gap on organic waste collection and treatment is not bridged by the informal pickers' activity.

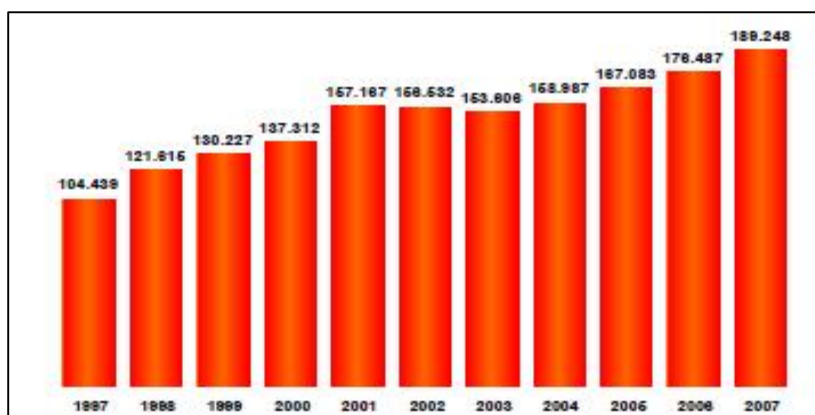
Next section will consider more specifically waste matters of *Curitiba* and its urban hinterland.

3.2 MSWM of Curitiba and its Metropolitan Region

The city of *Curitiba* and its metropolitan area is nowadays passing through an important transition in the area of waste management.

As proved and witnessed by some representatives of the Waste and Citizenship Institute of *Curitiba*, the strong urbanization brought a large raise in poverty on one hand and on the other a steep enlargement of the richer *Curitiban* society. Both phenomena caused an increasing growth of waste production (see graph 3.2) and un-sustainable effects to the city and its residents.

Graph 3.2 – Solid waste production in the MRC*, between years 1997 and 2007



* Excluding waste produced by the city of *Curitiba*.

Source: SMMA 2007 & IPPUC, 2008.

In total around 1.500 tons of waste are produced every day in the city of *Curitiba* (estimates of the year 2000⁵⁸, table 3.2). The majority of the waste produced in the MRC is buried in the sanitary landfill and the remaining small quantities are incinerated, dumped in open-sky sites, composted, separated or dumped in controlled landfills.

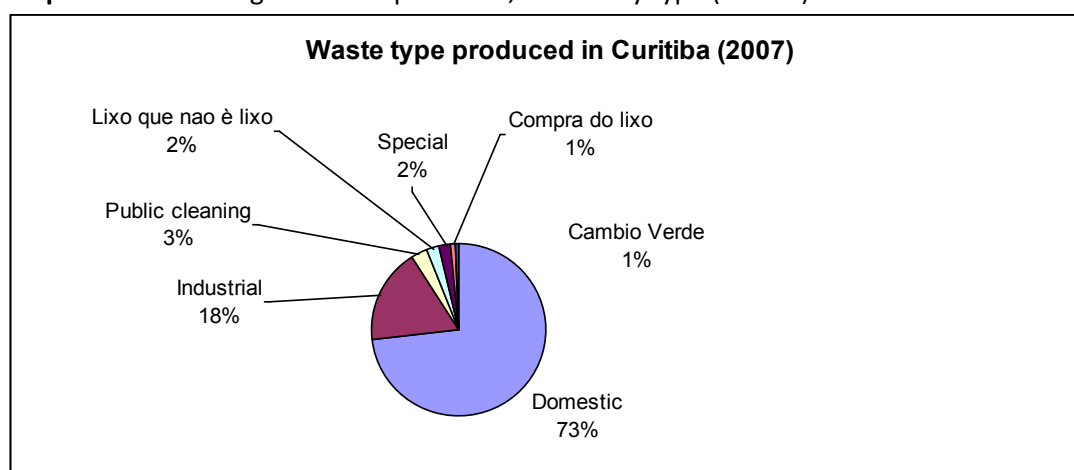
Table 3.2 – Waste final destination Curitiba and its metropolitan area

Quantities (tons/day) Areas	Total waste produced	Open-dump Sites	Controlled landfill	Sanitary Landfill (Caximba)	Composting facility	Separation facility	Incineration
Curitiba	1548,9	-	-	1.547,5	-	-	1,4
MRC	2131,8	114,0	7,5	1.982,4	25,0	1,5	1,4

Source: IBGE, 2000.

The major type (in quantity terms) of waste produced in *Curitiba* is the domestic one (graph 3.3).

Graph 3.3 - Percentage of waste produced, divided by type (in tons)



Source: SMMA 2007 & IPPUC 2008.

Those officially responsible for domestic waste management are the municipal authorities of the Metropolitan Region (MRC). In the case of the city of *Curitiba*, the Sanitation Department (*Limpeza publica*) of the environment secretary is in charge for managing the waste produced by local households. Related to private companies' role, most of the MRC towns considered (see table 1.4 section 1.6), with an exception of *Almirante Tamandarè* (for only non-recyclable waste) and *Colombo*, which have third party companies responsible for the domestic waste collection (*Conresol*, 2010). The *Cavo Gestão Ambiental* enterprise, as a third party of the municipal council of *Curitiba*, is committed for collection and public cleanliness in the capital. Waste collection service in the 2000 Demographic Census was said to be covering 99,54 % of the urban households (IPPUC, 2008) in the city of *Curitiba*. While in the poorer municipalities its coverage reaches the 93,6 % to 95,1 % of the households (UFRJ, 2005). This data is quite contradictory with the data referring to pickers' role in waste collection (see table 3.3 and figure 3.1).

The inhabitants of the various metropolitan neighbourhoods deposit their solid waste in plastic containers, metal basket or in plastic bags and place them on the streets' sidewalks, separating the recyclables from non-recyclables (mainly organic). The municipal waste door-to-door collection of domestic waste in *Curitiba* is divided in different services: recyclable materials are picked by the trucks of the *Lixo que não é lixo (LqnèL)* <waste that is not waste> programme, while organic and non-recyclable material are collected by trucks that go to the sanitary landfill of *Fazenda*

⁵⁸ Source: IBGE 2000.

Rio Grande. In *Fazenda R.G., Estre Ambiental* enterprise is now in charge for the final disposal of waste for most of MRC towns (belonging to the consortium).

Regarding recyclable waste, it is collected by the municipal service, has different destinations:

- (a) In the *Usina de Valorização do rejeito* <Plant of Valorization of Waste> of the municipality of *Curitiba* in the town of *Campo Magro*, administrated by an NGO *Instituto Prociudadania* <Pro-Citizenship Institute>;
- (b) Different storages of *catadores*;
- (c) Associations and cooperatives of *catadores* through the programme *Ecocidadão* <Eco-citizen> administrated by the NGO *Aliança Empreendedora* <Entrepreneurial Alliance>;

Moreover, there exists another municipal programme treating recyclable waste, *Câmbio Verde* the <Green Exchange> programme. It was initiated in the year 1991 and it was targeted for the low-income districts of the city where there was no easy access for waste truck. It is based on the installations of some temporary spots for exchange of recyclable waste by the households with food provided by the municipality (explained more in details further on).

According to the data given by the consortium⁵⁹ (*Conresol*, 2010) in most of the towns of the MRC, the municipal recycling collection programme exists.

Related specifically to the recycling side, the formal subjects involved in the process are the municipal authorities but un-officially the informal pickers of waste, called *catadores do papel*, have a central role in the recycling field of the metropolitan area (e.g. tables 3.3 and 3.4).

Table 3.3 – Recycling amounts in 2006 in the towns (in tons/year) belonging to the Consortium

Municipalities	Recyclables		
	Formal collection	Informal collection	Vegetal
Almirante Tamandarè	505	N.I.	N.I.
Araucaria	417	1900	280
Balsa Nova	320	30	30
Bocaiuva do Sul	N.I.	N.I.	N.I.
Campina Grande do Sul	N.I.	N.I.	N.I.
Campo Largo	65	2724	370
Campo Magro	908	0	N.I.
Colombo	1028	12	N.I.
Contenda	52	N.I.	N.I.
Curitiba	13.324	45.500	52.800
Fazenda Rio Grande	N.I.	N.I.	N.I.
Mandirotuba	N.I.	360	N.I.
Pinhais	624	624	960
Quatro Barras	780	240	N.I.
Quitandinha	N.I.	240	N.I.
São Jose dos Pinhais	500	N.I.	N.I.

Source: *Consórcio Intermunicipal para Gestão de Resíduos Sólidos Urbanos*, December 2007.

In *Curitiba's* urban region a large amount of agents involved in waste picking and reprocessing are informal. Much of the information, especially on informal picking, is lacking due to the difficulty in obtaining precise data; when given, it can be seen that generally they recycle much more waste than the municipal services do (table 3.3).

The city of *Curitiba* recycles the most and this thanks to the informal recycling sector that leads the sector. According to Medina (2010), every month the informal pickers in the city collect

⁵⁹ *Consórcio Intermunicipal para Gestão de Resíduos Sólidos Urbanos* <Intermunicipal Consortium for Management of Urban Waste>.

3.000 tons. Precise numbers of recycling rates is difficult to find, different sources give different information. Of the total waste produced, in 1999 the municipal council estimated that 500 tons are in average recycled, 32,29 tons/day by the municipal programme and the remaining 445,50 tons/day by the informal pickers⁶⁰ (information given by the SMMA⁶¹ of *Curitiba*). According to Medina (2010, p.33) the municipality of *Curitiba* recycles 800 tons of recyclable waste per month (at US \$ 180/ton). In the last six years the recycling rate in *Curitiba* increased by 155 % of its volume, the 10.493 tons collected in the year 2004 became 27.940 tons in the year 2010⁶².

Most of the domestic waste produced is buried in a landfill (table 3.4 and figure 3.1).

Table 3.4 - Some official numbers on waste quantities

Waste Final destination MRC and Curitiba	Tons per day	Non-recyclable waste Recyclable waste: the last four data refer only to the municipality of <i>Curitiba</i>
Caximba Landfill (2010)	≈ 2.400 tons/day	* The data is concerning all the town halls that deposit waste in <i>Fazenda R.G.</i> , as precise data on <i>Curitiba</i> has not been published.
Fazenda R.G. Landfill (2011)	≈ 2.500* tons/day	** Between 600 and 800 ≈ 700 tons/month. 700/20 (working days/month) ≈ 35 tons/day.
Campo Magro Recycling plant (2011)	≈ 35** tons/day	*** As demonstrated by a study of the municipality of <i>Curitiba</i> in 1999 (saying that they collect more than 92 % of recyclable materials in the city).
Informal pickers – <i>catadores</i> (2000)	≈ 445,50 *** tons/day	**** Obtained by dividing the total amount given by <i>AE</i> for the year 2010 $\{[3770/12(\text{month/year})]/20\}$ (working days/month) = 15,7 tons/day.
Project <i>Ecocidadão</i> (2010)	≈ 15**** tons/day	***** Obtained by dividing the total amount given by the SMMA of May 2010 (310 tons) by the days the CV is operating in a month (16): $310/16 = 19,375$
Programme <i>Câmbio Verde</i> (May 2010)	≈ 19,4***** tons/day	

Industrial waste has to be managed by the industries themselves, which pay private companies for the treatment of their remnants⁶³. Sanitary waste such as expired medicines and health products are normally incinerated. The particular waste as tires, batteries, lamps, gardening waste, civil construction waste follow specific processes of recycling or treatment.

The information on the SWM, solely based on the municipality of *Curitiba*, are summarized in the following figure 3.1.

⁶⁰ At that time, the Town hall estimated as the number of picker of approximately: 3.300.

⁶¹ Municipal Secretary of Environment.

⁶²Source: newspaper '*Paraná* online' website of the 12/2/2011, see: <http://oestadopr.pron.com.br/cidades/noticias/915/?noticia=crece-a-coleta-de-lixo-em-curitiba>

⁶³ Passing on the orbital road *Roan. Contorno Sul* of *Curitiba* to go to *Caximba*, crossing the *CIC* it is possible to see numerous enterprises and private landfills where recycling of industrial waste is done. Some names: *Transresiduo, Transportek, Ars, Transgravagem, Impresa limpa*, etc.

Figure 3.1 - Waste Management in Curitiba

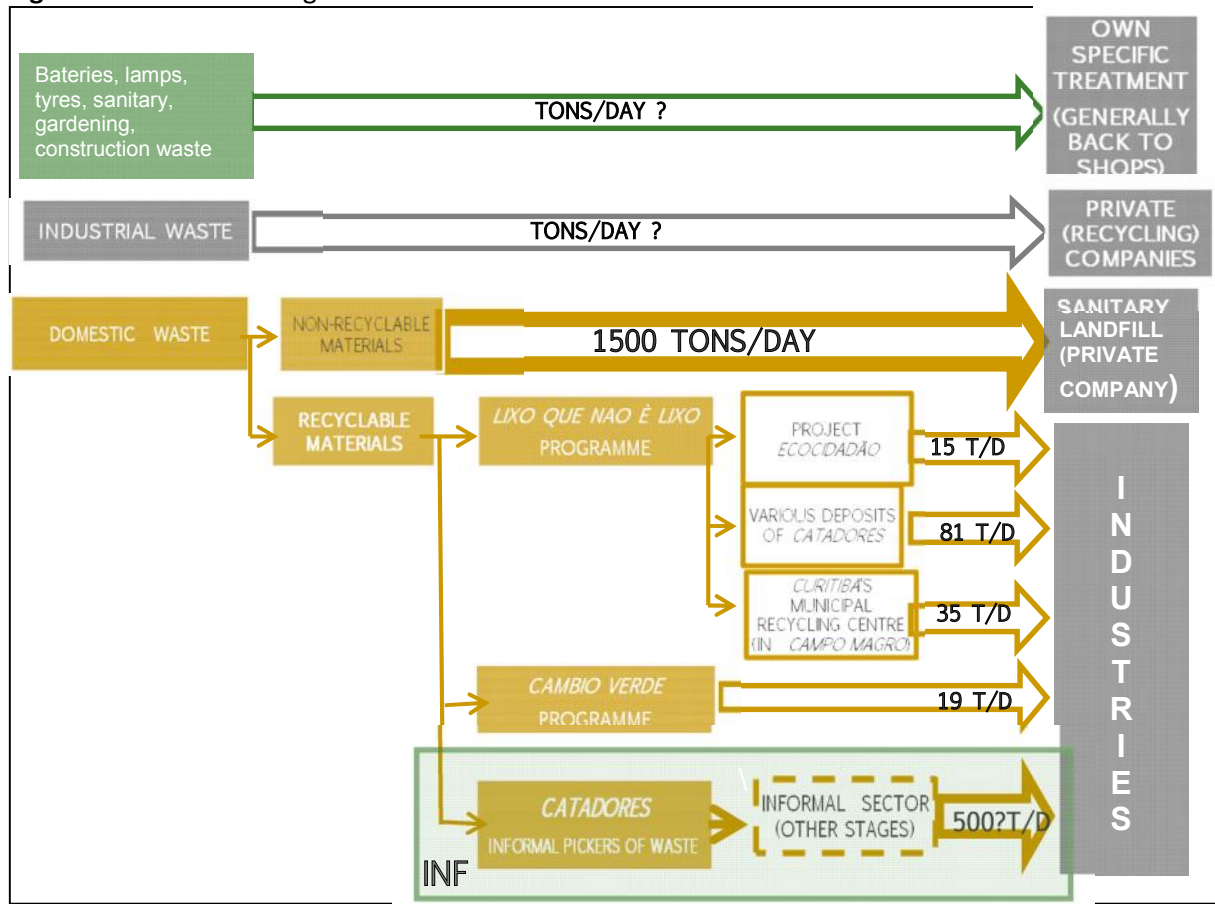


Figure 3.1 has to be related to figure 3.2 in the section 3.6 that refers to the informal sector (see dashed arrow and box) to get the whole picture of the waste cycle and management in the MRC.

In the other towns of the MRC in general, the waste management works basically in the same way as in *Curitiba*. The non-recyclable material goes to *Fazenda Rio Grande* (of 99 % of the municipalities belonging to the Consortium, around 2.500 tons per day); previously it went to the landfill of *Caximba* (table 3.4). Recyclable waste is collected formally by municipal services that discharge it in deposits of *catadores* (table 3.3) to be separated and inserted in the informal waste economy, or is collected by informal pickers themselves. Industrial and special waste follows its specific path (see box 6, the example of the particular case of the municipality of *Piraquara*). The *SIPAR* plan should forego some composting system but currently most of the towns of the MRC do not have it yet (table 3.2).

In the following sections, the various branches of the waste management in *Curitiba* and its metropolitan region will be analyzed deeper.

Box 6 - SWM in *Piraquara* municipality

The following information comes from official data of the municipality of *Piraquara*, divulged through flyers for its population and through information got through different open interviews done at the town hall.

In *Piraquara* 34 tons of waste are collected every day, by the municipal trucks. The municipality of *Piraquara* affirms that the majority of waste that is produced is collected but admits also that the region is contaminated by waste thrown or left by many people in *valetas*¹ or open-dump sites.

It is forbidden to have a waste landfill in the territory of *Piraquara*, due to its particular nature of being a watershed land. Thus, the domestic waste collected went to the landfill of the MRC in *Caximba* (now to the one of *Fazenda R.G.*). The municipality of *Piraquara* advertises and stresses the importance of the habit of separating waste (including cleaning and drying the materials before depositing them in the waste bins) in their flyers.

Particular waste:

Waste as tires, deriving from civil construction, remnants of health products, rests of gardening and used kitchen oil cannot be deposited in *Fazenda's* sanitary landfill.

Used tires have to be accepted by the sellers, re-processed by them.

Based on the Environmental Municipal Code, for the law number 907/2007 the remnants from civil construction (as bricks, ceramics, stones and tiles) have to be re-processed by the providers.

Sanitary waste as old medicines, has to be destined to health centers (in general incinerated).

Waste from gardening on the basis of the municipal law 897/2007, is collected through a specific service.

Kitchen oil, used for frying or cooking, has to be stored in closed containers (of plastic or glass) and to be brought to a collection point or given to the 'recyclable waste-truck'. It cannot be thrown in the ground or sewage².

All that is not solid and recyclable waste goes as organic, as common waste, to trucks that go to *Fazenda Rio Grande*. It is not possible to make personal composting systems in *Piraquara* because of its particular nature of an area of environmental protection³. The municipality of *Piraquara* provides a calendar with the streets and days the municipal trucks are passing. In some areas they pass just once a week, some twice and some three times.

The recyclable waste is collected just once per week. The municipality of *Piraquara* made an agreement with an association of *catadores*, in which the municipal trucks deposit the recyclable waste at the *barracão* <big barrack> of the *catadores* which will separate it and get the profit from its sale.

They told me that in *Piraquara* is collected around 900 tons of waste per month which 30-40 tons of it is recyclable, moreover the 30% (10 % of the total) is re-processed. They said they spend around 1.800.000 R\$ for the waste service and they do not even get to pay the 50 % of the service through the taxes on waste.

An official working at the Environment secretary told me: "poor people have possibly a major awareness on environmental issues, because of their state they re-utilize and save materials due to necessity, this happens much more than in rich classes."

¹ Literally, means "small valleys". It is the rough way to define the open-sky sewage fosses.

² A drop of oil can contaminate 1000 liters of water.

³ At the secretary Environment, they explain me that the service of picking recycled waste is not named *lixo que nao é lixo* but that all the people use that name because it became so famous thanks to marketing action of *Curitiba's* authorities.

3.3 The *Aterro Sanitário* <Sanitary Landfill> of *Caximba*

Operational description

The sanitary landfill of *Caximba* (southern neighbourhood of the city) is nowadays closed (since 1st of November 2011), but the history and the process it has been passing through are very worthy to mention to get a complete picture of the SWM in the MRC.

For 21 years⁶⁴ the un-separated waste of the metropolitan region of *Curitiba* coming from private houses⁶⁵ was deposited in this sanitary landfill. The secretary of environment of *Curitiba* was responsible for the landfill. The municipalities of the Consortium paid 24 R\$/ton of waste to the municipality of *Curitiba*, which paid the enterprise *Cavo Gestão Ambiental* to treat it and manage the whole landfill.

In the year 2006, the Consortium declared that the landfill of *Caximba* received 600.000 tons⁶⁶. Official data demonstrated that at the time the landfill was going to close (year 2011) it received averagely 2.400 tons of waste per day from 19 cities of the MRC (belonging to the Consortium).

The landfill takes an area of around 500 square metres. The space for the landfill of *Caximba* was assigned after a study on environment impact of *IAP*⁶⁷. A ground analysis was made to test if it was possible to render waterproof and install the canalization of waste-grease, the so-called *chorume*.

All the trucks are weighed at the entrance and exit of the landfill to measure and register the weight of the waste left in the landfill. The landfill is composed by two main waste mountains, based on two phases of formation, a younger and an older one. The mountains are separated in cells 5 metres high, rendered waterproof trough a blanket of membrane of PEAD 2 mm thick. After the discharge by the trucks, the waste is compacted by tractors and afterwards the waste grease is drained. After compacting and covering with a membrane the waste, it is covered with soil and remnants of furniture to make it more compact and let the tractors and trucks drive on it. At the end, grass is put on the top of the mountains.

Inside the cells there are horizontal and verticals drainers⁶⁸ to collect the waste grease. The treatment of grease in *Caximba* costs 120.000 R\$ per month. There are also chimneys from where the gases produced by the waste can exit. Before they contact with air, the gases pass through a burning process. The resulting gas is composed of methane. Every cell should have also rain drainage (but not all of them do) in order to avoid the waste getting wet and do not get in contact with grease. The collected rainwater goes directly to the river *Iguaçu* (found at a distance of 600 mt. from the landfill).

⁶⁴ Its operation started the 20th of November of 1989 initially receiving just the waste of the municipalities of *Curitiba* and *São Jose de Pinhais*.

⁶⁵ In *Caximba* can enter only domestic urban waste, based on the accord made in 2004.

⁶⁶ Source: *Conresol*: “*Plano de Gerenciamento do Tratamento e Destinação de Resíduos Sólidos*” – version for public consult, December 2007, p. 10.

⁶⁷ *IAP*: *Instituto Ambiental do Paraná*, <Environment Institute of Paraná>.

⁶⁸ The vertical drainers are composed like that: an internal tube of steel of a 30 cm diameter, around it there are some stones that are closed by an iron net, covered with a geo-textile (that acts as filter for impurities).



Pic.3.1 - An aerial photo of the sanitary landfill of *Caximba*.

It is seen the different layers, the cover with membrane on the right and then the final coverage with grass.

Source: website of *mafia do lixo* <waste mafia>.

Source: <http://www.mafiadolixo.com/>

Between the landfill and the living area, there is a safety buffer area of 50 metres. There are more than 70 employees working in the landfill, the discharge activity occurred 24 hours a day (with an illumination system for the night), 6 days a week with the only non-working day on Sunday.

The waste mountains are not fixed, they are moving downwards, and for this reason, some re-structuring is needed. The older mountain was under a re-conformation, doing re-structuring with waste⁶⁹ as all the material was beaten down. There are some measuring tools on tubes⁷⁰ for understanding the topography of the area by evaluating the inclination of the mountains and to what extent they have fallen.

There are also two kinds of greases, which receive different treatments⁷¹; one, more contaminated and toxic, coming from the older mountain of waste, and the other, less contaminated from the newer one. At the end of the treatment process that lasts more or less 180 days, the final product of both greases, go to the *Iguaçu* river. After the closure of the landfill there will have to be a monitoring of the area, for estimative following 20-50 years, because of the grease continuously being produced.



Pic.3.2 & 3.3 - The state of the landfill where the waste is discharged.

It is possible to see the tractors working, vultures and the vertical drainers (red flag generally indicating where the flame is).

Source: Mafia do lixo website.

The periodical records made by the representatives of the landfill, reveal that the amount of organic waste is above 40 % (see table 3.5) of the total material that arrives. As affirmed by the Consortium and its Coordinator, this fact encourages to accentuate the recycling (separation) system of the materials at the source.

⁶⁹ Which was chosen as best material to be used for this function. The waste mountains at that point already had a small downfall and they wanted to prevent a landslide.

⁷⁰ One of those had the basis detached by the ground at a height of approximately 70 cm, this demonstrating that the mountain of waste has been beaten down (the instruments were collocated 5-6 years ago, this meaning a decrease of approximately 10 cm per year).

⁷¹ The older grease goes to a tank, called lagoon, where it goes into a process of oxygenation (made with a machine that generates air), it can be seen foam produced on the surface. After the aerobic treatment, it goes to a physical and chemical centre of treatment (he could not say which substances were used there). The grease coming from the newer mountain goes to two tanks where undergoes a process of aerobic and anaerobic process. In all the tanks 25-30 cm³ of grease is treated per hour. The lagoons are deep 3 (the 2 medium) and 4,5 metres (the bigger one). There are also some wells for monitoring the quality of water.

Table 3.5 - Material composition of waste in the landfill (year 2005)

Material type	Percentages
Organic	38,17%
Paper	15,33%
Plastic film	12,19%
hard Plastic	6,63%
Diapers	4,87%
Rags	4,35%
Card-board	4,20%
Glass	3,81%
Rubber	2,34%
Iron metals	2,21%
Tetrapak	1,74%
Leather	1,72%
Other materials	0,93%
Wood	0,81%
Non-iron metals	0,70%
Total	100%

Source: Conresol

Waste landfills judicial history

The landfill of *Caximba* was supposed to have closed for some years (starting from 2003⁷²) because its utile-life was coming to the end. Since August 2008, the sanitary landfill of the Consortium passed through different juridical processes. Initially it was decided that it had to close for exceeding its capacity in July 2009, but after various extensions, the formalized date was November 2010⁷³.

The alternative to *Caximba*, that gained the official bidding was the second cheapest option (73 R\$ per ton, instead of 50 R\$ per ton). This landfill situated in *Mandirotuba* (with a capacity of 2000 tons per day), would be managed by the same company *Cavo Gestão Ambiental* that managed the landfill of *Caximba*. This proposal was supported by the municipal council of *Curitiba* but has been suspended by the Justice due to different irregularities⁷⁴. At the same time the cheapest alternative to *Caximba*, in *Fazenda R. G.* was also facing a judicial process with the a neighbour of the landfill.

For long time the future on waste disposal of the MRC was uncertain, thus the Consortium took the decision the 4th of May 2010 to temporarily depend on private landfills for waste disposal service. They declared, “[this choice is taken...] because utile life of *Caximba’s* landfill is terminating and the legal process on the previous plan of *SIPAR* is still in suspension. This would be a temporary choice (with a contract of about 2 years) until the *SIPAR* project will be rehabilitated by justice”⁷⁵.

After long time of uncertainty and with the conclusion of some judicial processes, finally it was decided that the land for the new landfill of the MRC would be situated in *Fazenda Rio Grande* and managed by the enterprise *Estre Ambiental S/A*.

The cost for contracting a private enterprise⁷⁶ can achieve 40 millions of Reais but the landfill of *Fazenda R.G.* is the only one permitted to receive waste with a capacity for 2,5 thousands tons per day. The section 3.5 will discuss and describe more fully this landfill.

⁷² Information given by IPPUC.

⁷³ Information got form the article in the newspaper of *Gazeta do Povo* of 6th May, the major newspaper of the state of Paraná, one of the most important of Brazil.

⁷⁴ It got blocked also by a municipal law of 2008 that forbids to establish a landfill on that municipality land.

⁷⁵ Information got during attending the meeting of Consortium.

⁷⁶ As affirmed in the article of *Gazeta do Povo*.

As has been asserted, the closure of *Caximba* apparently was a conquest of the public opinion pressure because the Public Power wanted to continue until the end of the year to give time to the landfill of *Mandirotuba* to get ready.

Irregularities and environmental consequences

Beyond the legal irregularities and the struggle between politicians and justice, the landfill of *Caximba* has been causing other negative externalities. The Ngo *ADECOM - Aliança para Desenvolvimento Comunitario da Caximba* <Alliance for the Community Development of Caximba> is concerned on various issues about the landfill, but principally the effects on the nearby environment and on its inhabitants' health and living. The 10 years old organization has been denouncing various illegalities, deficiencies and inefficiencies of the landfill⁷⁷.

Adecom has made different denunciations regarding various issues such as: the proximity of the landfill to three schools and a health centre⁷⁸, bad effect on inhabitants' health, air, ground and water (of the close *Iguaçu* river) pollution and prohibited material discharge.

On matter of air contamination, the children of the day-care but also the people of the whole neighborhood area are exposed to the gases emitted by the landfill. The produced gases are methane and *Solphidrico*⁷⁹ <hydrogen sulphide> gas. *Adecom's* president declared that the major health problem that sulphidric acid provokes is spontaneous abortion⁸⁰.



Pic. 3.4 -The day care of Caximba *CEMEI*, visibly close (just 100 metres) to the landfill (red mountain).

It is possible to see the head of a person, supposedly one of the employees of the day-care. The photo was taken during the visit, it was possible to hear children's voices, (thus they were most probably playing in the yard) and to hear the noise of the trucks depositing waste in that moment. Mr. Lima said that approximately more than 100 of children pass their day there.

Moreover, the NGO claims that quantity of waste arriving at the landfill was over the permitted limit and that there was no adequate equipment on place. Additionally, they denounced the deficiency in the treatment of the water effluents that went to *Iguaçu*⁸¹. In 2004 there was given a fine for quantity of *chorume* that exceeded the permitted standards in this river.

As mentioned before only domestic waste should be discharged in the landfill. Thus waste as batteries, lamps, tires, sanitary, furniture are not permitted. *RSS (resíduos de serviços de saúde)* <sanitary waste> is not permitted to be deposited in the landfill, it should be re-processed by

⁷⁷ Following information are based on interview with *Adecom's* representatives and a visit in the neighbour region of the sanitary waste landfill of *Caximba*.

⁷⁸ Two schools at less than 500 metres of the landfill - *Escola Estadual Maria Gai Grendel* and *Escola Municipal Joana Raksa*, then a day-care at less than 150 metres, *CEMEI - Caximba*. One of them is a municipal day-care, based on a project developed by *FAS Fundação de ação social de Curitiba* <Curitiba's foundation of social action>.

⁷⁹ It is a gas that when weather is humid stays still in the air, but when it rains it dissipates around.

⁸⁰ In one of the principal streets, *Estrada delegado Bruno de Almeida* close to phase three of the *aterro* <landfill> where in 47 houses occurred 24 abortions.

⁸¹ For instance with the *DBO - Demanda biológica de oxigenio* <Biological demand of oxygen> that should be at the limit of 1 mg for 1 litre, it is of 64, 63 times higher than the permitted quantity. The *DQO - Demanda química de oxigenio* <Chemical demand of oxygen> should be 150 mg for litre and it is at the level of 2500 mg for litre.

sanitary centres⁸². The representatives of *Adecom* declared to have seen various times remains of hospital products.



Pic.3.5a - Image of a health product taken in an area close to the landfill

Pic.3.5b - Health product waste in the landfill.

Source: *Adecom*

Moreover, the *Adecom* signaled two serious illegalities: an irregular enlargement of the area of the landfill where to deposit waste, and while considering that the utile life was almost going to terminate continued activities of the landfill without a license by the *IAP* for five years. *Adecom's* worry on the enlargement of the landfill is about possible collapse of the mountain of waste in case of strong rainfall because of the absence of the covering grass that has been taken out⁸³.

Considering the lack of license, there is a technical document generated by *IAP* and signed by the civil police, *COPE - Centro de Operações de Policiais Especiais* <Operation Centre of Special Police>, of the year 2005, called TAC⁸⁴.

With the closure of the landfill, *Adecom* claims recuperation of the area, that is foreseen in the *Plano do encerramento* <closure plan> – part of the Federal Law 6938⁸⁵. In the community there has occurred an *Audiencia Publica*⁸⁶ <public meeting>, with 150 people of the neighbourhood and different political and juridical authorities⁸⁷, discussing a bidding for evaluating, cleanliness and recuperation of the area. The community have made requests on how to compensate the presence of the landfill for the last 21 years⁸⁸.

To conclude, it can be said that various interviewed experts concerned about the environmental impact of the landfill of *Caximba* and the business interests behind it, believe that low interest in investing in recycling is related to avoiding that the quantity of waste, and thus of profit, going to the landfill diminishes (the service is paid based on quantity of waste deposited).

⁸² In general, the incineration method is the most common.

⁸³ In February 2010, the NGO denounced the occurrence of an erosion of a waste mountain which was localized just at 200 meters from the day-care and the healthcare centre.

⁸⁴ *Termo de Ajustamento de Conduta* <Terms of Conduct Adjustment>, it's an executive extrajudicial title established together within the municipal administrations for all the municipalities that presented irregularities in the destination of waste, which defines deadlines and activities that the municipality should implement, for environmental regularization of the installations of operating waste disposition (CETESB, 2003).

⁸⁵ This law establishes the National Policy of Environment, its targets and mechanisms of formulation and application, constitutes the National System of environment (Sisnama) and institutes the Record of Environmental defence. *Lei N° 6.938, de 31 de Agosto de 1981*, muted in 2010.

⁸⁶ There is a resolution: *O Conselho Nacional do Meio Ambiente – CONAMA N° 9, de 03 de dezembro de 1987* which say that in terms of Environment, every time that the society has doubts can call an *Audiencia Publica* <Public meeting>, calling the Public Prosecutor, another authority and minimum 50 citizens, and a class representative entity of <entidade de classe representativa>.

⁸⁷ As the Public Prosecutor, the environment Secretary, the *IAP*, the President of the Tribunal of Counting and representatives of the town hall from other secretaries.

⁸⁸ The so-called recuperation of *passivo ambiental* <passive surroundings> and its surroundings (especially considering pollution of river *Iguaçu*). Community requests mainly regarded work for the neighbourhood, such as asphalt on some main roads, sewage system, gym, lands regularization, a new day-care construction.

Even in a city where concern of environmental issues is internationally recognized, the strength of business interests seem over-ruling and the lack of respect of existing environmental regulations is occurring. All this, results in negative effect on surrounding environment and public health.

3.4 The new Sanitary Landfill of the MRC in *Fazenda Rio Grande*

Operational and basic description in comparison with the landfill of Caximba

Since December 2010, as the landfill of *Caximba* closed, the domestic waste of the MRC (specifically of the municipalities part of the Consortium) has been managed by *Estre Ambiental S/A (EA)*⁸⁹.

The Sanitary landfill is situated in *Fazenda do Rio Grande*, a municipality of the MRC at 30 km from *Curitiba*.

The area in *Fazenda R. G.* managed by *EA* is large 260 hectares (2 millions of square meters), and 60 Ha of this area will be used for collocating the landfill, a composting plant, a recycling cooperative of *catadores* and a new headquarter of the Institute *Estre*. The remaining 200 Ha will be an area of environmental preservation (working as a buffer zone between the river and the landfill). The landfill area borders of the river *Iguaçu* and from far away can be seen a mountain of waste at the landfill of *Caximba*.

The capacity for what their license is 2.500 tons per day (100 tons more per day respect to *Caximba*) and an estimated utile-life that of the next 30 years. The landfill works 24 hours per day, an illumination structure for the night activities was built to accommodate this. Around 300 waste trucks enter the landfill everyday, and as in *Caximba* at the entrance of the landfill area there is a balance to weigh all the material that enters. The discharging waste activity works until 10 PM and starts at 7 AM. They receive waste every day, even in Sunday.

The landfill was still in the implementation phase in March 2001 so many infrastructures as the main entrance road, the offices, the landfill itself (planning ground, 2 drainage systems, dike, burning pillars etc.) were under maintenance. Moreover, it is still lacking the recycling plant of *catadores*, the energy treatment, the grease treatment and the composting plant for organic waste. Compactation of the ground was still going on to get the area prepared to receive the waste. Concerning the start of the operations of the landfills, it was said that the license received permitting to start to work, arrived 15 days before the official opening date. Moreover, they began receiving from the first moment the full charge of around 2.500 tons per day, which normally is un-common, as it should be started step-by-step with the quantities. These declarations were made to justify the lack of being totally prepared and operationally ready to start treating waste.

In the landfill, a small mountain of waste resulting from waste discharging during a period of around 3-4 months (from December to March) was present, arriving to the level of the 4th layer (8 layers are the maximum). The waste is generally situated in a site separated from the underground by a film of PEAD⁹⁰ membrane. This waste is compacted by tractors, then when the cell is filled, it will be covered with the geomembrane and finally with some soil and plants (vegetation) received from the urban door-to-door⁹¹ service collection. Every cell (layer) is of 5 metres of height and at the top of the 8th cell grass is collocating to sustain the soil. This insulation system was also present in *Caximba*.

⁸⁹ *EA* is a private company was established in 1999, it manages already landfills in different 10 places in the state of *São Paulo*, as in *Paulinia* (120 km from *SP*, which was the first one since 11 years). One is situated in the city of *Rio de Janeiro*, now two in progress in the state of *Paraná* (including the one of the MRC). The site of *Paulinia*, originally intended to receive 500 metric tons per day, currently receives nearly ten times as much daily. Nowadays, *Paulinia* has the first machine producing energy from waste http://www.youtube.com/watch?v=XG1YLq3B1BQ&feature=player_embedded

⁹⁰ Polyethylene of high density.

⁹¹ In reality, this layer of vegetation is not foreseen in the treatment plan of the waste but its use is due to the opportunity to use it (as the municipality donated it).

Pictures 3.6a & 3.6b - At the Sanitary Landfill of *Fazenda Rio Grande*



In this landfill, there exist an internal drainage system, it is composed by drains of three different sizes⁹² interconnected in a network. All the grease collected goes to main drain large 8x1 metres that is next to the dike surrounding all the landfill area as a ring. The dike has the function of protecting from the waste discharging area, a preservation forest called *mata nativa* <native wood>, surrounding all the landfill area and for separating the landfill with the container of grease.

The collected grease then goes to a final container, the main captivator, which stores all of it and where it should be treated. The whole landfill is in decline of 1 degree to make the grease fall from the gravity and be collected all together. Nowadays, the grease (3-400.000 litres per time) is taken by an enterprise in the state of *Santa Catarina*, at 220 km from *Curitiba*⁹³ but in the future *EA* will directly treat it. Concerning grease treatment, it was said that the resulting liquid will be used for industrial uses or *Sanepar*⁹⁴, at it is forbidden to simply discharge it anywhere.

Beyond producing grease, they produce methane that is burned in some tubes installed in the very bottom of the waste mountain. The following plan is included to produce energy with gas, taking a consistent volume of it to be channelled to a burning process in an energy plant.

Also in this landfill exists a rainwater system collection⁹⁵ made of external channels, to not let that it go into the waste and to not let it turn into grease (the two drainage systems are separated).

As in *Caximba* after some time the waste mountain will need maintenance, re-structuring will be necessary for its unstable nature.

It has been asserted that if there would exist a wider and more efficient recycling system in the city, this landfill would not treat such big quantities and that due to the low investments (deriving from taxes paid by the citizens) no better sustainable (and more expensive) technologies can be installed.

In conclusion, both of the landfills appear to have the same working system; existing insulation of waste from the ground, vertical and horizontal drainage for grease and rain water systems, production of gas and need of re-structuring works occasionally.

But as witnessed during the visits and interviews, the landfill of *Estre* appears to be more respectful of the environmental standards, for instance with a different and more sustainable treatment of the grease produced, the planned gas use for energy production, the installation of a composting system

⁹² The smallest of 0,60X0,60 square metres, medium of 1 square meter and the biggest 8 square metres.

⁹³ Five trucks come every day to take the grease produced.

⁹⁴ The *Paraná's* company for Sanitation services.

⁹⁵ At the 8th final floor all the rainwater is collected and go down through the channels to the *caixas sedimentadora* <sedimentation cases> (of approximately 35 linear metres each) where the sediment is filtered.

and storage of *catadores*. These initiatives overcome some main problems generated in the previous waste treatment system as *Iguaçu* river pollution, air contamination and lack of organic material treatment. These differences show awareness of the new managers on the problems caused previously. For this reason many has been using the word *lixão* <open-dump> than 'sanitary landfill' to define the *Caximba's* landfill. Either way many of these environmental goals are only predicted and have not been demonstrated to be reached yet.

3.5 The Recycling Municipal Programmes (Municipality of Curitiba)

The municipal waste collection of domestic waste in *Curitiba* is currently divided in different services: Recyclable materials are picked by the trucks of the *Lixo que não é Lixo (LqnèL)* <waste that is not waste> programme and organic and non-recyclable material goes to the sanitary landfill of *EA*. The particular and industrial waste has specific process of collection and treatment (see box 6). The picked waste by the municipal service for recycling goes to the recycling-plant of *Campo Magro*, to some deposits of *catadores*⁹⁶ (around 30) and some specific associations of *catadores* through the programme *Ecocidadão (EC)* <Eco-citizen>. Another two municipal programmes dealing with waste and recycling exist; the *Câmbio Verde* <Green Exchange> programme and the *Compra do Lixo* <Waste Purchase>, specific for low-income areas. These programmes will be described next.

3.5.1 *Lixo que não é Lixo* Programme

The programme on recyclable domestic waste has existed for more than 20 years in *Curitiba*. The collected waste is deposited in the *Usina de Valorização do rejeito* <plant of valorisation of waste> of the municipality of *Curitiba* that is found in *Campo Magro*.

There are scheduled days (Monday, Wednesday and Friday) for the inhabitants to put the recyclable waste out of their residences. The trucks of *lqnél* after collecting the recyclables, also go to different *catadores'* deposits, some them are also in the project *Ecocidadão*.



Pic.3.7 - The truck of *Curitiba's* recycling programme (with its famous comic of the propaganda).

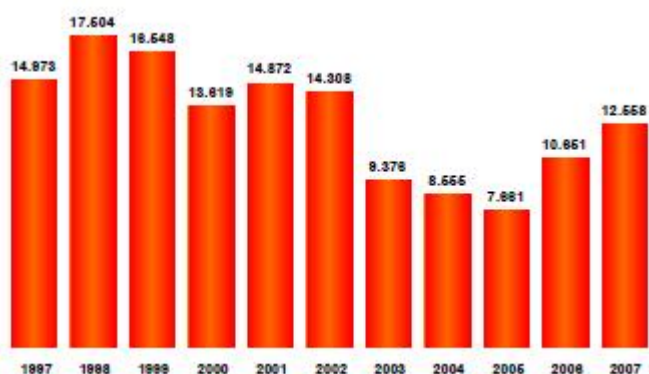
At the beginning of the *lqnél* programme a massive propaganda was done, using different items (as a can, a banana etc.) drawn as comics, to sensitize the residents to waste issues and give them incentive to separate recyclable materials from non-recyclable (generally organic) waste. Any person aged more than 25 years that has lived their life in *Curitiba* would remember this propaganda.

The same type of recyclable materials collection exists in most of other towns of the MRC. This programme name is so famous that is also misused in these other towns. In general the recyclable waste quantities collected have changed during the years (referring to period between year 1997 and 2007), having a general decrease rate and then improvement in its performance (see graph 3.4). The collection efficiency a part of its up and downs throughout the years, does not demonstrate any significant improvement on the final data given (compared to the initial one, graph

⁹⁶ As told, some of these might be run by uncertain owners (may be involved in drug dealing) that exploit *catadores*.

3.4). This data is showing that on the recycling side, no significant increase in investments has been done to improve the programme efficiency and thus its recycling rate⁹⁷.

Graph 3.4 – Quantities collected of recyclable waste (tons/year) by the *Iqnél* programme



Source: IPPUC, 2008.

3.5.2 The Municipal Recycling plant in *Campo Magro*

The *Unidade de Valorização de Reciclagem* <Unity of Recycling Valorization> in *Campo Magro* (30 km from *Curitiba*) exists since the year 1990, it is managed by an NGO *Istituto Procidania de Curitiba* <Institute Pro-Citizenship of *Curitiba*>⁹⁸. The NGO receives the money from the sales of the material with which pays all the workers, giving social safety and nutrition⁹⁹.

The plant receives recyclable domestic waste only of the city of *Curitiba*, which is the 30 % of the total recyclable waste collected by the *Iqnél* municipal service. The remaining 70 % is distributed to more than 32 barracks (storages) of associations of *catadores*, which is said are private barracks registered in the municipal council. The trucks arrive at the plant three times per week, every week arriving with 100-150 tons at the plant, which in a month makes around 600-800 tons. 86 % of the waste that arrives is re-processed, the rest goes to the waste sanitary landfill as remnants.

At the plant work 176 workers, divided in 2 shifts¹⁰⁰. All the workers have uniforms and work around mechanical tables where waste flows by quickly. They separate it into big containers. A lot of waste was noticeably falling down in the last 'mixed waste' container.

The materials separated are plastics, glasses, metals, tetra pak, polystyrene, papers. All the materials are separated on the basis of types and colours, as for plastic material: PET¹⁰¹ (white and coloured), PEAD¹⁰² (white and coloured), PS¹⁰³, PVC¹⁰⁴ and even RX (resonance magnetic) sheets. For paper material it means white paper, mixed paper, cardboard and journals and for metal, the so-called *asucata* <all things made in iron and cans>. The material that arrives relatively the most in quantity is paper. In an outdoor room of the plant there are also some computers accumulated. Of all the material separated also CDs and DVDs are collected, sold for 2,50 R\$/kg to industries.

Every type of material is sold to different industries. Every material and type has own price; 39 items in total are for sale (see table 7.15 in the Appendix).

⁹⁷ Even if according to some other source (see note 62) showed that tons (10.493) in the year 2004, increased of over 155 %, to 27.940 in 2010.

⁹⁸ Previously was run by the FAS coordinator, Fernanda Richa (wife of previous Mayor and actual Governor of *Paraná*, Beto Richa).

⁹⁹ The following information results from the visit and the interview made at the plant. It is possible to visit the centre since it exists, there are 2 responsible for that. They have guided tours, including at the beginning a video show in a room for environmental education. Every day, there are around 3 or 5 visits, in general schools.

¹⁰⁰ The first one from 7 AM to 16 PM, the second one at 16 PM to 1 AM.

¹⁰¹ Polyethylene terephthalate, the common fizzy drinks' plastic bottles.

¹⁰² Polyethylene of high density.

¹⁰³ Polystyrene.

¹⁰⁴ Polyvinyl chloride, a plastic not totally originated by oil.



Pic.3.8 – Work in the municipal recycling plant in *Campo Magro*.

Can be seen that it is an industrial way of working, the flowing mechanical tables, the containers were they separate, the protective equipment and the final container with mixed waste that will go to the sanitary landfill.

In this plant shown, the waste that arrives does not have such good quality, much of it is organic and mixed, demonstrating the bad separation habits of the city's households. As will be seen further, this problem exists also for the associations of *catadores*.

They also have a museum with very ancient things found in the recycling plant since 1996, with more than 7000 objects found in the waste by the workers. It is possible to find all sort of things¹⁰⁵. At the video room, there is also an exhibition of various objects built through the recycled materials sold by the plant¹⁰⁶.

To know how much waste arrives to *Campo Magro* compared to *Fazenda R.G.* see the following formula,

$$\frac{[(\text{tons of waste per day to Fazenda}) * (\text{days of month})]}{\text{tons of waste per month to the recycling plant}} = \frac{(2500 * 30)}{700} = 107, 1$$

Every month the recycling plant receives around 700 tons of waste, which corresponds to a quantity of waste 107 times smaller than the amount the landfill of *Fazenda R.G.* receives.

In conclusion, compared to the work and state of the *catadores* (as it will be described further), the workers of this plant appear to be working in a more industrial way, with fixed timetables, easier activity (less wearing), with the use of protective equipment, meals provision and being legally registered for their job (with work rights respected).

3.5.3 The *Ecocidadão* Programme

Part of the picked waste by the recycling municipal collection service of *Curitiba* goes to deposits of *catadores* through the programme *Ecocidadão (EC)*. These associations also receive material donated by various companies, public organs and collection of *carrinheiros* <cart pushers> themselves.

The *catadores* in these storages separate, weigh and pack material, only those who keep pushing the cart are also involved in the collection phase¹⁰⁷. All the post-separation material, namely the non-recyclable waste (generally organic) selected by the *catadores*, is picked by a waste municipal truck to be brought to the city landfill.

¹⁰⁵ As paintings, musical instruments, iron, computers, arms, old coins and banknotes, a map of *Curitiba* of the year 1856, a copy of a small statue that is in the *Louvre* museum in Paris there is also a hairdresser seat. It is a real antiques store.

¹⁰⁶ As pieces for doing roofs made by toothpaste and by tetrapak (25 % plastic, 75 % aluminium), concrete to make dividers for houses made by sand, polystyrene and cement (in the holes some PET bottles). There are things done with remnants of magazines and journals, and a mop made by PET, another made by PET and Tetrapak.

¹⁰⁷ Same functions are found also in pickers associations not part of the *Ecocidadão* project.

Picture 3.9a & 3.9b – An EC association and *LqnèL* truck discharging recyclable waste



The *EC* programme is administrated by the NGO *Aliança Empreendedora (AE)* <Entrepreneurial Alliance> and it is initiated by the municipal council of *Curitiba*, its Secretary of Environment and the *Fundação de Ação Social (FAS)* the <Social Action Foundation>. The objective of this programme is economical and social inclusion of *catadores* and an improvement of their income and life quality. Data given by the municipal council say that *Curitiba* had 20 % recycling rate at the beginning of the programme, and it was expected to increase to 38 % (basis on the year 1999, as the project was planned in the year 2001)¹⁰⁸. The first experience *AE* had with an association of *catadores* was with the cooperative *Zumbi*, having the help of Wall-Mart and *ABN*¹⁰⁹. After this experience, they started willing to work with *catadores* and they participated in an initiative with the municipal council and *Avina*¹¹⁰.

The *EC* programme then started concretely in 2007 (the year of approval). *AE* conceived the project and is its executor and administrator of the project, *Avina* is accompanying the project; helping for localizations, support and paying the external auditing and juridical advisor. Further participants are the *Secreteria Municipal do Meio Ambiente – SMMA* <Municipal Secretary of Environment>, which passes the resources, and accompany the progress of the project, and the *FAS* which gives social support due to the reality the *catadores* live in.

In the first year, 2008, three associations were supported¹¹¹. In 2009, additional two organizations (totally 5) were supported and in the year 2010 in total 12 associations were made (including the recycling plant of PET). Nowadays they attend around 400 people. Their target is to achieve 25 associations by 2012 (19 by this year), so next year being the last one for opening new associations. Apart from the initial three, all the other associations were mobilitated and formed thanks to the project.

Since the beginning of the project, 800 % more material in total has been collected with an increase of salary per month of 120 R\$ for each *catador* (data given by the *AE*).

The associations who will be able in 2012 to take total control of their functions will have direct contact with the municipal council, the ones that need more time for their structuring and

¹⁰⁸ The following information derive from an interview at the *AE* headquarter.

¹⁰⁹ *ABN AMRO Brasil* is an aggregate of Brazilian enterprises.

¹¹⁰ *Avina* is a Swiss foundation that focuses in South American social entrepreneurs to support them. It makes diagnosis of this kind of people working in social area, people that reach activities with social affairs, in cooperatives, associations. It is the only donor organization in the world with an initiative to support waste pickers, it has donated over US \$ 9 million to *MNCR* and 24 cooperatives of *catadores* in 10 Brazilian states, benefiting 1.500 individual members and creating 6.500 new jobs (Medina, 2010).

¹¹¹ *Sociedade do barracão* in *Boqueirão* (already existed before but did not have a structure), *Natureza Livre* in *Uberaba* and afterwards *Catamare* which is the only that already existed as an association and had a structure.

consolidation will have support from *AE* for more 1 or 2 years. In 2011-2012, the future development of the programme will be known.

One of the central ideas of *EC* is to stimulate the formalization of these groups of *catadores* and their organization. The first phase is the mobilisation one, finding people potentially willing to create an association. About this in the year 1999, the *FAS* made a study of irregular occupied settlements (supported also by *COHAB*¹¹²) and within them of the presence of *catadores*. This helped to know from which areas start with mobilization, making contacts and starting with the programme. A team of technicians shows the advantages in working in an association or cooperative.

After mobilisation and showing the advantages, the group that has interest starts having reunions, prepare an *estatuto de regimento interno* <internal statute of rules> and all the needed documentation. They have elections for the directory board, to be registered in the statute and in the protocol of the directory election. This initial phase on documentation generally concern all the associations (also those out of the *EC* programme).

Afterwards starts all the support on the administrative and structural aspects, a stall (storage) is rented, it gets equipped with tables for separation, material cages, pressing machines, balance, pallet-balance, pack fork-lift, office with computers, kitchen (with cookers and fridge), the *IEP* (which is the equipment for individual protection, that has to be provided continuously), *EPCS* (fire extinguishers). This is the basic standard equipment to work for an association of *catadores* in the *MRC*.

Furthermore, the *AE*'s technicians administrate and give assistance in how to improve the production of separation of materials, as witnessed of 20 material types they usually separated, they can pass to 35-40 types. Thank to collective work, better separation (selection) can be done. For instance, to not waste time a single *catador* may put together two materials that have a slight different price. In gathering more workers for separation, the gain comes through summing up all the newly separated materials' small quantities. Moreover, they start to learn to weigh waste, to do a better selection of the waste (the organic is rejected) and they learn to communicate with the donors (as on the quality of the material coming). In this way, the aggregate value of the material to be commercialized, increases.

In the initial phase of association, it was noted that sometimes there exists conflicts due to favouritism to friends or relatives. For instance, somebody weigh more or less depending for whom it was for. Thus, in this phase it is important to work also on improving the relation of trust, for instance with the group giving the responsibility of weighing functions only to some specific people.

Having improved the production phase, the technicians focus in teaching and supporting the administrative and financial skills. They start to do payments, receipts, and to fill the weight data in the computer's databases. The idea is that in 5 years they would learn everything; all the skills will have been apprehended resulting in full self-management and autonomy.

Nowadays, the programme is thought to be spread in different areas of the Brazilian Nation and new orientations have been designed, as instead of putting permanent technicians for support, just give temporary tasks to *catadores* to see if they can make it, being guided step-by-step towards full independence of the associations. More information on the challenges to be faced by this NGO during this programme will be discussed in chapter five (section 5.1) of this Thesis.

3.5.4 The *Câmbio verde* Programme

There exists another municipal programme treating recyclable waste: *Câmbio Verde (CV)* the <Green Exchange> programme. It was initiated in the year 1991 and it was targeted for the districts of the city where for the lack of infrastructures, waste trucks were not able to pass in order to collect waste (as on a hill or a riverbank)¹¹³.

¹¹² Brazilian popular housing company.

¹¹³ The following information is based on an interview and visit at a *CV* point.

In the year 1991, there were 53 points, but now it is grown to 89. It occurs once per week in low-income neighbourhoods and it is based on an exchange of recyclable waste with food (based on a relation of 4 kg per 1 kg, mainly horto-fruit products). Used kitchen oil is also collected and goes to an organization *Ambiental Santos* that commercializes it by extracting the impurities and producing cleaning products.

As declared, it passed to be from an emergency and environmental project to a more socially concerned programme.

Picture 3.10 – A point of *Câmbio Verde*



There are more or less seven spots every day spread in the city¹¹⁴, which rotates every 15 days¹¹⁵, involving six trucks of waste and five trucks of food. The point of CV stays two hours, and the most recently installed ones, just one hour. The food and waste is weighed at the collection points. On one side, there is a municipal (recyclable waste) truck where the employees weigh waste and on the other side, there is a truck of *Câmbio Verde* that donates food based on waste's weight. In total 10 workers approximately are involved in the

whole process.

The advertisement is made through the department of environmental education. The choice of the districts is made by the team of the department of environmental education and alimentary education¹¹⁶, which are partners in the programme¹¹⁷.

Data coming from the Department of Sanitation of *Curitiba* says that in May 2010, they were able to collect 310 tons of waste and distribute 90 tons of food, benefitting around 800 families. The majority of these families in general benefits also from another programme, the *Compra do Lixo* (explained further). It was said that the majority of the beneficiaries of the programme are the *catadores*, as they exchange material that is the least valuable one, such as glass.

The horto-fruit products come from the *CEASA - Convenio Federal Paranaense de Produtores Rurais* <Federal Convention of Rural Producers of Paraná> which buys the products and sells them to the municipal council of *Curitiba* at a lower price in comparison to the standard ones¹¹⁸. Some food products are donated. In average the food costs 6000 R\$ per month and an additional 16.500 R\$ for each truck (not more information on costs was given).

The centre of *CEASA*, it is an immense market, where all the agrarian producers keep their products and sell them. CV programme has also an own room to keep the products¹¹⁹. The products they store are cheaper because of their appearance¹²⁰, but everything is in good quality and edible.

In conclusion, some experts in the field gave different comments on this programme. For instance, it was said that resources could be addressed in a much better way; not spending money to pay third-party industries for these kinds of projects, but rather establish associations to do this work. Somebody said it is a very expensive policy and not very transparent (unknown how much it costs exactly). It has been declared that this programme is not that popular or popularized, and is a

¹¹⁴ Saturday is the most full, because is the day when more people are around.

¹¹⁵ The programme during the week is from Wednesday to Saturday.

¹¹⁶ *Secreteria do Abastecimento* <Secretary of supply>.

¹¹⁷ They do a survey on the average income of the area. Indeed, a fundamental requisite has to receive maximum averagely three minimum salaries per family.

¹¹⁸ In reality at the Institute *L&C* has been explained that exists a service, called *CEASA amigo* in which it is possible to subscribe just being an association and so get food for free.

¹¹⁹ That day there were oranges, rice, bananas, beans, turnip, cabbage, potatoes, *inhami*, carrots, and *manioc*.

¹²⁰ For instance old *maniocs*, deformed carrots, small potatoes (apparently difficult to sell).

way to show that the municipal government is doing social work, but in reality is only concerned about marketing, as the municipal council does not actually have relations to the informal collection of waste. Indeed the waste quantity they collect in a month (around 300 tons) does not reach anywhere near the quantity collected by the pickers in one day (500 tons, published by the municipal council¹²¹).

3.5.5 The *Compra do lixo* Programme

The *Compra do lixo* (CL) <Waste Purchase> Programme also began for districts where the waste trucks were unable to pass, but it is older as it was initiated in 1989. The reason behind this project was to motivate to not throw and spread the waste around.

CL simply consists in placing a waste container of the capacity of 2000 kilos (equalling around 200 bags) in a road of a neighbourhood. The type of waste is domestic and non-recyclable and it has to be collocated in a specific bag of the enterprise *Cavo*. One day the bags are left in the container and another day, depending to the number of bags, food is received. The exchange relation is every five bags of waste for one bag (of 10 kilos) of food, or a bag of waste for a bag of eggs.

Before putting the bag into the container, the project responsible has to be informed. Generally, they are the leaders of dweller's association that do it voluntarily. The leader gives a ticket to all the beneficiaries, where he marked the quantity of bags and he does a report. After a week, the truck comes with the food.

The public participation decreased until the programme's total closure. In the year 1989, 75 communities (corresponding to 30.000 bags per week) were participating in the programme, and in the year 2010 just 11 communities (corresponding to 200.000 bags per week), around 7.200 people every month were participating. Every month averagely around 270 tons of waste is collected and more or less 20 tons of food is distributed. The municipal council donates empty bags collect waste.

Compra do lixo contrarily to *Câmbio Verde* is in extinct. The programme was forecast to close at the end of the year 2010. The closure is due to the said fact that the targets were achieved and there are not places anymore where trucks are not able to pass thanks to the improved infrastructures. Normally, where a point of *Compra do Lixo* is closed, they start a point of *Câmbio Verde* to stimulate the people to separate waste.

3.6 The Informal sector of Waste Management in the Metropolitan Region of Curitiba

The reality of informal pickers studied in the various world cases considered previously also regards Brazil, *Curitiba* and its Metropolitan Region. They are called *catadores do papel* <paper pickers> because historically the first pickers just collected material made of paper or card-board. More precisely they are defined as *catadores do materiais recicláveis*, the informal pickers of recyclable materials.

Concrete numbers on how many informal pickers exist in the MRC is difficult to obtain. Different sources give very different and contradictious data¹²². On one side, for instance, the *Paraná's MNRC*¹²³ leaders believe that in the MRC, there are around 130.000 *catadores*. Contrarily, the Municipal council gave amounts of approximately 5.000-6.000 individuals only in the city of *Curitiba* and more than 10.000 if encompassing the whole urban region.

¹²¹ Through pamphlets explaining the *Ecocidadão* programme.

¹²² In a recent research developed by IPPUC it was affirmed that more than 96 % of those living in low-income areas of the MRC, pick waste. Considering that in the MRC approximately 60.000 people live in the so-called *favelas*, the number of *catadores* in this study achieved an esteem of about 54.000 persons. The very high percentage of pickers in low-income settlements is very questionable. Source: website of IPPUC, <http://www.ippuc.org.br/ippucweb/sasi/home/>.

¹²³ The political movement representing the informal pickers of Brazil.

Catadores have been affected (in a way benefitted) by the urban and economical expansion of the metropolitan area with the result of much more waste production. This expansion has occurred in the MRC as shown in section 1.6.

There exist different types of informal pickers in the MRC but considering an informal reality, it is difficult to obtain clear and precise information of the actual picture. It is very complicated to define some categories of them because every *catador/a* has his/her own story of life. The majority of them is exploited, live and work in a total informal reality. They generally use a rudimental cart to pick waste (picture 3.11). The cart weight can reach around 200-300 kilos and they generally do long-distance walking with it.



Pic. 3.11 – A *catador's* cart (centre of Curitiba).

On the roads of the city centre of Curitiba, especially during the evening, when shops are being closed, it is possible to see many individuals pushing their carts and collecting waste (mainly cardboard) left by the shops outside. The two minor in the picture might be the children of the *catador* owning the cart.

Some pickers are homeless and live in extreme conditions, addicted to different kinds of substances (drugs and alcohol), and some others sleep in their carts on the street.

An illegal form of renting carts exists by dealers owning waste storages. They make agreements with the *catadores* to bring (at very low prices) the materials collected (during the day) to them. This results in a sort of exploitation and debt system. For instance, in case of bad weather (rainfall) pickers gain less and are not able at the end of the day to pay the cart-rent (as said e.g. gaining around 3-4 R\$ per day with the cart usually costing 5-10 R\$). As witnessed in an association, some pickers used to rent a cart and when they sold materials, a percentage of the material value went to the owner, for instance, for every 1 kilo of card-board that had a value of 0,21 R\$/kg he paid 0,15 R\$/kg (making a profit of 0,06 R\$/kg).

These carts made by some artisans can be also bought for 500 R\$ or 300 R\$ (if second-hand), amounts generally not affordable for non-organized pickers.

Some of the *catadores* pay a rent to sleep inside the waste storages. As witnessed by a representative of the *MNCR*¹²⁴, “many owners of *ferro velho*¹²⁵ put there 15-20 families and constrain them to find waste and push carts; it is practically slavery work, without rights to *INSS*¹²⁶, to infrastructures such as bathroom, shower and to a decent alimentation”.

¹²⁴ The national movement of the pickers, *Movimento Nacional de Catadores de Materiais Recicláveis*.

¹²⁵ <old iron>, they are storages owned by intermediaries that collect pickers' waste to be sold to other intermediaries. In this Thesis also defined as junk-shops.

¹²⁶ Social safety services.

Picture 3.12 – Storage of *catadores* with carts



[T., *carrinheira*, 65 years old]:

“I have been working 30 years in the recycling field. My husband and I owned a *Ferro Velho*. We were helping the pickers that brought the material to us. Nowadays, since the death of my husband I lost the activity, I’ve been working for four years in an association of pickers and collecting waste with my cart every day (earning per month around 200 R\$). I am gaining much less. At that time I was making so much more money, you can’t imagine!”.

Many pickers are not homeless and use their houses as working areas, filling them with waste that they will separate. As witnessed by an NGO representative, accompanying some groups of *catadores* organized in associations, “most of the work of *catadores* is invisible, it’s the separation phase which takes long time”.

They usually have low levels of education and for this reason they choose an activity requiring low skills. A research conducted by the Federal University of *Rio Grande do Sul* - *UFRGS*¹²⁷ on the pickers of the southern states of Brazil, said that 52 % of pickers chose this work for lack of alternatives and 21 % for the presence of friends or relatives and the remaining ones for various factors. This data demonstrates that half of the pickers choose this activity as a survival strategy. As affirmed by their movement, the *MNCR*, *catadores* are,

“persons of different attitude that takes the activity of collecting recyclable waste as own strategy of survival, normally they are the most recently arrived in the city, still not finding a job, or temporarily unemployed, or employed that in free-time does this activity to improve own income, as elderly people or those with health problems and those who have problems to enter in the market of labour”¹²⁸.

Moreover, as demonstrated by the *UFRGS* research, a facilitating factor for entering in this informal activity is the presence of some relatives or friends (network of contacts). In the case of the *MRC*, of the 94 interviewed pickers, 42 had other relatives working as a picker (see table 7.4 in Appendix). Some associations looked like more family enterprises (within them members of same family were working in). Indeed, some pickers are carrying out this work as carrying out a family tradition.

¹²⁷ Carried out between the years 2008 and 2010, on informal waste pickers in the states of *Rio Grande do Sul*, *Santa Catarina* and *Paraná*, with 94 interviewees.

¹²⁸ Source: *MNCR* website. It has been commented that, “*catadores* are those poor people that refused to rob or get involved in drugs dealing and decided to survive working with waste, they are real heroes”.

[49 years old female picker]:

“I’ve been pushing my cart for 20 years, I learned this activity from my family. My husband picks, my aunt picks, my cousin picks, my grandma died picking, my mum retired picking and my daughter started to get her first gains in the association of pickers we created”.

Working conditions

This section will discuss how the informal nature of the economy on waste, its structure and pricing formation, affects the working conditions of the informal pickers. The large majority of *catadores* is economically exploited and suffers of many health problems.

They pick waste outside shops in the evening, from houses (generally agreed with owners), from some markets areas, a few companies (which in general sell their waste to bigger dealers) and public institutions (which should be obliged to¹²⁹). All the *catadores* non-organized in associations sell their waste (and are paid normally every day for the material collected) to *Ferro velho* <old iron>, a sort of storages of recyclable material (especially of metal), also defined as junk-shops, which define the prices. They generally need to get paid everyday for two reasons; financial ones, and not having place where to store the material (Legaspe, 1996 in Fagundes, 2009).

The economical exploitation is based on a chain of passages (sales) of the picked materials. The first passage occurs between *catadores* to other subjects, such as intermediaries called *atravessadores* that usually own smashing junk-shops/storages called *ferro velho*. After this passage the material is sold to other intermediaries. Those who reach to accumulate a reasonable quantity of material to be sold to industries are called *apares*. The industries use them as raw material for their industrial processes. At every passage there is an increase of price of the material so that the final price compared to the initial given by the *catadores* has increased at least 3 or 4 times¹³⁰. For example, as explained a kilo of PET bottles¹³¹ is sold to an *atravessador* <intermediary> by a *catador* for 50 cents of R\$/kg, then the *atravessador* sells it for 80 cents of R\$/kg to another one and so on, until finally being sold to an industry for 2,50 R\$ per kilo. The certain prices at which the *atravessadores* sell are very difficult to obtain (box 7).

The low prices the *catadores* get can be seen also comparing the prices at which the recycling plant of *Campo Magro* sells (see the table 7.15 in the Appendix). The low incomes they get make the work very time-consuming in order to attempt to increase their incomes.

When the owners of the storages, the *atravessadores* that buy from *catadores*, are working on small-scale one, they generally operate illegally, not respecting any work right or public law and producing near slavery work of un-registered *catadores* (which are seen just as providers of materials so that no responsibility returns to them). Some larger owners of storages, *atravessadores*, can be formalized and register their workers, *catadores*, resulting in a status of employees rather than just providers of raw material. This respects the public law on economic activities. To escape this informal nature of the system is very difficult, especially for the *catadores*.

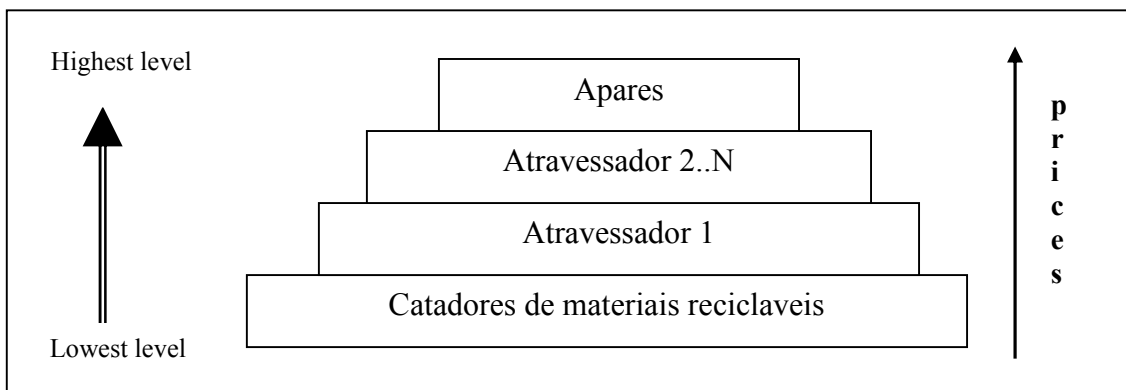
The informal sector has a hierarchical structure, when going upward the actors sell at higher prices of the materials (figure 3.2).

¹²⁹ Since 2006 thank to a Federal decree (5.940) all the Federal entities are committed to separate own waste and give to the associations and cooperatives of *catadores*.

¹³⁰ As witnessed by various experts working with associations and cooperatives of *catadores*.

¹³¹ You need 18 bottles to make a kilo.

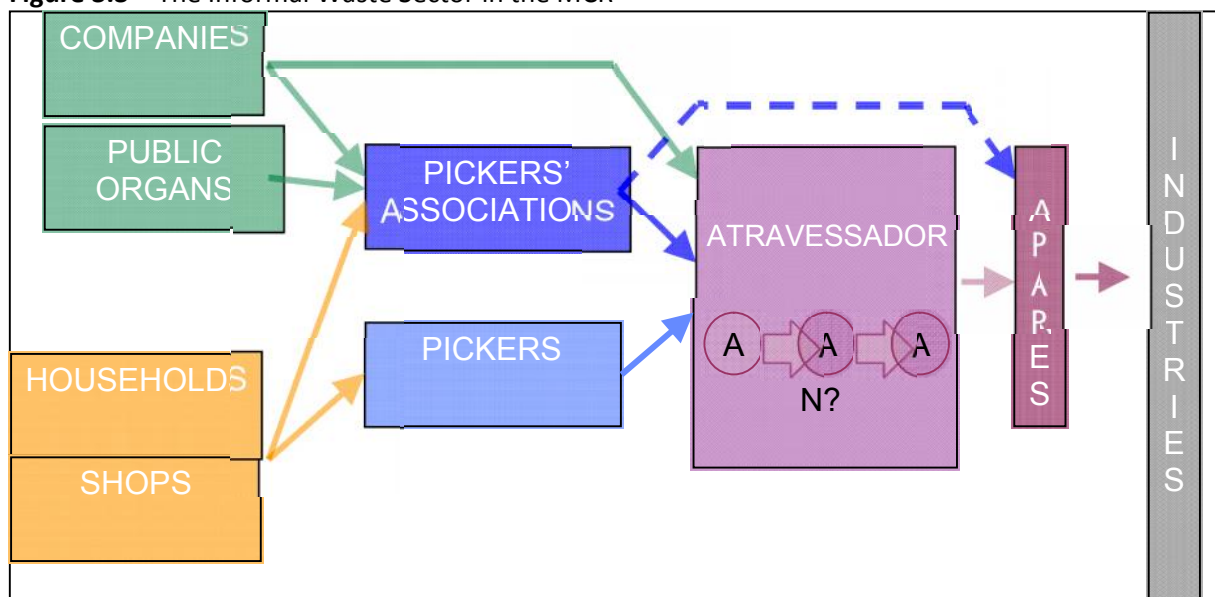
Figure 3.2 - Hierarchy of informal recycling



To get to know more on the pricing formation and its volatility and variability see box 8 on the specific cases of the associations (referring to the table 7.15¹³² in the Appendix).

The prices change depends also on the type of buyers, the closer that the *catadores* get to the industries the more they gain (higher prices). *Catadores* not organized in associations normally exert an individual activity and sell everyday to the so-called *Ferro Velhos* <junk-shops>. The figure 3.3, gives a better imaginary idea of the chain of passages in the informal waste sector, thicker arrows show the most common routes, while dashed ones less common. The *apares* are those waste dealers defined as who has the direct contact with industries. How many *atravessadores* the waste passes by before reaching them is not known as well as precise information (it mainly depends on the quantity of material accumulated).

Figure 3.3 – The Informal Waste Sector in the MCR



¹³² In the table, the columns in blue refer to prices given last year during the first fieldwork.

Box 7 – Interviewing *atravessadores*

From two different associations, one in the very south of *Curitiba* and one in *Almirante Tamandarè* I got the contacts of two so-called *atravessadores*.

Both of them when asking the permission to visit for an interview preferred the option of a phone-interview.

The first one was a buyer of mainly plastic materials (60 %), since 8 years. He sells for some companies in *São Paulo* and the state of *Santa Catarina* that produces basin-pieces and granulated material for other products. He said he buys from *catadores*, from around 30 storages, and achieves accumulating in total approximately 100 tons per month. When I asked him about the price he sells at, he tells me he cannot give me this information.

The second one was a buyer of *Almirante Tamandaré*. This contact was given by a *catador* clarifying that he was the buyer of the whole area and that he came from *Curitiba*. The *atravessador* at phone told me that he has been working 30 years in the field of recycling. He buys different materials: plastic, cardboard, metal etc. He declared he buys waste from markets, companies, shops, and individual people that accumulate by themselves, but he denied that he buys from *catadores*.

He said to he sells to different industries, one per material type as in *Morretes*, in *Bocaiuva do Sul* (for card-board) etc. He said being able to accumulate around 50 tons of material per month.

When I asked him about his sale prices (he was the responsible of the sales), he told me he did not know them.

Box 8 - Material prices their volatility and variability

In the different associations were asked at which the prices the materials are sold (table 7.15). It can be seen that the prices vary but are similar, depending on the type of material in sale. There are many different categories of material, going from around 30 to 40 items.

The majority of the associations used to sell to the so-called *atravessadores* and just some of them were selling some type of material to *apares* (that sells to industries).

In all the associations, they told me that the prices especially of the paper materials fell down in the beginning of the year 2011, this because of the summer holidays and so due to economic activities getting an arrest. The *catadores* told me that this is normal and that the same will happen in the period of July-August.

For instance, the white paper passed from costing 0,54 R\$/kg in December 2010 to 0,42 R\$/kg (April 2011), or mixed paper from 0,25 R\$/kg to 0,10 R\$/kg (150 % of decrease), card-board from 0,48 R\$/kg to 0,20 R\$/kg (almost halved prices). These divergences can be seen also comparing with the last year prices (in blue in the table), indeed these (as the ones of *Catamare*), of paper materials, are relatively higher than in the other associations. In some associations, thus they store the materials longer waiting for better prices, to take advantage of the price volatility.

In *Acampa*, the president explained me that in long-term strong variability of prices occurs, "for instance, in some years the card-board (that at that moment cost 0,32 R\$/kg), it passed to 0,38, then 0,20, 0,15, 0,18 and even reached the level of 0,4 R\$/kg". This happens also because apparently, nowadays the card-board is a material much more found on the market, and so its price falls.

On the other hand, the plastic material price is increasing, especially in the periods of Easter and at the end of the year, when lots of plastic is produced (because of shopping). As witnessed by a picker, "PET was at 0,90 R\$/kg, now it increased at 1,50 R\$/kg and times ago it was at 0,65 R\$/kg". Its price started to increase, as there was little material available on the market. The cause (quantity available on market) is the same but the consequences are opposite.

In the case of cans (the gold of *catadores*) that nowadays are at a price of 2,60 R\$/kg, was told me, "three years ago were at 5 R\$/kg, then the price fell down and never came back to that rate, but in winter it goes a little bit up".

Another example is on *asucata* <various metals>, nowadays it costs 0,24 R\$/kg, last year was at 0,35 R\$/kg (as demonstrated in *Mutirão*).

In the associations, materials' sale prices generally improve. Some pickers told me, "a *catador* working individually gets from a *ferro velho* 0,50 R\$ for 1 kg of PET which we sell for 1 R\$ per kg", double price. A *catadora* told me that "in the *ferro velho* all the plastic that arrives is mixed and of value of just 0,30 R\$/kg, then the workers there separate it and the boss would sell it for 1 R\$/kg". She added, "I know one of these owners, he was able to buy a truck just after 2 months of work, thanks to the all gain he got". She confessed that the fact they have higher prices is because they are an association and they negotiate better, they even go directly to the buyers stations.

The association *A ilha*, just got a space to work and is not yet an official association (in the first phase of formation). They do not have yet machines (as the pressing one to pack the material and the balance to weigh). Thus, they present just three prices, very low and only differentiated by material type. This happens, because they still sell to a *Ferro Velho*. For instance they sell all the plastic at 0,30 R\$/kg while in the other associations the plastics are at different prices (from 0,10 R\$/kg to 1,50 R\$/kg) depending on the type. They get even more cheaper price for card-board (0,22 R\$/kg) while even in *Resol* when they sell the card-board not packed it is 0,27 R\$/kg, and 0,30 R\$/kg when packed.

In the case of Cooperative *Zumbi*, due to the fire burning all the machines (box 10), they have been obliged to sell un-packed materials. For this reason the weight was less, as the water more easily evaporated, "in the morning 1 kg is transformed in 500-600 grams in the afternoon", so the buyer pays less when rains justifying the fact that the weight is not the right given.

These differences, give demonstration of better economical conditions thanks to the existence of associations.

Conclusion

In this chapter, the focus was on the analysis of the solid waste management of the MRC, answering the first research sub-questions.

It was outlined how SWM works and the different segments in which it is divided (depending on the type of waste). It was shown that it is a multi-dimensional system where the waste generators are industries, households, shops, public institutions and the actors involved in the collection and final destination are municipal authorities, third party companies, and informal agents.

A very large quantity of domestic waste is buried in the sanitary landfill, and irregularities of the landfill have had consequences on the surrounding environment, and public health in the landfill's neighbourhood. For this reason, different judicial issues and political denunciations have risen up.

Moreover, even if a recycling municipal programme has existed for long time, recycling is mainly carried out by informal workers in the metropolitan area.

The existing informal waste sector has a multi-level hierarchical structure characterised by a chain of passages, sales, of recyclable materials. At every sale, moving up in the hierarchical pyramid (figure 3.2), the prices of the materials also rise. Pickers that stay at the lowest stage, gain the least in this system, whereas waste dealers at the highest, gain the most.

The exploitation system (due to materials' low prices imposed by intermediaries and lack of rights respect) affects pickers' working conditions. Due to low incomes, the activity is time-consuming. Additionally, this work is characterized by hard physical efforts, un-sanitary context and an informal nature that does not allow for any working right and safety measures respect.

4. Informal pickers, working conditions, living conditions, Associations and Political Movement

Introduction

A particular attention in this study is given to the informal waste management sector that generally is neglected and difficult to depict, which is the focus of chapter 4.

This chapter will present the data via the questionnaires and interviews that were conducted in different associations of *catadores* in the MRC (see Appendix). Semi-structured questionnaires were held in nine associations (with in total 94 respondents).

The main topics discussed will be pickers' living conditions, working conditions as well as the factors that can result in improving these conditions (as political activism and pickers' association formation), and affecting urban sustainability.

The acknowledged bad working conditions affect picker's conditions of life. This influence will be analyzed in terms of facilities possession, education level, income, social inclusion, health problems and assistance.

Moreover, will be analyzed to what level pickers affect environment, through their activity/work.

Acknowledging the bad living and working conditions of informal waste pickers in the MRC, attention will be paid to association's formation and its influence on pickers work and living conditions. This will be done in order to evaluate the role of the political movement and the consequences they bring on pickers' conditions (and thereby also on environment).

Considering the issues mentioned above, the following sub-questions will be answered:

- *To what extent does the activity carried on by the informal pickers of waste affect their living conditions?*
- *To what extent does the work of the informal pickers favour sustainability in the urban environment?*
- *To what extent does the political movement (and the formation of associations) of the informal pickers affect their activities (and lives)?*

4.1 Basic socio-economic characteristics of the respondents

This section will provide some basic data on demographics of the pickers interviewed during research.

Gender

The majority of the workers present and interviewed in the associations were female.

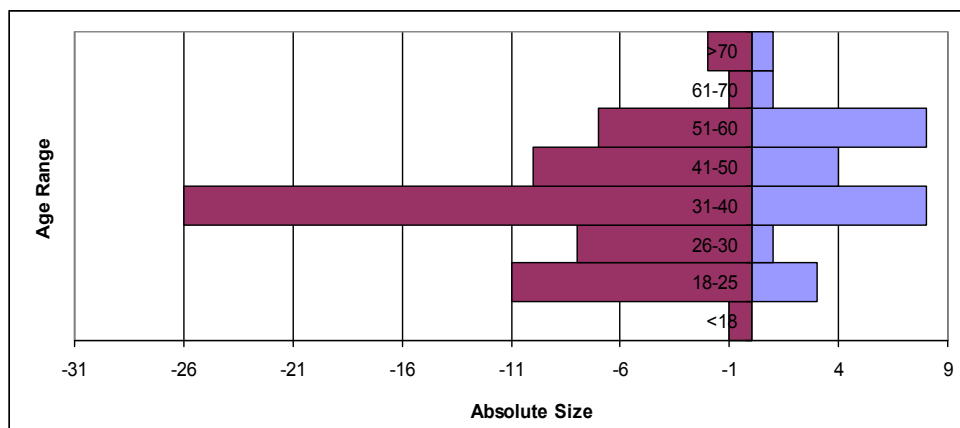
68 women and 26 men were interviewed (graph 4.1, in total 94 people). In percentages, 72 % of the respondents in the associations of the research area were female workers. If taking into consideration all the associated, 31 % are male and 69 % female (in total 222 people).

The L&C institute¹³³ says that around 65 % of pickers in the MRC are women.

Age

People of all ages are involved in the work.

The majority of the workers (joining both genders) were between 26 and 50 years old (with a peak between 31-40 years old). In addition, young and very old people (in smaller portions) are also part of this category of workers. In particular, one under-age worker was found working in a deposit and workers were over 70 years old.



Graph 4.1 – Gendered ages

Blue bars indicating the male population and purple indicating the female one. Negative numbers on the axis are present just for graph designing purpose.

Men were overrepresented in 51-60 years old category. Whereas young women were overrepresented in the 26-30 years category (and relatively of 18-25) (graph 4.1).

Households¹³⁴

The households in question were relatively big¹³⁵.

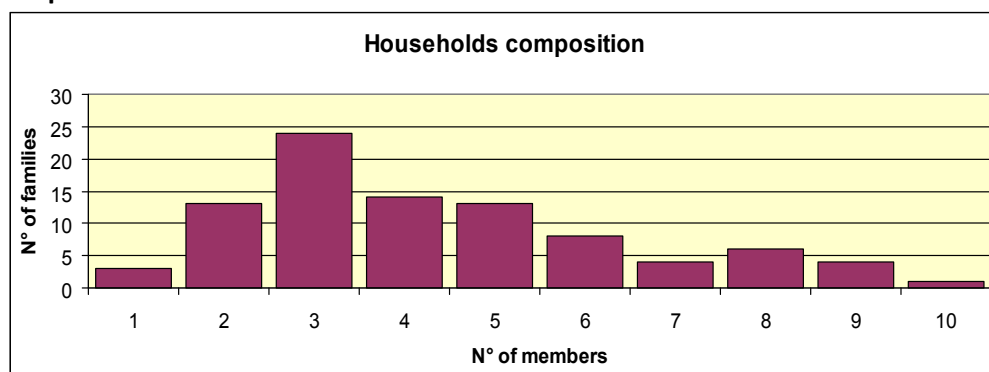
The largest group was of households made by only three members (26 households, graph 4.2). However, many households were also composed by bigger numbers of members (from five to nine people), the biggest household had 10 members.

¹³³ *Lixo e cidadania* <waste and citizenship>, NGO supporting numerous associations of catadores.

¹³⁴ The definition of household taken in this study is a person or group of people occupying a single dwelling (same house or complex of houses in same land). They generally share expenses and income.

¹³⁵ Majority of households had between two or three children (which are minors). Around six-seven households had five children (minors) and a couple of them had six or seven minors. Still, compared to a Western family, the number of children is certainly higher.

Graph 4.2 – Households' size



The households generally included many minors.

The most present category was children (68 people, see table 4.1), representing 39 %. Cutting out all the major children and including the other minors (as nieces and nephews), the percentage of total minors in the households is 34 % (in absolute numbers 59 individuals).

Indeed, minors compose 1/3 of the pickers' households, people that in general need to be sustained in their livelihood.

Table 4.1 – Households' composition

With who is living	N°
Partner	54
Children	68
Mother	8
Father	3
Brothers&Sisters	12
Aunt	2
Uncle	1
Nephews/nieces	12
Cousins	1
Grandmother	1
Grandfather	1
Father-in-law	2
Mother-in-law	2
Brother-in-law	2
Daughter-in-law	1
Son-in-law	1
Step-father	1
Colleague	1

Civil Status

The majority of the respondents were in a relationship (1/3 were married and almost 1/3 were co-habiting with a partner). The remaining pickers were single (1/3 of whole population).

Gender issues

Many of the female workers were single mothers (29 % of the total female population), many of whom sustained their households just through their activity as a *catadoras* (18 % of the women, table 4.2).

Table 4.2 – Gender issues

Gender issue	Abs. N°	% of all women	% of Total Pop.
Single women	23	34%	24%
Single mothers	20	29%	21%
Single mothers self-earners	12	18%	13%
<u>Total women</u>	68	<u>100%</u>	
<u>Total population</u>	94		<u>100%</u>

Education

The education level of the pickers is generally low.

The first 8 years of school (from age between 7 and 14 years old) are obligatory in Brazil (UFRJ, 2005, see table 4.4 on the Brazilian Education system). However, 77 % of the respondents (including those who have not studied at all) had not completed the eight basic years of the 1st grade (corresponding to the elementary school) and the remaining 23 % had (table 4.3). Nine people (10 %) had not carried out any studies or stopped studying in the middle of the first year.

The pickers themselves acknowledge the low level of education.

[Catadora, 35 years]:

“I have completed a post 2nd degree course as a ‘technician on natural gas’. In the past, I was also a professor and I did many different jobs in my life. However, as I lost my job as a confectioner, I started being a waste picker. I know it sounds a bit crazy seeing the education title I have, indeed I am a bit mad”.

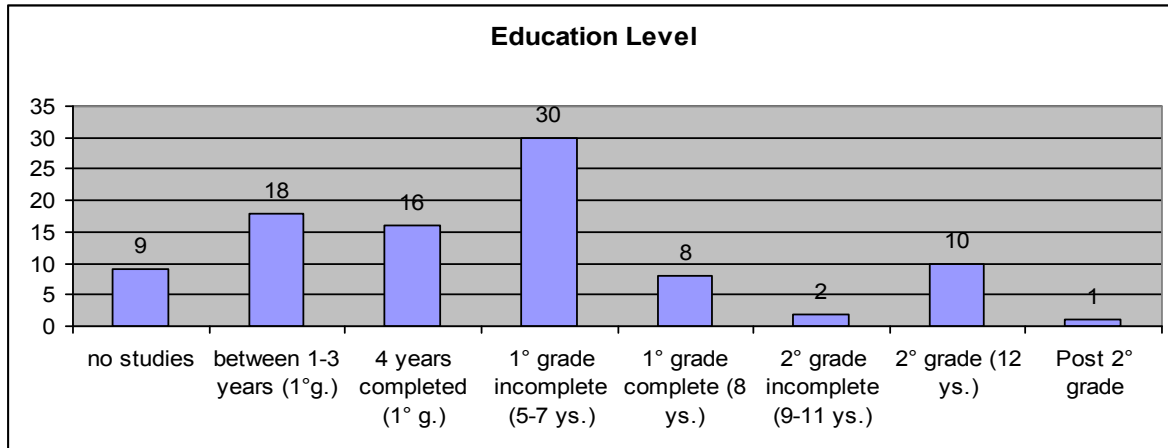
The higher we go in the study years, the fewer the years of school accomplished (see graph 4.3).

Table 4.3- Pickers’ education Level¹³⁶

Education level	N°	%
No studies	9	10%
Between 1-3 years (1°g.)	18	19%
4 years completed (1° g.)	16	17%
1° grade incomplete (5-7 ys.)	30	31%
1° grade complete (8 ys.)	8	9%
2° grade incomplete (9-11 ys.)	2	2%
2° grade (12 ys.)	10	11%
Post 2° grade	1	1%
Total	94	100%

¹³⁶ The amounts of years that were filled in the data elaboration, represented the amount of full academic years completed.

Graph 4.3 – Pickers’ education level



Despite the low education, the pickers did acknowledge the importance of education in order to get better life opportunities.

[Carrinheira¹³⁷ since 10 years old, 38 years old and with three children]:

"I raised my children through and thanks to recyclable materials. They never starved, I did. I give value to every small piece of paper. I answer very proudly that I am a *catadora* if they ask me about my profession because this is what 'broke my hunger'. This job has dignity as other ones but my 14 years old son does not think like that, so I told him to study to get a better job. I told him to continue studies and to not get involved in drugs, which in my neighbourhood is so easy".

[Catadora, 39 years old]:

"When I finish working, I study in the night, I am at the third class of elementary school, I am willing to get completed the first grade".

Moreover, the study made by the *UFRGS*¹³⁸, demonstrated that 62 % of the *catadores* interviewed (94) in the southern part of Brazil, were willing to re-take studies.

Type of school grade	Age	Classes	Public responsibility	Studying years (cumulative)
Creche <Day care>	6months ¹⁴⁰ - 6 years old 3 years -5 years old		Municipal authority	
1° grau <1st degree> <i>Ensino Fundamental</i> <Elementary school>	6 years- 14 years	1st to 8th	Municipal authority	8 years
2° grau <2nd degree> <i>Ensino Medio</i> <High school>	15 years - 17 years	1st-3rd	State	11 years
<i>Faculdade</i> <i>Ensino Superior</i> <Higher education>	17 years -	Or: 1 st -2 nd 1 st -4 th Or: 1 st -5 th	Public Private	Or: 13 years 15 years Or: 16 years

¹³⁷ Who are the pickers that exert the collection phase of the waste with a rudimental cart, pushed by them.

¹³⁸ The Federal University of *Rio Grande do Sul* (for explanation see page 83).

¹³⁹ After the graduate level, there is the post-graduate (*mestrado* <master>) and doctorate but in this study this information is not relevant as no picker achieved this education level.

¹⁴⁰ Few day cares offer this possibility, in general they start at 3 years old.

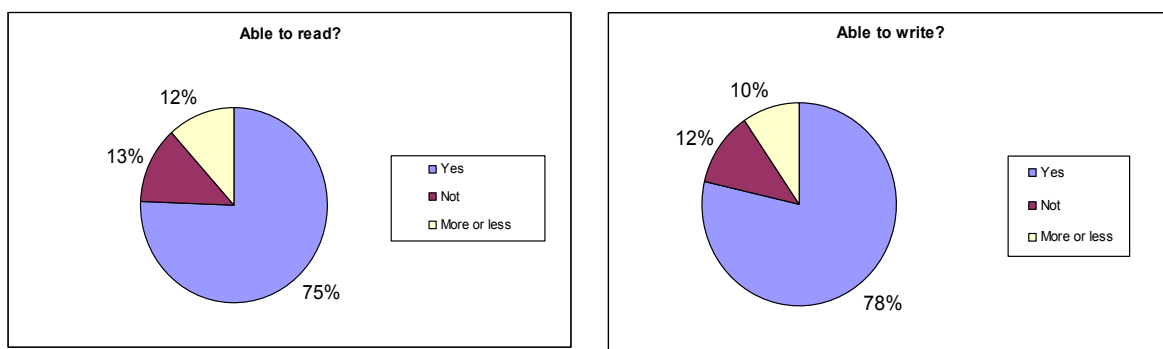
Illiteracy rate

The majority of the respondents were able to read and write. Around 75-78 % of the interviewed people were literate (graphs 4.4a and 4.4b). The reading ability was lower than the writing one. A rate of around 22-25 % was not able to fully read and write.

In Brazil, functional illiteracy is referred to the population of over 15 years old with maximum three years of education (UFRJ, 2005). Data given in the year 2000, say that the average functional illiteracy rate in the city of *Curitiba* is around 13,7 % (UFRJ, 2005, p.31) with big variations between the neighbourhoods. The low-income areas of the municipalities of *Colombo*, *Piraquara*, *Pinhais* and *Almirante Tamandarè* present functional illiteracy rate between 23,06 % and 34, 44 % (ibid, 2005).

In the case of the pickers interviewed, functional illiteracy would refer to a rate of 29 % of people (table 4.3). The functional illiteracy rate calculated of the pickers fit well in between these data, demonstrating the same illiteracy rate of the neighbourhoods where they come from.

Graphs 4.4a and 4.4b – Able to read or to write



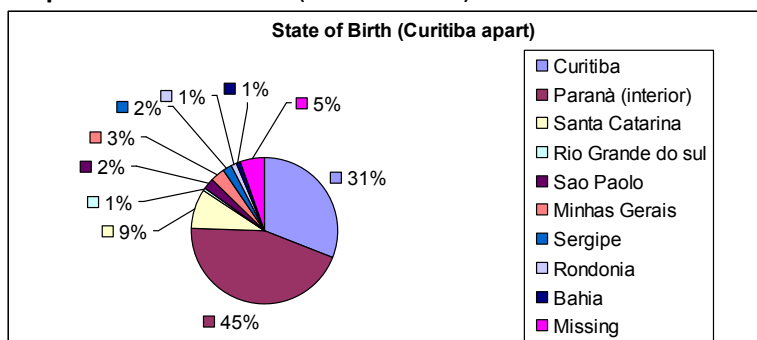
Furthermore, the study made by the *UFRGS*, showed that in the state of *Paraná* illiteracy rate of pickers was much higher (22 %) than in the other two states considered in the study, *Santa Catarina* (6,5 %) and *Rio Grande do Sul* (4 %).

Pickers' provenance

The *catadores* working in the MRC were not recent immigrant coming from rural areas but they could be the second generation (sons and daughters) of the rural immigrants that came to the city previously.

Around 1/3 (31 %) of the interviewed workers came from, were born in *Curitiba*, while 45 % came from other areas in the same state of *Paraná* (making the total *Paranaense* group of 76 %, graph 4.5). According to information coming from their life-stories, of the more than twenty people not born in *Curitiba*, more than half arrived to the city as children, 1/4 were young and only the remaining 1/4 were adult.

Graph 4.5 – Provenance (State of birth)



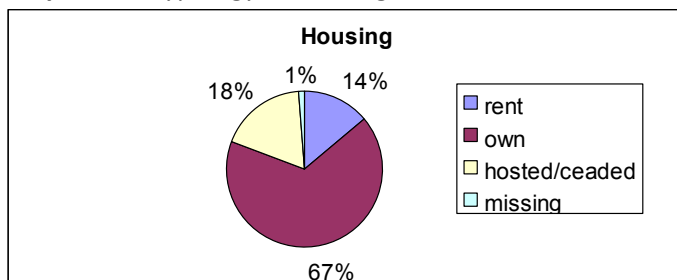
4.2 Pickers living conditions

Most of the pickers interviewed had poor conditions of life. They lacked facilities and infrastructures (water, electricity, and house material and sewage system).

On matter of housing, most pickers are living in irregular occupied areas where they have been able to build own barrack. Indeed the majority (67 %) owned a house (see graph 4.6).

Moreover, those who were not able to pay for rent, lived in other's houses (of parents, grandparents,) or received house as a donation from some relative (18 % of the total).

Graph 4.6 – Typology of housing

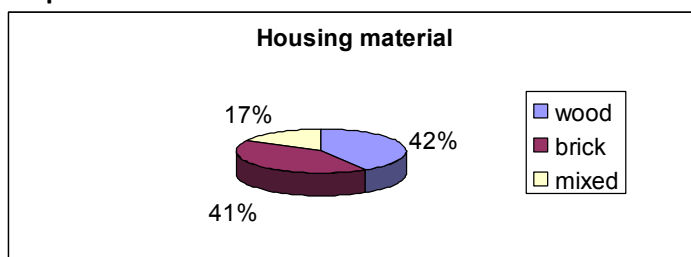


Houses built with bricks generally have more social status than the wooden ones, as the latter ones are less resistant and more prone to attract insects.

The material by which a house is made, is an important factor affecting the living conditions especially in a city such as *Curitiba*, where the temperatures in winter season drop almost to zero degrees (rudimental wooden barracks normally have many holes in the walls). People that are financially less powerful generally build their own house with wood, sometimes donated by somebody.

Most of the pickers had poor housing (69 % of the interviewed) and were living in houses made of only wood or of mixed materials (wood and bricks¹⁴¹, see graph 4.7).

Graph 4.7



As for electricity, the irregular installations, called in Portuguese *gatos* or *rabichos*, are light-spots wooden pillars invaded with irregular cables connected to the houses. These illegal installations should not to be under evaluated, they can create serious problem such as blackouts, burning electrical devices or even cause human death in the houses of the dwellers¹⁴².

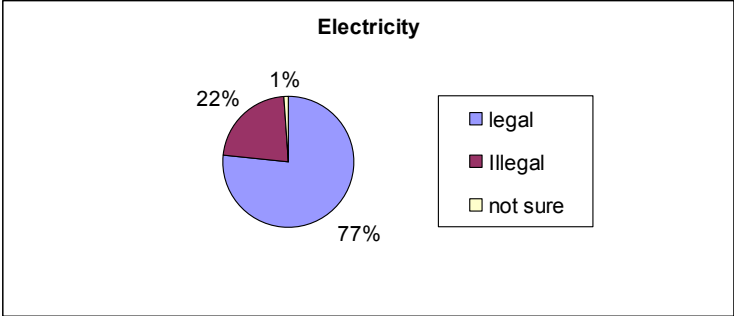
Most of the pickers had regular electrical installation (77 % of the respondents, graph 4.8) in their own accommodation, and therefore pay fees for the service (to *Copel*¹⁴³).

¹⁴¹ Normally it concerns houses made with wood but with the kitchen and/or living rooms in bricks.

¹⁴² Information got from the first fieldwork in Brazil (January-June 2010) through visits in low-income houses.

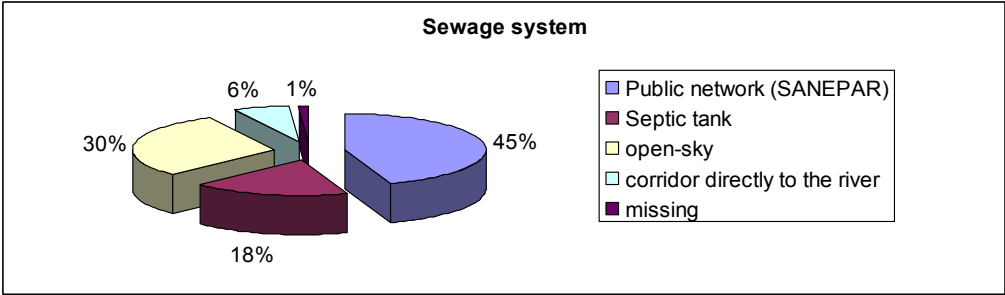
¹⁴³ It is the energy company of *Paraná*, the biggest private company of the State.

Graph 4.8 – Regular or irregular electricity provision



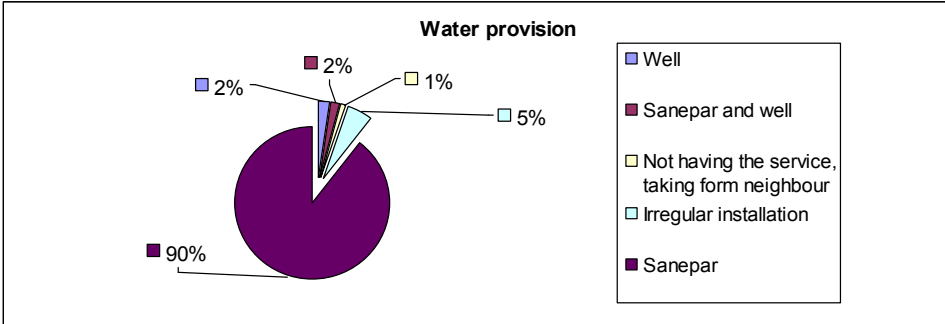
On matter of sanitation, the majority of the interviewees were not provided by a regular service. Less than half (45 % of respondents) of the pickers had a regular (safe and closed undergrounded network) sewage system, provided by *SANEPAR* (the water company of *Paraná*). The remaining people (54 %, graph 4.9) discharged their dirty water in open-sky collectors¹⁴⁴ or river and in septic tanks (generally very rudimental).

Graph 4.9 – Sanitation facilities



As for potable water, most of the pickers were provided by this service in their houses (by *Sanepar*, graph 4.10).

Graph 4.10 – Potable water service provision



So, of all the considered facilities, the pickers had best access to the service of potable water.

¹⁴⁴ They are called *valetas* <small valleys> that are normally found on streets' side.

4.3 Health issues

Living and working conditions affect pickers' health.

In the case of the working environment and conditions, the un-hygienic context and lack of protective tools worsen picker's health. In this type of activity, there is a high of exposure to air-borne bacteria, as infectious and toxic materials can be present in solid waste, and to the passage of disease-carrying vectors as rodents or insects. These factors make it fundamental to the provision of individual protective equipment, which in Portuguese is called *equipamentos de proteção individual (EPIs)*.

During research, low awareness on health issues was observed. In different associations, pickers were indeed working with waste without the use of gloves or boots. This is also due to their long-term habits. Furthermore, majority (61 %) of them had the perception of not having any health problems (see table 4.5).

Table 4.5 – Presenting health problems or not

Declaring to have health problems?	Abs.N°	%
Yes	37	39%
Not	57	61 %
Tot	94	100 %

No medical diagnosis was considered but just the spontaneous answers of the interviewees, based on their knowledge.

It is possible that those who claimed no health issues had not visited recently by a doctor (ignoring so their health issues). This factor was not calculated in these statistics. A research made by the L&C institute (between November 2007 and December 2008 on around 565 people), showed that 58,8 % of pickers regularly go to the doctor and 46,2 %, not. Thus, almost half of the people in general do not have this regular habit, affecting the knowledge on their health issues.

The health problems presented and declared by the pickers are very different (see table 7.7, Appendix). Of most concern was blood pressure. Some pickers also presented back and arms pain, problems that can be surely linked to the hard work carried out.

[Representative of NGO]:

“Their main health problems are physical pains, especially for the back, spine, and muscular ones, due to the physical efforts they do”.

The other problems are very difficult to verify as to whether they are caused by work, living conditions, or just as genetic problems. Thus, not much comment can be made on these data; due to the lack of professional medical knowledge. This information, however, can be important for other researches or authors. Moreover, problems such as alcoholism or drug addiction were not carefully analyzed because of the delicate nature of the topic. In almost all the associations these type of problems were observed or mentioned.

During research and visits to the associations, awareness by the pickers on pathogen vectors was acknowledged. One of the recognized problems in Brazil is *dengue* (as mentioned in section 2.3).

[Catador]:

“We had a lot of material in metal, many cans and we were obliged to sell it all as firemen asked us for some documents (that we obviously do not possess). This happens because rainwater can be collected in all these metal things, generating *dengue*. There have been nine deaths for *dengue* in *Curitiba* recently. In the packed material there is no danger and the buyers do not want wet material, which is also why we had to sell it all”.

Another recognized risk among the *catadores* is being bitten by a rodent, which can bring *leptospirosis* disease.

[*Catadora* for more than 20 years]:

“I was bitten by a rat 14 years ago in my house and I got *leptospirosis*. After one week I entered in coma, I was pregnant of 6 months. They took him out [the child] while I was ‘sleeping’. I woke up some time after, I was very lucky. Nowadays, I have kidney problems. One was taken out for the disease. I have foot, hand and belly inflammation. I took medicines before but they provoked an ulcer so I do not take them anymore. The medicine is very expensive, sometimes I got them in the *FAS*.”

Moreover, picker’s relatives present health problems too. These problems can be related more to the living conditions.

Pickers’ relatives presented more health problems than the pickers themselves (52 % of people, table 4.6). This data can be biased due to the easiness of talking about others’ problems than ones own.

Table 4.6 – Health problem in the family

Any health problem in the family?	Abs. numb.	%
Yes	49	52%
Not	41	44%
NA	2	2%
No relatives	2	2%
Total people	94	100%

In this case, a bigger range of people is considered because a picker may have referred to more than one person.

Of all the pickers’ relatives, the sons show being the most affected by health problems (table 4.7).

In different associations, it was observed that the pickers’ children hang out in the storages full of waste (issue considered more in depth in the further section of infantile work and children care).

Moreover, out of the six female partners presenting health problems, five of them were pickers.

Table 4.7 – Who in the family has health problem/s

Who is having the problem	Abs.N°	<i>catadora/a?</i>
Female partner	6	5
Male partner	9	1
Son	13	2
Daughter	2	0
Brother	3	0
Mother	8	0
Father	4	0
Sister	2	0
Grandma	1	1
Grandpa	1	0
Aunt	1	0
Mother-in-law	1	1

Pickers’ relatives present different problems (table 7.8 in the Appendix). Arm and back pain are not showed, confirming that it is more a problem related to the picking activity.

Relatives’ health problems indicate an additional responsibility for the pickers. For instance, in the case of mental problems (eleven, including epilepsy and convulsions). As observed during fieldwork and as witnessed by some NGO representatives, those that are disabled or present mental problems are often *catadores* or work with waste. Over nine associations visited, six presented people with mental disabilities, either working or just staying there.

[*Catador* for five years, 41 years old]:

“I generally go collecting with my cart, then when I bring the material to the storage, my wife, who is in a wheel-chair, and if she is in the mood, helps me separate the different materials.”

Foregone in the article 23 (in the Federal Constitution), it is competence of the Union¹⁴⁵, the States, the Federal District, and the municipal authorities (part II): “to take care of the health and public assistance, of protection and guarantee for disabled persons¹⁴⁶”.

This type of assistance is not efficiently guaranteed to pickers. Only in two of the considered households, they receive economic aid for the disabled, whereas the majority (five out of seven) does not (following table 4.19). Information on assistance is given further.

Health Assistance

In Brazil, there is obligation of the State to give free medical assistance to everyone, independently of the social condition it is foregone in the Federal Constitution, articles 196 and 197¹⁴⁷.

In all the MCR town neighbourhoods there are health centres, which offer all type of assistance and exams for free. The general complains concern the delays in the service provision of exams or surgeries.

[Graduate in Law University of the Catholic University of *Curitiba*]:

“The *Sistema Único de Saúde (SUS)* <Only Health System>, the public health is precarious (including hospitals and health centres). Therefore, those who have money pay for a private service while the poor are left behind in a failing and inefficient system.

The public health in Brazil is free for low-income people but is also very ruinous”.

The majority of the pickers (16 people) presenting health problems were mostly treated with medicine (see table 4.8). Some of them (nine people) openly affirmed to not have been treated at all. This is mainly due to lack of finances (as also seen above).

[*Carrinheira* since 28 year]:

“As you can see my arms are very inflamed but I can’t treat this problem. The doctor said I should stop pushing the cart but I cannot finish with my work. How would I survive then?”

¹⁴⁵ It is the juridical entity representing the Federal Government internally and externally the Federal Republic of Brazil.

¹⁴⁶ In Portuguese, *Cuidar da saúde e assistência pública, da proteção e garantia das pessoas portadoras de deficiência*.

¹⁴⁷ Article 196: Health is a right of everyone and duty of the State, guaranteed through social and economical policies that aim the reduction of disease risks and other harms, and a universal and equalitarian access the actions and services for its promotion, protection, and recuperation. Article 197: They are of public relevance the actions and services of health, fitting the Public Power dispose, in the terms of the law, on its regularization, control and monitoring, having to be its execution directly or through third parties and also for physical and juridical persons of private right.

Table 4.8 – How health problems are treated

How treating health problems?	Abs. Numbers
Medicines	16
Not treated	9
Injection	4
Inhaler for asthma	4
Visit at the doctor	3
Psychopharmacological medicines	2
Cream	1
Psychologist	1
Pain killers	1
CAPS ¹⁴⁸	1
Avoiding coffee	1
Dialysis	1
Staying at home	1
Taking care in alimentation	2
Control every 8 months	1
Surgery	1
Working	1
Exams	1
NA	2

As mentioned above, health assistance and medicine provision should be free for low-income individuals.

Almost half of the pickers (48 %) that needed medicines declared that they generally got them for free at the health centres. A large proportion, 1/3 of them (the 29 %), got medicines occasionally sometimes while 1/5 of them (19 %) never got any at all (table 4.9).

Table 4.9- Getting medicines from public health service for free?

Always get medicines from health public centre?	Abs.n°	%
Yes, always	19	36%
Mostly yes	6	12%
Some medicines yes	15	29%
Never	10	19%
NA	2	4%
Tot people	52	100%

Finally, having seen all the pathogens *catadores* are exposed to and the lack or deficient health assistance they are provided by, awareness on health and hygiene issues are fundamental. Indeed, working in the association generally improves this aspect. For instance, all those that used to separate waste at their home, when working in an association and having an adequate working space, do not need to do it any more. Knowledge and awareness on using protective tools needs to be strengthened.

¹⁴⁸ *Centros de Atenção Psicossocial*, centres for mental health.

Source: <http://portal.saude.gov.br/portal/saude/default.cfm>

4.4 Catadores' Impact on the Environment

Catadores de papel are poor individuals that choose to make a living through waste picking separating and re-selling. Thanks to this activity, they initiate an incredible and un-measurable informal recycling process in the metropolitan area.

Data given by the municipal council of *Curitiba* in the year of 1999 said that 92,5 % of solid recyclable waste is picked in the city by these informal pickers, with a quantity of around 445,5 tons per day¹⁴⁹ (for the other municipalities see table 3.3). In general, thank to the high material quantities they handle with, informal pickers take the lead in the urban recycling sector, (e.g. see the SWM and data on waste tons of the city of *Curitiba*, figure 3.1).

The more material is collected and initiated to the recycling process, the less waste goes to the landfill, thereby reducing the level of contamination of the ground, water and air (e.g. what happens in the landfill of *Caximba*). Furthermore, natural resources are saved and less energy is used to treat waste (Batool et al., 2008).

It was possible, during the fieldwork and visits at the association, to observe the broad range of categories of materials in which pickers separate the waste (table 4.10 summing up data of table 7.15 in the Appendix with all the type of materials listed, including their prices). The more categories they are able to divide waste into, the more efficient their work is (better quality of the products), and the better they are paid. More efficient separation (and thereby also recycling) also affects the environment positively. Better work is favoured by various factors, as better means, technology (machines), knowledge etc. These elements can be acquired by supporting and equipping the associations (seen further more in details).

Table 4.10 – Maximum number of material categories pickers divide waste.

MATERIALS (MAX N° OF DIVIDING CATEGORIES)
PAPER (6 TYPES)
PLASTIC (10-20 TYPES)
METAL (5-11 TYPES)
GLASS (4-7 TYPES)
USED OIL KITCHEN, CDS, DVDS...

The economic aspects over-rule the environmental ones. Indeed the selection of materials to be collected and separated, is based on their economic values (see box 9). Again, it becomes apparent that recycling efficiency depends on market forces.

To conclude, as mentioned before, the activity of picking waste is mainly carried out for reasons of survival. As seen in the theoretical chapter (section 2.2) poverty is in general seen as only causing environment degradation. However, in the case of informal pickers of waste, their poor origin causes positive benefits to the environment thanks to the work they carry. However, if households had better separation habits and companies would put more efforts into producing less packaging, environment would benefit even more.

¹⁴⁹ Source: *SMMA* of *Curitiba*.

Box 9 – The choice of materials

Depending on how many workers there are in associations, on the quantity of materials donated (from companies, shops and public organs) and on their quality (mixed or not with organic), they produce recyclable materials between 10,000 to 100,000 tons (one *fardo* <pack> of paper is about 200-250 kg, of PET is 60-80 kg, 65 cans make 1 kg).

The materials that has the most value are the metals. They are the most desired ones, but also rarer and are more difficult to be found.

For some associations, the type of materials that were collected the most were paper materials (as for *Resol* and *Acampa*). As asserted by one *catadora* "what gives more money is plastic but there is not so much of it and to pack it, it takes an entire day".

Other associations, handle mostly plastic materials (as in *Assol* and *Mutirão*).

In some associations, where the collection occurs mainly through carts and *carrinheiros'* work, the collection of paper is avoided. This happens because it is easily damageable on the roads in case of bad weather. As declared by a *catador*, "who collects on the street would not take PS but PET, not paper but plastic". *Carrinheiros* make their selection already during their collection on the streets.

The material that has the least value is the glass (especially the broken glass). Therefore, for instance in *Catamare*, it is collected for everybody, only to pay small expenses like lunch. On the glass, a *catador* said, "autonomous *catadores* that go on the street never pick glass".

Linked to the weight, most of the associations expressed the problem of storing the *isopor* <polystyrene> as it takes a lot of space but weighs very little. Therefore, in order to be sold, it needs to be collected in immense quantities. Many associations hence thought or were thinking to about giving up its storage.

Picture 4.1 & 4.2 – Some plastic materials packed



4.5 Associations/Cooperatives of *Catadores de papel*

The *catadores* have a political movement, the *MNCR - Movimento Nacional dos Catadores/as de Materiais Recicláveis*, which is spread around all the Brazilian Nation. The movement fights for human rights, acknowledging the reality of exploitation that many *catadores/as* still experience, as well as the right to work and to survive¹⁵⁰.

Thanks to the efforts and claims of the movement some *catadores* started to organize themselves. The organized pickers have, over the past years, created cooperatives and associations¹⁵¹, where they mainly exert a cooperative way. This is in contrast to the previous more competitive and individual tradition.

Thank to the Federal Sanitation law nº 11.445 of 2007, the municipal authorities can have direct contracts with cooperatives of *catadores* to exert waste selective collection service.

A cooperative has particular characteristics, for its economical character. Its aim is to put the products and services of its members in the market, in more advantageous conditions as being isolated. In this way, a cooperative can be seen as an enterprise. A cooperative needs minimum 20 people in order to be formed. Co-operators pay some tributes (36 % of the gains), and at the end of the year, the remained profit is shared. Normally a group starts with an association, because the average amount of people of an initiating group is around 10-15 (minimum amount needed is two) and it is cheaper. Simple associations do not possess social capital and therefore have more difficulties in getting finances together with institutions and loans.

In general, association or cooperative formation brings positive effects to the work of the *catadores* and its conditions. Associations are generally equipped with a storage where separate waste and with machines to weigh and pack materials (pictures 4.3 and 4.4).

Picture 4.3 – Pressing machine to pack materials



Pic.4.4 – packed materials charged on the truck after sale



¹⁵⁰ From the movement pamphlet's *Caminhar e resistir* < to walk is to resist >.

¹⁵¹ An association is a formal or informal initiative that gathers physical persons or other juridical entities with common objectives, looking for overcoming difficulties, and generating benefits for its associates. Thus, it is the most basic form to be juridically organized in a group of people for the achievement of common goals.

A cooperative is an autonomous association of people that get joined voluntarily to satisfy aspirations and economical, social and cultural necessities through entrepreneurialism of collective property and generated democratically. What is aimed in organizing a cooperative is the improvement of the economical situation of a determinate group of people, to solve problems or satisfying common necessities that exceed the capacity of each individual satisfying it as an insulated element. It is thus a mean for a determinate group of people to get specific objectives, through a volunteer agreement for reciprocal cooperation.

Association's location

As seen from the map 1.2 in section 1.4, all the associations are situated or close to low-income living areas (the so-called *favelas* in Brazil).

Many of these areas lack infrastructures and services (as seen in section 4.1) thereby affecting the living conditions and health of the dwellers.

The cooperative *Catamare* is the closest to the centre of *Curitiba*, just 3 kilometres from the very downtown. The people that work in there generally come from the various well-known (for their stories of violence and criminality) *favelas* close to the city centre: *Vila Torres*, *Icapanema* and *Vila Parolin*.

The *Mutirão* association is situated in the south of the city of *Curitiba*, in the neighbourhood of *Sítio Cercado*, in the *Vila Bairro Novo*, around 20 kilometres from the centre of the city, some of the pickers live in the famous neighbour low-income area of *Osternack* (known for its violence) and some in the same *vila* of the storage. In *Bairro Novo*, it is estimated that around 5.000 *catadores* live there, which added with the neighbour area of *Xaxim*, would make 5.000.

The association *Vida Nova*, is situated in the south of the city of *Curitiba*, around 8 kilometres from the centre of the city. Most of the workers live just behind the storage of the association, in a small low-income area close to the highway *Régis Bittencourt* in the so-called *Vila of Jardim Paraná*.

In the case of *Piraquara*, all the workers live in the big low-income neighbourhood of *Guarituba*, the biggest *favela* of the state of *Paraná* and the largest of Brazil as an environmental protected area (being a watershed area).

The cooperative *Zumbi* is situated in the famously violent big *favela* of *Vila Zumbi* of the municipality of *Colombo*.

The association *Resol*, is found in a natural area, the so-called *Valle das Flores* <valley of the flowers> of the municipality of *Colombo*, more precisely in the upper side of the hill, in the low-income *vila* of *Monte Castelo*, from where most of the workers come from. It is a small *favela* where 14.000 people are living.

The association *Arep* is situated in the industrial area of *Vila Emiliano Pernetá* of the municipality of *Pinhais*, 8,5 kilometres from the centre of *Curitiba*. The workers are more spread in different low-income neighbourhoods such as *Conjunto Atuba* and *Vila Perdiz*.

The association *Assol* in the municipality of *Almirante Tamandarè*, is situated in a hilly *favela* called *Jardim Roma*, about 14 kilometres from the centre of *Curitiba*. Most of the workers live there or in the neighbours *Vilas Parque São George* or *Jardim Gramado*.

In the case of the Association *A Ilha*, in the municipality of *Almirante Tamandarè*, all the members are living in the small *favela* in between the river *Tanguá* and *Barigui*, a small living area containing some tens of houses. This area is very close to other high-class areas and is surrounded by different block-of-flats. It is close to the boundary (the river) with municipality of *Curitiba* and only 6 kilometres from its centre.

Some of these *favelas* are mentioned in a list in the *CUFA - Central única das favelas* <Only Centre of *Favelas*> website¹⁵².

¹⁵² <http://www.cufa.org.br/in.php?id=favelas/pr>.

4.6 Pickers' working conditions

As explained in details above (in box 8), in general the associations are able to get better prices, because the quantities are joined and better buyers are found, moving up the hierarchy of the informal sector (figure 3.2).

In general, association formation allows better working conditions depending on the respect of regulations and the support they receive by different entities (local governments and NGOs).

Indeed the negative aspects of working conditions shown above of the not self-organized pickers can be found also in the associations.

Firstly, the low prices and income render this activity very time-consuming (table 4.11 and 4.12).

Table 4.11 – Working hours per day

Working hours per day	How many workers?	%
4 hs	1	
5 hs	1	
6 hs	3	
8 hs (or more or less)	67	71 %
9 hs	3	
10 hs	4	
11 hs	4	
12 hs	4	
13-14 hs	2	
14 hs	3	
15 hs	1	
Missing	1	
Total people	94	100 %
Tot for more than 8 hs	21	22%

The majority (71 %) of the interviewed people respected office-working hours (around 8 hours per day), mainly because these timetables are given by the large part of visited associations and that many (67 % of the total) work inside the storage just for the separation¹⁵³ phase (see graph 4.12).

Anyway, there was still a relatively high proportion of people (22 % of the total) that worked more than 8 hours per day. This was mainly the case for those who carry out a more independent and individual work (in respect to the association), as *carrinheiros* (graph 4.12).

Table 4.12 – Working days during the week

Working days per week	Abs.N°	%
work per day	1	
2 days	1	
3 days	2	
3-4 days	2	
5 days	53	58%
5-6 days	8	
6-7 days	1	
6 days	19	20%
7 days	4	
Missing	3	
Total	94	
More than 5 dias	32	35%

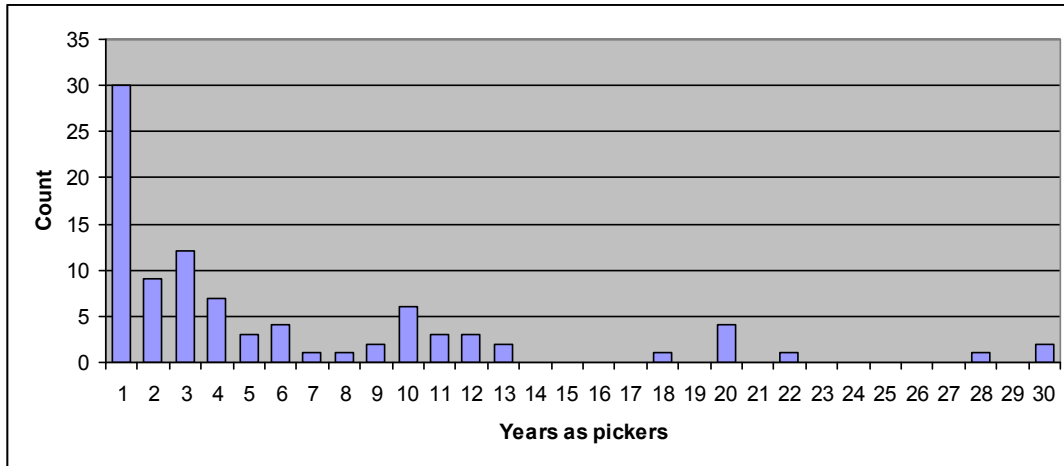
More than half (56 %) of the interviewees worked the regular amount of five days per week while a considerable portion (35 %) still worked more than 5 days per week.

Even if most of the pickers worked in associations where working days are scheduled, still more than 1/3 of *catadores* interviewed in the MRC worked more than the law indicates (more than 5 days per week, combining tables 4.11 and 4.12).

Secondly, it has been said that this activity generally starts for survival strategies, this would lead to some rate of temporariness nature of the work (graph 4.11a and 4.11b).

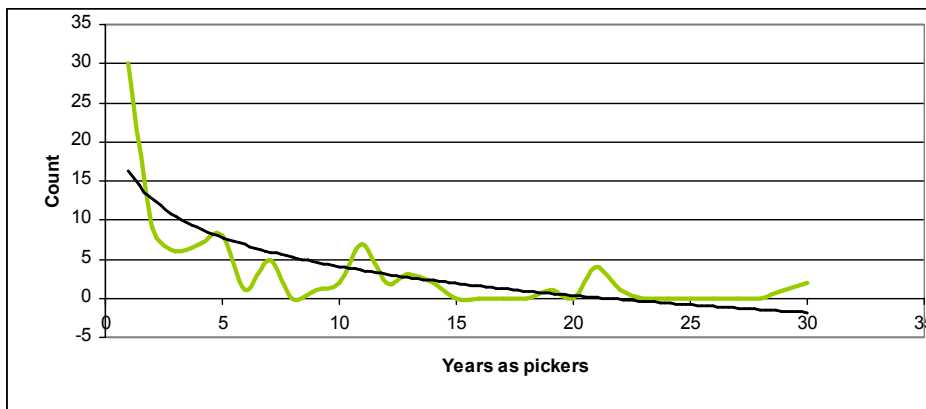
¹⁵³ Material received by the Municipal trucks, e.g. in the *Ecocidadão* Programme.

Graph 4.11a – Total years working in the informal recycling sector



Around 1/3 of the studied sample (30 people, equalling 32 %of the total population) had worked less than one year and the other 30 % (28 people) had worked between one and five years. This data confirms the fact that some workers pass some time in these storages due to temporary unemployment.

Graph 4.11b – Line tendency of working years



Graph 4.13b is done to show the decreasing trend line of working years as pickers, with respect to time (in year reference).

Anyway, the remaining 1/3 of respondents had worked for a time-span between 6 and 30 years, giving to this activity a permanent nature. This data also demonstrated the difficulty in getting upward social mobility (for instance becoming waste intermediary). The pickers that carried out this work for many years saw being a picker as a profession.

Thirdly, public laws on working rights are not respected. Neither self-organized waste pickers nor self-organized pickers working in an association are officially recognized professions. The profession is therefore not ruled by the *CLT - Consolidação das Leis do Trabalho* <Work laws consolidation>, which is the principal legislative norm of Brazil on work relationship between employer and employee. Indeed, to be a *catador* does not need any type of registration in any bulletin, no working rights¹⁵⁴ are recognized, and a fiscal receipt (in this way being part of an informal economy) does not accompany sales. Moreover, the majority cannot afford to pay taxes and cannot afford to save up for their retirement (see table 4.13 on *INSS*¹⁵⁵).

¹⁵⁴ After the 30's in Brazil, the social rights were recognized in the working rights, regulated by syndicates (as retirement, social assistance, holidays, fixed working hours etc.), defining the so-called 'regulated citizenship'. In the 80's other rights were formed but the centrality of working rights already persisted, the main idea identifying the working card as the citizen card.

¹⁵⁵ *Instituto Nacional de Seguro Social* <National Institute of Social Insurance>, dealing with Social Security.

Table 4.13 - Paying the retirement tax or not

Pays for retirement (INSS)	Abs. N°	%
Yes	25	27 %
Not	63	67 %
Already retired	6	6 %
Total	94	100 %

Of the interviewees, the majority (67 %) did not pay towards getting a retirement.

Thus, even in the case of legalized associations (where registration of associated must occur and municipal authorities know it), work right is not guaranteed.

Of the 94 respondents, 1/3 was able to pay for their retirement, which is certainly better compared to a non self-organized picker that works individually.

Fourthly, it is difficult for those working in the informal sector (with a focus on waste pickers) to get out from the informal reality (table 4.14a and 4.14b).

Table 4.14a – Anytime registered officially in some work or not

Was he/she Registered	Abs. N°	%
Yes	41	44 %
Not	38	40 %
Missing	15	16 %
Total	94	100 %

A large part of the interviewed *catadores* has been officially registered (44 %) at least once in their life in a job, whereas 38 (40 %) have never been registered in any (consider the big lack, 16 % of no answers).

The research made by the *UFRGS*, showed that 58 % of pickers had been registered at least once, but of these, 62 % benefitted of the *CLT* just for five years.

Table 4.14b –Relatives registered or not

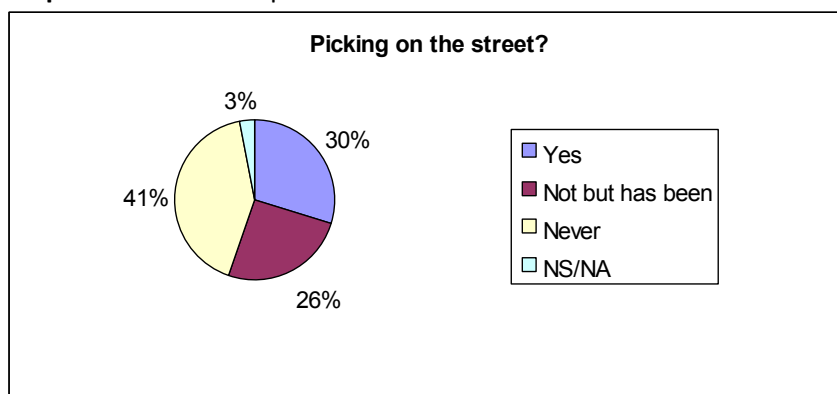
Registered	Abs.N°	%
Yes	32	33 %
Not	62	64 %
Does not know	3	3 %
Total people	97	100 %

Those appertaining to a household, where workers are informal, were in general also exerting informal activities (64 %). Many were informal pickers as well (see graph 7.4 in the Appendix).

The data of these two researches confirm that it is difficult to get permanently out form an informal working reality.

Fifthly, this activity implies wearisome physical efforts (this is especially the case for those pushing the carts (that can weigh 200-300 kg) for waste collection – the *carrinheiros*, see graph 4.12).

Graph 4.12 – Is or has picked on the street?



Value of 56,10 R\$.

Of the interviewees, 30 % (28 people) still collect its waste (to be later separated) on the streets¹⁵⁶, while 26 % (24 people) do not pick anymore but have done earlier.

This last data confirms that almost 1/3 of workers improved their conditions by entering the association as for the physical aspect of the work. Adding the 41 % of those that never needed to pick the waste, they handle.

Wearing physical efforts generally concern also the long-time distance the pickers have to walk for the collection phase. According to the interviews, in general, of the actual or former *carrinheiros*, they went collecting in areas a few kilometres from the association or their house. There were also some exceptions of pickers going to collect waste much further.

[*Catador of Mutirão*, 54 years old]:

"I used to go until the centre of *Curitiba* (*praça Ruy Barbosa*), during the day I walked in total six hours (3 hours to go, 3 to come back)".

The reason why some of the *catadores* that can, go to the centre of the city, is that there is much better material to be found. They go mostly in more affluent areas, such as the centre of *Curitiba*, which is full of shops and economic activities. These leave, at the end of the day, much material on the streets. Moreover, some picking routes are fixed, many of them have already spots of the city they regularly return. This zoning of the picking areas causes some competition.

[*Catador of A Ilha*]:

"I have a van so I can go to the centre of *Curitiba* or some high-income neighbourhoods of *Mercês* and *Bom Retiro* while the *carrinheiros* here pick more from the neighbour high-class block-of-flats. I go further because I have the means and I leave to the others the closer areas".

[*Catadora*]:

"My husband and I, we always go to the post-office and in the polytechnic and agrarian institute".

[*Catadora of Arep*]:

"I went to all the companies around here that kept material for me".

[*Catador of Catamare*]:

"The *carrinheiros* of here basically go all to pick in the centre of *Curitiba*, we are proud to be the responsible ones for all the surrounding area of the Federal University".

Often, *carrinheiros* have agreements with household's keepers.

[*Catadora*]:

"A housewife would never give its waste/material to another *carrinheiro* but just the one she is used to".

Seventhly, as mentioned above, getting work is not always so easy, (due to zone competition for instance), network of contact by friend and relatives favour it. Indeed, of 94 pickers, almost half (42 people) had informal waste pickers in their households (see table 7.4 in the Appendix).

Eighthly, picking waste is generally the only activity exerted. During the fieldwork, only two persons were found that exerted the picker activity as supplementary to their real job. Moreover, some elderly pickers (seven people, graph 4.19) receiving retirement were working as pickers to get better finances.

¹⁵⁶ Five of them do it with a van (which three with the same one), two with a truck (collaborating also with the whole association's collection), two (a couple) with a horse bounded to the cart.

[Catadora and mother of four children, 38 years old]:

“I work as an assistant in a laundry three days per week (gaining monthly 640 R\$) and the remaining days of the week I pick waste (gaining around 350 R\$ per month).

[Catadora, mother of three children, 32 years old]:

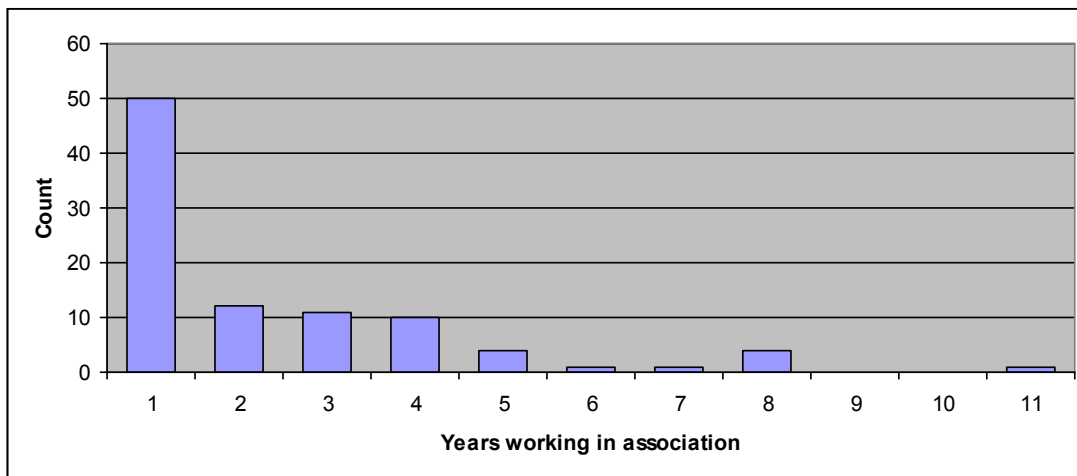
“I work in a hospital three days per week, gaining 600 R\$ per month and to complete my income I am a *catadora* the other week days so I can help my husband that is a mechanic assistant. Together, we make around 1000 R\$ per month”.

[Catador, 66 years old]:

“For me, this job is good, I am retired. Now I work just to keep going and to earn a bit more”.

Finally, looking at the associations, their formation has created some job opportunities¹⁵⁷. Most of them entered into the associations in the last year (graph 4.13).

Graph 4.13 – How many years working in the association



Only 1/3 of them (33 people) carried waste picking activity for some period in their life before entering the associations (see table 7.5 in Appendix). This means that the remaining 61 (65 % of the interviewed) started to work with waste since entering in the association.

Waste pickers have also had other type of job in their life. In general, they are manual labourers. There is a large percentage having previously been a housekeeper, which is an indicator of having many female workers.

It is relevant to see that just one person have worked in a rural area, confirms the hypothesis that the majority of pickers are not first-generation rural immigrants.

Economic aspects

The *catadores* do an informal work that moves an economy of millions and millions of Reais (Brazilian money). As explained above however, they suffer form exploitation and gain low incomes in this job.

In general, the sale prices of associations and cooperatives are higher than for an individual *catador*. This occurs because the material collected by all the pickers, adding the one received, is sold all together to the intermediaries (so in larger quantities). These associations sell to *atravessadores* and sometimes even to *apares* (see figure 3.3 in section 3.6). They have dreams/objectives to sell directly to industries, but in order to do this, they would need to produce much more material reaching large-scale industrial quantities.

¹⁵⁷ Four people started working in the association, as first employment.

Pickers, on average, with their work in the associations can achieve to gain approximately a minimal Brazilian salary (445 R\$¹⁵⁸, a bit more if taking the average rate, a bit less if taking the median¹⁵⁹, table 4.15).

Picker's income	
Average	466,17 R\$
Mediane	410 R\$
Max	1100 R\$
Min	160 R\$

Table 4.15 – The month income of the interviewed *catadores*

The total of interviewee taken is 89 rather than 94 because of missing data on five people that did not receive yet the salary (just started working) or were not able to answer.

The wages of the pickers vary considerably (see the maximum¹⁶⁰ and minimal salaries), depending on many factors: type of work in the association¹⁶¹, contacts of waste donors, physical strengths in case of *carrinheiros*, sale prices, working hours and days.

Moreover, comparing with the research made by the *UFRGS, Curitiba's* pickers presented an average wage of 429,38 R\$, higher than the *Paraná's* average (365 R\$) but smaller than the other Southern Brazilian area (480 R\$).

Among the interviewed pickers, gendered incomes were found (table 4.16). The average income earned by men (25 people), also considering the median, is higher compared to women's one (64 individuals). This can be justified by the reason that men are stronger biologically and can perform better at manual labour.

Table 4.16– Gendered incomes

Male average income	Female average income
Average: 589,014R\$	Average: 418,18125 R\$
Median: 490 R\$	Median: 400 R\$
Tot. people: 25	Tot. people: 64

Many of the pickers live in households where economic earnings come also thanks to work carried out by other households' members. In general, the average income of the households is around two minimal Brazilian salaries (see table 4.17).

Table 4.17 - Household incomes	
Total households	85
Average	885,4412 R\$
Median	800 R\$
Max	2200 R\$
Min	250 R\$

Even if these incomes are not so high and observed ambitions for upgrading are low, there exist cases of *catadores'* children that try to achieve their own dreams.

¹⁵⁸ Law n° 12.382, of 25.02.2011. While the *Paraná's* one is between R\$ 708,74 and R\$ 817,78, depending on the worker category. Source: http://www.portalbrasil.net/salariominimo_parana_2011.htm.

¹⁵⁹ Which is leaving out the extreme cases.

¹⁶⁰ The highest value is of a picker who picks with a cart helped by his woman, with 30 years of experience, working almost twelve hours per day and seven days per week.

¹⁶¹ Depending if it is collective or per production. In the first case all the gain from the sale of materials is divided equally between all the workers of the association. In the second case every worker separate its own waste, from which will receive the economic value (its income, based on the weight).

[Catadora since 10 years, mother of six children]:

“My husband and I, we sustain our whole family with this work, it is rewarding even in all the difficulties we have to face. Now my older daughter, of 22 years, is at her 3rd year of the faculty of medicine. She is working in a shopping centre (gaining 800 R\$ per month) to pay for her studies”

To have a better idea of the economy of these workers, calculations on their expenses¹⁶² were made, on electricity, water, rent and medicines (table 4.18).

Table 4.18 - Expenses

	Rent	Electricity	Water	Medicines
Average	214,85 R\$	75,07 R\$	32,09 R\$	99,26R\$
Median	200 R\$	70 R\$	25 R\$	70 R\$
Total n° of considered households (tot=78)	13 (17%)	53 (68 %)	67 (86 %)	21 (27 %)
Max	370 R\$	220 R\$	150 R\$	500 R\$
Min	130 R\$	5 R\$	5 R\$	14 R\$

On electricity, 55 households were considered, taking into account only those that had regular electricity and thus pay (was cut out from the statistics who was not able to answer or was part of the same family of another interviewee).

About water provision service, 67 households were considered (no answers or in case of illegal installations have not be counted).

The service of sewage system is not included because it is included in the water bills, people who do not have a public regular system pays only the water provision service. People who have both of them pay a higher water bill from *SANEPAR*.

On the matter of medicines, only the people who regularly needed to buy some medicines were considered, the total households considered were 21.

The percentages of households considered are based on the total of 78 hs (=100 %), this number results cutting out pickers that were belonging to the same household.

Only 17 % of interviewees paid a rent. For those who did it, it is their main expense. Most of the pickers paid water (86 %), majority paid electricity (68 %) and only 1/3 paid for medicines (27 %).

The second highest expense is on medicines. Some of these expenses are so high that they are not affordable for *catadores* (information on health and assistance will be given further).

[Catadora, 35 years old]:

“I have a cancer in my intestine, to cure it the doctor gave me medicine that cost me around 500 R\$, I cannot pay for it”.

[Catador, 40 years old]:

“I have a skin disease (psoriasis) and for this reason I lost my job in a water company, where I worked for 13 years, regularly employed. Since I got fired I became a *catador*. I should pay 1000 R\$ per month to get cured with special creams”.

¹⁶²It is important to make notice that these data want to indicate a general situation of the expenses, as average rounded amount have been taken and many interviewees might have given very approximate or even wrong values (no water or electricity bill has been analyzed). It has to be kept in mind also the variability of bills during the years (depending on the seasons).

Government aid

All the pickers interviewed generally belong to low-income households, for this reason they may receive some government donation (see a small description for each kind, table 7.6 in Appendix).

The major support the pickers received from government came from the low-income water aid, and from the *Bolsa Familia* aid (receiving either 68 R\$, 112 R\$ or 134 R\$, per month depending on number of children).

As observed during research if pickers would receive fair incomes they may not necessitate any government funding.

[NGO member]:

“If a *catador* would receive the right income for his work he would not need any funding such as the *Bolsa Familia*”.

The considered low-income households in the MRC received more aid from the water company *Sanepar*, than the energy one (*Copel*)¹⁶³. This may be a reason why many (22 %, graph 4.8) still kept an irregular electric installation (to not pay for the service) or needed to share this expense with others.

[Catador]:

“I pay a truck of money for the light in my house”

Table 4.19 - Government aids received

Government aid type	N° of households benefitting
<i>Bolsa Familia</i> <Family aid>	23
<i>Agua baixa renda</i> <Low income water aid>	30
<i>Aposentamento</i> <Retirement>	7
<i>Luz fraternal</i> <Low income light>	5
<i>Assistencia para portadores de Deficiência</i> <assistance for disbaled people>	2
<i>Desemprego</i> <Unemployment aid>	1
<i>Auxilio doença</i> <Disease aid>	1

Having seen the major income and expenses of the considered pickers' households, calculating an average income per household, hypothetical income per capita can be calculated (dividing the former one by the number of members of household, see the formula).

Formula:

$$\text{Wage per capita} = [(Family\ wage + government\ donation) - expenses] / N^{\circ}\ of\ Family\ members$$

Table 4.20 – Income per capita

Average	239,4 R\$
Median	154,6 R\$
Max	1074 R\$
Min	-112,5 R\$
N°	82

The households considered (82) are more than the fixed total number of households (78) chosen because some members of same household have declared different amounts.

The income per capita was calculated as an average to be around 240 R\$. In the case of a median, it is around 155 R\$. It is the total hypothetical amount each individual member of a pickers'

¹⁶³ This can be demonstrated also comparing the maximum amount of expense for water (150 R\$) and electricity (220 R\$), see table 4.18.

households, should live with for a month. In Euros, this value is around 100 as an average and 56 as a median.

4.7 Opinions on work

Open questions on difficulties and positive aspects of their work were asked to the *catadores* (results in tables 7.9 and 7.10 in the Appendix). For difficulties refer to summarized results on table 4.21, and table 4.22 for positive aspects.

Difficulties

A large quantity of respondents demonstrated to be unaware of their own problems, being used to the working conditions. Many pickers, at negated many problems or difficulties in doing this work, while nine declared openly that there are many or always problems and difficulties (table 7.9).

Table 4.21 - Difficulties presented by catadores (by theme)	N°people
Bad state equipments in the associations	19
Quality of the material received	17
Economic issues	14
Discrimination, social exclusion	12
The work (organization)	11
Lack of collaboration	8
Difficulties for cart-pushers	4
Lack of opportunities to grow	3

[Catadora]:

“I already cried and I hope things will change. But then I think there are people in worse conditions than us, they stay inside landfills, with owners exploiting them”.

The main difficulty that was pointed out was either the lack of or poor condition of material things in the associations, such as working space, lack of equipments (truck), safety tools, and infrastructures (roads).

[Catadora]:

“I always have the fear of hurting myself. I cut my foot falling into a hole. I always try to work with boots and gloves, the main problem we have is with glass”.

[Catadora]:

“I would prefer to work in a company, there, there is everything. Here there is nothing”.

Some pickers answered that main difficulties were related to the quality of the material, i.e. the arrival of organic waste, mixed with recyclables from the municipal service (discharged by the municipal trucks). This type of waste slows down pickers’ separation work and attracts disease-vectors.

[Catadora]:

“The difficulty for me here is that I have to deal with things that I did not know before, which are dirty and smelly”.

[Catadora]:

“The majority of waste that arrives here is mixed with organic remnants, not only food but animal faeces, medical syringes or other products. *Catadores* in the street get cleaner waste products”.

Some expressed their problem on economic issues (un-fair prices and low-incomes).

[Catadora]:

“The work is not recognized. We earn little, the work of three people make a minimum wage!”

[Catadora]:

“We get unfair prices, for our work we should receive more”.

[Catadora]:

“We have never been paid for our work, it should be a right, and they [municipal authorities] should pay us based on the tons the trucks bring”.

[Catadora]:

“It is giving me only enough to survive (now the wage is relatively low). I do not know how to save the money. Thank God the church is giving us food, if we continue like that, we will be able just to survive”.

In general *catadores* are discriminated against by society, making them feel excluded. Different pickers expressed this feeling was.

[Catadora]:

“We are not recognized, we are seen like waste-bins. We are invisible. When people on the streets pass by and they say ‘what a smell’”

[Carrinheira]:

“In the street you can meet nice people, some help you, but some other people walk next to us with an expression of disgust in their face”

[Carrinheiro]:

“They insulted us, they called us thieves. It is barbarity the fact that they put even dead beings in the waste”.

Some pickers expressed difficulty in the work itself, which is tiring and tough to organize. Some refer to lack of collaboration.

[Catador]:

“Always there are some difficulties, the work is a lot, and sometimes it is suffering”.

[Catadora]:

“Nowadays we are not having any problem in organization. We had a meeting and we made an agreement, but at the beginning there was no collaboration. Now the work is collective, and everyone has to work at the same rhythm”.

[Catadora]:

“There are a lot of quarrels. We have a lot of confusion and we receive a lot of organic waste. Some people collaborates, some people do not”.

Some referred to the difficulties of the cart pushers and some mentioned the lack of opportunities to grow (lack of courses).

[Catadora, 24 years old]:

“There are no schools to have better chances so I have to stay here, but it will be a temporary job”.

[*Catador*]:

“I would like to take a course, somewhere away from here. I would exchange my experience and learn from new ones”.

Two people mentioned the fire that brought problems; they belong to the Cooperative *Zumbi* (see the related story in box 10). Other difficulties were on more specific issues.

Box 10 – Challenges to face – Two stories

The Cooperative *Zumbi* is the oldest cooperative formed in the MRC. It started as a pilot project of an NGO *Aliança Empreendedora* in 2001. It is been in existence for eight years, but has been official for six. It is situated in the well known, big, dangerous slum, *favela* of *Zumbi de Palmares*, in the municipality of *Colombo*. Around 25 people work there, the majority being women and pushcarts. They also receive waste from the municipal programme. They pay for their retirement (*INSS*) which is un-usual. Different sponsors have supported their start.

All these gains passed through different challenges. A social assistant, that gave some formation to co-operators of *Zumbi*, told me that, initially, there was a slavery type of work functioning in the cooperative. It "seemed to be a factory", where one of co-operators was actually ruling all the others, gaining more and exploiting other's work. For this reason, many pickers left the cooperative, and went back to the streets, thinking there they could earn more.

While the course was going on, the social assistant was teaching them their rights, and talking about the political movement of the pickers, the workers started to rebel and the cooperative solidified, with everyone having same rights and incomes. They elected a new president and they now have a collective way of working (all the gain divided equally).

In February, there was a fire in the storage of the cooperative. It started exactly where pressed and packed materials were stored and ready to be sold. Around 45 *fardos* <packs> of PET got lost. Two pressing machines and balances were also burned, causing the materials to be sold un-packed and have a lesser value. They began selling to a *Ferro Velho*. The income significantly as well as the the co-operators earnings. Not everyone was able to get paid. Many co-operators left the storage to work on the streets because of this lack of earnings. The foundation that was paying the storage rent, paid for new machines and the municipal council was willing to help as well with the cleaning the storage and finding of a new working space. However, all this process of reform happened very slowly, while the co-operators continued to loose wages. They needed to put a lot of pressure on the public institutions to get this help.

As witnessed: "The relationship with the public council is not easy, sometimes they help, and sometimes we hate it. It is necessary that everyone helps and collaborates, because no one wants to take the entire burden of reforming on its shoulders".

Finally, implicitly seemed that some of the co-operator suspected the fire was fraudulent, sort of revenge for having achieved workers independence. A lot of mistrust demonstrated, as said: "we had many difficulties because we had many not nice people here that cheated us".



The association *A Ilha* is in the town of *Almirante Tamandarè*, on the boundary with the municipality of *Curitiba*. It is close to the *Tanguà* Park and some high-class block-of-flats. It is still not a formal association yet. It is composed by a group of 20 families (around 30 people) that live in a small *favelinha*, in an occupied area between two rivers, *Barigui* and *Tanguà*. When it rains, the rivers tend to flood and they say its like living on an island, hence the name, *a Ilha*. *Catadores* of this association never had a work space, they usually brought the material collected on the streets to their houses, to be there separated. During Carnival holidays, in March, they decided to squat in an abandoned storage to be able to have a proper working space. It is close to their living area but in a more high-income zone, and has been abandoned for 16 years, with the owner leaving many debts behind. They started to work there, trying to reform the place and creating better conditions, not without difficulties. Indeed, half of the roof was lacking, creating many problems when it rains. They put illegal, electricity and there were no working machines, so the material was not pressed and packed. (less valued), It was sold to *Ferro Velho* at very low prices. Some of the neighbours did not want them saying that they keep the area dirty, reporting them to the police. They started a judicial process to get a re-appropriation of the building from the owner, <*reintegração do posse*>.

The neighbours lost in court and the *catadores* of *A Ilha* got equipped and helped by *Cefuria* (with machines and roofing), hoping to gain possession of the place legally, thanks also to their social function. Still so much needs to be done, but the pickers do not surrender. As said: "We have hope but alone we cannot do it".

Positive aspects

A large group of people had positive feedback as a first reaction on their work, while four gave negative ones (table 7.10 in Appendix).

[Catadora]:

“My life changed totally in the positive, I travelled in different places for the movement and meetings, and I got to know a new family. I was pushing the cart before (for 20 years), now I get better salary, I do not miss anything”.

Table 4.22 Positive aspects of the work (by theme)	N° of people
Human relationships in the association	21
The economic aspect	17
Environment benefits	12
Motivation for improvement	9
The work	8
Job creation	3
Help from entities	3
Relief from stress and Having Recognition	2

A large group of pickers gave importance to the friendships they make at work and the relationships with their colleagues.

[Catador]:

“It is good, it is like a family. When somebody is missing we feel it”.

[Catadora]:

“The people that work here, we are all close to one another. Sometimes there are some fights but then they pass, we are all united”

[Catadora]:

“I like my colleagues, we joke a lot, and the time passes very fast here”.

Different pickers mentioned the income and the possibility to sustain their own household.

[Carrinheiro]:

“This association will give me a lot of profit and one day I’ll be able to open a *Ferro Velho*”.

[Catadora]:

“Many things are good, it is already a gain to be here, many people live thanks to this job, depending on this work”.

[Catadora]:

“As I am single, it is good to work to be able to get things for my child”.

[Catadora]:

“We could not support our houses in any other way, thank God this work exists. For everyone else it is garbage, for us is livelihood”.

Some people referred environmental benefit they bring as a positive aspect of their work.

[Catadora]:

“Our work is rewarding, the benefit is not only ours, but it is social, for the recycling and the environment”

[Catadora]:

"I feel very happy to take away tons of waste from nature, leaving something good for future generations".

[Catadora]:

"The positive thing is that we are cleaning the environment, not leaving waste on the roads or in the rivers".

[Catador]:

"It is generating employment and avoiding contamination of nature, we are doing our part to help the Earth".

Many saw the hope they have for improvement and their struggles as a positive aspect.

[Catador]:

"We hope for price improvement. Further, we would need courses for improving our abilities".

[Catadora]:

"We have hope, we created a cooperative, it is taking time for bureaucracy, but *Cefuria* is accompanying the process".

[Catador]:

"The good thing is the struggle itself and to not surrender, it is a conquest. We do not have to pay rent, and so we have a space to work. Before, we received only municipal waste, now it is also coming from the market and from *Banco do Brasil* as well as big generators".

Some referred to the work itself as a positive thing, saying that it is easy, the organization is good, and self-management is especially rewarding (no rules, no boss, no strict timetables).

[Carrinheira]:

"The cart is good, the place is good, the roads are good, the people I meet are good and we are getting more help from the banks".

Few referred to the employment creation as a positive thing, while others referred to the help and support they received from different stakeholders and as being recognized as professionals.

[Catador]:

"It is good to know there are people that worry and want to improve our conditions".

[Catadora]:

"I started for necessity, now I like it and I do it for love. I defend everyone in here, our engine is our arms and legs".

[Catador]:

"Before we were considered as beggars, now it is recognized as a real work".

Last but not least, some referred to the possibility of this job being helpful in fighting stress.

[Catadora]:

"It is really good, if I could, I would work also on Sundays. I come here also on Saturdays, I stay alone, and I do not think".

4.8 The political movement of the pickers, Movimento Nacional dos Catadores/as de Materiais Recicláveis (MNCR)

“It does not matter what religion you follow, football team you support, political party you vote, we are only one thing, we are *catadores*; all the people that stay here have had something to do with waste”.

[M. Aparecida de Lima, a national leader of the *MNCR*]:

The *MNCR* is spread around most of the federation of Brazil. It is present in almost all the states, around 23 of them plus the Federal district. It works as a syndicate for the *catadores* representing around 500 cooperatives and associations with approximately 60,000 members. It is the largest political movement of recyclable waste pickers in the world (M. Medina, 2010, p.33).

It was generated at the beginning of the year 1999, with the first national meeting, but it was officially founded in June 2001 at the first National Congress of *Catadores/as* in *Brasilia* with more than 1700 participants and as an extension of the *MST*¹⁶⁴. At congress, the ‘Paper of Brasilia’ was given: a document that expressed the necessities of this category of workers. Before the congress, different groups of *catadores/as*, organizing for their rights in the various states of the federal nation, were already there. In the year 2003 the first Latin-American congress of *catadores/as* in *Caxias do Sul* (RS) occurred. The result was the ‘Paper of *Caxias*’, describing the situation of the *catadores/as* in the whole South-American continent. In 2005, the 2nd Latin-American congress occurred.

The movement is claiming for human rights, acknowledging the reality that many *catadores/as* still work and live in open landfills or on the streets, and claims the right to work and to survive. Moreover, it claims for the dignity of this category of work and the value of every worker. Their values are human divination and social value of work. They defend their independence, from any political party, governments, or enterprises and support the guarantee of being a popular class movement, which is oppressed by the social system. They believe in a direct practical action in which the worker totally participates in everything that involves his life. They fight against exploitation, for a cooperation, and for autonomous management of own work.

They claim,

“The control of the productive chain of recycling, trying to guarantee that our service will not be beneficiated just by a small groups [...] that is why we organize in different groups, associations and organizations, in which nobody can gain at the expense of anybody else”.¹⁶⁵

In general, the movement aims to find public policies for *catadores*. In 2002, the *catadores*’ work was legally recognized, with a category created in the *CBO - Classificação Brasileira de Ocupações*¹⁶⁶ <country’s Classification of Occupations>.

In March 2006, the *MNCR* organized a march to *Brasilia* requesting different issues from the federative government, such as the creation of jobs in cooperatives and associations, which would be the basis for the movement. Approximately 1.200 *catadores/as* marched in the *Esplanada dos Ministérios* of *Brasilia*, their objective was the creation of 40.000 jobs. In 2009, the government instituted a tax credit for all those industries consuming those recyclables purchased by *catadores*’ associations.

In June 2010, the *MNCR* of *Paraná* met in *Fasinal do Ceu* (around 200 *catadores*) where a meeting for formation of the movement was organized.

Some laws were created to incentivize *catadores*’ work, such as the decree law 5.940/06, which gives the obligation to public federal organs (post-office, Tribunals, Bank of Brazil, *IBGE*¹⁶⁷ etc.) to separate the waste and donate it to associations and cooperatives of *catadores*.

¹⁶⁴ *Movimento Sem Terra* <Movement of non-landers>.

¹⁶⁵ Source: <http://www.mnrc.org.br/>

¹⁶⁶ *Ministério do Trabalho e Emprego*.

¹⁶⁷ *Instituto Brasileiro de Geografia e Estatística*.

Some expressed doubts on the effectiveness of the decree law.

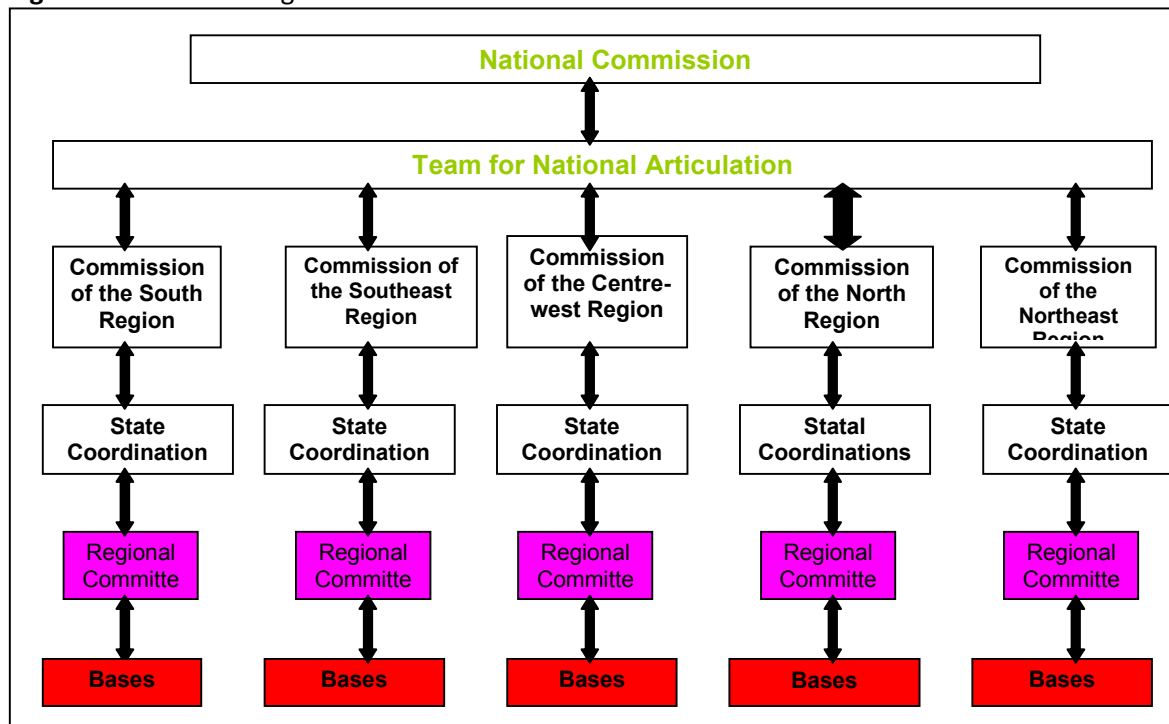
[NGO representative]:

“The federal decree law 5.940 is a good thing but it doesn’t take into consideration the conditions of many *catadores*. How can they get all the public institution’s waste? What tools do they have?”

The movement in *Paraná* is articulated in the whole State with more than 60 bases (associations or cooperatives, each one with at least 2 representatives).

The bases, with two representatives each, form the regional committee. This committee elects two people to be part of the coordination of the State, and these elect the one to represent the regional committee at Federal level in the National commission (see figure 4.1).

Figure 4.1 –MNCR’s Organizational structure



The meetings of the movement of *Curitiba’s* region take place at the headquarter of the *L&C* Institute, with around 10-15 people. The representatives acknowledge the lack of participation, as at every meeting important decisions are made and important information is given.

Some associations’ representatives pointed out the conflict of interests between the *Curitiba’s* movement (at regional level) and one association. This fact may lead to a lack of trust toward *Paraná’s* representatives, causing a deficiency in participation.

[*Catadora*]:

“We have the flag, we are the movement. From one side the movement works, but in *Paraná* the directory board should be changed. It could be doing more. It is just that group; you cannot distinguish who is part of the movement or part of *Catamare*. The idea was that *Catamare* should have worked as a reference, as an ‘umbrella’ for all the other associations, but this dream we had did not work out. They should open up for more pickers to participate. I went to many meetings, especially in September and October of last year (2010), but then I got out of the movement. The representative never came to visit us, she should have. At the end of the year, the children got some presents but it is not the help we

need, she should have known what our necessities were. Now things might start changing because they lost supporters”.

Lack of participation is also related to the difficulty of leaving ones own work. Due to low-incomes, to miss half-days of work means a lot for a *catador*.

[*Catadora*]:

“I do not go out much from here (the deposit). I don’t listen too much but I know they succeeded in many things already”.

[*Catadora*]:

“Now I’m busy but I’ve participated to course on self-management of the associations/cooperatives and in network sales (to sell all together) in the past. We also went to the state level meeting in *Fasinal do ceu*. Now I do not know how it is going. We stay at the base so we do not know anything about what is happening out there”.

At one meeting, they were organizing the mapping of all the *catadores’* associations in *Curitiba* and its metropolitan area to systematize the collection of two big waste generators, *Banco do Brasil* (60 filials) and *Caixa Economica* (40). In total, there were 100 spots in the metropolitan area to be attended. This was a consequence of the Federal decree, 7.404 enforcement¹⁶⁸. For the first time the movement was trying to organize a large-scale logistic platform for collection. Even if there are conflicts between the different associations (based on institute support) it is acknowledged, an attempt to be include all the associations in this platform will be made.

Pic.4.5 - Two *catadores* holding their movement’s flag. **Pic.4.6** – meeting of the *MNCR* in *Curitiba*



Themes they deal with and struggle for are:

- Eradication of infantile work;
- Eradication of waste landfills;
- Day-cares and schools provision for *catadores’* children;
- Recognition of the work (in the public cleanliness and retribution for the service provided);
- Improvements for organization, self-management of the associations and cooperatives;
- Go further on the productive chain of recyclable materials;
- Incentivize recycling systems and the commercialization network of *catadores*;
- Incineration¹⁶⁹ prohibition;

¹⁶⁸ Being both of the institutions at a Federal level.

¹⁶⁹ On the matter of waste incineration, some plants exist in Brazil. In some states as *Sao Pãulo*, *Minhas Gerais*, *Rio Grande do Sul* and *Santa Catarina* it is hot issue for the public powers. In the state of *Paraná*, an

The struggle against incineration is based on environmental reasons but also interest. Indeed if waste would be burned, there would not exist recycling and pickers would not have their raw working materials.

In conclusion, looking at the themes for which they struggle, it can be asserted that an awareness of environmental and social issues was developed among *catadores*. Picking waste is not seen only as a survival strategy. The movement story and gains have risen an awareness and knowledge of *catadores*.

Feedback on Movement

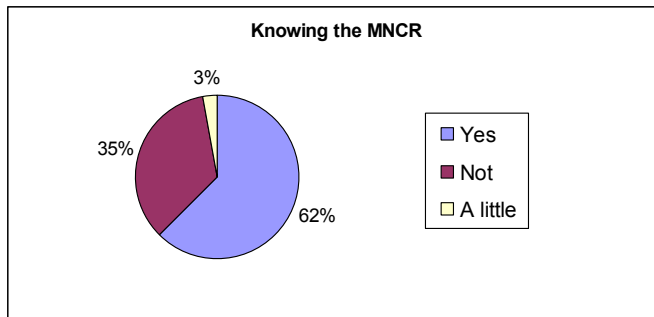
As mentioned above, movement arose awareness and commitment of some *catadores* on social and hot environmental hot issues.

[*Catadora*]:

“I’m part of the movement. We want to be recognized positively by the government, it has existed for long time, it supports us, but there are people that do not know it. We went to the government palace, there we were many of us”.

Open questions and opinions on the movement (focusing on the one of *Paraná*) were asked to different *catadores* in the associations. Even if association formation was one the most important gains of the *MNCR*, not all the associated know this movement. More than half of the *catadores* knew the existence of the movement representing them. However, a relevant portion (35 %) did not (graph 4.14). This low-knowledge can be attributed by the fact that around 55 % worked in the association for less than a year (see graph 4.13). Indeed, some pickers justified their ignorance saying that they just recently started to work in the association.

Graph 4.14 – Knowledge on the existence of the *MNCR*



Even more *catadores* interviewed demonstrated ignorance on the leader of the movement (in this case of the state of *Paraná*). More than half of them (55 %) did not know or remember any *MNCR* leaders’ names (table 4.23).

incineration plant does not yet exist and the issues are not present. The incineration technique is seen as an optimal solution mainly for efficiency (viable and quick) and economical aspects (cheap).

Table 4.23 – Knowledge of leaders’ names

Do you know any leader of the MNCR?	Abs.N°	%
Not	51	55%
1	13	14%
2	10	11%
3	5	5%
4	4	4%
5	7	7%
6	1	1%
Everybody	3	3%
Total	94	100%

Lack of knowledge is even much higher when it comes to the themes the movement fights for. The majority of interviewees (63 %) were not able to answer questions about the movements’ struggles (see table 4.24).

Table 4.24 – Lack of knowledge on MNCR struggles

Do you know any fight of the MNCR?	Abs. N°	%
Not	58	63%

The remaining 37 % (36 persons) of *catadores* answered in different ways (see table 7.11 in Appendix, table 4.25 summarizing answers by theme).

The largest group referred to the general targets of the movement like fight, rights, dignity, improvement, representation, etc.

[*Catador*]:

“Transform the picker into a professional, diminish the value of the working years to get *INSS*, value women’s work and defend them, take children off the streets”.

[*Catadora*]:

” More dignity for the pickers,. We are not waste, we are people”.

Some answered the retirement issue (*INSS*). Indeed, the movement is trying to achieve the right of the *catador* to work less than 25 years to achieve retirement, justifying the wearing nature of the work.

Some pointed out environmental issues, while others focused on work issues, the associations, their economic conditions and few the defence of some weaker social categories.

Table 4.25 - Knowledge on issue the movement struggle for

Struggle themes	N° respondents
General themes (rights, dignity, etc.)	13
Better working and economic conditions (in Associations)	11
<i>INSS</i>	4
Environmental issues (<i>SIPAR</i> , incineration etc.)	3
Defence of some categories (women, children)	3
Will to participate more	2

Some pickers gave negative feedbacks, specifically on *Paraná’s* movement leadership (table 7.12 in Appendix). No *catador* expressed the existence of the movement meant, as a bad thing.

[Catador]:

“The movement right now is disappointing. It says one thing but does another”.

Conquests and laws

The *MNCR* achieved some conquests for the pickers in Brazil. *Catadores* were asked questions about their knowledge of any political conquest or success of the movement (table 7.12 in the appendix). Knowledge on *MNCR* successes is higher (tables 4.26) than the one on struggles. More than half of the respondents did not know what their political movement achieved.

Table 4.26 – Lack of knowledge on *MNCR*'s conquests

Do you know any conquest by the <i>MNCR</i> ?	Abs. N°	%
Not	51	54%

The remaining half (46 %) gave different answers (table 7.12 in Appendix).

The largest group mentioned the federal decree (7.404) signed by Lula that the *MNCR* got to be applied (explained further). Some other referred to the Federal decree 5.940 (explained above). In the State of Paraná, a State Decree 4.167 was created. It is similar to the Federal, that state institutions donate their recyclable materials to associations or cooperatives of *catadores*. Paraná is the first Brazilian country emitting such a law, it was signed by the governor Roberto Requião¹⁷⁰.

Few mentioned the donation of *FUNASA*¹⁷¹; 200.000 R\$ for buying a truck (which generally costs 150.000 R\$), a forklift, mechanical tables, a van, and other machines (depending on the exigencies of the associations). Four of ten associations (*Assol*, *Catamare*, *Resol* and *Acampa*) visited gained it. To become equipped with a truck is a very important fact because it gives larger possibility of getting the association more involved in the collection phase with no physical human effort.

All the other answers are quite specific, many are linked to the storages they worked in and the direct help they received, such as projects from different institutions. For instance, *BNDES* – National Bank for Economic and Social Development approved 57 loans for a total of over US \$17 million (Medina, 2010, p.33) in January of 2010.

Some of these conquests were not achieved by the *MNCR* itself but by the members of the associations, which demonstrate that they believe in being the movement themselves.

Some *catadores* gave negative feedback on the movement action.

[Catadora]:

“We are doing a cooperative now between October and January, we got a new pressing machine, and a new truck. The movement could do this. What we got is not in their merit”.

[Catador]:

“Until now they have not done that much, but we feel represented. We did not have any help from them, the help came from Belgium, Austria, Germany etc.”

Some demonstrated feeling of belonging.

[Catador]:

“When we need to go, we all go together”.

Infantile work

One of the most important struggles of the *MNCR* has been the elimination of infantile work.

On the streets of the downtown of *Curitiba*, entire families of *catadores* (children included) can be observed going around the city with their carts (occasionally pushed by horses) to collect waste.

¹⁷⁰ Ex-mayor of *Curitiba* (1986-1989), governor of the state (1991-1994, 2003-2006, 2007-2010).

¹⁷¹ *Fundação Nacional de Saúde* <National Foundation of Health>.

A Nation wide campaign and programme called "No More Children in Dumps" was implemented in Brazil, supported by the Waste and Citizenship Programme. This action was also based on a study on child labour among *catadores* published by UNICEF in the 1998. It said that over 45,000 children nationwide worked as pickers. By the end of 2005, more than 46.000 *catador* children were enrolled and going to school, thanks to some cash transfers received, with requirement of school attendance and healthcare visits (Medina, 2010).

In many of the considered associations the presence of children was observed. In four out of nine associations this presence was regular, in two others they just passed by after the school, and in the remaining three, there were no children noted as being present. This habit evidently affects the children's health (table 4.7 in section 4.3)

Children compose most of the households (see table 4.1). One of the main problems the pickers expressed is the children's care. This is because the pickers not only carry out such long working hours but also because the children stay at school only half of the day (common factor of Brazilian public education).

[Representative of MNCR, President of an association]:

"The majority of *catadores'* children do not have a place to stay after the school and this creates problems for their care".

Moreover, when the work is carried out in night hours the picker-parents do not want to leave children alone at home, acknowledging the dangers of the neighbourhoods in which they live. Especially when considering teen-agers, many drug problems and exposure to easy accessible drug trafficking are revealed in these areas.

[*Catadora*, 39 years old]:

"My 17 years old son of is living with my mum in a smaller town, I don't want him to stay in *Curitiba*. Here it is too dangerous, he could get involved with drugs".



Picture 4.7 – Playground for children in the middle of an outdoor storage.

Questions on where minor children stay during their work were posed (table 4.27). The majority of parents declared that the children 'stay half day at school and the other half at home'. What exactly 'home' means it is unclear.

A smaller proportion is composed by the luckiest ones, who either go to day-care (the youngest from six months old to five years old) or school the whole day, or enrolled in after school projects (25 children).

Just few *catadores* admitted to keeping their children in the storage, and acknowledging that it is, in fact, wrong.

Additionally, some parents cannot find a place in the day-care for the younger ones. Only half of them get to stay in a day care, the other half stays with relatives at home¹⁷².

There were two couples of parents that could afford to pay a baby-sitter.

[A couple of *catadores*, parents of two children]:

“If we work well we gain 2000 R\$ together in a month, but we also need to work 14 hours per day. We feel bad for leaving the children alone for such a long time. We pay a lady 300 R\$ per month to look after them a few hours a day. We think our children feel abandoned.

Table 4.27- Where the children (minors) stay while they work

Where the minor stay?	Abs.N°
At home	12
School all day	4
School half day, half day at home	90
Work ¹⁷³	5
In the day-care for whole day	14
At the deposit when not at school	6
When not at school in a project organized by Mun./Gov.	10
The baby with...	13
half-day baby-sitter, half day day-care	3
with neighbour	1
NA	5
Total minors	163

Federal decree 7.404

One of the biggest political successes of the *MNCR*, was the December 2010 Federal Decree 7.404¹⁷⁴ of, signed by Luiz Inácio Lula da Silva before leaving his presidency charge. It is on the matter of responsibilities of big generators of solid waste, of consumers, and of public powers. It foregoes that producers, distributors, importers, merchants and owners of public service for urban sanitation and solid waste management are responsible for the life cycle of their products.

Public power and entrepreneurs have to follow the law nº 12.305/10, which comprehend integrated management and responsibility.

The consumers must dispose re-usable and recyclable solid waste for the collection adequately. Mandating the separation of organic and solid waste, programmes by the Union for the inclusion of associations and cooperatives of *catadores* to improve their working conditions, and opportunities of social inclusion are also foregone.

Moreover, it creates an inter-Ministerial Committee on National Policy of Solid Waste. Based on this law the waste material is considered as an economical good.

Thanks to this decree, *catadores* have priority in municipal solid waste management systems and all the actors (including companies) have to take it into account. For instance, it becomes illegal to sell a company’s waste to dealers, it must be donated to the *catadores*.

Furthermore, it has to be considered that the material that comes from companies is of higher quality than the ones coming form private houses.

¹⁷² Older sisters (4), mother (3), father (1), grand-parents (two), aunt (two) or mother-in-law (one).

¹⁷³ Five under-age people work, this also due to the possibility in Brazil to do some internship in some companies at 16 years old.

¹⁷⁴ Regulating the Law 12.305 of 2nd of August 2010 that institutes a National Policy on Solid Waste.

[Catador]:

“The big supermarkets (Carrefour, Vida, Muffato, Sestra, Big, etc) sell the good material, the bad one goes to landfill”.

Some expressed some doubts on this law enforcement and its effectiveness.

[MNCR leader]:

“This decree is a good thing, but we cannot just wait for the law, we have to see if the law works and is applied. In Brazil, we have many problems of disrespect for laws. Indeed, many enterprises do not follow this law. We know that some have been selling waste and using the money for employees benefits, travels, and dinners at the end of the year”.

An important consequence of this law is that if *catadores* would receive waste from big generators, they would not need to go so far to get the material, and thus have less working time, would receive material of better quality (and not mixed with organic) and would receive better incomes and working time (better also for the children care).

Additionally, the donations of *Funasa* are related to this orientation chosen by the Federal government of supporting and developing groups of *catadores* in taking care of the recyclable waste issue¹⁷⁵.

Questions on the knowledge of this important decree were made (for the results see table 4.28).

Half of the interviewees declared to know the existence of that decree.

[Catadora]:

“Since the 23rd of December the waste is of the pickers, with this, the nature will improve and the prejudice will diminish radically”.

This, in some way, is contrasting with the other data evidencing the lack of *catadores'* knowledge and awareness on the movement (tables 4.24 and 4.26). One of the factors affecting this statistic could be that it is easier to answer yes to any question regardless. The other is that this decree had a national scale resonance in mass media thanks to a TV-interview to the President Lula.

[Catadora]:

“Oh is the law in which Lula gave huge amount of money to *catadores* and he even cried¹⁷⁶”.

This event shows how central a role the television for Brazilian society has and that *catadores* are sometimes knowledgeable, not because of participating in the *MNCR* meetings, but because they are getting the news from the most beloved Brazilian household appliance.

Table 4.28 – Knowledge on the last Federal decree

Do you know the Federal decree 7.404 signed by Lula last December?		
Answers type	Abs. N°	%
Yes	48	53%
Not	46	47%
Total	94	100%

¹⁷⁵ As the issue of waste and environment is related with public health, *Funasa* that is in charge for it, generated these investments.

¹⁷⁶ It can be seen on this link: <http://www.youtube.com/watch?v=uN6JUPfenfE> in which Lula is actually referring to the loan of BNDES of 200,000 R\$ to the *catadores*.

Conclusion

In this chapter, the discussion converged on informal pickers issues, aiming to answer the three sub-questions presented in the introduction.

Based on the data collected in this research in the MRC, analysis on how bad working conditions affect pickers' conditions of life was conducted.

One of the findings shows that pickers generally live in low-income areas, characterized by lack of infrastructure and facilities. Moreover, unsanitary working environment and hard physical efforts are potential factors leading towards health problems. These problems are weighed by a lack or deficient public health assistance. Some categories related to pickers, such as disabled people or children, also suffer from lack of proper social assistance. In general, pickers are subject to marginality and social exclusion.

The characteristics of pickers' work do not allow space improvement of their living conditions life, which has been demonstrated, through low levels of education and difficulty to find alternative legal employment.

Pickers' activities bring relevant contribution to the urban environment, this directly related to the meticulous separation of the numerous types of material they are able to separate. Needless to say that this activity save natural resources and avoid waste disposal, which can cause environment contamination, as discussed in chapter two and three.

Legalization of pickers' associations was one of the most important gains of pickers' political movement (the *MNCR*), however knowledge on this entity and awareness of its struggles show some gaps and necessitate to be strengthened within the associations.

With the creation of associations, working conditions and income improvement and more recognition of pickers' work is achieved. The acknowledged environmental benefits are also improved, thank to better efficiency in the material recovery achieved through equipment provision and learning of new skills.

Finally, the existence of associations does not solve all the problems pickers face everyday. To enhance improvement initiated by the associations, better and stronger organization and structuring of associations and support of other stakeholders is needed.

5. The other Stakeholders: The NGOs, the Judiciary and the Municipal Council

Introduction

For a better analysis, it is important to give a complete framework of the stakeholders involved in solid waste management, potential to change picker's conditions and picker's influence on the environment.

This chapter will discuss the role of three NGOs (*Aliança Empreendedora*, *Instituto Lixo e Cidadania* and *Cefuria*) and of public institutions (the Public Prosecutor and the Municipal Councils) dealing with informal waste pickers.

This is done, also, in order to understand the pickers' institutional context and the favouring and hindering factors for overcoming associations' challenges.

The following sub-questions are answered:

- *To what extent do the relations between the informal pickers and the municipal waste managers favour a sustainable development of the informal SWM in the MRC?*
- *To what extent other actors (as NGOs and Judiciary) affect sustainability and the pickers' conditions in the MRC?*

5.1 The role of NGOs

Different NGOs support the informal pickers and their associations in the MRC towards their formalization process.

During research, contact with three NGOs (*Istituto Lixo e Cidadania*, *Aliança Empreendedora* and *Cefuria*) was maintained and interviews at their headquarters were held (basic description of the organization and their history is found in box 11). Table 7.16 in the Appendix also shows the partnerships with which NGO the pickers' associations had.

NGOs, in general, also support and try to facilitate the association formation and development from different aspects. A SWOT analysis (table 5.1) was done to see the strategic position of the NGOs in the association formation.

Swot¹⁷⁷ table 5.1 - on the NGOs role in supporting pickers' associations

Helpful In achieving the objective		Harmful In achieving the objective
Internal Origin Attributes of the organization	<u>Strengths</u> <ul style="list-style-type: none"> - Pickers trust toward NGO - Pickers will to collaborate - To gather waste of single individuals - Better contact with buyers - Funds (equipments, courses) - Work organization, Production, Management, Financial and Negotiation skills - Picker awareness - Create larger cooperatives (formed by different associations/cooperatives) - Hygiene - Dialogue with Local Government - Raise awareness 	<u>Weaknesses</u> <ul style="list-style-type: none"> - Lack of pickers' trust - Lack of funds (lack of equipment) - Pickers' lack of awareness - Pickers lack of collaborative attitude - Pickers' low education level - Lack of pickers' consistency
	<u>Opportunities</u> <ul style="list-style-type: none"> - Funds from Federal institutes and companies - The support of Local Authority - Laws protecting pickers and facilitating their work (At State and Federal level) - Support of the PP¹⁷⁸ - Support of the MNCR - Aware civil society and better waste habits of households 	<u>Threats</u> <ul style="list-style-type: none"> - The informal waste chain (intermediaries imposing prices) - Informal setting of living areas - Negligence of Public Authority - Conflicts between associations (NGOS) - Economic interests on waste business (companies and politicians) - Pickers discrimination and lack of commitment of civil society
External Origin Attributes of the environment		

The SWOT table was made acknowledging that pickers' challenges are assumed directly by the NGOs that support them. The objective in this analysis is the improvement of pickers' working and living conditions through association formation

¹⁷⁷ It is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project or in a business venture. It involves specifying the objective of the business venture or project identifying the internal and external factors that are favorable and unfavorable to achieve that objective.

Strengths: characteristics of the business or team that give it an advantage over others in the industry.

Weaknesses: are characteristics that place the firm at a disadvantage relative to others.

Opportunities: *external* chances to make greater sales or profits in the environment.

Threats: *external* elements in the environment that could cause trouble for the business.

Internal factors – The *strengths* and *weaknesses* internal to the organization.

External factors – The *opportunities* and *threats* presented by the external environment to the organization.

Source: Mehta S., 2000, *Marketing Strategy*.

¹⁷⁸ Public Prosecutor, a judicial institution.

The 'Strengths' side, in this type of analysis focuses on characteristics of the associations (NGO) that give an advantage over others (in this case the pickers not supported by NGOs and not organized in associations).

The existence the pickers' trust of towards the NGO must first be underlined. Without it, any partnership could start (put also in the 'Weakness' side). Indeed some sort of reluctance or mistrust of some associations toward some NGOs or representative was observed, thus hindering collaboration and benefitting of associations.

One of the main points in creating an association is the possibility of gathering all the recyclables collected by the pickers or received by different stakeholders. In this way an association produces many more recyclables than an individual *catador*, increasing the likelihood to sell to better buyers (see figure 3.2).

In fact, as part of the external environment (as 'Threat'), exploitation and prices imposed by intermediaries cause pickers to earn less.

[NGO representative]:

"One of the advantages of creating a cooperative is that it is possible to avoid economical exploitation of *catadores*. In fact, joining the waste collected by each one gives the possibility to sell to a further intermediary in the waste-chain. This causes a significant price increase".

One of the attempts to move upward in the hierarchical pyramid of the informal sector (figure 3.2), is to gather and group the materials of different associations together. This is done, for instance, by *Cefuria* which joined four different associations in a cooperative, called *COPERSOL*.

[NGO representative]:

"This would improve the working conditions and income of the *catadores* involved, as the amount of material for sale would increase four times."

Something similar is attempted by the L&C institute in creating a 'solidarity network' for the commercialization and aggregation of material value, assisting 39 different associations through just one entity (*Catamare*).

Another strength of being an association supported by an NGO is the possibility of receiving funding (thanks to NGO support). This gives the possibility of purchasing basic equipment such as machines to process materials, safety tools and any facility for the storage.

For instance, the L&C institute, thanks to the *ITAIPU*¹⁷⁹ funds (in the year 2003), started a project of supporting, monitoring, creating, and structuring collective groups for recycling. Another project in initiation was with *BNDES*¹⁸⁰. It has a value of around 3.000.000 R\$ and would benefit around 15 to 17 associations, filials of *Catamare*, in equipping storages with better machines (collection trucks, mechanical tables, storing buckets, horizontal vertical pressing machines). The same can be said for the *FUNASA* funds (explained in section 4.8). Indeed, as part of the external environment, funds from federal institutes or companies strengthens the possibility for better equipping, structuring of associations and pickers' working conditions (in the 'Opportunities' side).

To have a working space waste can be stored, separated, weighed and packed, improves pickers' conditions and income. In general, this factor is favoured by the local government, which generally helps renting a space ('Opportunities').

The existence of a working space and of safety tools, improves hygiene aspect greatly. As a matter of fact, pickers that were used to bring waste to their houses no longer need to do so, preventing pathogenic infections (positively affecting their own health as well as that of their relatives).

¹⁷⁹ The second biggest hydroelectric power station company of the world.

¹⁸⁰ *Banco Nacional de Desenvolvimento Economico e Social* <National Bank for Social and Economical Development>.

Getting better equipped can also help in improving the production of quality recyclables. The example is given by the *AE* and the generation of a PET treatment plant, managed by a cooperative of *catadores* (explained in box 12).

In the end, better price of the materials (better picker's income) is a matter of quantity, quality and capacity.

[NGO representative]:

“Obstacles to *catadores* upgrading are the quality and quantity of the materials sold by a *catador*, making decrease the sale price [...] that is why raising awareness and formation of *catadores* is so important”.

Funding renders educational courses feasible for financing improving pickers' skills. Courses are aimed at improving skills not only in production, but also in work organization, management, and counting.

[NGO representative]:

“An association/cooperative is not just a place or work that guarantees food. It is based on a fundamental economic rule of cooperation. The work of *catadores* has always been based on competition. An association makes it a cooperative way of working, which is not easy because this activity has been traditionally individualistic and competitive”.

For instance, another project initiated by the *L&C* institute has provided a course named *CATAFORTE*¹⁸¹ in the different associations, given by social assistants. It was funded by *BNDES* and *Banco do Brasil*, which are institutes at federal level, for a total of 1 million and half R\$ ('Opportunities').

Cefuria is also organizing formation modules¹⁸² for all the associations of *catadores* it supports. This is thanks to the funding of about 54.000 R\$ they received for a project approved by *Petrobras*¹⁸³.

Courses can also be on price negotiation with intermediaries, which is favoured by the exchange of experiences of the pickers (on better contacts).

The hindering factors in teaching these skills is shown, as a 'Weakness', by the lack of collaboration between pickers and their low education levels. In the case the *EC* programme, these skills are given by technicians that accompany and support pickers in their work for five years.

[NGO representative]:

“The period of accessorising must be more constant and long. We perceived that the education process is much more critical in the category of *catadores* (compared to other groups supported). Having lower education levels, they need longer training periods”.

A long-term assistance is needed also due to the high turnover rate of some pickers (lack of consistency). This especially affects the initial phase of association formation.

¹⁸¹ *Projeto de Formação, Fortalecimento, Mobilização e Acompanhamento Técnico de Arranjos Coletivos de Reciclagem no Estado do Paraná, para Implantação de modelos Autogestionário* <Formation, strengthening, mobilization and technical accompaniment of collective arrangements for recycling in the state of *Paraná*, for the installation of self-management patterns>. It was structured in different modules of formation, in total 96 hours of lesson plus 32 hours of practical activities were given. They attended around 800 people from the 59 associations accompanied in the state.

¹⁸² The themes of the courses have been decided with a meeting with some leaders of the different associations, such as: commercialization strategies (prices, sale, negotiations etc.), safety, health and hygiene, collective work and conflicts resolution, self-management, organization of the working space, solidarity economy, safety II, health and hygiene II.

¹⁸³ The Brazilian oil company.

[NGO representative]:

“If some of them leave employment having already absorbed this knowledge, it breaks the continuity. It is necessary that as many as possible participate in the training, not only for the productive part of separation, but also in acquiring skills in administration, commercialization and finance”.

Additionally, courses can also focus on the awareness aspects such as hygiene, exploitation etc. This is helped by the involvement of *MNCR* members in giving classes (‘Opportunities’).

Another strength that NGOs show is the capacity of communicating with municipal councils, acting as an intermediary and supporting pickers’ claim.

[NGO representative]:

“Another responsibility of the institute is to communicate with the municipal authority to make it deposit waste at *catadores* associations”.

Last but not least, creation of associations positively affects, the human aspects, such as gathering people that have experienced the same challenges, increasing awareness, enhancing collaboration and joining forces for achieving their own claims.

On the opportunity side, a favourable legal framework facilitates pickers’ conditions. As seen in section 4.8, different laws (as the 7.404 or 5.940) were emitted at Federal and State levels, protecting the pickers’ category and prioritizing them in the waste management plans of the cities. This also brings major recognition of their work and of the contribution they bring to both the society and the environment.

In general, support of the *MNCR*, thanks to their bargaining ability and gains with public powers, as seen in previous section 4.8, is beneficial.

Looking at the external environment, the role of the local Government, due to the power it possesses, is fundamental (on the specific case of *Curitiba*, see following section 5.4).

The Judiciary, in the case of *MRC*, the Public Prosecutor, has an important role in facilitating and prioritizing pickers’ involvement in city waste management plans (see section 5.3).

On the external environment, the role of the civil society needs to be mentioned. In case civil society is aware and committed toward the pickers’ conditions, it can act as a sort of lobbying actor on the public authority. Moreover on case of better separation habits of the households, it improves pickers’ work and conditions.

On the ‘Threat’ side, it is fundamental to mention the competition that can be generated between private companies and pickers’ association formation. In the case of the *MRC*, more efficient work of the pickers would mean less waste (equaling less profit) to the company managing the sanitary landfill of the metropolitan area. As seen in section 3.3 economic interests can be strongly related to political ones, worsening pickers’ position.

A negative external factor is the dwelling areas where pickers live and where waste is often stored. These areas are precarious, thus negatively affecting the achievement of autonomy and legalization of the associations.

Furthermore, a negative environment factor disfavours the pickers’ cause and conditions is the lack of collaboration and competition between NGOs (and the affiliated associations). This scenario was observed during research and demonstrated a strong lack in creating a solid lobby factor on the local authority, made by a network of NGOs.

Box 11 - The NGOs supporting *catadores* in the MRC

Istituto Lixo e Cidadania <Institute of Waste and Citizenship>

The Waste and Citizenship Programme (WCP) is a nation-wide programme created by the Brazilian Federal Government and partly funded by a loan from the World Bank. The initiative started in years 1998 to 1999, in *Pernambuco* with the national Forum *Lixo & Cidadania*. The first projects were related to eradication of infantile work (a common feature of picking waste workers), the project name was *criança no lixo nunca mas* <children in the waste never anymore>.

In *Paraná*, the initiative started in the year 2001, coordinated by the Public Prosecutor of Justice of Labour and Employment. The institute *Lixo e Cidadania* <Waste and Citizenship> of *Paraná* was established in June 2003 for the necessity of creating the executive secretary of the decisions taken at the Waste and Citizenship forum, becoming a juridical entity.

Nowadays it is supporting approximately 40 deposits/associations of *catadores* in the city of *Curitiba* and its metropolitan region. In total, they follow around 60 associations of *catadores* in the whole state of *Paraná*. 1.000 people are affiliated with the institute directly (2.000 indirectly) with fourteen people working as staff members. With its partner, the Public Prosecutor, it presents proposals to the public power for effective participation of *catadores* on the plan of city waste management.

Aliança Empreendedora <Entrepreneurial Alliance> (AE)

The organization administrates the municipal programme *Ecocidão* in *Curitiba*.

The formation of *AE* was pushed by different forces as *Brasil Junior*, a Junior Enterprise league, entrepreneurial students' leagues and European Confederation of junior enterprises. This brings an entrepreneurial spirit at the basis of its foundation in 2005.

Nowadays the area of actuation of *AE* is in 11 states, starting from *Paraná* (beginning with *Curitiba* in 2005). There are three main offices in Brazil, in *Curitiba*, *Recife* and *São Paulo*.

AE looks for partnerships in all the Brazilian countries. They opted for creating a network developing projects with partnered organizations that believe in their methodology. Nowadays they have 84 functionaries spread in these three offices and have supported 4500 micro-entrepreneurs.

AE is mainly financed by private companies, banks and foundations, such as *Santander*, *Gerdau*, *Danone*, *Wall Mart*, *Banco Real*, *Avina* etc. In total there are 14 private financiers. The only public institution who finances it, is the municipal council of *Curitiba*.

The public attended by the *AE* are entrepreneurs with lack of knowledge, investments, infrastructures and technologies available. This is including productive groups, individual micro-entrepreneurs, social and community business, young entrepreneurs and *catadores* belonging to, as defined, low wage classes, as E, D, C (principally C2).

AE is based on three pillars, SAGA, which is access to knowledge (creation of methodologies), SOLIDARIUM as access to commercialization (application of methodologies) and IMPULSO for funding (microcredit). The mission of *AE* is to render accesses viable, favouring entrepreneurial formation in low-income areas, thus promoting social inclusion and socio-economical development.

CEFURIA

The name originates from the initials of *Centro de Formação Urbano Rural Irmã Araújo* <Urban and Rural Formation Centre of Sister Araújo>. It is an organization of the civil society with the aim of strengthening popular organization and the struggles of the population for better life conditions. Its name is homage to *Irmã Araújo* who dedicated her life to the organizations of poor people of the southern region of *Curitiba* to solve concrete problems, especially on health issues. Thanks to these efforts, important conquests occurred in the area in the 1980s, such as building of health centres, solutions for flooding, dwelling re-localisation, improving public transports, etc.

After many debates with community leaders, political and social activists and religious agents, *Cefuria* achieved its Foundation assembly in August 1981. It was generated from the necessity of doing political formation and contributing in the articulation of social movements. The Basis of Ecclesiastic Base Communities helped in the re-organization of the community. It has given importance to popular education in order to understand the struggles and history, the functioning of the society, the social differences (the existence of rich and poor people), the meaning of rights and political issues. Their action is based on the Solidarity Economy paradigm. They support five associations of *catadores* in the

Box 12 – The PET recycling Plant

During my interview at the *AE* headquarter, the representative of the NGO told me that one of the ways to involve *catadores* in further stages of the recycling chain (getting so better economical conditions), was to involve them in further stages of the material treatment process. For this reason, they installed a PET treatment plant <*Usina de reciclação de PET*>.

The plant is situated in the *CIC* (the 'industrial city' of *Curitiba*), the machine for treating PET was donated by *Banco do Brasil* (valued at about 200,000 R\$) to the Association of *catadores* called *Acampa* (also in *EC*). The storage where the machine is situated is rented by the Municipal Council.

The machine basically transforms PET into 'flakes', it can process 300 kg/hs of material at a 100% production level.

The idea came from the members of *Acampa*. They chose plastic as material because of the large quantities they receive and due to its contamination on nature.

The associated of *Acampa* obviously demonstrated a strong will of being directly involved in the work of this plant (also as owners of the machine).

This plant would allow going further in the productive chain of waste materials, producing better quality materials and selling directly to industries, thus improving radically the finances (gains) of the workers radically.

The technicians responsible for the plant told me they are in contact with a company from *Curitiba* (*Quatro Barras*) and another one in *São Paulo*. The second one is asking cheaper price because of transportation expenses (1,50 R\$/kg instead of 2,00 R\$/kg for instance).

The idea is to join all the PET materials coming from different *catadores'* associations (offering a better price), in order to reach the target quantity. They said "nowadays the bottle of PET is paid around 0,90 R\$/kg to *catadores*. Here they could be paid 1 R\$/kg or 1,50 R\$/kg, depending on the price decided in the cooperative and on the market which fluctuates frequently. The prices go up and down".

This system would surpass the *atravessadores* and the exploitation system they impose.

They told me that if they would join all the PET of the associations in contact they would receive around 14 tons per month, which would not be enough for producing at the maximum capacity (2,4 tons per day). Indeed, expenses need to be considered too, the machine for instance needs large quantities of water (40,000 in three months), a rainwater collection system was installed).

Therefore, they need to find more providers (other associations) and even the *Campo Magro's* Municipal recycling plant could be one.

On the matter of gains, in a normal production day with no impediments and producing at maximum capacity they say, "if we sell at 1 R\$/kg and we produce every day at 2.400 kg, it means we would gain 2400 R\$ every day". These are high values compared to what the *catadores* are used to.

Thank to this profit they will be able to make pay the INSS for all the partnered associations and in future pay all the expenses (instead of the municipal council).

The machine was donated 2 years ago. One of the representatives told me "this plant is still not working, because the enterprise that delivered the machine had some delays. it is in a testing phase for various adjustments that need to be done before starting, especially for safety issues".

Working in this plant will also make necessary to focus more on the quality of the material sold, for this reason a chemistry laboratory exists in the plant.

Before starting thus, *catadores* will need to be trained on new production skills, safety preventive actions, machines maintenance, management and administration of the plant, financial skills, basic chemistry, negotiations and relations with companies. All these apprehended skills will definitely create a new type of *catador* that has never existed on the scene of the Metropolitan Region of *Curitiba*.

5.2 Changes in entering the Associations, pickers’ personal opinions

In the previous chapter were presented the opinions on the work of the pickers interviewed in the different associations.

Acknowledging the benefits of association formation, questions on life and work changes were asked too (results are in table 7.13 in Appendix, summarized in table 5.2).

Most of the pickers gave positive feedback (table 5.2) on entering associations; few gave negative and some neutral remarks. Variations in opinions also depend on the association situation, at which stage of formation it is, how it is equipped and how cooperative work is developed.

[Catador]:
 “I would like to have colleagues willing to be unified, to make the system work better and to earn more and clean the city better”.

[Catador]:
 “I thought it was one thing, but it turned out another, I thought entering it would be a ‘sea of roses’ but actually it is an ocean of problems, I felt quite disappointed, there are internal administration problems, lack of humility and knowledge of the directory board”.

[Catadora]:
 “My life changed, it got more difficult, only now after 10 years of struggle I can see some results”.

[Catadora]:
 “Until now it did not change, because we just started, but we hope in many changes, better salary, being recognized, and having a working place”.

[Catador]:
 “I never thought this work would bring a big change to me but to get to eat [survive] is a good activity”.

Table 5.2 – Positive Changes in entering the associations

Themes	N° of pickers
Better finances	18
Better working conditions	16
Help the stress	10
Better human relationships	6
Safer employment	5
Learn new skills	4

A large number of pickers mentioned that in starting to work in associations, their finances improved and so they were able to access more material belongings and to better sustain their families. In the case former cart pushers answered, they underlined this improvement even more.

[Catador]:
 “Before I did not have resources”

[Catadora]:
 “It changed in everything, I have everything, I could get a lending, and the help from the people changed 100 %. Everything I have is thanks to this place”

[Catadora]:

“Many, I never got to build my own house, now yes, I even have a land. We got better in finance, we could help our children also for their education”

[Former cart-pusher]:

“The wage improved too, before I was getting between 5 and 15 R\$ per day”.

Many pickers believed a main change was in the improvement of working conditions, such as not being obliged to work on the roads. For those who used to bring waste home, hygiene improved too.

[Catadora]:

“It changed a lot, I do not have to push the cart on the road anymore, everything helps here, if it rains we do not lose money”.

[Catador]:

“On the road is more suffered, if there is an indoor place is better, you don't get wet for the rain, do not get hot for the sun, before we worked more physically”.

[Catadora]:

“Much better than recycling at home, the truck bring already to put on the separating tables, everything is easier”.

[Catadora]:

“It changed in the sense that we do not need to keep waste at home, so that it is clean, also the material is more clean”.

[Catadora]:

“It changed a lot, especially in hygiene, for the children too, because before we recycled at home”.

[Carrinheira]:

“A lot, I have a corner where to work plus from the street you collect animals and parasites, now at least we are far from home.”

Some pickers admitted that the work had also distraction functions. Indeed lack of employment, personal issues, and risks in living in some specific areas were all problems mentioned by pickers.

[Catadora]:

“At home I got nervous, now I feel better as I can collect money to pay for a house”.

[Catadora]:

“I like it, I stay with people, and I am less worried and stressed while I'm working”.

[Catadora]:

“I was staying a lot at home, I was very stressed and tired, here you get lively, and I enjoy working with people that are like you”.

Some pickers mentioned improvement in human relationships.

[Catadora]:

“I got to know another family here”.

Few catadores mentioned feeling more safe in being employed (income and rights).

[Catador]:

“Before I was depending only on the government [aid], nowadays I do not go on the roads without anything to do”.

[Catador]:

“It improved, many people that receive the unemployment-tax do not work, and I do not wait for it anymore”.

[Catador]:

“Everything changed, now I have freedom, I can go to the doctor without worries, and if I am ill I can stay at home, now we have the same right as workers”.

Some pickers answered that the change was mainly about learning something (on separation, coordination, or team working).

[Catadora]:

“I got more experience, I did not know how to separate before, I was messy, I understood that we need to learn, I like this work and it's good for the future and for our children too”.

[Catadora]:

“We have more knowledge, also of the local population, also on how to sell better and on the coordination of the organization”.

5.3 *Ministero Publico do Trabalho e Emprego* – <Public Prosecutor of Work and Employment>

Another fundamental stakeholder in waste management and especially aiming at the issues of urban environment preservation, respect of human rights and informality of the pickers, is the Public Prosecutor (PP). In comparison with NGOs, it has more public power.

As in other democracies in the world, the political power in Brazil is divided in the juridical, executive and legislative branches. The Public Prosecutor is part of the judiciary. The role of the PP in Brazil is to monitor whether or not the law is applied and if it is done correctly. At the municipal level it controls municipalities' actions. In case of disrespect to some environmental law, the PP has the power to fine a municipal council.

Pictures 5.1 & 5.2 – Forum *Lixo e cidadania* in Curitiba, at the PP headquarter



At the headquarter of the Public Prosecutor in Curitiba every month there is a *foro do lixo e cidadania* <forum on waste and citizenship>¹⁸⁴. There are people from the political movement¹⁸⁵ of the *catadores*, environment departments of municipal councils of the state of Paraná, different enterprises involved in waste projects, NGOs representatives and a few students.

It is a meeting open to the public, in which issues on waste are discussed and serves to give information and share knowledge. The procurator informs about new laws or ongoing processes of justice. Special attention is given to the pickers' state and cause. At the PP, the commitments of the municipal councils toward the pickers are underlined¹⁸⁶.

In the year 2002 the PP, in partnership with the *MNCR*, recognized the activity of the *catadores*, establishing for the category the same rights and obligations of an autonomous worker.

Catadores are informed of their rights¹⁸⁷. Ultimately, it was decided, based on a Federal Law that municipalities need to present a waste management plan (where involvement of pickers is obligatory).

During research, cases were observed in which associations of pickers were formed and supported by local governments under threat of pending fine of the PP. Moreover, the generation of the *Lixo e Cidadania* institute, as executive secretary of the PP, strengthens the relationship between judiciary and *catadores*.

¹⁸⁴ Normally there are around 50-70 people.

¹⁸⁵ At the central table there are generally some representatives of the *MNCR*.

¹⁸⁶ As the obligatory assistance (social and technical) of municipal councils to associations of *catadores*.

¹⁸⁷ For instance some rights, as: *catadores*' child protection, human protection and dignity, social right, health, retirement, entertainment (Art.6), Valorization of human work and dignitous existance (for private entrepreneurship, Art. 170) etc.

In conclusion, the PP functions as a monitoring actor of the municipal councils' action, toward environmental protection and the protection of the pickers. It also enhances awareness upgrading of civil society and the pickers themselves.

5.4 The Municipal Council of Curitiba

Among all the local governments, *Curitiba* was chosen to be interviewed. Curitiba was interviewed, because of the project they started with some associations of pickers and to know its position on different pickers' issues. It was also desired to know if associations believed integration into the formal waste management system was considered feasible. An additional factor is the much acclaimed sustainability characteristic sought by the municipality.

As mentioned in chapter 3, the municipal council of *Curitiba* initiated a process of involvement of *catadores* in the municipal waste management. This occurred through the programme *Ecocidadão*, managed by *Aliança Empreendedora* (details in section 3.5.3 and information on results in box 13).

The Municipal Council of *Curitiba* provides equipment (storage, working machines, office devices and safety tools), pays for storage rent and expenses (phone, light, water) and funds the entire project (technicians and members of the *AE*). In total the municipality makes an investment of 300.000 R\$ (around 120.000 Eur) per month, or 3.600.000 R\$ (around 1.450.000 Eur) per year. Nowadays the municipality supports approximately 14 storages (including the PET treatment plant).

The pickers work in storages to separate the waste collected by the municipal service. On scheduled day the municipal trucks discharge the waste in these storages and on other days the municipal service takes the remnants that *catadores* have discarded (not being saleable). The recyclable materials produced are then sold by the associations, which produce gains and income for the pickers working in them.

The municipal council aims to support around 25 associations (an additional 11 need to be created) by the end of 2012. This year is also considered that by which the first associations supported (after assistance for a period of 5 years) should start having direct relations with the municipal council, as well as the ability to self-manage and self-sustain autonomously.

[Official];

“At that moment, the first associations we started with, should have more capacity, responsibility, maturity, vision of future and so be able to do partnerships directly with the municipal government, shared management will not be necessary anymore”.

Nowadays, the Municipal government does not have direct relationships with the associations it supports. The NGO is still acting as an intermediate between picker's associations and the local authority in a shared responsibility view.

If the targets are achieved in 2012 half of the pickers living in the municipality of *Curitiba* should be included by that time. This projection is based on the official numbers of only 5.000 *catadores* existing in *Curitiba*. As shown in section 3.2, based on the research conducted and interviews held in different neighbourhoods¹⁸⁸, this number is fictional and many more pickers exist in the municipality (unfortunately precise data is not available).

Financial self-sustainment, as observed during visits and interviews in the associations going to end getting the municipal support, is the major worry of the pickers.

¹⁸⁸ Just in the neighbourhood of *Bairro Novo* (where one of visited association is situated) it was said there are 3.000 *catadores*, which joined with the neighbourhood of *Xaxim* is believed would make 5.000 *catadores*.

[*Catadora*]:

“We are getting help from the *AE*, it pays the expenses¹⁸⁹ but it will arrive the moment in which we will have to pay”.

The major barrier is the cost of the storage, indeed as seen in table 7.16 in the appendix, all the associations are provided by the storage by either public or private institutions. Pickers' associations are not able to fund it.

[NGO representative]:

“Something that kills whichever entrepreneurship about recycling with *catadores* is the cost of the rent, also because these barracks (storages) cannot be of whichever type, they have to be in accord with law, firemen regulations, the sanitary surveillance, these things are not so easy to be implemented”

At the environmental department of the Municipal Council of *Curitiba*, the intention to continue the project was shown after the scheduled project-ending year (2012) which is supported by public opinion.

During interviews in the associations and *MNCR* meetings, some pickers declared that one of the *EC* project targets was to diminish the number of pushcarts on the streets, putting them to work in the associations. This idea was totally aborted at the environmental department, sustaining that they even financed some projects to design better carts for pickers (aiming at less physical efforts). Indeed different newly designed carts were observed in the associations, some with re-chargeable batteries or utilizing electricity. Based on the pickers' interviews, the use of these carts have not been helpful yet, and many drawbacks were found¹⁹⁰.

One of the difficulties *catadores* working in the *EC* associations face, is the large quantity of organic waste they receive from municipal trucks. Apparently, around 30 % of the material they receive is discarded as organic remnants, it is collected by the trucks that go to the landfill of the metropolitan area. If pickers would not receive all this organic waste, their gains would be much higher (less time spent in separating organic from recyclables) and hygiene would be better (no need to handle contaminated remnants).

This problem is related with bad separation habits of the households, indicating the need of major environmental education on this issue. At the department, it was asserted that major investments on education are intended.

The probability of creation of a municipal composting system for organic material in the integrated waste management plan of the metropolitan area (*SIPAR*) is not yet in execution neither is forecasted in the near future.

One of the main problems, affecting pickers' income, is the existence of an exploitative informal system where intermediaries (*atravessadores*) that buy waste impose the prices (figure 3.2 in section 3.6). The environmental department did not express the will of taking any legal initiatives towards the intermediaries or on the prices they propose. The reason why the municipal council did not start to work with the intermediaries were the unacceptable working conditions (as infantile work, payment through alcohol and drugs, storages as dwelling) and illegal framework in which they work. Therefore, the idea behind the project on this aspect is that through legalization of pickers' work, also intermediaries and their junk-shops would start to get legalized and regularized. *EC*

¹⁸⁹ Which is wrong information because is the town hall that pays.

¹⁹⁰ They said they are either too small, too small wheels, battery need to be charged after 15 kilometers, difficult to drive (cannot go backwards), too slow, heavy (hard to push) and some also find it as a way to do some hidden publicity, moreover they are very expensive.

storages had the target to be sort of thermometers for the neighbourhoods about issues like parity, justice, solidarity.

[Official]:

“In future the actual *atravessadores* who want to work within the market, and with self-organized *catadores*, they would need to be registered, to respect the environment, the sanitary codes, the human issues and the justice of job (legally contract the *catadores*)”

Therefore, it is believed a major legalization and respect of sanitary rules of the *catadores*' storages would automatically bring legalization of the *atravessadores*' work.

On the matter of pricing, it was only said that *catadores* sell to those intermediaries that impose lower prices because they pay by day. This declaration is contradictory due to the fact that in the associations *catadores* do not get paid by day.

Another reason for getting low incomes is the unfeasibility to sell recyclables directly to the industries. The department showed awareness that different obstacles existed in reaching this stage, such as logistics, deadlines respect, quantities of materials or conditions of payment. One solution would be to gather the material of all the associations, but for the lack of capacities, this is still not the right moment to do that, it was believed.

On the issue of major integration of the pickers in the municipal waste management system, at the department it was expressed that the intentions for future prospects of the project were making few of these associations, reference points of the surrounding areas also for collection of waste. This would be feasible, especially after donations of some trucks to the associations (as with *Funasa*). Anyway, as said, this moment has not come yet and ability of the pickers in this sense will need to be proven. Indeed different problems were exposed, like vulnerability of the workers (as people addicted to drugs not able to be in public service), difficulty in logistics, or in scheduling collections (not being precise with collection timetable).

Moreover, the issues of paying directly the *catadores* for the services they provide is still not considered at the municipal council headquarter of *Curitiba*.

Finally, as observed in other municipalities, the role of the local governments in improving or not pickers' conditions is fundamental. In the case pickers' associations were supported by municipal councils, better incomes and conditions were observed. Moreover, the support of the local government bears on the recognition of pickers' work in the society. This was also demonstrated by the competition and envy between associations not involved in the *EC* project, and those that were.

[*Catadora*]:

“We are going to walk alone, we do not want a technician (for the sale, counting) that stays closed in his office, we want he teaches us (i.e. giving a course), we would accept just an agreement like that”.

[*Catador*]:

“Those who gained the *Funasa* donation, were all belonging to the *Ecocidão* project. The technicians helped in requesting the fund. Pickers alone would not be able to do that”

In conclusion, the municipal council of *Curitiba* showed awareness of the difficulties pickers face (on organic remnants, low prices, not reaching industries etc.) but appeared to turn a 'blind eye' on some fundamental issues (numbers of pickers in the city, un-fair informal system, lack of environmental education of community). The will of improving and involving pickers in major integration was demonstrated, even if showing that still many obstacles are found and need to be overcome. Pickers are seen to lack capacities to take the lead in recycling for some city areas. The future and the facts will prove if the intentions of the local government are real.

Box 13 - Data of *Ecocidadão* Programme of the year 2010:

- Total amount of gross material collected by the *catadores* was 3.769 tons (whole year);
- Total amount of waste passed as remnants (rejected) was 196 tons (organic);
- Monthly average number of *catadores* in the associations was of 253;
- Average number of people indirectly benefiting of the project was 653;
- Every month average rate of new entry of workers is 16;
- Billing of the barracks for the sale of the materials was of 1.480.000 R\$;
- Average wage per *catador*: 419 R\$;
- The average of the best wages of the year was of 2.260 R\$, the average of the lowest wages was 97 R\$¹.
- Average rate of separation for *catador*: 1,1 ton per month;
- Recycled material composition: 69,20 % paper, 6 % glass, 7,8 % metal, 17 % plastic (data from 1st semester 2010);
- Origin of the materials: paper (37,60 % from *catadores*, 17 % and 45,20 % other donors), plastic (34 % from *catadores*, 34 % and 32 % other donors), metal (42 % from *catadores*, 29 % and 29 % other donors), glass (65 % *LqnèL*, 20 % from *catadores* and 15 % other donors).

¹He explained that, "the reason is presence of many people with special needs, lack of consistency".

5.5 Opinions on the Relations with the Municipal Council

In analyzing the relationship with the municipality it was asked to the *catadores* their opinions on the local governments help (were they helping or not, and if yes how), for the results, see tables 7.14a.b.c in Appendix). The municipal authorities considered were *Colombo* (two associations), *Piraquara* (one association), *Pinhais* (one association), *Almirante Tamandarè* (two associations) and obviously *Curitiba* (three associations) (see table 7.1).

The majority of pickers gave positive comments on the local governments help. Most of the answers related to material donations (storage, machines, material donated, etc.). It shows the strong dependence of the pickers on the authorities' support.

[*Catador*]:

"I thank for the space they gave us, the pay our light, water and phone, the material they send to us; If it would be us paying this would not be possible".

[*Catadora*]:

"It is a support that we can never loose especially in this situation"

[*Catador*]:

"It is helping, they came to repair the machine, they pay water and electricity, basic alimentary basket¹⁹¹ and they sent cleaning products"

[*Catadora*]:

"It helps a lot, if it would not be for it, we would not be here, if it would not be for *AE*, we would be totally abandoned"

Less but still many pickers had negative comments on the local authorities and the lack of help.

¹⁹¹ *Cesta Basica*, a donation in food (explained in table 7.6).

[Catador]:

“It never helped in anything”.

[Catadora]:

“They do not help us at all, they helped only with the land, It is enough that we make a mistake and they will make us close”

[Catadora]:

“I never liked it. There should be conferences on public health, they occur only in case of emergency”

[Catador]:

“There should be more participation in the life of the association, also form the local authority, the mayor should come to visit us”

Furthermore, some negative comments were especially on the municipal propaganda.

[Catadora]:

“They never say who stay behind the truck of waste”

[Catadora]:

“I don’t like this town hall’s propaganda, they show the waste as a living character, but in reality a can how does it arrive to the recycling process? Does it have legs? Why they do not put a photo of us in the propaganda on recycling programme”.

A smaller range of pickers had more neutral positions toward the local authorities.

[Catadora]:

“They help a bit, they help in their way, but they could be more present”.

[Catador]:

“They help in between, they could do more, we always need to stay behind them, to fight for documents”.

[Catador]:

“Sometimes it seems there is no interest, sometimes the interest seems forced, and it does not exist in the practice”.

In conclusion, it can be said that help and support by the local authorities is appreciated and acknowledged by the pickers. Major involvement and commitment in general by the Local Governments is necessary for real change of pickers’ conditions.

[MNCR leader]:

“The solution would be more attention and support of the public power, it would be necessary much more intervention of municipal authorities creating associations, cooperatives, joining together, with the final target to get out from this slavery system”.

Box 14 - Interest in the research

The final question, which sought to see the interest on their own issues and if any arose from conducting the research, was about the will to know the research results (table 5.3 on the results).

Table 5.3 – Interest in knowing the research results

Do you have interests in knowing the results of this research?		
Answers	Abs.N°	%
Yes	85	91 %
No	7	7 %
I don't know	2	2 %
Total	94	100 %

Even if some sort of lack of awareness was observed during research, most (91 %) of the interviewed demonstrated to be willingness to know more. The playing factor was curiosity but also to get better and major knowledge of their own state. A central factor role affecting interest was also that the research subjects were associations in the MRC (surveying issues in common or not). Each respondent was part of one association, thus knowing only its reality. This research would shed light on a wider context.

It is interesting to see some final comments the pickers wanted to leave:

- "It is good to know more and more";
- "All you can learn is good";
- "We have interest in knowing, we hear a lot about recycling, it is super important for the environment, but there is not much recognition of our work (which it should have)";
- "It is a commitment of any of us, of the society, of the mayor, the community, the church, it is needed more participation, interest for the society not only for us";
- "You should come more times, it is good what you are doing, because we help you and you help us";
- "It is important to show the real side of the city, the authority shows only the good ones, not the poverty, you are going to carry another reality, this is good";
- "I got to know the humility, I discovered how the people suffer, especially those that push their carts";
- "It is good that these things (news about us) are going abroad, so that things that are not valued can be";
- "I want to know the results and I want to keep this relationship. For instance 3 years ago one person came for a theatre project to our association, after she brought other two people, then we could do this project. It is a partnership, an exchange, one day you will come with more people, I'm sure";
- "I'm very happy to be able to contribute to the science".

Conclusion

In this chapter, the role of different actors like NGOs and public organs influence on the picker's conditions (and urban environment) was analyzed. It was confirmed that due to the difficult state and challenges the associations of *catadores* face all these actors are relevant for potential change.

The role of the municipal government, is essential improvement of working, living conditions and recognition of pickers, thus affecting, also the urban environment. In cases where municipal government does not provide support for pickers, SD in the informal sector is not achieved.

In order to favour municipal authorities' actions toward SD in the informal sector, other stakeholders are necessary.

The NGOs in general support directly pickers' associations and function as intermediate between the associations and local governments. This role helps in understanding better the informal sector dynamics and its potentials in being integrated within the municipal management system.

The Public Prosecutor acts generally as a monitoring actor of municipal councils' actions, sometimes incentivising local government's support of pickers' associations. Its role in general is beneficial for environment preservation and social parity policies toward pickers.

Finally, for a better integration of *catadores* in the formal waste management, top-down initiatives (public powers) are vital but would never work if they do not meet the bottom-up boosts (of NGOs and *MNCR*).

6. Discussion and Conclusion

Introduction

This chapter will compare the different cases considered in the second chapter of this Thesis, with one studied on place in the MRC. Based on the theoretical framework, the discussion will focus on SD aspects and their inter-relations in SWM with a focal point on the informal sector. This chapter aims at showing main similarities found between the issues on informal pickers in different developing countries' urban contexts. In this way, the case studied in the field, will give new knowledge on this topic, thus enriching the SWM academic field.

Firstly, this chapter will discuss the different solid waste management systems, looking at the main waste treatment techniques used in the various cases and their impacts on environment.

Secondly, the informal sector, giving central attention to the informal pickers will be discussed in this chapter. This will be done by looking at the origin of informal picking activity, the economical aspect of waste issues and the structures the informal sector presents. Then more specifically regarding the pickers will be discussed the consequent health issues, the different demographics (the existence of gender issues) and their working conditions. In the end, the focus will be on association and cooperatives formation, their challenges and the role of various stakeholders and their influence on the pickers as public powers (municipal council).

Finally, thank to the research conducted and the case analyses done, the chapter ends proposing general policy recommendations, aiming at a more sustainable solid waste management, with the formal integration of the former informal pickers into the Municipal SWM.

6.1 The Waste Management Systems

This section will compare the SWM systems (and the composing formal and informal segments) in the different cases with the case of the Metropolitan Region of *Curitiba* studied directly on field. This is done with the help of the table 7.17 found in the Appendix.

As explained by different authors as Baud (et al., 2001) and Ojeda-Benitez (et al., 2002), the SWM is formed by different groups (public, private, NGOs) and it is divided in formal and informal sectors. The same happens for the SWM in the MRC.

In all the studied cases the most used waste treatment technique is to discharge it in open-sky areas, either in a landfill or in open dump sites; these two in general not presenting so many differences. Some countries use also the incineration method (as in Thailand for 46,3 % of the waste or Taiwan for the 54,2 %, Idris et al., 2004, p.106).

Only in the case of *Teodoro Sampaio* and *Curitiba*' urban area, there have been implemented more environmentally sound facilities as sanitary landfills. Anyway, the two mentioned cases are not representative of the entire Brazilian reality (10 % of the municipalities). Moreover, in both cases, even if concern on environmental issue was higher compared to other cases, negative environmental impacts it has been found here as well.

Communities' bad waste habits such as burning or throwing the waste in the waterways, are due to deficiencies of municipal waste collection services in developing countries' cities, e.g. only between 50 % and 80 % of waste generated is collected (Wilson et al., 2006,). This can be observed in the African studied cases of Accra and Ilorin and, in general it concerns between 20 and 80 % all African cities' waste (Boadi et al., 2005). These bad habits together with their respective environmental impact, have been observed also during the first fieldwork in Brazil.



Pic. 6.1 – Open-sky sewage and waste burning.

Picture taken last year in a street of the low-income neighbourhood *Guarituba* (municipality of *Piraquara*).

Moreover, all the considered cases do not have a proper recycling municipal programme (table 7.17), with the Brazilian exceptions of *Curitiba*, *Teodoro Sampaio* (with a municipal recycling plan) and *Tarumã* (recycling plant at the end of collection).

Organic remnants are found in large quantities, in the landfill of *Caximba* for instance it consists of almost 40 % of the total waste found. In Accra (Boadi et al., 2005) it composes over 70 % of the total household solid waste generated, in Colombo (Sri Lanka) it is more than 80 % (with just 4 % of it treated, Van Horen, 2004), in Bandung it forms the largest proportion of waste (50, 6 %, Sembiring et al., 2010).

The presence of organic remnants in landfills is the main responsible for water and ground pollution in Brazil (Fagundes, 2009).

In most of the considered cases a municipal composting service does not exist (table 7.17) and if they exist are present in very small portions¹⁹². *Tarumã* is presenting the only case of composting facility in its municipal recycling plant (Fagundes, 2009). In *Curitiba's* urban area too the only initiatives are taken in some associations of pickers (thank to a course¹⁹³ where it was taught) but it is just on the matter of organic produced in the association. A municipal composting programme is foregone in the *SIPAR*¹⁹⁴ plan and eventually in the sanitary landfill of *Estre Ambiental S/A*.

On the problem of bad habits mixing recyclable waste with organic remnants, fundamental are municipal environmental education programmes for the residents. In most of the cases studied (that give this information), there is no such programmes (table 7.17). In *Curitiba* on the matter of environmental education, large propaganda was done at the initiation of the recycling programme. Anyway, this problem is still evident in the entire urban area.

Large-scale responsibility for urban recycling rates is related to the informal picking activity (table 3.2 and table 3.4 in chapter 3). Acknowledging the lacks and irregularities of the formal service, the role of the pickers in recycling city's waste, gains more in importance.

In general, pickers collect waste from different places (shops, companies, public spaces, households etc.). In all the analyzed cases (giving this information, table 7.17) it is shown that there are pickers present in waste landfills. The MRC case, concerning *Caximba* is an exception, even if presence of pickers was denounced by a local NGO but it was never legally demonstrated. The presence of pickers in the landfill results in even worse inhuman conditions, more unhygienic, with low quality of waste (because mixed) and rushy type of work¹⁹⁵.

None of the cases studied by different scholars, including *Curitiba's* metropolitan area, gives current clear data on recycling rates of the informal sector. Thus as said by Idris (et al, 2004), the amount of recycled or recovered material that returns to the market is not clearly controlled, so that the flow of waste and pollution transformation during the recycling processes is unknown.

The difficulty of dealing with the informal sector of the solid waste management and making some accords with it, lead the municipal authorities to favour delegacy of these services to private companies (table 7.17). This also because of the acknowledged efficiency private companies perform in providing services, bridging the gaps left by the public services. In the MRC, private companies' role is significant but space to the public power in the management is still left.

Summing up, most of the cases present deficient treatment services of waste bringing negative impacts on urban environment. Some sustainability in SWM is guaranteed thank to the work of the informal actors, which bridge the municipal services' gaps (but not the composting one). Due to the uncertain reality of the informal sector, and the difficulties to the control it, gaps left by public services are generally delegated to be dealt by private companies.

6.2 The Informal sector and the informal waste pickers

To quantify the scale of the economy the pickers mobilize is hard, as it is to know how many actors are involved. None of the studied authors dares to give numbers on the amount of informal actors of the recycling informal sector.

In most of developing country cities, the multilayered informal sector plays an important role in waste management at the level of itinerant collectors, pickers and micro-enterprises. It is in general a system composed of a complex hierarchy.

¹⁹² In the case of Colombo, compromise for composting was taken. The composting activities were first successfully implemented by informal sector and community-based organizations, before that municipal authorities wanted to intervene (Van Horen, 2004, p.769).

¹⁹³ *Cataforte*.

¹⁹⁴ *Sistema Integrado de Processamento e Aproveitamento de Resíduos*, the new plan on waste treatment of the city of the waste consortium of the MRC

¹⁹⁵ For an interesting source of information, see the movie *Lixo extraordinario*, made at the second South-American largest landfill, *Jardim do Gramacho*, in Rio de Janeiro.

In the MRC, the number of actors along the chain of waste depends on the quantity of materials that can be accumulated by each of them. Only who is able to reach an adequate industrial quantity sells to industries. This actor generally is paid the fairer price.

The hardest work is carried out by the lowest level of the hierarchical pyramid (see figure 3.2), getting the lowest gain. Moreover, the system is characterized by patron-client relationships between pickers, collectors and dealers, having the transactions among informal-sector agents highly personalised, multi-dimensional and long term (Hayami et al., 2006).

The exploitation of the lowest level of the informal sector it may be due to the low education level the pickers present (see also 6.6). Some authors said that recovery of recyclables is a low-skill occupation with relatively free entry, low capital investment and offering enormous on-the-job training (Masocha, 2006). For this reason, it may appear an easy employment for new migrants.

Even if generally education level is low, pickers need to learn skills both directly related to waste recovery as well as for locating materials on market and getting potential customers. Lacking this latter skills result in the exploitative relationships explained above. In the MRC, some pickers declared that one of the difficulties at the beginning was the rhythm and skills to be apprehended. Indeed, even if education is low, as declared by Wilson (et al., 2006), informal recycling sector is often highly skilled at identifying wastes with potential value.

Finally, it was demonstrated that informal waste pickers beyond the economic ones, bring incredible contributions to the society also in terms of public health and environment conservation. As Hayami (et al., 2006, p.64) said, the public cost saving of around Rs 200 million (US \$ 4 million) in New Delhi was not so large compared to the contribution to the city's environment. Even if poverty issues are generally related to environmental degradation (box 2 and section 2.2), in the case of informal picking can be said that environmental conservation is obtained. Furthermore, looking at the case of the urban area of *Curitiba*, environmental themes and causes (as the struggle against waste incineration) became political targets of the pickers and their movement, the *MNCR*. This demonstrated that a consequence of carrying this work is that pickers have started developing awareness on environmental issues.

6.3 Informal picking work characteristics

This section will discuss the informal picking work characteristics, timetables and incomes.

Looking at the work characteristics, was proved that informal picking is a time-consuming activity, due to low incomes it is needed to be invested much time (Masocha, 2006).

In *Curitiba's* metropolitan context, elaborated data showed that majority of the interviewees worked the regular amount of five days per week and a higher rate worked 8 hours per day (tables 4.11 and 4.12). Still, more than 1/3 (35 %) of the respondents worked more than five days.

On the matter of income gained by pickers, similar cases are found. Most of the cases, pickers reach the minimal wage value or more, according to their country (Masocha, 2006, Fagundes and Nzeandibe, 2009). The only exception showing very low incomes was the Indian case of New Delhi, where most incomes were shown being below the poverty line (Hayami et al., 2006).

In the MRC, the average income calculated, was of around 466 R\$, slightly higher than the minimum Brazilian wage (445 R\$), and as a median (410 R\$), lower. The households' income calculated were around 800-880 R\$ (depending if as average or median).

Moreover, depending on which association, the organization of the work, the hours carried, it was seen that the incomes can widely vary, the maximum income calculated was 1100 R\$ while the lowest 160 R\$. It is relevant to mention the case of *Tarumã* where pickers are employed in a municipal recycling plant, better incomes (even double) are shown than in *Teodoro Sampaio*, where work is mainly informal. This cases show the improvements that are achievable through formalization of pickers' work.

On matter of the cart-pushers, physical strength and health state, working time, type of material collected, area of the city where collect, and good contacts of donors play a fundamental role (also confirmed by Fagundes, 2009, p.173).

Picture 6.2 – A picker pushing her cart on the street of *Guarituba (Piraquara)*



The research conducted in the MRC also demonstrated that the pickers working in associations, which generally sell to better intermediaries (a part of the case *A Ilha* and *Zumbi* for the fire, see box 10), got better income than those working individually. Interviews demonstrated that pickers' average income in the MRC not belonging to any association, would not reach the minimum wage.

As Wilson (et al., 2006) say, with the exception of the Indian case, even if the picker income is very low, they are not necessarily the very poorest in society. Moreover, as Hayami (et al., 2006) noticed, poverty of pickers is not transitory, but chronic. Based on the case of *Curitiba's* region, incomes thank to associations creation, can improve (see next section 6.8) and so poverty lessened.

The unacceptable low incomes of the pickers, also considering the exploiting system existing, are confirmed looking at the higher incomes of the intermediaries too, in the different cases (Hayami et al., 2006 and Nzeandibe, 2009).

Moreover, was observed that is hard to enter the higher-level of waste traders (intermediaries and dealers), denying an easy upgrade mobility for the pickers (Hayami et al., 2006 and Mitchell, 2008). This is also expected in the MRC but was not possible to be analyzed quantitatively.

Moreover, some cases proved a gendering of the incomes (Mitchell, 2008). In the MRC, was found that incomes are gendered too, with a difference of almost 100 R\$ per month (400 R\$ for women and 490 R\$ for men, calculated as medians).

Another characteristic proved by Mitchell (2008), is that the activity of waste-recovery has usually a temporary nature. In the MRC was proved that some temporariness of the work (1/3 of the respondents having worked less than one year). This work was shown also as permanent, with remaining (1/3 of interviewees having worked between one and five years and last 1/3 spread between 6 and 30 years of work).

Moreover, as proved in the MRC the working rights are not respected, demonstrated by the fact that most cannot afford to pay retirement tax (67 % of the respondents). This factor has not been considered in any other study.

On the matter on difficulty in leaving the informal sector, in the case of Victoria falls Town was shown that majority of the respondents in case of the landfill closure answered would engage in other informal activities such as street vending or selling artefacts to tourists.

In the MRC from the research came out that most of the pickers carried manual activities in their life and 40 % of them were at least once, employed in a legal job. Hence, to get a formal job it is possible

but not so easy. Additionally, of those pertaining to a picker's household, 64 % also exerted informal activities. These data confirm the difficulty to get out from the informal reality. As said by Wilson (et al., 2006, p.802), "if alternative employment opportunities and associated wages were higher, scavenging would be less financially attractive".

In conclusion to sum-up, picking waste is a labour-intensive, time-consuming, sometimes carried temporarily but also permanent activity, where incomes are low, even lower in some cases for women, working rights are not respected and is difficult to upgrade and find alternative legal employment.

6.4 Origin of informal picking work and provenance of the pickers

This section will discuss the factors favouring the generation of the informal picking activity and its actors' origin.

Concerning the origin of the informal picking work, as demonstrated by the different considered authors, its existence is caused by several factors such as low levels of economic development, lack of safety net for poor people, poor wages, high unemployment and increased demand for recyclables (that have low prices, Masocha and Wilson et al., 2006).

Moreover, the globalizing economy and urban transition have been catalysts for the growth of the informal picking waste population (Mitchell, 2008). A relevant factor is also the recent increase of waste quantity in proportion to the rises in population and urbanization (Nzeandibe, 2009). As in the case of Vietnam (explained by Mitchell, 2008), Brazil also lived a strong economical growth and especially a steep urbanization in the last decades, this generating a strong increase of waste production rates. As asserted by Wilson (et al., 2006), consumerism has paradoxically benefited the informal pickers, the increase of material production for economic activities' proliferation have raised material quantities, to be handled with.

In the case of MRC, as asserted by a representative of the L&C Institute of *Curitiba* the strong urbanization brought large poor neighbourhoods expansion on one side and on the other the growth of a capitalistic society, resulting in rise of waste production and un-sustainability of the city. These phenomena in some way have increased the number of potential pickers.

Waste picking is a livelihood survival strategy for the urban poor. Many thousands of people in developing country cities depend on it (Wilson et al. and Masocha, 2006). The official movement of pickers in Brazil, the *MNCR* confirmed it too.

Looking at the various cases, can be said that many new urban immigrants start the work of picking waste. Their rural origin is confirmed in the cases of New Delhi, Enugu and Hanoi (Mitchell, 2008, Hayami et al., 2006 and Nzeandibe 2009).

The case of *Curitiba's* urban region situation is slightly different, indeed 1/3 (31 %) of the interviewees were born in *Curitiba* and of those coming from other areas, based on the different life stories, the majority of them arrived as children (more than half of them) or young (1/4) and just the remaining 1/4 arrived since short time. Thus, this data demonstrates that most of them are the second generation of the rural immigrants that migrated to the urban region showing also that informal picking activities were developed since some times in the MRC.

As shown by Wilson (et al., 2006) and his general studies on pickers, they often come from discrete ethnic social groups or belong to minorities. This issue is not demonstrated in Brazil, as the society is very multicultural and mixed and it is very difficult to categorize minorities.

As seen in *Curitiba's* case, also considering some *catadores'* declarations, being a picker is an identity strongly felt and it is like being part of a minority.

In general, even if informal picking could be seen as an easy activity to start for urban poor, as shown by some authors, a network of contacts of friends and/or relatives favours entering this sector (Mitchell, 2008 and Hayami et al., 2006).

In the MRC this is demonstrated by the high presence of pickers in pickers' households (42 out of 94 had a picker in own family (see table 7.4 in Appendix). Moreover, some picking zoning of the city

areas was observed in the MRC, resulting in competition between the pickers and so disfavoring this activity start.

6.5 Health issues

Beyond the environmental benefits they bring, pickers suffer not only from economic exploitation and social discrimination, but also for health problems. Another inconvenient of the informal pickers in their work is the sanitation issues.

The un-hygienic places they work in, the lack of protective equipments and the presence of organic remnants in the handled waste are all factors that can be vectors of diseases and infections.

Infectious diseases of poor sanitation and poverty are the most common diseases affecting poor residents (Boadi et al., 2005). Among the health problems, the pickers suffer from, from the studies were found respiratory, dermatological problems and eye infections and more in general body aches, general weakness, cuts and bruises (Nzeandibe, 2009 and Wilson et al., 2006).

As stated by Wilson (et al., 2006), literature on health problems of informal pickers is very limited and further research is needed.

In the MRC case, even if the that more than half of the pickers declared not having any health problem, main ones concerned back and arms pain. Blood problems are those found most too. Moreover, risks from *dengue* mosquito and *leptospirosis* coming from rodent's bite were often mentioned during fieldwork.

In general, one of the health problems often presented in picker's family (see table 7.8 in the Appendix), apart of blood pressure problems, are respiratory problems. Boadi (et al., 2005) showed there is some correlation between uncollected garbage and the occurrence of respiratory diseases. Moreover, looking at the picker's family health issues, the most striking result is that, the category most affected is son of the pickers. During fieldwork was observed the presence of some of the picker's children in the storages.

During fieldwork was also observed a high presence of disabled persons working in the association or in relation with pickers (eleven people). This data revealed the existence of a group of people in an already marginalized category.

I acknowledging potential health hazards for the work and the existence of some weaker groups of people (children, disabled) it is relevant to see how the pickers' and in general the poor receive assistance for their problems. In table 4.9 was shown that they treat mostly their problems with medicines (16 people). Almost half of them, quite always got them free at the public health centres, whereas 1/3 of them just get them sometimes or only some specific ones and almost 1/5 never got them (table 4.10). Moreover, of the pickers' households having a disabled person only two got the government aid for it (table 4.19). For the issue of children, lack of children care is also another problem the pickers suffer from.

Finally, health problems pickers are exposed too are weighed by lack of efficient health care and prevention measures, with some groups suffering more for this reason.

To conclude, health problems' causes are difficult to be related to bad living or working conditions and some problems reveal only in long-term. For this reason further research on these issues and more precise and professional analysis and diagnosis, is needed.

6.6 Demographics of the pickers: socio-economic characteristics and gender issues

This section will focus on the socio-economic characteristics (gender, age, household's composition and education level) of the pickers.

As in all the studied cases, in the urban region of *Curitiba* too, the pickers come from low-income areas. In the case of *Curitiba's* region, they live either in the periphery of the city or in the

metropolitan surrounding towns. As shown in the graphs 4.6 to 4.10 (section 4.1) they are generally areas poor of infrastructures and facilities¹⁹⁶.

The various cases show that very different type of people carry out the waste informal picking. In many cases, they are mostly adult men (Hayami et al., 2006, Nzeandibe and Fagundes, 2009). In other, there were all types of people, according to gender and age (Mitchell, 2008). In some cases majority were underage (Adeyemi, 2001) as those working in Hanoi's landfill (Mitchell, 2008).

In MRC particularly, considering all the numbers, can be said that majority of pickers are women (between 65 -70 % of the total). Only in another case, the 'gendered occupation' biased toward women, occurred, in another Brazilian town of *Tarumã* (Fagundes, 2009). In general, this information is quite surprising due to the wearing nature of the activity (thus a major male population presence would be expected). Indeed, Fagundes (2009) shows that in the case of *Teodoro Sampaio* where waste is picked at the landfill and on the streets, accompanied by the cart-pushing activity, the female presence is less than in *Tarumã*, where they work in a recycling centre and so carry a much less exhausting work. Looking at the MRC case, of those who are still cart-pushers half are female (twelve people) and half are male (eleven people), but looking at the total population, 53 % of the women does not push carts while only 27 % of the men, does not (graph 4.12 in section 4.6). A stronger female presence in the associations in the MRC can be related to the fact that in these, work is less exhausting than on the street or also that women have harder time in finding legal employment.

Looking at all the cases, it is not easy to say which age categories are most probably present in this work area. It could be expected that the people having more problems in finding a regular job, as teenagers and elderly, would be the ones. Nevertheless, this is not always the case. In the case of *Curitiba's* region, all the ages are found, with a peak in the most productive age (between 26 and 50 years old). It was also observed that very young and over 70 years old people can be found.

On matter of household, majority of pickers have families (Nzeandibe, 2009). About households' size and composition, they generally present very large ones (Hayami et al., 2006). In the MRC, there were many medium and large households and most were composed by children (table 4.1 in section 4.1).

On civil status, differences among the cases are found. In *Curitiba's* urban area, 2/3 of the pickers were in a relationship (married or co-habiting). Acknowledging the majority of female presence, 21 % of the total female population was single mothers and 18 % of the female population was composed by single mothers sustaining their family only through the picking activity (13 % of the total population). This confirmed what Nzeandibe (2009) asserted, that waste picking enable to raise a family, being thus a stable and profitable occupation. Anyway, the profitable level and the conditions in which it will be raised are questionable.

On the matter of education, more similarities are found throughout the cases. As seen normally the levels are quite low (Fagundes, 2009 and Adeyemi, 2001). From the fieldwork in the MRC, came out that almost 80 % of pickers did not complete the obligatory 8 years of elementary school (with 10 % that did not carry out any study). Moreover, the functional illiteracy calculated was around 29 % (table 4.3), reflecting the low education level of the neighbourhoods, they come from. In spite of their limited formal education, all of the waste pickers interviewed had very good knowledge of the kind of materials they were interested in collecting.

¹⁹⁶ Of the interviewed pickers in the MRC, 42 % is living in houses made only of wood with 17 % living in a mixed material house, more than half (54 %) population has not a regular (safe and closed underground network), 22 % still gets electricity from irregular installations and the most provided service is potable water (90 % of population having it).

6.7 The economic aspect of waste

In this section the economic aspects of waste and the business that can be made with waste, are discussed.

As explained well by Ojeda-Benitez (et al., 2002) the market forces are those that lead the scene and generate the state of things. Both the formal and informal sectors follow the flows of the market and the material's price volatility.

Looking at the informal sector, in the metropolitan area of *Curitiba*, it can be demonstrated by the simple fact that, for instance, cart-pushers generally do not pick those materials that value less, or that due to price decrease some associations decide to store some material waiting for better prices. Moreover, in the interviews was shown that pickers who are able (thank to better working means), always go picking in the downtown to get better material (with more value). The existence of a recyclable materials chain (figure 3.3 in chapter 3) in Brazil, is related to their lower prices compared to virgin raw material's ones (Fagundes, 2009).

The waste money-value size is incalculable but it is expected to be on a massive scale. In Colombo (Sri Lanka) for instance pickers and collectors are adding more value than their own income to waste producers' income (households and shops activities, more than 40 % of total value added). Additionally they contribute to the saving of the city government's expenditure, i.e. decreasing waste quantity disposed in landfills (Van Horen, 2004). In New Delhi were calculated public cost savings and was discovered that the external benefits informal pickers produce valued around 15 % of their average earnings. Another demonstration is that when the municipal authority of the Sinhalese capital decided to privatize the sector, the budget allocation increased by 58 % in one living area, while in another it increased by 86 % (Van Horen, 2004, p.758).

As observed in *Curitiba* and other cases (i.e. the case of Naples), large-scale business can be made managing waste. The long judicial and political struggle (see section 3.3) to find an appropriate alternative to *Caximba* is just a reflection of it. In the MRC, the conflict of interests brought uncertainty on the urban region's waste destination until the very last moment. The previous company *CAVO Gestão Ambiental S.A.* has tried infinitely to get its management on the landfill, extended. It also won the bidding proposing an alternative (in the municipality of *Mandirotuba*) to the previous landfill. The anomaly was that *CAVO's* proposal was not the best one in economic terms but it won. A municipal law that prohibited waste site in *Mandirotuba's* municipal land delayed this choice, starting a judicial process. At the same time, the best choice in economic terms (of *Estre* company), started to get into judicial problems, too. A neighbour of the landfill denounced the company. This process was dealt by the same judge¹⁹⁷ on the case of *Cavo* in *Mandirotuba*. Some people said this occurred to give more time to let *CAVO* continue managing *Caximba* (as there was no other alternative)¹⁹⁸. *CAVO Gestão Ambiental S.A.* is part of the group *Camargo Correa*, a very rich enterprise, lead by a family that makes business in very different fields (engineering, cement, pavements, streets, sanitation and siderurgy), with total invoices of around 16 billion R\$/year¹⁹⁹. Apparently, this group has been a big financier of the ex-mayor of *Curitiba* and actual Governor of the State of *Paraná*, Beto Richa.

Waste business is a temptation also to criminal groups and for illegal frameworks. Criminality in waste issues in *Curitiba* at the informal level is expressed by illegal small-scale activities creation, the so-called owners of *Ferro velhos* (*atravessadores*). They impose non-human conditions and

¹⁹⁷ Patricia de Almeida Gomes Bergonse.

¹⁹⁸ Source of the information: website *mafia do lixo*, article: *Licitação para aterro sanitário do lixo de Curitiba volta para a guerra de liminares* <Bid for the sanitary landfill of Curitiba is back in a war of verdicts> <http://www.mafiadolixo.com/2010/10/licitacao-para-aterro-sanitario-do-lixo-de-curitiba-volta-para-a-guerra-de-liminare>

¹⁹⁹ Source: Newspaper *Isto è dinheiro*, article of Leonardo Attuch and Tom Cardoso, of the 23rd December 2009, http://www.istoedinheiro.com.br/noticias/865_CAMARGO+CORREA+UM+GIGANTE+SEM+ROSTO

exploitation of the *catadores*. Thus the waste business that is generated, which intermediaries take advantage of, is based on the picker's exploitation (showed by their low gains).

To conclude, it is very relevant the position and the actions taken by the local government in charge. One of the difficulties for regulating informal sector is not only related to market variability (Ojeda-Benitez et al., 2002) but also to the illegal system existing and massive economic interests that stay behind. A transparent and firm governance is fundamental in order to avoid speculation in waste issues. This type of governance has to be implemented, also aiming at sustainability issues of the system. The massive business scale and interests with waste (in both formal and informal sectors) explains the difficulty in investing on municipal recycling programmes.

6.8 Relationship with the municipal councils

This section will discuss the relationship between the local government and the informal pickers.

As shown in the various studied cases in general the position of the municipal government is not positive towards the informal recycling activity and the actors involved in. The continuum of responses ranges from repression through neglect, collusion and repression (Wilson et al., 2006, and Nzeandibe, 2009). This attitude results in a lack of recognition of picker's contribution to the society and from public administration and enterprises (Fagundes, 2009).

This occurs, because as Wilson (et al., 2006) explains, the municipal power regards informal picking as retrograde and dirty activity and generally incompatible with a modern waste management system. As explained by Baud (et al., 2001), local governments are generally reluctant to create alliances with small-scale enterprises, waste traders and waste pickers because of their unofficial status and the number of units involved. The informal reality is in conflict with the enforcement of rules and regulations (including sanitary codes and health standards).

This negative attitude is reflected also in the privatization tendency, as shown by Van Horen (2004). Privatization is related to higher level of productivity and efficiency, positive especially in acknowledging the inefficiency of public sector provision (e.g. poor coverage of low-income areas). Furthermore, privatization is seen as an easy option as expenditures are mostly linked to the costs of labour and vehicles and so solid waste sector is seen highly flexible in terms of the ability to privatize some components.

In the case of Colombo (Sri Lanka), the introduction of private enterprises in the sector has brought some advantages as improvement in the service coverage and larger quantity of waste collected. Moreover, it has also brought some drawbacks, 17 % of the low-income areas are still not covered, workforce has dropped, and costs arose (by 60 % and 80 %, as shown above). As confirmed also in the case of New Delhi (Hayami et al., 2006) private companies involvement brings higher costs to the service.

In *Curitiba's* metropolitan area are also involved private enterprises, as the *Cavo* for the collection service and previously for the management of the landfill (nowadays responsibility of *Estre Ambiental*). In this case, as well the relationship with private companies (generally through large-scale enterprises, as stated by Baud et al., 2001) is favoured. No study was done on the advantages of this choice in the MRC. The coverage as mentioned in section 3.2 is almost total (99 %, referred only to the city of *Curitiba*), but this data was somewhat contradictory. It, however, shows an important result, the potential competition between informal pickers and private companies. An efficient waste collection and management would hinder pickers' activity. This was demonstrated during fieldwork by the claims of the pickers' political movement of prohibiting landfills. Indeed, as witnessed on place, some pickers even competed with the waste trucks in picking waste.

For this reason, the role of intermediate of the local governments is fundamental. Full privatization would bring more problems and conflicts between the two sectors. Integration of the informal sector into the formal one would be the most optimal choice. Moreover, major involvement of the pickers in the waste management would lessen public expenditures (as already seen in the previous section) but this needs to be done ensuring that the savings are not a result of pickers' exploitation. Re-distribution of gains in the waste business is needed.

Formalization of the informal sector need to follow different steps, the principal one is the facilitation of associations and cooperatives formation of pickers (discussed in the following section). Moreover, the whole process is favoured by the role of different stakeholders. In both cases of *Curitiba* and Colombo (Sri Lanka), where integration of informal sectors started, it was seen that due to the old-style antagonistic relationship between municipal council and pickers, establishing partnership arrangements between local government and NGOs is necessary, reflecting the concept of 'cooperative autonomy'. In none of the other analyzed cases, however, was mentioned the support by the judiciary. In the case of the MRC, judiciary (specifically the Public Prosecutor) plays a fundamental role, as facilitator of the process, too.

Finally, in the case of the MRC, another facilitating factor of integration is that the municipal council does not show the typical full negligence of the other cases is not demonstrated. Officials (or better their collaborators) showed to be aware of all the difficulties the *catadores* live (see section 5.4) even if on some issues forced ignorance seemed to be shown. The awareness of the Public Sector may be a result of the mediation work by the NGOs and the judiciary.

To conclude, as seen also in other cases, the role, the intentions and actions of the local authority is essential in changing the state of things and initiating a formal integration process.

6.9 Associations and cooperatives

This section will discuss the role of associations/cooperatives formation and the changes it brings.

In different studies was declared that to improve living and working conditions of the pickers, not forgetting the improvement of a more efficient recycling, it would be needed to create associations of informal pickers (Wilson et al., 2006).

Through association formation, an initial process of formalization of their work occurs. It also overcomes the individualistic nature of picker's work and turns it into a cooperative one.

It is very relevant to compare initiatives experience of cooperatives and associations in other cases with the one in the MRC, supported by political movement of *catadores*. Another case where a partnership between pickers, NGO and local government, was made in order to create a recycling centre, is shown in the city of Colombo by Van Horen (2004)

Looking at the MRC case it was shown that more than 50 % have worked in the association just maximum one year (graph 4.13) thus for many of the respondents the experience of being in an association was fresh but those who had larger experience contributed giving important information.

During the research in the MRC, many differences were noticed between the associations/cooperatives visited (see also table 7.16 in Appendix). This depended on the relationship with the local government, the support of the NGOs, the contacts of the buyers, the stage of association formation and the urban context they were situated.

Despite these, in general formation of association brought different positive consequences (table 6.1, combining table 4.22 and table 5.2).

Table 6.1 – Positive benefits thank to pickers' association formation

Positive consequences (declared)	N° of respondents
Friendships and get relationships with people living the same conditions	21
Better income and possibility to sustain own household	18
Better working conditions – not anymore on the roads, suffering for the weather and wearing human efforts	16
Environmental benefit they bring	12
Distraction functions/help with stress	10
Their fights for their rights	9
Self-management - no boss, no timetables, autonomy	8
The help they can get form other stakeholders	3
Safe employment	2

In general, more than 1/3 of the respondents expressed satisfaction in working in an association.

The most relevant positive effects were income rise (improvements for their livelihood), better working conditions, employment creation (indeed only 1/3 of the associated were pickers before entering the associations table 7.5), increased awareness on their rights and environmental benefit they bring. Secondly needs to be mentioned, the safe feeling in working for an association than just individually on the road, sharing thus same challenges with other people.

On matter of income rise, the association helped to move up the hierarchy shown (Wilson et al., 2006), typical of the informal sector. This was demonstrated by the better prices of materials, they got, thank to the accumulation of larger quantities and to negotiation skills apprehended. Looking at the case of Colombo (Sri Lanka) the income of the pickers improved too, (US \$ 30/month in the first months of operation, to an average of US \$ 70/month, Van Horen, 2004, p.765). The case of Madras (in India), where an alliance between municipal authority, NGO and pickers to was created help to rehabilitate street children by paying them to take care of cleaning *and* maintaining the streets also showed income improvement for selling recyclable materials (Baud et al., 2001).

All these results have not come by themselves, as said in the case of the metropolitan area of *Curitiba*, different stakeholders have been supporting the process, the pickers' movement (*MNCR*), the judiciary (the Public Prosecutor), the municipal governments (when willing) and different NGOs.

In the case of Colombo, the support of third parties as CBOs or NGOs was essential, too. The difference between *Curitiba* and Colombo is that in the latter case community-based organizations - CBOs were involved too. In general, third parties aim at promoting community involvement in solid waste management and at increase the awareness of waste as a resource (Van Horen, 2004).

Both in *Curitiba* and in Colombo the role of the NGO was fundamental for various tasks. It was the initiator of sustainable projects, facilitator of the dialogue between the Municipal Council and the low-income communities (specifically the pickers), technical assistant on different skills (accounting, management, negotiation, and production), promoter of community awareness programmes and finally instrumental in building networks (better buyers contacts).

Finally, a benefit of NGO–public power is also the growth of the recycling rate of the city, facilitating pickers' work and improving their efficiency has strong environment benefits²⁰⁰.

Nevertheless, associations even if advantaging pickers in their activities, still have to face many challenges.

6.10 Associations' challenges

In the MRC, beyond the positive effects the associations formation generally brings, was observed that some main drawbacks of the systems persisted. In particular, the existence of an exploitative system was shown, based on low incomes of the pickers and high earnings for the other informal agents. Anyway awareness on the system functioning arose and some associations demonstrated to be able to skip some intermediaries.

The associations in the case of *Curitiba's* metropolitan area have to face different difficulties (see table 4.21). Moreover, interviewing different stakeholders and observing the context and reality of the associations, other challenges concerned:

- Lack of actual respect of working rights;
- Lack of sufficient awareness on *MNRC* (indeed even if in Brazil exist this movement, it can be seen that the activism has to be developed and information has to be spread);
- Lack of social assistance (as pickers' children care and health issues);
- Lack of larger involvement in the municipal programmes (effective formalization) reflecting major recognition by the local government;

²⁰⁰ For instance as showed by Baud (et al., 2001, p.8) the recovery of solid waste in San Juan (Perù) municipality increased from 10 % in 1983 to 35 % in 1994.

- Potentially deficient organization in respecting timetables in case of involvement into a partnered municipal collection service;
- Lack of logistics skills, in the case of application of the decree law 5.940/06, which gives the obligation to public federal organs to donate their waste to *catadores's* associations;
- In case of formal payment by the municipal council, the various income levels the pickers receive would create difficulties in estimating the right income;
- Lack of community awareness and participation in changing waste habits;
- Difficulty in eradicating the cart-pushing activity (indeed those *carrinheiros* who make a good job and have good contacts gain more than those working just at the separation phase in the associations);
- Lack of composting treatment of organic material;
- Difficulty to meet the targets of private companies (efficiency) with the one of the pickers (see Taylor, 1999, box 5 in the second chapter);

Moreover another problem, not mentioned previously, that was noticed in the MRC, was some level of corruption (common in the political Brazilian classes), also at lower levels in the movement, reflected in some attitudes of favouritism in the associations²⁰¹. Due to ethical reasons, it will not be possible to get into details.

Overcoming all these difficulties would mean create real small enterprises, working in a more industrial way, with higher technology and better equipments, with production and sale growth, different skills apprehended, with scheduled working timetables, easier activity (less wearing), with the use of protective equipment, meals provision, regular payment for their work and being legally registered (with work rights respected).

Thank to the comparison of the cases was shown that even if the Brazilian case of the MRC caught some further step in formalization of the pickers, much has still to be done in reality.

Major involvement of the community is needed (proved by the bad separation habits), stronger action and higher investments by the local governments towards integration of the pickers must be implemented, capability of pickers needs to be upgraded and the exploitative and cliental relationship of the informal sector needs to be eradicated.

Hence, an integrated approach of environmental, economic and social dimensions is necessary, involving all the parts of the Waste Cycle, from the generators to the managers, making aware all of them of the communal environmental, economical and health benefits

6.11 Policy recommendations

From the research conducted in the MRC and the cases analysis, came out that in order to achieve the SD goals in waste management, formalization of the pickers' activity, integrating it into the formal waste management system, is needed. In this way, Municipal SWM system would incorporate the benefits of informal recycling as reduced costs and major environment conservation (strengthening and rendering more efficient recycling). Moreover, the pickers would benefit of improved working conditions, major social assistance, and inclusion.

The formalization process however, is not straightforward and without complications. The major challenge is to convince the local government of these benefits.

Even in instances where the political will does exist, is very difficult to understand how informal initiatives can be legitimized and integrated within the waste management system without undermining the dynamism that derives from the nature of informality (Wilson et al., 2006).

The preferred option is to integrate the informal sector into waste management system, building on their practices and experience (Wilson et al., 2006).

²⁰¹ For instance weighing more or less the material collected, depending for whom it is.

The integration process recommended (based on the case analysis and on the project *Ecocidadão* in *Curitiba*) is designed in the figure 6.1 (showing the actors at stake and their relative action within the process).

The two actors directly involved in the process, at the initial stage are NGOs, intermediating between pickers and municipal council.

As already proposed by different authors, for the integration, would be helpful to support the pickers organize themselves in associations, creating sort of small enterprises.

The process has to be supported by a previous study of the low-income living areas, on lack of infrastructures, household survey, and socio-economic characteristics. Something that apparently *FAS* did in *Curitiba* and was used by *AE* for initiating the *Ecocidadão* project. This study will reveal the specific problems and deficiencies in the neighbourhoods and the categories of people needing (i.e. single mothers, elderly, children, disabled etc.). Indeed, as already mentioned in the second chapter one of the initial steps of formalization has to concern the provision of infrastructures, regulating and improving dwelling, strengthening education and health issues. Specific aid or programmes must be addressed for particular needing categories assessed (e.g. projects for pickers' children). Health assistance should be made priority for pickers, seen their working contexts.

The promotion of association formation has to be done through mobilization and meetings in the living areas, where pickers are concentrated (as different NGOs did in the MRC).

At the initial phase of association formation, different courses need to be provided. Courses need to concern different issues, as hygiene and safety, cooperative working, better production (separation), management of associations, accounting, working rights, negotiation skills and awareness of the informal sector functioning.

The cooperative way of taking decisions and working has to be stimulated and practised (in the MRC it was experienced with the initiatives of electing a directory board and building an internal rule statute). The mobilization and formation phase is generally implemented by third parties like NGOs.

At the same type, adequate equipments like a working space (storage), machines and safety tools need to be provided in order to insure a safer and healthier work. Moreover, the use of machines would improve the quality of the products and so workers' incomes.

The provision of equipments due to the high costs in general s done by the public power, in some cases good NGOs initiatives achieve funds also from companies or foundations. Municipal council would be useful also in financing the courses that NGOs teach.

In general all this initial phase of the process is facilitated by the role of the NGOs (Ojeda-Benitez et al., 2002, Van Horen, 2004, Fagundes, 2009 and Wilson et al., 2006), due to the acknowledged bad relationships between the local government and low-income communities. Indeed, during research feelings of mis-trust and disappointment toward their local governments, were expressed by pickers.

Considering the MRC case, was observed that if there would be major collaboration between the NGOs themselves, this would strengthen the forces supporting picker's causes and pressure on the local government.

When mobilisation is concluded, cooperation has started, equipments were provided, regularization of documents is made, courses are given, then associations are formed in their entirety. In *Curitiba's* urban region, associations were formed even if not with all these stages accomplished. Most of them collaborate with the local governments and receive waste collected by municipal service (table 7.16), to be separated in their storages. In the case of *Tarumã*, pickers were employed to work in a recycling and selection plant (Fagundes, 2009) too.

Looking for instance specifically at the case of the *EC* in *Curitiba*, the number of pickers involved is still very low compared to the massive population of pickers existing in the city. In order

to initiate a real formalization process of the pickers and of reform of the solid waste management, much higher investments and wider involvement of pickers with increased number of associations formation, need to be implemented by the municipal councils.

Once associations are formed, cooperative way of managing and working are well established and skills are apprehended, better and wider production of materials can be achieved.

In the case of the MRC this is intended to be attempted gathering quantities of different associations (as many as possible) to be sold to the same buyer (e.g. of the formation of cooperative *Copersol* with *Cefuria*) or through treating material in order to get better quality products (e.g. PET treatment plant of the *AE*). In these two cases, when implemented would give the possibility to the pickers to reach much further intermediaries (if even industries) in the waste chain. The skills apprehended can give to the pickers other production and employment opportunities.

Once the associations are more autonomous and capable, a major involvement in the formal management can occur. At this stage, municipal governments start a direct relationship with the associations. They can hire pickers for small-scale waste collection services, rendering the storages, reference spots for specific living areas. In the case of the MRC, this stage is not achieved yet. In the city of *Curitiba* thank to the interviews held appear to be one of the next intentional steps (of the *EC*). Challenges at this stage can concern logistics and scheduled collection timetables respect, for this reason pickers need to be much more supported by the municipal authority with equipments (as trucks) and contract making. If this happens, a larger coverage of the areas (especially low-income) of the collection service is reached and the recognition of the pickers' work is official and not only verbal. A consequent action would be the direct payment of the local government to the formalized pickers for the provided public service. As seen in the MRC due to the very different performances of pickers, payment could be based on the quantity of materials collected.

As mentioned above, the knowledge and dynamism of the informal sector should be analyzed and apprehended by the formal one, integrating the new potentials of it. In order to do that, some adaptation of regulatory frameworks is needed. Specifically on the market issues and exploitative conditions, direct interventions, such as controls on prices, wages and interest rates as well as business licensing, should be avoided (at least in the initial phase). This need to shift away from a preoccupation with regulation and control, toward increased flexibility and tolerance of the positive contributions made by so-called informal operators in the informal sector (Van Horen, 2004). Municipal authority should get to increase transparency in transactions and may consider the possibility of establishing such institutions as the wholesale market of wastes, similar to the wholesale markets for vegetables and meats (Van Horen, 2004). Provide public information services, such as regular price quotations on typical waste items through mass media, will be also effective in increasing market competition and transparency (Hayami et al., 2006). Moreover, acknowledged that some type of materials are more favoured than others (i.e. the case of low incomes coming from glass collection in the MRC) due to their higher value, leading to selection in collection, a system of economic incentives should be created to enhance the picking of all the materials. 0

Direct government regulation is not only impossible to enforce effectively in the informal sector, but also likely to become the major source of corruption and rent seeking. An recommendation gave by Ojeda- Benitez (et al., 2002, p.285) to overcome the possibility of rent-seeking, is to create a hybrid agency that takes on the tasks of handling municipal waste, as property of the municipality but managed by experts dedicated to the learning and innovation of new strategies.

Moreover, facilitating the integration process of the informal operators into the formal one contributed in the case of the MRC, at a higher governmental level, the actions taken by the Federal Government of Brazil. In Brazil different federal laws favouring pickers' activity and protecting this

category of workers, were emitted. The policies of the Federal government were stimulated also by the pressure and claims of the Pickers' political movement (the *MNCR*) at a National level.

In general on legal matters, laws and decrees (on different governmental levels) on pickers' activities and on their working rights (as on retirement, vacation, health assistance etc.) should be made. These laws should include also public institution enforcement to donate their waste to pickers' associations (e.g. Federal decree 4.950 in Brazil).

Moreover, the Judiciary (like the Public Prosecutor in *Paraná*) should be monitoring municipal council's actions, acknowledged the difficulty of rule enforcement in the developing countries.

Considering human rights, activities, like picking in landfills, due to the unfeasibility in achieving decent working conditions²⁰², should be prohibited by the Judiciary.

Integration of the informal sector into the formal one, include a reform of the municipal waste management system itself. Indeed, aiming at environment conservation, one of the steps should be, create a composting facility for the entire metropolitan area. Thank to this, less waste would be disposed in the landfills, and pickers would exert better separation activity, being also less exposed to pathogens.

Waste management plan production made by the municipal authorities should be expected (see the *GIRS*²⁰³ in Brazil).

From a governmental side, Fagundes (2009) suggests that all the municipal secretaries and organs must be involved in the integrated management plan of solid waste, exerting especially the separation of own remnants. The different secretaries that would collaborate in order to get the most optimal management system involved would be:

- Secretary of works and environment, with the target of collecting waste making them be recycled and re-used, preceded by a selective discard.
- Secretary of social promotion, implementing programmes of social support and value of *catadores*;
- Secretary of education, supporting the projects of Environmental education related to solid waste.
- Secretary of health, monitoring the conditions for storage and discard of the sanitary waste <RSS> and promoting the necessary technical norms respect.
- Secretary of finance, rendering viable the necessary investments, as for machines, propaganda etc;
- Secretary of planning (which is of extreme importance during the whole process of reformation), defining the strategic points of each secretary, aiming at recycling, considering quality, productivity and the minimal possible costs.

The municipal waste management plan should take into consideration also the generators of waste (e.g. the federal decree 7.404 prioritizing pickers to receive waste from companies and public organs).

On the matter of major involvement of industries in the SWM, by Ojeda-Benitez (et al., 2002) recommend training of groups by NGOs to recycle industrial waste, which once processed will be sold to the same company that provided the materials. This would strengthen or creates direct relationship between industries and pickers, too.

Indeed as pointed out by Fagundes (2009) recycling cannot be considered as a final solution for solid waste, it needs to consider the generation side, aiming at minimization and re-use of products and packaging.

On the matter of private companies involved in the MSWM, many cases (table 7.17) showed this tendency to privatize the sector. Before involving private companies, municipal governments should seriously due an analysis on costs and benefits and define their policy targets. If the target is

²⁰² As shown in the case of *Teodoro Sampaio*, is described as exerting this activity in precarious conditions in (the middle of mountains of waste), without any use of safety equipments and staying in such an unhealthy environment for more than 12 hours/day (Fagundes, 2009, p.172).

²⁰³ The integrated management of urban solid waste.

recycling and with less expenditure, even if the process might take much longer time and many difficulties might come up, informal pickers' integration in the SWM is more favourable. Private companies can be also contracted but their involvement should be well accounted, not giving all the responsibility at once and with short-term commitment (which is difficult to be accepted by a private company). Related to this indeed Ahmed (et al., 2004) said that public-private partnerships will not be effective and sustainable unless there is incentive for both public and private agencies to enter into it. Moreover, even if partial privatization of the system has shown to be worked well, it is important for the public sector to retain control of part of the service to not let it be taken hostage by a private monopoly (Van Horen, 2004).

Depending on how much autonomy is given to the private companies, their role for pickers' formalization, might create a problem. The municipal government having contracted them and so being committed cannot just keep them out from the whole formalization process. In the favourable circumstance in which municipal council retain some power in the MSWM, some type of partnerships between these companies and pickers can be made (with the supervision of the local government and the support of NGOs). In the case of Curitiba for instance, an initial stage of this partnership is shown by the discharge of municipal waste (collected by a private company contracted by the municipal council) in some pickers' associations (e.g. *Ecocidadão*).

Finally yet importantly, civil society needs to be aware of the entire integration and MSWM reform processes. Environmental education campaigns in schools, public spaces, and public transports are needed, promoting the importance of the benefits of separating habits and composting. Conferences and large events can also be organized with the participation of the pickers. Environmental education of households is made for obtaining more participation in selecting and separate recyclable materials at its origin and to convince (more) people to give away their material to waste pickers (Ojeda-Benitez et al., 2002). This would facilitate and improve pickers working conditions, affecting also their incomes. Related to the organic remnants, to separate organic from non-organic waste need to be underlined in this campaigns²⁰⁴.

The formalization of pickers associations should be accompanied with marketing policies (something that the city administration of *Curitiba* is expert in) on new recycling programmes and services. The propaganda used should put the figure of the picker as central one. This would also help in overcoming prejudices and discrimination pickers are used to suffer from, enhancing their social acceptance and sense of identity. A simple tactic would be to invent a sticker, or label that the pickers wear, showing they are partnered with the municipal council, giving to them much more entitlement.

Moreover, Fagundes (2009) also suggests the involvement of other representatives of the society in the formalization of the pickers' associations, as public and private schools, dwellers' associations, syndicates, commercial associations. Ojeda-benitez (et al., 2002, see box 5) proposes for instance to form a voluntary work group for selective picking, as an association of representatives from all levels of administration. This would create synergies and scale economies when cooperating at all levels with other administrations to solve problems and take advantage of common opportunities.

For better management of the whole process of waste system reformation including the formalization of pickers, Fagundes (2009) suggests to create a Municipal Committee on integrated management of urban solid waste <*Conselho Municipal de Gerenciamento Integrado de Resíduos Sólidos Urbanos*> formed by representatives of both public and private sector and the community. This council has to be normative, deliberative, consultative and monitoring the relative issues. Importantly, as said by Nzeandibe (2009) pickers' views and interests should be incorporated in the development and implementation of solid waste management policies.

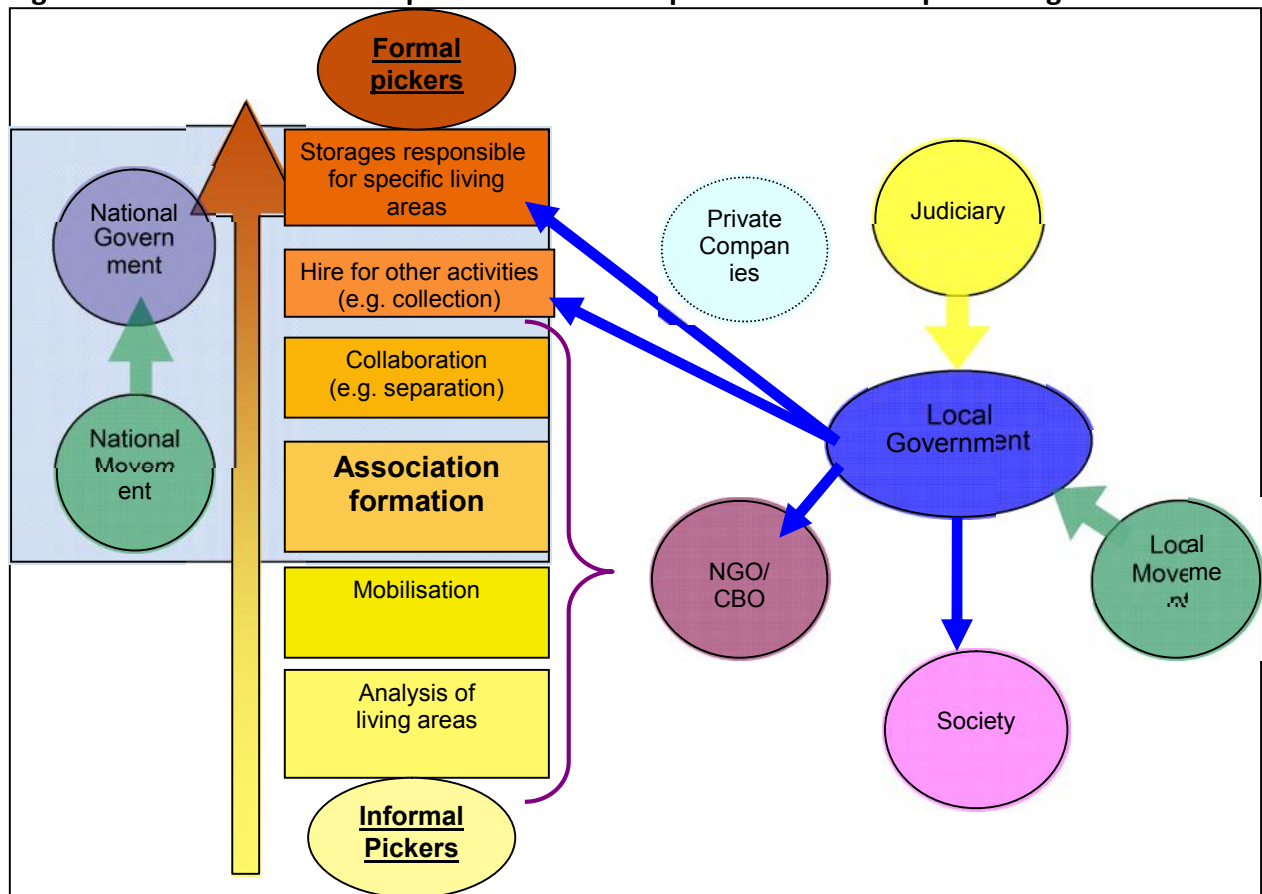
²⁰⁴ As shown by in the case of *Tarumã*, organic remnants were contaminated by other type of toxic waste (as heavy-metals) it has been in contact with (Felipetto, 2005 in Fagundes, 2009, p.166).

In the case of the MRC, was formed an inter-municipal Consortium, which decisions concerned public sanitation and waste management (including collection, transports, landfills management, recycling).

To conclude, an optimal integration of the pickers associations into the formal waste management system, aiming at better recycling and improvement of pickers' working and living conditions, reform need to be done at the governance level. Indeed, to render the informal solid waste management sector sustainable (from the view of all the SD concepts), it is necessary to involve all the levels of governments and social sectors. In this way, top-down actions (of public organs) meet bottom-up initiatives (by the NGOs and in this case the *MNCR*), bringing so positive spin-offs in terms of socio-economic and ecological sustainability, and public health aspects.

For this reason, instead of referring to the term solid waste management, should be referring to the concept of solid waste Governance.

Figure 6.1 - The formalization process of informal pickers into Municipal Management



Box 15 - The Agenda 21 and the MDGs

Policy recommendations for cities to be sustainable, were agreed at UN-level and indicated in the 'Local Agenda 21'.

Moreover, with the MDGs, international goals aiming at poverty eradication were indicated by the majority of the countries in the world. Going through this study, can be noticed that three of the eight MDGs, concerning health, environment and job creation are related to the informal SWM issues in the developing countries.

Looking at Agenda 21's indications (box 3) it is striking that if the various studied cases and the case of *Curitiba*' region analyzed on field, would implement all the practices recommended, the goals for sustainable waste management system would be achieved. Indeed, aiming at poverty eradication, more attention to SD issues would be given, enhancing the sustainability of the system, allowing the participation of poor, fostering capacity building networks, learning from traditional sustainable methods, favouring grass-roots movements formation, strengthening health and social facilities, taking care of the weaker categories (children, women) etc.

Therefore the deficiencies of the local governments on aiming at SD in SWM, reflects gaps on implementing policies that most of their states agreed on.

In particular, considering the case of the city of *Curitiba*, the much acclaimed sustainability of this city, after conducting this research on SWM is open to question. Regarding waste matters and management, the city did not demonstrated to be sustainable. Indeed economic and political interests seem over-ruling the environmental ones.

From a purely environmental point of view, sustainability is a result of the work of *catadores*. Although the positive benefits they bring, do not come without difficulties.

In case the city of *Curitiba* and its administration would start to implement policies as indicated by the largely agreed Agenda 21 and MDGs, it would be possible to assert that this city is orienting its political actions toward Sustainable Development.

6.12 Main conclusion

To answer the main research question of this Master Thesis on the extent is sustainable the informal waste management sector in the Metropolitan area of *Curitiba*, is not straightforward.

Referring to the notion of sustainable development, achieving the goals of environment conservation, social inclusion and economy sustained in time, (Paulista et al., 2006, p.186), and regarding the informal waste management sector, it is crucial to consider how the informal sector of SWM is structured and how it works. Indeed, at the basis of this sectors' functioning the informal pickers exert the major part of the work and initiate the informal cycle of waste, which is from collection to final treatment.

The main challenges for a sustainable informal waste management sector is how to improve their livelihoods, working conditions, and at the same time efficiency in recycling (Wilson et al., 2006, p.770).

Informal waste management sector did not reflect the achievement of at least two of the three goals of SD in the Metropolitan Region of *Curitiba*.

From a social point of view, based on the study made in the Metropolitan area of *Curitiba*, it has been concluded that pickers suffer from bad working conditions, social exclusion, health problems and lack of health and social assistance.

From an economic point of view, it was found that they receive low incomes due to unfair prices, this compared to what the other actors in upper stages of the informal sector receive.

From an environmental point of view, the activity that the pickers exert is beneficial. Anyway, the impacts the pickers bring needs to be considered from a larger context. Indeed, it is necessary to analyze how the municipal formal sector works and how it influences the urban environment. Due to deficiencies and irregularities of the municipal waste management programmes, the benefits of pickers' work gains in importance.

Based on research results, better work of the pickers (more efficient and wider recycling) is achieved through better working conditions, bringing positive effects to the environment.

Improvement of working conditions in the Metropolitan region of *Curitiba* depends on the action and influence of different stakeholders such as local government, NGOs, Judiciary and political movement of the pickers.

Moreover, social inclusion of the pickers depends on increased social and health assistance and recognition of their work, given by the local government, helped also by the pressure that the NGOs, Judiciary and political movement of the pickers exert.

Better economic conditions (higher incomes) of the pickers and so livelihoods can occur with regularization and formalization of their work.

Thus, to answer the main question, even if informal waste management sector is not sustainable in the MRC, it has some potential to become so.

In order to achieve all these goals and reach a real extent of being sustainable the informal waste management sector need to be integrated into the formal waste management system. This can be done with the formation of pickers' associations or cooperatives supported by the different actors at stake. This will result in creating jobs, while also improving the environment by reducing indiscriminate disposal, depletion of resources and having cleaner neighbourhoods. It is essential that the employment created, provide a wage for decent living, is safe from a health view and promotes equality among the people working in the sector and social inclusion.

Finally, a sustainable informal sector will also affect positively the entire solid waste management system, which needs to aim at transparency, efficiency, community safety, public health and sustainability.

As Baud (el al., 2001) concludes,

“[...] in cases where informal actors are integrated into formal waste management organizations, positive benefits are accrued in terms of both socio-economic and ecological sustainability, and in terms of improved public health” (Baud et al., 2001, 3).

7. Appendix

Table 7.1 – Pickers’ Associations visited and interviewed

Association/cooperative name	Municipality	Number of people/workers interviewed
Associação ‘A Ilha’	Almirante Tamandarè (Vila Tanguà)	7 people
Associação ‘Assol’	Almirante Tamandarè (Jd. Roma)	11 people
Associação ‘Resol’	Colombo (Monte Castelo)	13 people
Cooperativa ‘Zumbi dos Palmares’	Colombo (Vila Zumbi)	10 people
Associação ‘Reciquara’	Piraquara (Guarituba)	9 people
Associação ‘Arep’	Pinhais (Vila Emiliano Pernetá)	15 people
Cooperativa ‘Catamare’	Curitiba (Rebouças)	8 people
Associação ‘Vida Nova’	Curitiba (Capão Raso – Jardim Paraná)	14 people
Associação ‘Muitirão’	Curitiba (Bairro Novo)	7 people
Associação ‘Acampa’	Curitiba (CIC)	no interviewed people!

Table 7.2 – Visits and interviews done during research periods

Interviews	Visits
Mr. Julio Cesar Rodas and Eng. Celso	Sanitary landfill of <i>Caximba</i>
Mr. Jadir Lima and Father José (NGO Adecom)	<i>Caximba</i> neighbourhood
Mr. Gilberto Hanig (Sanitation department - Environmental Secretary of <i>Curitiba</i>)	<i>Câmbio Verde</i> and <i>Compra do lixo</i> points
<i>Estre Ambiental’s</i> employees	Sanitary Landfill of Fazenda Rio Grande
Plant’s guide	Municipal recycling plant of <i>Campo Magro</i>
Mr. Felipe Silveira (AE)	Environmental secretary of <i>Curitiba</i>
Ms. Gisele Tlera	Environmental secretary of <i>Piraquara</i>
Mr. Rafael Cardeal	Aliança Empreendedora
Mr. Edimario and Mrs. Estrela (AE)	PET treatment plant – <i>CIC</i>
Ms. Magda Mascarello	NGO Cefuria
Mr. Sergio Faria	Institute <i>Lixo e Cidadania</i>
Mrs. Marilza Aparecida de Lima (MNCR)	Institute <i>Lixo e Cidadania</i>

Table 7.3 - Attended meetings/events during fieldwork

Attended meetings
Different Fora ‘lixo e cidadania’
Meeting of <i>Conresol</i>
<i>MNCR</i> meetings
Picker’s associations meetings
Class of the course <i>Cataforte</i> for pickers

Table 7.4 – Work carried out by pickers' relatives

Doing what?	N°
Waste picker	42
Bricklayer	18
Housekeeper	5
Market/shopping centre	4
Mechanic assistant	3
Production worker	3
Attendant	2
House walls polisher	2
Driver	2
Restaurant/café/fast-food	2
Recycling company	1
Nurse	1
Gas point	1
Public official	1
Painter	1
Car washer	1
Cleaning company	1
Electrician	1
Metal worker	1
Rural worker	1
NA	1

Table 7.5 – Previous works

Doing what previously?	N°
Nothing	4
waste picker	33
Housekeeper	18
In a company	9
Restaurant/fast-food/café	9
Shop-assistant/market/cashier	6
In a recycling company	6
Employer	5
Production worker	4
Driver	4
Bricklayer	3
Street seller	3
Metal worker	2
Painter	1
Handcraft	1
Working for SANEPAR	1
Carpenter	1
Gold collector	1
Confectioner	1
Professor	1
Elderly carer	1
In logistics	1
School worker	1
Rural worker	1
In a recycling junk shop (<i>Ferro velho</i>)	1

Baby-sitter	1
Baker	1
Bus ticket controller	1
Laundry assistant	1
NA	6

Table 7.6 – The different aids that low-income families can receive in the State of Paraná

Government aid type	Description
<i>Bolsa Família</i> <Family bag>	It currently gives a monthly stipend of 22 R\$ (about \$12 USD) per child attending school, to a maximum of three children, to all families with per-capita income below 140 R\$ a month (poverty). Furthermore, to families whose per-capita income is less than 70 R\$ per month (extreme poverty), the programme gives an additional flat sum of 68 R\$ per month ²⁰⁵ .
<i>Agua baixa renda - Tarifa social</i> <Low-income water>	For families until 2 minimum salaries, the water bill will be a fix price of 5,80 R\$ for a month consumption of maximum 10 cubic metres ²⁰⁶ . There is also the minimum water tariff of 18,97 R\$ for low-income families.
<i>Luz fraterna</i> <Fraternal light>	It exempts from paying light bills, to low-income families that are registered to some social programme as <i>Bolsa Família</i> or in the social register of <i>Copel</i> , the consumption must be under the limit of 100 kWh kilowatts-hours, per month ²⁰⁷ .
<i>Assistência Social para Pessoas Portadoras de Deficiência - BPC</i> ²⁰⁸ <Social Assistance for disabled people>	It is foregone in the Article 20 of the Constitution, the 'benefit of a continued performance' of a minimum salary (545 R\$) for a mentally or physically seriously disabled person or a sick person older than 65 years, that prove to not have any livelihood means and neither the family does. Provided by <i>INSS</i> , it is welfare, it does not need any money contribution to receive it (is the only one of <i>INSS</i>). To request it, it is needed to not overcome ¼ of minimum wage.
<i>Aposentamento</i> <Retiring Pension>	It can be integral or proportional. To have the proportional one a male worker need to have worked for 35 years, contributing with <i>INSS</i> , while female worker for 30 years. To get the proportional one, male worker need to be 53 years old with 30 years of contribution, whereas the female needs to be 48 years old and having paid for 25 years. ²⁰⁹ Moreover, the <i>INSS</i> provides guarantees for those workers who pay, as: maternity aid, disease aid, imprisonment aid etc.
<i>Seguro Desemprego</i> <Unemployment security>	Financial aid, lasting maximum 5 months for those workers who were fired without right justification. It can varies around amount of R\$ 300 e R\$ 561,30 ²¹⁰ .
<i>Cesta Basica</i> <Basic basket>	It is composed by products considered useful for a family for a period of a month. It is normally made by food, hygiene, and cleaning products. As food can be found meat, milk, biscuits, bread, flour, rice, potatoes, tomatoes, sugar, oil, butter, coffee powder, fruits and vegetables ²¹¹ , additionally toilet paper, waste bags, disinfectant liquid, soap ²¹² .
<i>Auxilio doença</i> <Disease aid>	It is a benefit given to an insured person, which has an impediment for working for disease or accident for more than 15 days. To get it, it is needed a medical receipt and being in the situation of having paid <i>INSS</i> at least for 12 months ²¹³ .

²⁰⁵ It is currently the largest conditional cash transfer programme in the world, though the Mexican program *Oportunidades* was the first nation-wide program of this kind (Source: *Bolsa Família: Changing the Lives of Millions in Brazil*, the World Bank, Aug/22/2007).

²⁰⁶ *Sanepar* asserts that 48,8 % of citizens of the state of *Paraná* pays it. It is one of the lowest tariffs of the country. Source: <http://site.sanepar.com.br/noticias/tarifa-tera-reajuste-de-16-recuperando-parte-da-inflacao-acumulada>

²⁰⁷ <http://www.copel.com/hpcopel/root/nivel2.jsp?endereco=%2Fhpcopel%2Froot%2Fpagcopel2.nsf%2F0%2F8E4D366598F91398032573FB0067A1B4>

²⁰⁸ *Benefício de prestação continuada* <Benefit of continuous performance>.

²⁰⁹ Source: <http://www.previdencia.gov.br/conteudoDinamico.php?id=19>

²¹⁰ Source: <http://www.parana->

online.com.br/editoria/economia/news/132306/?noticia=DRT+ESCLARECE+DUVIDAS+SOBRE+SEGURO+DESEMPREGO

²¹¹ *Metodologia da Cesta Básica Nacional - Versão Preliminar*, 2009.

²¹² As a picker told me.

²¹³ Source: Ministry of Social Security, <http://www.previdencia.gov.br/conteudoDinamico.php?id=21>

Table 7.7 – Health problems declared

Health problem	N°
Blood pressure	11
Back pain	6
Respiratory	4
Bone joints inflammation	4
Digestive system problems	4
Heart problems	3
Diabete	3
Arms and legs pain	3
Alcoolism	2
Kidney infection	2
Depression	2
Eyes problems	2
Colesterol	2
Sorethroat	1
Fever	1
Cancer in the intestine	1
Skin disease	1
Thyroid	1
Prostate	1
Headache	1
Bladder	1
Nervosism	1
Stress	1
Hemorrhoids	1
Leptospirosis	1
Epyleptic attacks	1
<u>Tot people</u>	37

Table 7.8 – Which health problems in pickers' families

Health Problem	N°
Blood pressure	8
Respiratory problems	8
Mental	7
Cardiac problems	4
Epilepsy	3
Alcoholism	2
Pain in the back, flanks	2
Hernia	2
Headache	2
Back pain	2
Labyrinthitis*	1
Osteoporosis	1
Stomach virus	1
TBC	1
Feet pain	1
Paralysis	1
Cancer	1
Parkinson	1
Prostate	1
Meningitis**	1
Eyes problem	1
Diabete	1
Convulsions	1

* It is an inflammation of the inner ear. It can cause balance disorders.

** It is inflammation of the protective membranes covering the brain and spinal cord. Meningitis can be life-threatening because of the inflammation's proximity to the brain and spinal cord; therefore the condition is classified as a medical emergency.

Table 7.9 – Difficulties expressed by the *catadores*

There are not – 30
A lot of organic material and not recyclable material (even dead corps of animals) – 14
Prejudices of the society, Discrimination - 9
Tiring work / Rhythm of work – 9
Low income /To pay the expenses, food – 9
Always there are/many /"Here is very difficult"/It is difficult for the <i>catadores</i> – 9
The material value, low prices – 5
To work in team/lack of collaboration– 5
To relate with people (colleagues), the cohabitation – 4
No safety (i.e. uniforms, gloves and boots (Risk to get injured)) – 4
Lack of space – 4
Lack of things/equipment in the storage/lack of truck to do the collection – 4
The working space is bad/not adequate / We need a new <i>barracão</i> <storage> – 4
There are not courses to have better chances, lack of capabilities/Few opportunities to grow – 3
Some (Lots of) quarrels in the storage – 2
Problem for the truck to reach us (bad roads) – 2
Weather: sun (heat), rain – 2
This week we did not receive enough material – 2
The sale of the paper is not in the right day – 2
Lack of recognition of the work by the society and the authorities – 2
Personal disabilities (cecidity, depression) – 2
Before the fire there were not /The fire made fall the prices- 2
When the trucks discharge material, they do it on the floor
Organization of work
Who works in the street gains little
We cannot use the material coming from " <i>Lixo que não é Lixo</i> "
Lack of people in the directory board
When I do not work I have to stay at home
The waste that stays outdoor, brings animals (hygiene)
Problems with the pressing machine
Public transport to get to the <i>barracão</i> <storage>
The walking until the <i>barracão</i> <storage>
The locomotion means (the cart)
Day-care for children
Go further to not bother the <i>carrinheiros</i> <cart pushers>
We would need more interest from the local authority
It is difficult to find a registered job
I don't know – 6
No answer – 1

Table 7.10 – Positive aspects of the pickers’ work

I like the work – 25
Friendship (colleagues) – 21
The environmental issue – 12
Many things/There are advantages/ “It is Excellent”/very good– 8
To sustain my house, feed my children, pay expenses – 6
It is more close to my house – 6
Freedom/Self-management: No boss, timetables, working for ourselves – 5
Gives to survive /Helps our income” /The income got better – 5
There are not / Nothing – 4
Our fight (our pride), keep going on – 3
Learning (about separation) – 3
The income – 4
Giving employment – 3
Many families depend on this work – 2
“We hope things will improve” – 2
The structure/ the place is good – 2
It is not necessary to bring material at home, thus it is clean. Now the place is adequate – 2
Courses of specialization, entrepreneurship, formation – 2
The help of the president – 2
That we gain based on production / The organization of the work – 2
It is a therapy for the head / Working I have time to think – 2
The income hopefully will increase
That we have a cooperative
“Who gives me the material is a good person”
Good roads
The pressing machine
The help coming form Cefuria
I hope we will grow as a cooperative
The help from the banks
Good relationship on the streets
To be equals
The roads are good
Recognition of the work
The work is easy
Conquests
We hope in better prices
We have a second hand shop, to get better finances
We have hope
Dedication of the people
That we are not paying anymore the storage’s rent
No answer

Table 7.11 – Causes the *MNCR* is fighting for

On the <i>INSS</i> – 4
Our President is dealing with it – 3
For us letting work (To transform a <i>catador</i> in a professional) – 3
To get improvements for <i>catadores</i> – 3
Taking out the <i>carrinheiros</i> from the road and put them in the associations – 3
I'd love to go to some meetings – 2
They do meetings – 2
I don't feel represented by this state leaders – 2
Recognition of the <i>catadores</i> and of our fights – 2
To raise awareness – 2
Improvements for the storages – 2
Rights for the <i>catadores</i> To support <i>catadores</i> -2
Many things, there are always fights -2
For the dignity and the rights of the <i>catadores</i> -2
To represent us
Recognized in a better way by the Government
Less tiring work (improvements in then associations)
To get storages for the <i>catadores</i> being able to work
Sale and commerce network
On self-management of storages
For economical improvement
Lending in the bank for <i>catadores</i>
For solidal Economy
Women defence
School for <i>catadores</i> ' children
Against the infantile work
For the environment
Against incineration
Some time ago on <i>SIPAR</i> ²¹⁴
They came to see if we needed help
The fight they did in <i>Asso!</i>
They do a good job
What was promised was not respected
Until now nothing for us
They should do better
The management here is already a fight

²¹⁴ *Sistema Integrado de Processamento e Aproveitamento de Resíduos*, the new plan on waste treatment of the city of the waste consortium of the MRC.

Table 7.12 – What the MNCR achieved?

Federal Decree with Lula – 8
Many things – 6
Donation of Funasa – 5
To work in this <i>barracão</i> <storage> – 4
Equipments – 4
Courses as <i>Cataforte</i> – 3
Federal decree 5.940 – 3
Help of the <i>Banco do Brasil</i> – 2
Right of working in a cooperative – 2
Help of Petrobras
New pressing machine
The government gave a lot of money to the cooperatives
The help we got from foreign countries
The Success in <i>Foz de Iguaçu</i>
Meeting with the Government
Meeting in <i>São Paulo</i>
3 million for an institute
Light, water and streets maintenance for our storage
The land for our <i>barracão</i> <storage>
We achieved having a buyer form the industry
Registration for <i>INSS</i>
Knowledge of the work
Less <i>carrinheiros</i> <cart pushers> on the street
Proibition of infantile work
The storage in <i>Almirante Tamandarè</i>
The Association <i>Arep</i>

Table 7.13 – Changes in entering the associations

The income improved – 18
It does not need to go on the roads, with rain, warm, doing more tiring work, with more risks/not interrupting work with rain – 16
It got better – 15
It gives me distraction, I like the work, staying at home it makes me nervous and stressed –10
A lot – 9
I started to work, giving me more safety on having a job – 5
Until now only the storage – 4
I learned to value the Nature – 4
I learned about separation – 4
In human relations – 4
Not much/ It is similar to my previous work/It did not change in anything, it is the same – 6
I could buy a house/ things for my house/I can buy a land for my house – 4
It just gave me to survive – 3
The income did not change too much/ same income – 3
The income will increase – 3
It will get better – 3
It got worse/ a lot of fight, many difficulties – 3
Before I had a boss, now not – 3
The INSS – 3
The health improved, also the hygiene of the house – 2
I developed more myself with the people, I improved – 2
We got contacts with many people – 2
The fact that the president is helping – 2
The help we get from the people – 2
It won't change
I thought it was one thing, it transformed in another
Changed in everything
The price of the materials grew
I can pay my expenses
I can sustain my children
I can pay the rent
I could help my husband with the income
I got better money lend form bank
The income worsened
I learned on coordination
I learned to work in a team
More knowledge
I learned to work
The support of the public power we get
"Thank God the church is helping us with food"
We are more recognized
To know colleagues that do the same work
If it is needed to go the doctor, it is possible, you can recover later
We have uniforms
I do not depend anymore on public transport
More time for my family
I don't depend anymore on the government

I learned about humility, the suffering of the people
"It is the only place I have"
I do not have any certain plan for the future
I could travel for the meetings
We hope in much more
I'm good in health here
Now we have everything here
<u>No answer – 1</u>

Tables 7.14a.b.c. – Opinions of the *catadores* on the Municipal councils

Positives Comments	Negative Comments
Pays the expenses (water, light, telephone) – 22	In no way – 6
It sells materials for us – 15	It is not helping – 6
It gave us the storage – 15	Never helped in anything – 5
Yes, helps – 15	We always have to run behind them to get some help – 4
It gave <i>cesta basica</i> <basic alimentation basket> – 9	They said they would help, until now nothing happened – 3
Pays the rent of the storage – 5	Our president is always behind them – 2
Many – 5	Everything is very slow, a lot of bureaucracy - 2
Now they are helping – 3	We should be paid for the collection, for cleaning the city - 2
Yes, it is a help we need in our conditions – 2	If we would have some problems they will throw us away
Yes, everything that there is here – 2	We get help only form another municipality
They repaired the roads – 2	They could do much more
They came to see the material	We do not receive much help
It is helping in everything	I never liked it
The official of the <i>SMMA</i> <Environmental secretary> is helping	They should give conferences on health
“I like the new official of the <i>SMMA</i> ”	Here lacks things that are cheap for the town hall
They repaired the machine	Should be giving more recognition
“We cannot complain”	Should be doing more
“They will help us”	Should be doing divulgation for separation habits
“They will pay our rent and then buy a new land”	“One day we will have to pay”
Accepting we are people	They want to take our money
With basic courses	The help of them is not enough
Doing divulgation in the media	Very little
Providing functionaries	They do just because threatened by the Public Prosecutor
I do not even know if they will ever help	

Neuter Comments
A little bit, not in everything – 5
They help more or less – 4
In some things – 3
Only with the land - 3
Their help is minimal – 2
We do not love, not even hate them
Before was not helping much
In some things, they came to some meetings
But they do not bother too
Sometimes they help
I don't know – 11
Missing – 2

	<i>PEAD branco <white PEAD></i> <i>Leitoso <White bottle></i>		1 R\$	1,10 R\$		1,20 R\$	1,20 R\$			1 R\$	1 R\$	1 R\$	1,37 R\$
	<i>PEAD colorido <coloured></i>				1 R\$	0,90 R\$	1,80 R\$			0,80 R\$	0,80 R\$		1,20 R\$
	<i>PEAD preto <black></i>												0,65 R\$
	<i>PVC</i>											0,40 R\$	0,16 R\$
	<i>Isopor <polystyrene></i>												0,50 R\$
	<i>Sucata <various metals></i>	0,10 R\$	0,15 R\$	0,20 R\$	0,12 R\$	0,10 R\$	0,15 R\$	0,20 R\$	0,20 R\$		0,22 R\$	0,15 R\$	0,18 R\$
	<i>Latinhas <cans></i>		2,40 R\$		2,40 R\$		2,50 R\$		2,60 R\$	2,20 R\$	2,00 R\$	1,80-2 R\$	3,22 R\$
	<i>Cobre mel <copper></i>				10,60 R\$					9 R\$			
	<i>Cobre misto <mixed copper></i>				8 R\$								
	<i>Metal- torneira <water tap></i>				7 R\$								
	<i>Inox <steel></i>												3,17 R\$
	<i>Aluminum panela <aluminium of pans></i>									3,20 R\$			3,67 R\$
	<i>Al. Marmitex <Aluminium for food></i>												1,25 R\$
	<i>Aluminium perfil</i>												3,62 R\$
	<i>Aluminium spray</i>												2,93 R\$
	<i>Litro bom-garrafa <1 lt. Bottle></i>		0,25 R\$								0,25 R\$	0,25 R\$	0,17 R\$
	<i>Vidro simple <Simple glass></i>												0,16 R\$
	<i>Vidro Branco <White glass></i>		0,10 R\$										
	<i>Caco <broken glass></i>		0,70 R\$					0,09 R\$		0,06 R\$	0,05 R\$	0,7 R\$	
	<i>Caco branco <transparent broken glass></i>			0,20 R\$									
	<i>Caco colorido <coloured broken glass></i>			0,25 R\$									
	<i>Vidro Marrom/verde <brown green glass></i>												0,14 R\$
	<i>Vidro garrafão <big bottle></i>												0,24 R\$
	<i>DVDs, CDs, electronic</i>			0,45 R\$									
	<i>Used kitchen Oil</i>			0,40 R\$									0,63 R\$
	<i>Batteries</i>												1,46 R\$
	<i>RX sheets</i>												0,60 R\$
	<i>Eletrrodomestico <Electrical device></i>												1,00 R\$

Questionnaire

Questionário socioeconômico

Coloque um X nos quadradinhos abaixo ou responda as questões abertas.

1. *Dados individuais*

1.a Nome (opcional): _____

1.b Gênero: Feminino Masculino

1.c Cidade de Nascimento _____

1.d Idade: _____

1.e Estado Civil: Solteira/o União estável
 Casada/o Outros: _____

1.f Sabe Ler Sim Não

1.g Sabe escrever Sim Não

1.h Grau de Escolaridade: _____

2. *Dados sobre moradia:*

2.a Onde você mora

Cidade: _____

Bairro: _____

Vila: _____

2.b Reside em casa: Própria Alugada (quanto por mês? _____)
 Cedida

2.c Material da casa de moradia: Madeira Misto
 Alvenaria Outro

2.d Abastecimento de Água: Comprada Sanepar (preço por mês: _____)
 Poço () com tratamento () sem tratamento

2.e Saneamento Rede Pública (pr. por mês: _____) Céu aberto
 Fossa

2.f Abastecimento de energia elétrica: Legal (preço por mês: _____) Ilegal

3. Dados Familiares

3.a Com quem reside na sua casa?

- | | |
|--|--|
| <input type="checkbox"/> Pai | <input type="checkbox"/> Irmãos (nº _____) |
| <input type="checkbox"/> Mãe | <input type="checkbox"/> Esposo/a |
| <input type="checkbox"/> Padrasto | <input type="checkbox"/> Filhos (nº _____) |
| <input type="checkbox"/> Madrasta | <input type="checkbox"/> Netos (nº _____) |
| <input type="checkbox"/> Outros: _____ | |

3.b Total de pessoas: _____

3.c Idade filhos (só menores)

nº 1	
nº 2	
nº 3	
nº 4	
nº 5	
nº 6	
Nº 7	
Nº 8	
Nº 9	
Nº 10	

3.d [no caso de filhos/netos menores] Onde ficam quando você trabalha:

- | | |
|---|--|
| <input type="checkbox"/> Comigo | <input type="checkbox"/> Na Rua |
| <input type="checkbox"/> Em Casa | <input type="checkbox"/> Na Escola (so de manha/tarde) |
| <input type="checkbox"/> Centro para criança/jovens | <input type="checkbox"/> Não sei |
| <input type="checkbox"/> Estagio | <input type="checkbox"/> Trabalha |
| <input type="checkbox"/> Outro: _____ | |

4. Dados economicôs e do trabalho

4.a Desde quanto tempo você faz este trabalho? _____

4.b Você fazia outro trabalho antes? Se sim qual/quais? Era registrada/o? _____

4.c Horas do trabalho medio por dia: _____

4.d Dias do trabalho medio por semana: _____

4.e Sua Renda media por mês: _____

4.f Se você cata os residuos, quais sao as áreas onde você va na maioria?

4.e Trabalhadores na sua família:

Trabalhador	Tipo Trabalho/Função	Quando	Registrado?	Salário

4.f Renda Familiar por mês : _____

4.g Você paga o INSS? Sim Não Já aposentado

4.h Recebe algum benefício do governo? quais?

Bolsa Família (quanto:___) <input type="checkbox"/>	Programa do Leite - de 6 meses a 3 anos <input type="checkbox"/>
Luz Fraterna <input type="checkbox"/>	Cesta Básica <input type="checkbox"/>
Fraldas <input type="checkbox"/>	Curso Profissionalizantes <input type="checkbox"/>
Isenção Tarifária (URBS) <input type="checkbox"/>	Leite Especial - questão de saúde <input type="checkbox"/>
Baixa Renda - água <input type="checkbox"/>	<input type="checkbox"/> Outro: _____

5. Dados sobre Saúde

5.a Você tem algum problema de saúde?

- Sim
 Não

5.b Se sim, qual?

5.c Você teve algum problema de saúde desde começo de seu trabalho (como catador)? Se sim, qual?

5.d Quais são as práticas para cuidar do seu problema de saúde?

5.e Alguém na sua família tem algum problema de saúde?

- Sim Não

5.f Tipo?

_____ Grau de parentesco _____

5.g Custo medicinais?

5.h Recebe os medicamentos pela Unidade de Saúde? Sim Não

6. Sobre o MNCR – Movimento Nacional dos Catadores de Materiais Recicláveis

6.1 Você conhece o Movimento Nacional dos Catadores de Materiais Recicláveis?

Sim Não

6.2 Você conhece os líderes do Movimento?

Sim Não

6.3 Se sim, alguns nomes: _____

6.4 Você conhece algumas lutas que o movimento esta cumprindo? Se sim, quais?

6.5 Você conhece algumas conquistas do movimento? Se sim, quais?

6.6 Você conhece o decreto federativo 7.404, de 23 de dezembro de 2010?

Sim Não

7. Opiniões Pessoais

7.1 Em sua opinião a Prefeitura como ajuda vocês?

7.2 Dificuldades encontradas no trabalho? Que você mudaria?

(sobre organização, renda, lugar do trabalho, relação com a prefeitura)

7.3 Quais são os aspectos positivos do seu trabalho?

7.4 Como mudou sua vida quando começou a trabalhar na associação/cooperativa?

7.5 Você tem interesse em conhecer os resultados da esta pesquisa?

Sim Não

7.6 Gostaria de comentar algo mais sobre estas questões?

Obrigada/o por a sua colaboração!

As respostas serão utilizadas somente com fins de pesquisa acadêmica.

Questions to associations

1. Quanto tempo existe?
2. Numero de trabalhadores?
3. Organizaçao do trabalho (espaço, equipamento, horarios, divisao entradas, venda)
4. Diretoria (quantos sao, ruoli, eleicoes, quantas vezes presidente).
5. Quantidade coletada por mes
6. Quais materias? Quais chegam mais?
- 7.Preços materiais (baixada/subida?)
8. Venda (quem è o responsavel, quantas vezes por semana? Para quem vende? Emite Nota fiscal?)
9. Onde vao catando na maioria? Porque?
10. Tem organizaçoes, pessoas que colaboram(parceiros)?
11. Relaçao com a Prefeitura?
12. Faz parte do movimento (como?participa aos eventos? Tah associado?)
- 13.Dificuldades
- 14 paga o INSS?
15. Qualidade material se chegam caminhoes municipais

Table 7.16 – Standard questions to associations of *catadores*

Association /cooperative name	N° of workers	Female/male rates	Since when	Partnerships (NGOs)	Receiving municipal waste	Paying INSS	Quantity collected	Selling to	Equipments' conditions	Who provides the storage	Cart-pushers presence?	Receiving waste from whom
Associação 'A Ilha' (Almirante Tamandarè)	30	15/15	Not official yet	Cefuria	Not	Not	Not known	Ferro Velho	No machines, bad conditions storage	Occupied by the pickers	Yes, all of them	Just form picking (households, shops)
Associação 'Assol' (Almirante Tamandarè)	12	7/5		Cefuria Instituto L&C	Yes	Not	Not known	Atravessadores	Yes, good conditions storage	Municipal Council of Almirante Tamandarè	Only one	Only Municipal service
Associação 'Resol' (Colombo)	16	12/4	5 years officially (10 ys.)	Instituto L&C	Yes	No but Yes before	15-20 tons/month	Atravessadores	Yes, not in good conditions, neither storage	Donated by Embrapa after occupied it	No	Markets, Hospital & Municipal s.
Cooperativa 'Zumbi'	25 (before the fire)	18/7	6 years officially (8 ys.)	Nobody, Before AE	Yes	Yes	30-40 tons/month	Atravessadores (Ferro velho)	Yes (before fire) Storage, more or less	Avina Foundation	Yes, majority	Municipal s., companies and picked
Associação 'Reciquara' Piraquara)	10	8/2	3 Years officially (5 ys.)	Cefuria	Yes	Not	18 tons/month	Atravessadores	Machines (not in very good conditions) Bad condition storage	Municipal Council of Piraquara	Some of them	Municipal s. and picked
Associação 'Arep' (Pinhais)	21	19/2	4 months	Instituto L&C	Yes	Not	Not known	Atravessadores Apares (plastic)	Good conditions both storage and machines	Municipal Council of Pinhais (in commodatum)	No	Companies and Municipal service
Cooperativa 'Catamare' (Curitiba)	60		3 years officially (6 ys.)	Instituto L&C AE	Yes	Yes	100 -110 tons/month	Atravessadores Apares	Yes, good	Municipal Council of Curitiba	Yes many of them	Municipal s., companies, public institutions
Associação 'Vida Nova' (Curitiba)	28	23/5	4 years	Instituto L&C AE	Yes	Not	60 tons/month	Atravessadores	Yes, good	Municipal Council of Curitiba	Only few	Municipal s., companies, public institutions, picked
Associação 'Muitirão' (Curitiba)	27	10/17	3 years	Cefuria	Yes (from another municipality!)	Not	30 tons/month	Atravessadores	Not good conditions, outdoor storage but in restructuring	Municipal Council of Curitiba (In commodatum)	Yes, most of them	Picked, some from municipal service, companies
Associação 'Acampa' (Curitiba)	40		4 years	AE	Yes	Not	Not known	Atravessadores Apares	Yes, more or less good	Municipal Council of Curitiba	Around 10	Municipal and companies, picked, shops

Cases	Major waste treatment technique	Formal recycling service	Informal recycling rate	Municipal Composting programme?	Pickers in the landfill/dump-site?	Privatization Tendency of the SWM?	Sale of waste to pickers? By who?	Support of NGO's or CBO's?	Project of environmental Education?	Inf. Pickers achieve minimal salary?
Mexicali (Ojeda-Benitez, 2002)	Landfill	Not	Not determined, but inf. pickers role essential	Not	Yes	Only for industrial waste	Yes (industries, individuals)	Yes	Not but considered	I.N.M. ⁱ
Colombo (Van Horen, 2004)	Untreated landfills	Not	Difficult to determinate but significant	Not ⁱⁱ	I.N.M.	Yes ⁱⁱⁱ	Yes, households	Yes	Yes	I.N.M.
New Delhi (Hayami et al., 2006)	Landfills	Not	Not determined but valuable	Not	Yes	I.N.M	Yes ^{iv} (households, shops)	Not	Not	Not ^v
Hanoi (Mitchell, 2008)	Dump-sites	Not	Intentionally not expressed by the authority	Yes ^{vi}	Yes ^{vii}	Not	Yes ^{viii} (households, restaurants, Small hotels/guest houses, institutions)	Not	Not ^x	I.N.M., gendered
Victoria Falls town (Masocha, 2006)	(60 %) Open unengineered municipal dump	Not	Relatively low but potential to grow	Not	Yes	Not	Not	Not	Not	Yes
Ilorin ^x (Adeyemi, 2001)	Open dump sites, land filling, open burning, reuse/recycling	Not	I.N.M.	Not	Yes	Not	Not, practice of exchange (barter)	I.N.M.	Not	I.N.M.
Enugu ^{xi} (Nzeandibe, 2009)	Landfill site	Not	Unacknowledged / Bridging the gap ^{xii}	Not ^{xiii}	Yes ^{xiv}	Yes	Not	Not	Not	Yes, more than double
Asian cities (Idris et al., 2004)	Landfilling and open-dumps, secondly incineration	Not	I.N.M. / Not clearly defined	Not ^{xv}	Yes	I.N.M.	I.N.M.	I.N.M.	I.N.M.	I.N.M.
Accra (Boadi et al., 2005)	Landfill, Open-dumps, waterways, domestic burning	Not	I.N.M.	Not	I.N.M	Yes	I.N.M	I.N.M.	I.N.M.	I.N.M.
Tarumã ^{xvi} (Fagundes, 2009)	Landfill and separation	Not ^{xvii}	I.N.M.	Yes	Yes	Mixed ^{xviii}	Not	Not	Not	Yes, around 2-4 times
Teodoro Sampaio ^{xix} (Fagundes, 2009)	Sanitary landfill	Not	I.N.M.	Not	Yes	Not	Not	Yes	Yes ^{xx}	Yes, exactly around the value of one
Dar Es Salaam (Kassim et al., 2006)	Landfill	Yes	Yes ^{xxi}	Yes	I.N.M	Yes ^{xxii}	I.N.M	Yes ^{xxiii}	Not ^{xxiv}	I.N.M
Bandung (Sembiring et al., 2010)	Open dumping	I.N.M	13 %, Significant	I.N.M	Yes	I.N.M	Yes (households)	I.N.M	I.N.M	I.N.M
Curitiba	Sanitary landfill	Yes (small)	Not easy to	Not	Not ^{xxv}	Yes and Not ^{xxvi}	Yes: market	Yes	Yes, some	Yes, a bit more

	(currently)		determinate, but role important				Not: households			
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- ⁱⁱ I.N.M: information not mentioned.
- ⁱⁱ Compromise to do it in Wattala Neighbourhood.
- ⁱⁱⁱ Due to efficiency demonstrated in South-east Asia.
- ^{iv} Just the dealers purchase, not the pickers which collect waste just by picking them up from public places such as garbage dumps and streets. In Hanoi they are called junk buyers.
- ^v The pickers gain 40 % lower than the minimal wage, while the collectors 25 % higher.
- ^{vi} Some kind of at the beginning, in partnership with the municipal authority.
- ^{vii} Generally children.
- ^{viii} Just the dealers purchase, not the pickers which collect waste just by picking them up from public places such as garbage dumps and streets. In Hanoi they are called junk buyers.
- ^{ix} But there is an attempt of the municipal authority in stimulating households separating their waste.
- ^x In Nigeria.
- ^{xi} In Nigeria, it is the capital of the Enugu State.
- ^{xii} As no recycling system is existing. Although scavenging is not a recent occupation in this city, it appears to have intensified with the development and operation of the landfill facility.
- ^{xiii} Apparently as in all Nigerian cities.
- ^{xiv} After the landfill was created, no controls were made.
- ^{xv} In a really small portion, 1,3 % for the whole Chinese country.
- ^{xvi} In Brazil.
- ^{xvii} It is consisted of separation by some informal pickers in a municipal recycling plant but it does not exist a collection of separated items.
- ^{xviii} The recycling plant is installed by the private sector.
- ^{xix} In Brazil.
- ^{xx} In 2006 an organic municipal law, was presented also plan for environmental education programmes.
- ^{xxi} Just in low-income neighbourhoods, not told the rate
- ^{xxii} With Privatization, the waste collection increased from 5 % to 48 %
- ^{xxiii} There is some presence, but the role is not really explained
- ^{xxiv} But it is acknowledged that this is needed soon through some feedback by households receiving recently the waste service collection.
- ^{xxv} Not anymore, it was denounced by NGO *Adecom* the presence in the old landfill of *Caximba*.
- ^{xxvi} Yes for the presence of *Estre Ambiental*, not for *Ecocidadão*.

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