UWEP
Urban Waste Expertise Programme

Alliances in Urban Environmental Management

A process analysis for indicators and contributions to sustainable development in urban SWM

linkages
Working document 14

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FOREWORD

The foundation for this Working Document has come from two different initiatives. The first initiative was the paper produced bu WASTE for the first workshop of the Working Group on Solid Waste Management in Low-income Countries that met in Ittingen, Switzerland, in April 1994. In that document an Action Plan was developed which later became the basis for the concept of 'integrated sustainable waste management' (ISWM). The starting point of the ISWM concept was that all the actors involved in practice in urban solid waste management should work together to make SWM more effective in urban areas, from a combined ecological, economic, social and institutional perspective. This document was written by Arnold van de Klundert and Inge Lardinois, and edited by Anne Scheinberg.

Gradually, the initial paper on ISWM was filled up through the empirical research carried out within the UWEP research programme on 'Linkages between stakeholders' carried out by Marie Dominique Suremain, Ines Duque, Margarita Sierra (ENDA/America Latina), Michael DiGregorio, Trinh Thi Tien, Nguyen Thi Hoang Lan, Nguyen Thu Ha (Hanoi/Vietnam), Sonny Saniano, Joyce Munsayac, Judy Tapel and Dan Lapid (Philippines) in 1997. It was they who carried out field research, and provided detailed information on the linkages between stakeholders in waste management and their influence on the overall performance and sustainability of such systems.

The second initiative was taken in the course of a wider research programme being done at the University of Amsterdam (UvA) on livelihoods and urban solid waste management systems (cf. Baud and Schenk, 1994). This had included studies by Marijk Huysman in Bangalore on waste pickers and the role of CBO/NGOs, by Jaap Broekema on privatisation in Bangalore, and Saskia Jordens, Maartje van Eerd on recycling waste materials, and Caroline Hunt on health aspects of waste picking children. In Peru, Michaela Hordijk had guided MA research by Christa de Bruin on generation of solid waste in Lima, Eva Baron and Danielle Castricum carried out a study on recycling entrepreneurs, and M. van der Zee on ideas concerning the links between health and environmental conditions.

The initiative was taken to combine the expertise in the UWEP programme and the UvA research programme, and carry out a comparative study on '(new) alliances in urban solid waste management and their contributions to sustainable development' under guidance of I.S.A. Baud, J. Post and A. van de Klundert. Drawing on fieldwork from the UWEP and UvA case studies, Stelios Grafakos made a comparative analysis of the alliances (or linkages) existing in urban solid waste management in various locations (initially this was part of the EPCEM programme, but was later continued separately). The merger of research results finally produced this Working Document on the 'Alliances in Solid Waste Management: a process analysis for indicators and contributions to sustainable development in urban swm[1] .

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SCOPE OF THIS DOCUMENT

In (solid) waste management there are many actors active.[2] All these actors have roles and responsibilities that influence to a more or lesser extend the performance and the sustainability of the waste management system in their cities concerned. Some of these actors work closely together, others do not. Their alliances are based on family, ethnic or religious ties; some of them are based on socio-economic dependency, while others work together on pure business grounds. Which of these alliances are more important than others in relation to the sustainability?

This research has been carried out in four different cities in the South. An inventory has been made of the stakeholders present, what roles these stakeholders play, what alliances exist between them and in what way these alliances contribute the sustainability of the waste system. The questions arose how to define sustainability? How to assess the contributions to sustainable development ? What are the objectives of the selected sustainability aspects and what indicators can be used?

- In chapter 1 sustainability is discussed in the light of public sector reform. The different aspects of sustainability is shown (environment, socio-economy etc.) and a definition selected.
- In chapter 2 actors are pictured and the way their activities are interlinked in the daily waste activities in the city. To assess the contributions made to sustainable development by the various alliances between sets of actors, indicators are developed. These indicators are applied at four levels: policy and regulatory, organisational, technical and performance.
- In chapter 3 the four researched cases (Chennai, Lima, Manila and Manizales) are analysed according to the system developed in chapter 2: different sets of actors and their alliances are described, their contribution to various aspects of sustainable development are analysed and the strength and weaknesses are evaluated. At the end of this chapter all alliances are compared in a matrix. Per aspect of sustainability the objectives are set out to the discovered alliances showing their contribution to sustainability. This methodology is then applied to the four cases.
- In chapter 4 the analytical framework (a.o. the identification of suitable indicators) and the outcome of the analysis of the four different case studies are discussed in an attempt to draw general conclusions on ‘alliances and their contributions to sustainable development’. It states that there is a positive spin-off in terms of socio-economic and ecological sustainability in cases where informal actors are integrated into the official waste management system and that in case of public sector reform a more wider range of actors should be included, which would benefit sustainability.

[2] A research in the Netherlands revealed that in the Dutch case there were as many as a hundred different actors directly or indirectly involved in waste management.

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CHAPTER 1 INTRODUCTION

In the past decade, ideas on ways of providing urban basic services have changed radically. The role of government has been questioned, and alternative ways of provision have been mooted by international organisations through the development of public-private partnerships. Simultaneously, in cities, an enormous variety of civil society organisations have developed around different habitat issues, focussing on locally adapted ways of working together with local communities to ensure provision of services to low-income households, who are often excluded from government provision. New types of partnership with local authorities, communities and other NGOs have also developed.
In this paper, the main question to be raised is to what extent the different types of partnerships or alliances providing urban basic services, contribute to patterns of more sustainable development in cities in the South. Urban solid waste management is taken as the case in point, because it is an important basic service and also one of the more expensive sectors local authorities have to deal with.

1.1 Public sector reform and sustainability

Current research on urban solid waste management (SWM) in developing countries has developed from two main concerns; the concern for public sector reform (including privatisation issues), and the concern for ecological sustainability in the urban context[3] . These two concerns have developed against the backdrop of the original purpose of introduction of SWM, namely, a concern for improving public health conditions.

The first category of studies is closely connected to the neo-liberal doctrine proclaiming a resurgence of the market and a reduction of state control. The structural adjustment programmes of the 1980s included as crucial items curtailing of government bureaucracies and cutting of public expenditure. The strong push for privatisation initiated then still has strong effects on policy discussions about delivery of urban services.
The promotion of private sector involvement in provision of urban services raises issues of public interest and acceptability. Although implementation of services may be carried out by private companies, governments must ensure appropriate standards, achieve co-ordination of provision by others, provide a competitive environment, avoid monopoly control of essential services by non-accountable private providers, and minimise corruption and inequity (Rondinelli and Iacono, 1996; Burgess et al, 1997). Therefore, privatisation in service provision usually implies a public-private arrangement. In such situations ideally the government retains some degree of power, while saving on costs, reducing political interference and red-tape, and lowering levels of coercion. SWM studies written from this perspective include those by Bartone et al. (1991), Ali (1993), Fernandez (1993), Cointreau-Levine (1994), Lee (1997), Ali, Olley and Cotton (199), and Post (1999).

Sustainability issues in development is the second major source of inspiration for many analyses of SWM systems in the developing world. The 1992 Earth Summit brought environmental problems to the forefront of international policy debates. However, developing countries have made it abundantly clear that environmental policies should reflect their own

[3] While admitting that any dualistic divide has something artificial and fails to do full justice to the wide variety of positions, these two basic orientations nevertheless seem to be real. However, individual authors will not always explicitly admit to one of these orientations. Being categorised within one of the two literatures does not automatically mean compliance with the main tenets.

priorities and not curtail their legitimate desire for economic growth. They have shifted the environmental focus from issues of natural resource depletion and resource management[4] to pollution issues (the so-called 'brown agenda'), with a predominantly urban focus (UNCHS, 1996). 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 e.a., 1994: 5)

The focus on pollution problems carries implicitly a conception of sustainability which combines ecological sustainability goals with attempts to meet human needs (cf. Satterthwaite, 1993, 1997). This implies a framework of analysis in which improvements to the natural environment are considered in conjunction with improvements in the quality of life in the urban habitat. SWM studies carried out within this framework usually deal with the contributions various actors can make to improve environmental performance as well as contribute to urban livelihood strategies. These include contributions by Furedy (1992, 1997), Pacheco (1992), Bose and Blore (1993), Baud, Huysman and Schenk (1996), and Blore (1999)[5].

Both sets of literature share a preoccupation with relationships between actors. In the literature on privatisation of SWM, the analysis of public-private partnerships is given primary importance, and usually covers collection, transportation and disposal activities. Studies enlarge on failures in public servicing, and suggest different methods of privatisation for greater efficiency and effectiveness. The major concern is to evaluate the organisational and financial aspects of privatisation initiatives, and to assess the capacity of government departments and private contractors to perform their new roles. The element of cost recovery from the public is also a major concern in this approach.

Little attention is given to the potential of small-scale, private operators and CBOs removing solid waste informally from residential areas. Local authorities prefer to link up with large scale, formal enterprises. There is an emphasis on strong contractual arrangements, for which informal businesses and communities do not qualify. Although the potential of the latter group is increasingly acknowledged, few governments have actually started to include them in their policies.

In the literature on SWM from the perspective of sustainable development, a larger range of investigated relationships is covered, focusing on possibilities of reducing waste flows, through prevention (although this element is rare in studies in developing countries), re-use and recycling initiatives[6]. It includes both public-private, community-private and private-private arrangements. The majority of studies focus on private activities within the SWM-system; notably, separation of waste, and the productive uses of waste. Examples of informal economic activities and community initiatives are often considered. Studies deal not only with linkages laid down in (semi-)contractual arrangements, but also with small scale business

[4] i.e. the prime environmental worries in the North

[5] Ecological sustainability within the confines of one city is considered impossible, as this would preclude waste streams being generated. Rather, the concern here is to move toward 'the transition to sustainability' (O'Riordan, 1999).

[6] This is in fairly sharp contrast with studies on SWM in Europe, where the primary focus is on prevention, re-use and recycling, according to the EU Guidelines laid down in 1979 (the so-called 'waste hierarchy').

transactions[7] and the impact of official rules and regulations on private or communal undertakings. Finally, economic evaluations are combined with qualitative environmental assessments.

A major gap in the current literature on SWM in developing countries is that SWM systems, are rarely investigated in their entirety, including the areas of prevention, re-use and recycling as well as public sector activities of collection, transportation and disposal. Assessments combining both ecological and socio-economic considerations are also still largely absent[8].

This paper attempts to contribute to a framework for integrated assessment by (1) identifying existing types of partnerships in SWM systems, and (2) carrying out a qualitative exploration of their contributions to aspects of socio-economic and ecological sustainability.

As such, it makes an analytical contribution to the concerns of the UWEP Programme, whose primary concern is to develop an 'Integrated Sustainable Waste Management (ISWM)' concept, usable in policy development in countries in the South. In the ISWM concept therefore six sustainability aspects are distinguished: technological, environmental, economy & financial, social & cultural, policy/political and institutional aspects. Each of them in its own specific way determines to the sustainability of the system. The integration of the six aspects are instrumental in both the assessment and the planning of a sustainable waste management system and so they play a role in the assessment of the alliances between stakeholders in this document (Klundert, Lardinois, 1995) and in the development of indicators.

[7] (forward and backward linkages among firms)

[8] Currently, an attempt is being made by researchers from the Moi University in Eldoret (Kenya), the Centre for Economic and Social Studies in Hyderabad (India), the International Institute for Environment and Development in London (UK) and the Amsterdam Research Institute for Global Issues and Development Studies (The Netherlands) to rectify this omission at least partially, using Nairobi and Hyderabad as examples. The UWEP Programme also uses a similar approach, directed mainly towards development of 'integrated solic waste management' initiatives at the policy level.

CHAPTER 2 ACTORS, ALLIANCES AND SUSTAINABLE DEVELOPMENT

Although the SWM system has been discussed as a whole until now, it has become clear through earlier research (Baud and Schenk, 1994; van Eerd, 1995 ; Broekema, 1997; de Bruijn, 1998) that the various alliances and their activities have different contributions to make to the various components of sustainable development in practice. Therefore, a first challenge is to unravel the different alliances and the activities they carry out. A major challenge is to consider the total range of alliances rather than one or two to make an overall assessment of the contributions of each actor.

A second challenge is to provide an assessment of alliances in SWM that integrates the ecological, socio-economic and public health components of sustainable development for a specific sector of urban environmental management.
The third is to develop an appropriate set of indicators that can be utilised for such an assessment. Therefore, this chapter pays explicit attention to developing such a set of indicators for the goals identified, based on a literature review of indicators. These are subsequently applied to the case studies discussed in chapter 2.

2.1 Conceptualising actors, alliances, and sustainable development

Models for more participatory forms of urban environmental governance – such as Local Agenda 21 - identify a wide range of actors, such as national authorities, local authorities, NGOs and CBOs, universities, the media, and others (Hordijk, 1999; Velasquez, 1999). In existing urban SWM practices, the range of actors can be clustered into the following main groups:

- the public sector, whose principal role should increasingly be to create the conditions for more effective and efficient SWM service that contributes to social equity, enable, facilitate, regulate and monitor alliance arrangements and safeguards public health. This sector includes national authorities, local authorities and local public departments, and constitutes a central set of players.
- The large scale private sector, which, because of its access to financial resources and its potential ability to operate efficiently, can play a role in reducing public sector costs and providing certain MSWM services and in construction, operation and maintenance. In this sector can be found Large Scale Enterprises (LSE) (collection, transport, disposal and recycling) and micro and registered Small Scale Enterprises (SSE) (collection, transport, disposal and recycling).
- The small scale, non-recognized private sector, which is actively involved in many aspects of SWM services, particularly in low-income districts. This sector includes various groups of waste pickers, itinerant buyers, traders in waste materials (dealers, wholesalers) and small-scale enterprises can be found.
- Local communities and outside organisations working with them who have a direct interest as service users, but who can also be involved in promotion, decision making, co-ordination and actual provision of MSWM services (Schuttenbelt & Lorentzen, 1994). This group includes non-governmental organisations (NGOs) and community-based organisations (CBOs).

Figure 1 shows possible alliances between the various actors in the SWM system, based on case studies carried out in Asian and Latin American countries. It must be considered a

heuristic analytical framework, ready to be tested against the empirical situation found in any city.

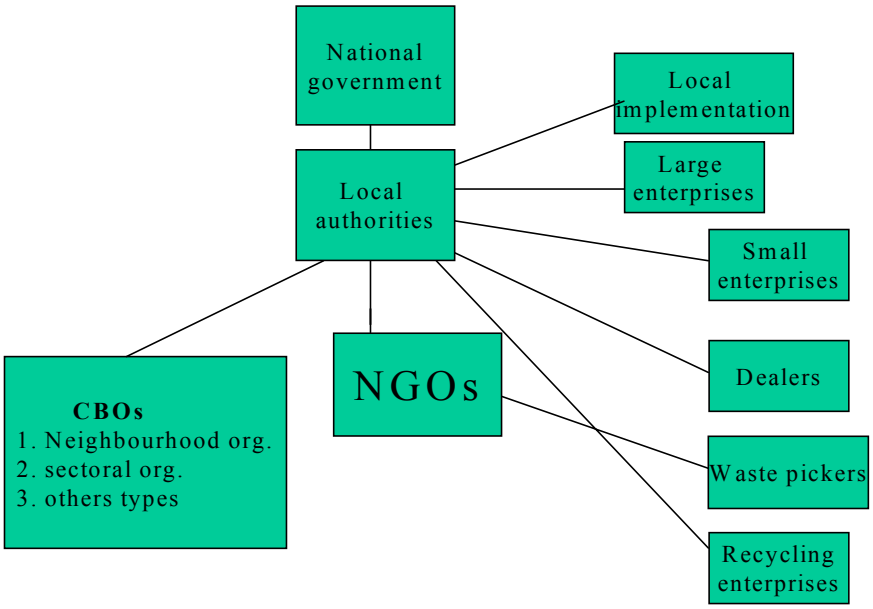


Figure 1 Possible alliances in urban solid waste management

(Baud et al., 2001)

In this paper the following definition of alliances is used to describe established relationships between actors in the SWM-system. The distinguishing features of an alliance are:

1. it involves two or more actors;
2. it refers to a more or less enduring relationships between the actors (based on a written agreement or a verbal understanding);
3. the relationship is mutually beneficial (without assuming equality)
4. it finds expression in concrete (physical) activities (Baud et al., 2001).

Alliances and sustainable development

In order to analyse the effectiveness of alliances between two or more actors, the conditions under which the types of alliances emerge have to be taken into account.

In the first place, **the structure of the policy/regulatory environment** has to be known[9] and how it relates the prevailing conditions in SWM provision. What are the main policies regarding SWM? According to what rules are SWM activities structured? In which areas have government departments developed policies and to what extent is their enforcement carried out? What regulatory framework is applicable to the activities and the actors involved?

Secondly, **the existing organisational map is important**. How are stakeholders linked to each other? Which actors are included and which excluded? What kind of agreements and conditions have they established? What constraints does the organisational context create?

Thirdly, the **technical means** available to actors to carry out their activities is important. Are technical systems adequate, and are they being developed in ways congruent with the

[9] This paper follows the model developed in the IDPAD's study 'Innovations in Urban Solid Waste Management: Secondary Cities in South India' (Publication in preparation on Tamil Nadu).

expansion of the problems? Are actors autonomous in obtaining new technology or very dependent on outside research and development initiatives? What kind of technical or technological means and ways are used to carry out the activities of SWM system? Are they suited to the prevailing conditions?

The policy/regulatory framework structures the way activities are carried out; although it is itself subject to change over a longer period of time. The conduct of activities is derived from the combination of organisational context and technical means utilised for SWM activities. Changes in the system can occur in each of these three areas, can influence the other areas, and also affect the ultimate performance of the services. These three dimensions should be analysed systematically in relation to the sustainable development goals to which the alliances intend to contribute.

The final test lies in assessing the **performance** of any particular alliance in terms of its contributions to aspects of sustainable development. As indicated in the introduction, sustainable development includes ecological and socio-economic aspects (Satterthwaite, 1997; Drakakis-Smith, 1996).
The aspects within the concept have been made operational for various components of the SWM system.
For ecological sustainability, SWM needs to work towards the following goals:

1. production of waste should be minimised, through new organisation of production processes
2. re-use and recycling should be maximised;
3. remaining waste should be disposed of in a controlled fashion, in order not to exceed the absorption capacity of local sinks.

For meeting human needs, several social and economic goals need to be included in conjunction with the ecological goals. These should encompass recognition that SWM provides various types of employment, which should provide a living wage, be safe and healthy, be carried out with dignity and respect, and should promote equality among the people working in the sector (Baud and Schenk, 1994; Huysman, 1994; Hunt, 1996). Such a socio-economic assessment of SWM systems include the following goals:

4. more efficient co-ordination within the sector of SW management;
5. financial viability of the system for all actors involved
6. safe and healthy employment with a living wage should be provided;
7. SWM activities should contribute to clean and healthy urban environment at the local level; and
8. the system should be considered legitimate by the actors involved (cf. Baud et al., 2001).

2.2 Assessing contributions to sustainable development: developing indicator systems

In this section the analytical framework is developed by showing which indicators can be used as measurement tools for the 8 point system of sustainable development described earlier. At this point it should be stated clearly that the indicators used, which refer to policy/regulatory, organisational, technical dimensions, are qualitative indicators that are used to analyse, express or describe aspects through which the alliances contribute to particular goals. They cannot measure quantitatively the contributions they make, because they refer to very different types of aspects that cannot be easily weighed against each other. Nevertheless,

these indicators can reveal the causes of the level of performance and thus are relevant to show policy makers and other actors where they put forward efforts to improve the SWM.

The indicators that are presented in the text below are based on the literature review and on discussions with leading persons in the area of solid waste management research and practice.

Approaches to indicator classification and use
The most commonly used framework for developing environmental indicators, the **Pressure-State-Response (PSR) framework**, was developed by the OECD in the early 1990's. In reaction to an increasing interest in the measurement of environmental damage and in evaluating the effectiveness of environmental policy measures, the OECD Council approved a Recommendation on Environmental Indicators and Information, instructing the OECD Environment Policy Committee to further develop core sets of reliable, readable, measurable and policy-relevant environmental indicators. In 1993, the OECD Group on the State of the Environment conducted a series of Workshops, developed a common conceptual framework, and defined a core set of indicators, using the Pressure – State - Response (PSR) framework.

The PSR framework is based on the idea that human activities exert pressure on the environment (represented by **pressure indicators**), thereby changing the quality of the environment and the quantity of natural resources (represented by **state indicators**). Society responds to these changes through environmental, economic and sectoral policies (represented by **response indicators**). Policy responses affect individual and collective actions (I) to mitigate, adapt to or prevent human-induced negative impacts on the environment, (ii) to halt or reverse environmental damage already inflicted, and (iii) to preserve and conserve natural resources (UNCSD, 1998).

In establishing the Work Programme on Indicators of Sustainable Development (WPISD), the Commission on Sustainable Development has adopted the PSR framework developed by the OECD, while going beyond environmental aspects, and identifying three further dimensions of sustainable development, namely social, economic, and institutional aspects.

In this expanded version of the framework, called the – **Driving Force-State-Response** – (DSR) framework, the concept of pressure has been replaced by that of "**driving forces**", in order to accommodate the inclusion of social, economic, and institutional aspects of sustainable development. The term "driving force" indicates an impact on sustainable development, which can either be positive or negative. Indicators in the “state” category give an indication of the state of sustainable development, and response indicators indicate societal responses to changes in sustainable development (UNCSD, 1998)[10].

This classification of indicators and the DSR framework were initiated from environmental concerns and developed for the purpose of environmental monitoring. This framework was based on a systems approach, and had a top-down orientation. The initially environmental

[10] Based on these frameworks, some core set of indicators has been developed for different sectors and different areas of sustainability. Some workshops that conducted from OECD and UNCSD have elaborated specific core sets of indicators focusing on specific aspects of sustainability. Some of these series of indicators are: “OECD core set of indicators for environmental performance reviews (synthesis report by the group on the state of the environment)”1993, “Indicators for the integration of environmental concerns into energy policies” 1993, “ Indicators for the Integration of Environmental Concerns into Transport Policies” 1998, “Towards More Sustainable Household Consumption Patterns; Indicators to Measure Progress” 1998, “Measuring changes in consumption and production patterns” 1998. Additionally UNCSD has elaborated a working list of indicators of Sustainable Development covering the social, economic, policy and environmental dimensions that are included in Agenda 21.

approach was then taken one step further to include other dimensions of sustainable development. The analytical framework for alliances in SWM starts from a different perspective. It starts from the bottom-up to study the dynamics of alliances (actors) and their activities. These activities are oriented toward socio-economic goals, and only partially determined by ecological considerations. Finally, this framework assesses their contribution to sustainable development aspects (e.g. from development perspective). It takes an actor-oriented approach; their activities are organised according to their own logic that should be comprehended before assessing the contribution to sustainable development.

In this paper, the approach is to combine systems concerns with individual actor concerns, by assessing what contributions different activities make to the various aspects of sustainable development.
Research, development and experience in the scientific community, governments and organisations may result in the improvement of this analytical framework and in further elaboration of relevant indicators that more accurately reflect the complex dynamics of alliances in SWM. In the longer term, the use of such frameworks should be carefully reviewed.

2.2.1 Criteria for selecting indicators

Some of the technical problems that limit the relevance and the applicability of the selected indicators can be avoided or reduced by following a simple set of criteria when developing indicators. Indicators need to be substantively **relevant**, be **valid** for the areas to which they relate and **reliable** (UNCHS, 1997). The OECD (1990) also adds that indicators should be **easy to understand**, even for people that are not experts on the issues concerned, in order that assessments may be valued by larger groups of people.
Practical criteria for adopting particular indicators include the **sensitivity** of indicators over time to change in the situations being observed. The information should preferably be **available** in time series, with comparable data sequences, and one should be **able to acquire** such data (UNCHS, 1997).

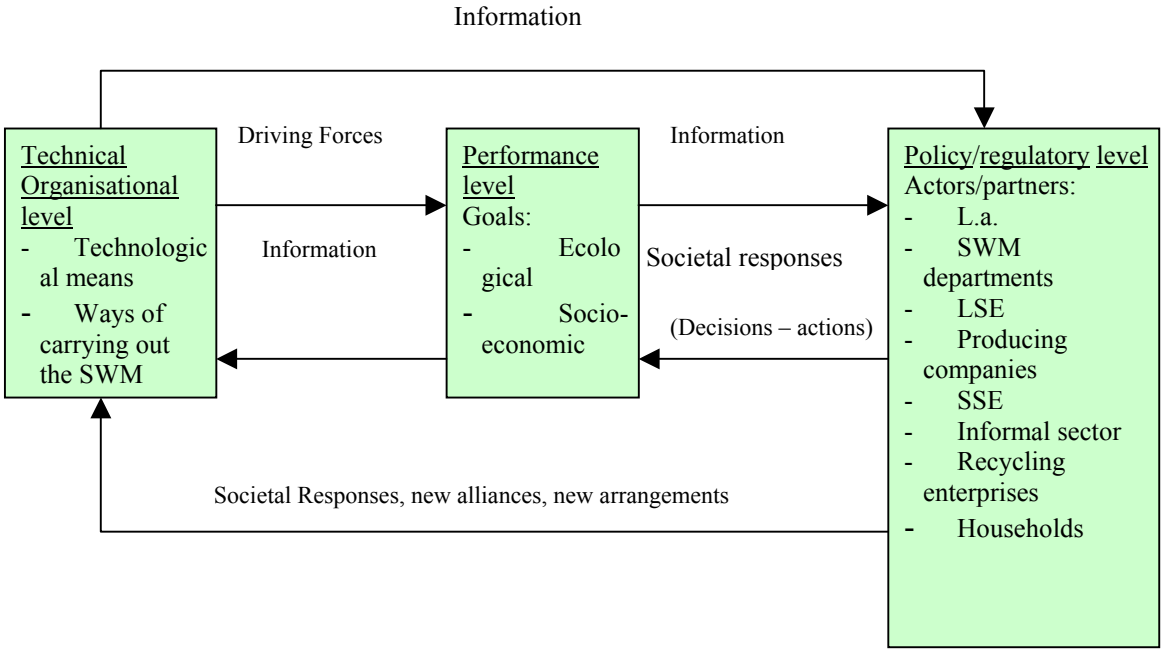


Figure 2. UvA analytical model for SWM in line with DSR framework of UNCDS

There is a certain tension between indicators chosen for the extent to which they reflect **local conditions**, are available in the context of different countries in the South and their **international comparability** (CSD, 1999) (CSD, 1997, www.umweltbundesamt.de)

The above criteria describe the "ideal" indicator and not all of them will be met in practice. In the present report, indicators are reviewed according to the following criteria:

- **relevance** to the goals,
- **validity**;
- **measurability**, taking into account availability of data, quality of data, and international comparability

	Evaluation of indicators		
Selection criteria	**1**	**2**	**3**
Policy relevance, i.e. relevance to the goals and levels of alliances	**High/ satisfactory**	**Medium/Average**	**Low/ Not satisfactory**
Validity	**?**	**?**	**?**
Measureability	**Short term/ Good**	**Medium term? Average**	**Long term/ Poor**

Note 1: Assessment of indicators: **A**: Immediately accessible, **B**: Improve development of definitions and conceptual base, **C**: Improve data availability, measurability and country coverage
Note 2: Indicators marked darkly are selected for further use. The unselected indicators require further work and more elaboration to complete the set of indicators for use in medium or long term.

2.2.2 Goals for ecological sustainability and indicators

1) Production of waste should be minimised.
This goal falls usually outside the usual purvey of local authorities dealing with the implementation of SWM. It concerns mainly changes in production processes, consumption patterns of households and use of materials by commercial establishments and institutions (such as schools, hospitals, etc.). Specifically, it concerns changes which waste generators need to make to products and their way of operation – either through reduction of material inputs, through more efficient use of inputs and increased close loop recycling.
The role local government can play in this area is to collect information on the major fractions of waste coming into the municipal stream and their sources, so other stakeholders can be directed strategically to waste fractions that are large in volume or hazardous to human health or toxic for the natural environment.

The **main stakeholders** in this area include private firms (producers and commercial), households, national and local government agencies, R&D agencies, and service providers.

The main alliances in this area (which is very new still) are between firms themselves in one sector, and between firms and the national or local government

Table 1: Preliminary evaluation of indicators for selection of indicators for waste minimisation (example)

Indicators/Criteria		Relevance	Validity	Measurability availability	Further work
Minimisation of waste					
Policy/ Regulatory level	Relevant legislation	1	1	1	A
	Incentives or barriers	1	1	1	A
	Application of ISO 14000, 14001 (Welford, 1996)	1	1	2	(B), C
	Existence of permit system (Wolsink, 1999)	1/2	1 / 2	2	B, C
	Degree of compliance (firm and government)	1	1	2	B
Organisational level	Monitoring system for production	1	1	1	A
	Vertical integration of waste reduction (between firms)	1	1 / 2	3	(B), C
Technical level	Taking back waste (packaging) material from consumers	1	2	3	B, C
	Cleaner production, cleaner technologies? - reduction of inputs - more efficient use	1	1 / 2	1	A
	Separation and recycling (close loop by factory)	1	1	1	A
Performance level	% of products produced which are durable, repairable or readily recyclable or compostable (Hart Environmental Data, 1999)	1	2	3	C
	% of reduction of waste produced	1	1	1/2	A

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

The following indicators were selected to assess waste minimisation.
At the **policy/ regulatory** level, two criteria are used. These include:

1. the existence of legislation concerning cleaners production (indicating whether there are any regulations, standards or guidelines that should be met by companies) and
2. incentives and (or) barriers for cleaner production (i.e.constraints and (or) incentives from the policy or regulatory framework for the implementation of clean technologies).

At the **organisational level**, the main criterion is the question whether a monitoring system for production is utilised, which indicates whether the producing company monitors waste production, waste contamination or waste minimisation.

At the **technical level**, two criteria are used. The first is whether the alliance carries out any clean production activities or whether it is using clean technologies for the minimisation of the waste production. The so-called "clean technologies" are designed to create less pollution and waste than conventional technologies. They include closed loop recycling, process and product reformulation, substitution with less hazardous inputs and installation of more efficient equipment (D. Phantumvanit, S. Sathirathai, 1986).
The second criterion is whether the company carries out separation and recycling, i.e. indicating whether the producing company employs any separation or recycling of the waste internally. Any recyclable materials that the firm sells or processes externally is considered external recycling and comes under the goal of 'maximisation of recycling'.

Finally, the performance level can be measured by the volume **(or %)** of waste **reduction actually achieved**. This indicator mainly describes the efficiency and the improvement of the producing company in terms of waste reduction. Absolute amounts also need to be calibrated to obtain a fair assessment between highly-polluting companies reducing waste by large amounts, and less polluting companies whose relative waste reduction may be less.

2) Re-use and Recycling should be maximised.
The second goal is maximising re-use and recycling of materials.
Re-use is the process by which product is reclaimed and used again in the same form. This can be done within a factory (whole products or components), as well as by consumers. The regulatory system is important for introducing re-use activities e.g. through obligatory or refunded deposit for some products. The legal framework also is a major factor affecting possibilities for source separation of waste either by consumers or at the final disposal site. Finally the existence of market incentives can stimulate trade and recycling (reuse) activities. It should be noted that due to separation of saleable inorganic recyclables, organic waste often constitutes 50% of the total volume of the waste from developing countries.
Recycling is the reprocessing of waste to a useful product. Both processes make essential contributions to ecological sustainability in a number of ways. The use of natural resources can be reduced (through the reduction of the extraction of raw materials and energy), emissions can be decreased (as less energy is used for reprocessing secondary materials than for extraction of virgin materials and the substitution of fossil fuels by organic waste), and the burden of the solid waste can be decreased (as smaller volumes of waste remain for disposal). Source separation of waste materials by households and commercial enterprises needs to be incorporated in the recycling process to obtain cleaner and high quality recyclables (P. van Beukering, 1994).

Solid waste recycling and re-use is an important component of a sustainable approach for solid waste management. As communities expand, the available sinks for waste disposal become limited and necessitate the transport of waste over greater distances. The ecological footprint of urban areas will therefore be greatly increased. By stimulating recycling and re-use, landfill capacity is maintained and operational costs for SWM reduced. There is also the benefit of increased income generation for the urban poor through recycling schemes (UNCSD, 1997).

The **main stakeholders** are producers, consumers, waste pickers, traders of recyclable materials (itinerant buyers, dealers, wholesalers), recycling enterprises,(local) government, NGOs, and CBOs.

The **main types of alliances** identified in the literature include those between 1) waste pickers and traders of recyclable materials, 2) traders of recyclable materials and recycling enterprises, and 3) NGOs and traders of recyclables.

Table 2: Selected indicators for maximisation of recycling

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Maximisation of recycling & reuse					
Policy/regulatory level	Relevant legislation	1	1	1	A
	Incentives or barriers	1	1	1	A
Organisational level	Length of trading chains	1	1 / 2	1	(B)
	Existence of junkshops, compacting plants	1	1	1	A
Technical level	Separation at source	1	1	1	A
	Segregation and marketing of waste	1	1	1	A
	% of waste stream that is recycled	1	1	2	A, (C)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

The selected indicators at the **policy/regulatory** level are:
1. relevant legislation allowing or prohibiting separation or recycling of waste;
2. incentives and (or) barriers through the policy or regulatory framework for the introduction of recycling practices.

At the **organisational level**, the main criteria are:
1. the length of the trading chains and the existence of junk shops or composting plants. The length of trading chains indicates the number of actors in it; the longer the recycling chain the less viable and reliable the alliance is (R. Dhanalakshmi, S. Iyer, 1994).
2. the existence of junk shops or composting plants, which indicate whether there is a market for recyclable materials (R. Dhanalakshmi, S. Iyer, 1994). The existence of composting plants indicates whether organic waste can be recycled (although its market may still not be guaranteed).

At the **technical level**, the two criteria are:
1. whether source separation takes place at the level of waste generators,
2. whether there is separation and marketing of recyclable materials

At the **performance level**, the criteria are:
1. the percentage (*or volume*) of the waste stream that is recycled, recovered or re-used is the main criterion (J.Leitmann, 1999; UNCSD, 1998). This indicator should be sub-divided according to the nature of the recycled material (metal, paper, glass, etc.) to be useful in determining the actual recycling rate. All sources of recycling and the methods used, combine to give an overall percentage of recycling.
2. The proportion of waste recycled requires an accurate estimate of the proportion of waste that is recycled or separated at each stage of the process of removing solid waste from

enterprises and households. The source separation by households, and separation and collection done on the street, by formal (or informal) waste management employees, or at the dumpsite also should be known. This can only be done by means of specialised surveys and inventories. Usually more indirect methods are used to estimate the overall percentage of recycling. However, there are some difficulties in order to obtain data from municipal records and from some informal sector industries, which are reluctant to declare their activities.

3)*The waste remaining should be disposed of in controlled fashion, in order not to exceed the absorption capacity of local sinks.*
Waste should be disposed of at controlled sanitary landfills instead on the streets, public areas or illegal dumpsites. Cleaner disposal means avoiding pollution of soil, water and air, reducing environmental health risks for the public.
Inadequate waste disposal practices create serious environmental problems that may impair ecosystem balance, human and animal health. Environmental degradation caused by inadequate waste disposal methods leads to contamination of surface and groundwater by leachates, soil contamination by direct waste contact or leachates, air pollution by waste burning and the spread of diseases by different vectors (C. Zurbrugg,1999).
A sanitary landfill is a landfill equipped with control units (access of waste dumpers, cell systems), waste compacting, damp-proof membrane installation and bio-gas and lixiviates collection systems. However, the definition of a sanitary landfill may differ from one country to another.

The main stakeholders in disposal include: local authorities, waste collection firms, transporting firms, and SWM departments.
The main alliances include those between (1) local authorities and private enterprises (LSE), and (2) local authorities and collection – transport - disposal firms.

Table 3: Selected indicators for cleaner disposal

Criteria for Cleaner disposal		**Relevance**	**Validity**	**Measurability - availability**	**Future work**
Policy/ regulatory level	Relevant legislation	1	1	1	A
	Incentives or barriers	1	1	1	A
Organisational level	Maintenance of regulation (inspection, sanctioning)	1	1	1	A
Technical level	Reducing and separating disposal of hazardous, hospital waste	1	1	1	A
	Sanitary disposal measures methods (type of landfill)	1	1 / 2	1	A
	Proportion of treated solid waste in official dump site	1	1	1 / 2	A, (C)
	Disposal methods and proportion	1	1 / 2	1 / 2	A, (C)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

At the **policy/regulatory level**, the main criteria are
1. the existence of relevant legislation and
2. whether there are incentives or barriers. The first indicates whether there is any legislation referring to cleaner disposal of waste (positive or negative), such as landfill disposal standards or guidelines that should be met (C. Zurbrugg, 1999). The second indicates whether there are any constraints and/or incentives from the policy or regulatory framework which affect disposal management.

At the **organisational level**, the main criterion is:
1. whether inspection and sanctioning takes place with regard to existing regulations. The main indication used is whether there is an authorised body for the inspection and maintenance of the related regulations (Wolsink, 1999).

At the **technical level**, the criteria used are:
1. whether sanitary disposal methods are used by actors carrying out the disposal activities,
2. whether hazardous and hospital waste is separately disposed of and reduced.

At the **performance level**, the two criteria used are:
1. the proportion of treated solid waste in an official sump site, and
2. the methods used in disposing of waste (including their respective proportions, such as incineration, open dumping, burning in open air). The form of disposal of solid waste is a major indicator showing the performance and efficiency of the disposal management and the share of the forms of disposal (UNCHS, 1997).

2.2.3 Goals for socio-economic sustainability and their indicators

4) Better co-ordination within the sector of SWM.
The main aspects concern the co-ordination between organisations of SWM services and the degree of overlap between organisations. The degree of privatisation of SWM services, the extent of public participation and the decentralisation of responsibilities and tasks related to SWM are the main factors that affect co-ordination and the other socio-economic aspects. This goal can be made operational as improvement in co-operation (and fewer conflicts or competition) and greater efficiency of SWM services in terms of capability to carry out primary collection to the transfer points and secondary collection, transportation from transfer points to dumpsites.

The main actors are: local authorities, SWM departments, NGOs, private enterprises, and CBOs.
The main alliances exist between local authorities and NGOs, local authorities and CBOs, local authorities and large-scale enterprises, and local authorities and small-scale enterprises.

Table 4: Selected indicators for better co-ordination:

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Better co-ordination					
Policy/ regulatory level	Legal framework or policy	1	1	1	A
Organisational level	Agreements, covenants	1	1	1	A
	Monitoring system (long term)	1	1	1	A
	Supervision	1	1	1	A
	Number of actors involved in co-ordination of SWM	1	1	2	C
Technical level	Way of monitoring (simple / complex)	1	2	2	C
Performance level	service interruptions	1	1/2	1/2	A, (B)
	Overlapping activities/regular conflicts	1	2	1 / 2	A, (B)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

At the **policy/regulatory** level, the main criterion is:
1. whether there is a legal framework or policy for the division of tasks, roles, responsibilities for each of the actors in the alliance.

At the **organisational level**, the four criteria are
1. the existence of any agreements or covenants between the actors,
2. whether there is a monitoring system for the SWM activities that are carried out (i.e. an organised and systematic monitoring system for the SWM system in the long term),
3. whether there is any supervision to improve operation of SWM services, and
4. the number of different actors involved (the assumption being that the fewer the actors involved the less complex and better the coordination is.)

At the **technical level**, the main criterion is:
1. the existence of a monitoring and supervisory system and its degree of efficiency.

At the **performance level**, the main criteria are:
1. the number of interruptions of the services that are provided by the actors of the alliance as a result of poor co-ordination, and
2. the extent of overlapping activities and responsibilities and regular conflicts arising from such overlap.

5) The system should remain financially viable for both consumers and local authorities involved (and private enterprises where relevant).
This goal will be achieved when the financial costs are less or balanced with the revenues for both parties of the alliance (e.g. local authorities, private enterprises) but also viable for consumers paying for the service. If one of these partners does not benefit from the existing

financial arrangements the alliance is not financially viable. From the consumer point of view "affordability" and "willingness to pay" should be taken into account. For implementing agencies, the way fees are collected and the financing of municipal services are crucial. Some indicators on cost-effectiveness of SWM show the costs per ton of waste or the number of vehicles that are operating. This combines the costs for the service with the volume of the waste that should be treated.

Table 5: Selected indicators for financial viability

Indicators/Criteria		**Relevance**	**Validity**	**Measurability - availability**	**Future work**
Financial viability					
Policy/ regulatory level	Ways of cost recovery (fees, taxes, subsidies etc.)	1	1 / 2	1	A, (B)
	Interest rate on credit	1	1	1	A
	Policy towards privatisation	1 / 2	1	1	A
Organisational level	Access to credit	1	1	1	A
	Sources of revenue	1	2	1	A, (B)
	Reliability of suppliers of raw materials (recycling & trade)	1 / 2	1 / 2	1	A, (B)
	Kind of privatisation	1	1	1	A
Technical level	Revenue collecting methods	1	1 / 2	1	A, (B)
Performance level	Degree of cost recovery	1	1	1	A
	Profitability (enterprises)	1	1	1	A
	Affordability - Local authorities - Users	1	1	1	A
	Willingness to pay (hhs)	1	1	1	A
	Stability of prices of raw materials	1	1	2	(C)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

At the **policy/regulatory** level, two criteria are used:
1. ways of cost recovery, such as direct fees to the users for the provision of the service, attaching the costs to real estate or income tax bills, or including the costs in the energy or water bill , and the
2. interest rate on credit provided to the sector.

At the **organisational level**, four criteria used are:
1. access to credit, as working capital for SWM activities;
2. sources of revenue for the actors in the alliance;
3. reliability of suppliers in the recycling & trade chains;
4. type of privatisation, such as contracting or franchising. Generally contracting is considered more reliable and efficient, with a lower financial burden than franchising.

At the **technical level**, the main criterion used is:

1. the method of revenue collection, indicating whether it is direct (secure) or indirect (vulnerable).

At the **performance level**, there are five criteria which can be used. These are listed below.

1. degree of cost recovery (J. Post, 1999): Indicates the degree of the costs that are recovered from the revenues. This can be measured combined data for the SWM system expenditures and for the amount and sources of revenues that have been received for the provision of the service. It is not very easy to obtain data for both financial inputs and outputs, as this indicator requires.
2. profitability for the entrepreneur: Indicates whether the financial arrangements concerning the activities of the entrepreneur are profitable;
3. affordability (L.a, users): Indicates if the financial arrangements for the local authorities and the costs for the users related to the SWM services are affordable or not;
4. willingness to pay (users) - degree of actual service payment: Indicates if the users are willing to pay for the provision of the service and how this is demonstrated in practice through their actual service payment.
5. stability of prices of raw materials (recycling & trade): Indicates if the prices of recyclable and raw materials are stable or vulnerable. If the market of recyclables and the recycling industry is vulnerable to price fluctuations then consequently the existence of the alliance is under threat (P. van Beukering, 1995).

6) Safe and healthy employment should be provided within the SWM system.

Secure employment should provided as much as possible, with healthy and safe work conditions. Security of employment is secured by providing formal contracts, social security, and a long-term perspective. This also includes the stipulation of a living for workers. Second, safety and health conditions need to be such that workers are not confronted with health risks and physical hazards.

Table 6: Selected indicators for safe and secure employment

Indicators/Criteria		**Relevance**	**Validity**	**Measurability - availability**	**Future work**
Safe and secure employment					
Policy/ regulatory level	Labour regulations	1	1 / 2	1	A
Organisational level	Training for the employees	1	1	1	A
	% of the employees whose activity is part of the informal sector	1	1	2	A, (C)
	Security of employment	1	1 / 2	1	A, (B)
Technical level	Provision of protective equipment	1	1	1	A
Performance level	Income level, extended coverage (basic needs)	1	1	1	A
	Employment level	1	1	2	A, (C)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark color: selected indicators

At the **policy/regulatory** level, the main criterion is:
1. the labour regulations that employers working in SWM need to meet.

At the **organisational level**, three criteria are taken into consideration:
1. provision of training to the employees regarding safety in SWM employment;
2. % or number of employees whose work is not formally recognised - 'informalised'; and
3. the degree of security of employment for different groups of workers.

At the **technical level**, the main criterion is:
1. whether protective equipment and clothing is provided and used by workers.

At the **performance level**, the main criteria are:
1. the income levels and coverage of basic needs; and
2. employment level in SWM activities.

7) SWM activities should also strive towards effectiveness in terms of clean and healthy urban environment.
The SWM services should be effective, resulting in clean urban environment at neighbourhood and city level. The problem of waste should not be externalised to other areas. As health risks are reduced, neighbourhoods gain in quality of life and aesthetics. Thus, this set of indicators refer mainly to the effectiveness of the collection of waste service and the linkage between environment and health impacts.

Table 7: Selected indicators for clean and healthy urban environment

Indicators/Criteria		**Relevance**	**Validity**	**Measurability - availability**	**Future work**
Clean and healthy urban environment					
Policy/ regulatory level	Sanitation bylaws	1	1	1	A
Organisational level	Health -environment inspectors	1	1	1	A
Technical level	Ways of waste collection	1	2	1 / 2	A, (B)
	Transfer of waste to other areas	1	1	1 / 2	A
	Accessibility of areas	1	1	1 / 2	A
Performance level	%of population (households) with regular solid waste collection	1	1	1 / 2	A
	% collected waste	1	1	2	A
	Clean streets/neighbourhoods	1	1	2	A, C
	Frequency of the provision of the service	1	1 / 2	1	A

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

At the **policy/regulatory** level, the main criterion is:
1. the existence of sanitation bylaws to regulate sanitation and environmental health aspects.

At the **organisational level**, the main criterion is:
1. whether there are environmental health inspectors.

At the **technical level**, the three criteria are:
1. the way of waste collection (door to door collection/neighbourhood dustbins/transfer stations);
2. how waste is transferred to other areas;
3. accessibility of areas for waste management.

At the **performance level**, the main criteria are:
1. % (or number) of population (households) with regular solid waste collection (UNCHS, 1997, A. Wyatt, K. Shaw, 1993)
2. proportion (% or volume) of collected waste (or remaining waste) (A. Wyatt, K. Shaw, 1993, CSD, 1999)?
3. clean streets/neighbourhoods (usually based on subjective perceptions)
4. frequency of service provision.

8) Legitimacy: acceptance by government and civil society

The extent to which an alliance is considered legitimate is important, because it influences the degree to which activities are accepted and complied with by other actors. This refers to the legal framework on which an alliance can be based and public acceptance. The latter covers also political aspects as public participation and empowerment of public opinion. Cultural aspects, such as views on 'waste' in culture also influence legitimacy of certain activities in SWM.

Table 8: Selected indicators for legitimacy

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Legitimacy					
Policy/ regulatory level	Are the actors supported by the law	1	1	1	A
	Are the actors formalised?	1	1	1	A
Performance level	Are there any public objections	1	1	1	A
	Are the actors harassed/penalised	1	1	1	A

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark color: selected indicators

At the **policy/regulatory level**, two main criteria are:
1. whether actors are supported by the law; and
2. whether the actors are formally recognised by the authorities or not.

At the **performance level**, the two main criteria are:
1. whether there are any public objections? and
2. whether actors are harassed/penalised?

Having gone through the exercise of selecting indicators to examine the extent to which activities in urban solid waste management contribute to sustainability, the next chapter looks at empirical evidence on SWM from four locations utilising the indicator system developed above.

CHAPTER 3 CASE STUDIES

3.1 Introduction

The questions addressed in this paper are analysed, using empirical evidence from four locations. The case studies concern Chennai (India), Lima (Peru), Manila (Philippines) and Manizales.(Colombia). These cities were selected because of several reasons. The first is that they are all very large and growing cities (5-10 million people at the agglomeration level), and illustrate the problems of growing waste flows very well. The second, more practical reason, is that in all four cities, extensive fieldwork has been carried out among actors in the SWM system, which allows us to look at how alliances actually function in some detail.

In Chennai, fieldwork was carried out during 1994 as part of a Netherlands government-funded research project, and regularly updated by the Indian researchers involved in the project in the years afterwards (Dhanalakshmi and Iyer, 1999). In Lima, Peru, research was carried out by the Peruvian research NGO DESCO (Riofrio et al., 1994), and by Dutch MA students from various universities guided by staff from the University of Amsterdam. In Manila, research was carried out by a Philippine NGO CAPS (Lapid et al 1997) in the context of the UWEP Programme co-ordinated by WASTE (Gouda, Netherlands). In Manizales research was carried out by (Suremain and Duque, 1997) within the framework of the UWEP programme.

Table 9: Comparing the case study cities

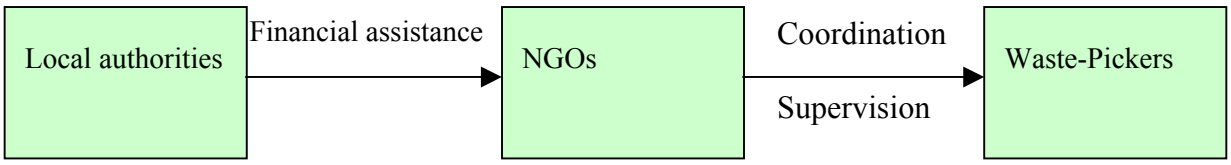
Characteristics	**Chennai, India**	**Lima Metropolitana, Peru**	**Manila, Philippines**	**Manizales, Colombia**
Population size (in millions)	Corporation: 3.8 (1991) Metropol. Area: 5.3	6.4 (Census 1993) 7 (estimate 1997)	9.45 (year?)	400,000 (1999)
Population density	218 p/ha (MA) 319 p/ha (Corp.)	average 40 p/ha; range 14-290 p/ha.	148 p/ha	average 8 p/ha.
Area	Corp - 172 km ; MA - 1170 km	2,817 km. sq		580 km. sq
Ec. Characteristics	economic sectors in transport, engineering, leather products, chemical-based industries, electronics, cinema	54% of GDP generated in Lima (1995)	city's contribution 30% of GDP. Average growth rate in Metro Manila 5.5% (1993-95).	coffee growth, animal husbandry, (recently) electronics, pharmaceutical ind. centre of communication
Quantity waste generated (in tonnes)	2500-2800 tonnes/day (estimate 1993/1994)	3535 tonnes/day	5500 tonnes/daily	180 tonnes/day (1997),
Waste collected	2300 tonnes/day	2121 tonnes/day	3800 tonnes/daily	high %; 280 tonnes collected by EMAS including other cities
Disposal sites	3 dumping grounds	2 official sites; >40 illegal sites	2 official dump sites	'natural' landfill (open since 1986), lifetime 17 yrs, 45 ha

The basic questions considered in this chapter concern the existence, strength and contributions of the possible different alliances as found in the cities under study. Basic information on each city is provided below. It is followed by the analysis of the main types of alliances found there.

3.2 Chennai – Madras (India)

In Chennai, three types of alliances were found. The first concerns a triangular alliance between local authorities, and NGOs working with waste pickers. The second is a community-private sector alliance between a CBO and waste pickers. The third type of alliance concerns private-private arrangements between different groups working in trade and recycling of waste materials.

3.2.1 Local authorities – NGOs – waste pickers



The Madras Municipal Corporation (MMC) decided to use a new scheme, under the Clean and Green Madras City project in the middle 1990s. The main aim of the project was to help street children to be rehabilitated, socialised and accepted by society by giving them recognised work in taking care of the **cleaning and maintenance** of the streets.

Madras Corporation entrusted the conservancy work in four areas on an experimental basis to four NGOs who were working with young waste pickers. Don Bosco Anbu Illam, Asha Nivas, Asian Youth Centre and Nesakaram were selected and given funds to support and **supervise** the young waste pickers. The MMC has provided all the **necessary items** such as special clothes, equipment and **financial** assistance. About 250 boys with three supervisors worked on this project. The boys were hired for a period of six months, with the expectation that they would be able to find other jobs afterwards. In order to expedite such a move, the NGOs provided them job training to help them in the task of getting another position (R. Dhanalakshmi and S. Iyer, 1999). The alliance lasted for somewhat longer than a year, but ran into difficulties because payments between the Corporation and the NGOs were not carried out smoothly.

Contributions to sustainable development

a) Environmental aspects

This kind of alliance connecting three different actors is the first of its kind in Chennai. Taking the criteria described in the previous chapter as guideline, the following assessment is made. The question of **waste minimisation** does not arise as the boys are dealing with household waste that is thrown on the roads (dustbins) or waste directly collected from the households.

Its main contribution in terms of ecological sustainability lies in the fact that separation and recycling of materials is carried out more regularly and more in direct co-operation with households rather than after removal of waste from bins. The rest of the waste is disposed of at the nearest collection point. The exact quantities of valuable waste materials collected by

these boys could not be traced, as this depends on seasonal changes and the extent to which households separate waste to sell.

This kind of alliance does not contribute to minimisation of waste or safer final disposal, as the boys operate at neighbourhood level and do not go beyond it. Going into the area of trade and recycling of materials more explicitly, it is clear that the changed **regulatory environment**, in which increased legality is provided by the official contract between the Corporation and the NGO for the activities carried out by waste picking youngsters, is essential. It means that households are less inclined to consider these youngsters as thieves and allow them access to the household premises.

At the organisational and technical level, the situation does not change, as the boys drawn into waste collection make use of existing traders and junk shops for selling their collected materials. However, an advantage is that the materials they collect are cleaner, because the households separate out wet and dry materials.
At the technical level, this system improves the quality of waste, because of the source separation by households and the separate selling of materials by the young waste collectors.

In terms of performance, this system is an improvement, because it leads to more effective collection of waste at neighbourhood level, and better separation and recovery of waste fractions for recycling. It does not have an impact on re-use, as this is carried out by households themselves. It does not have an effect on sanitary disposal, as the final disposal is still carried out by the Corporation crews.

b) Socio-economic aspects

In practice the co-operation between local authorities, NGOs and waste pickers contributes to a **better co-ordination** of the SWM services without leading to overlapping activities. The division of labour was based on an agreement between the Corporation and the NGOs. There was a clear and well-accepted distribution of the tasks in the contract period between the actors resulting in a better co-ordination of the service. The work was supervised and monitored by Corporation and NGO officials. However, the system collapsed due to irregular payments for the activities carried out between the Corporation and the NGOs. This is an essential requirement for an effective long-term alliance such as this one.

In terms of the policy/regulatory level, a policy existed that spelled out the division of tasks and responsibilities. At the organisational level, these were laid down in agreements, with monitoring, and supervision included. At the technical level, there was no data on the way the activities were monitored, or in performance the extent to which service interruptions took place.

The second socio-economic aspect concerns the financial viability of this alliance. Here the available information is not enough to provide a clear picture of the financial system. The Corporation provided financial assistance to the NGOs, who paid considerable salaries to the waste pickers for their conservancy work. The salaries were paid out, and a certain amount set aside for savings accounts. There was no cost recovery from the households for this work. The agreement fell apart because payments between Corporation and NGOs was irregular, and some charges of corruption were made, although they could not be substantiated. This point is of major importance for the continuity of such agreements between two actors. Negative experiences make it harder afterwards to replicate such types of agreements.

In terms of an assessment, at the policy/regulatory level, the type of agreement was a sub-contract by the Corporation. Cost recovery from consumers was nihil, and there was no policy in the direction of further privatisation.
At the organisational level, there was no data on access to credit by the NGOs, or the reliability of private sector traders buying materials from the young men employed b y the NGOs. Sole financial assistance was from the Corporation, which turned out to be an unreliable basis for co-operation. At the technical level, nothing is known about the contract with the Corporation, although the procedure in the end did not function.

In assessing the performance of this alliance, the degree of cost recovery from the consumer was nil, and the level of profitability to the NGOs unknown, but sourced from the Corporation payments (which did not come through adequately), and from sales to wholesalers of recovered materials. There is no information on affordabilibty to local authorities (and to users is not applicable). There is also no information on willingness to pay by users, or stability of prices paid by wholesalers for materials sold.

The boys recruited are older than 14 and were paid a monthly wage of Rs.900 through the NGOs. The amount of money paid was enough to cover their needs and to save about Rs 150 per month in an account. In addition to their regular income, they increased both income and savings through selling recovered materials to wholesalers.

By this alliance, the activities of the NGOs in providing regular employment to street children, and access to free medical treatment, non-formal education and vocational training were given some support by the Corporation. The combination resulted in secure employment with a long-term perspective, giving to waste pickers the feeling of social acceptance and the sense of identity.
The fact that the waste pickers were provided with protective clothes and gloves decreased the health risks that they had before, improving safe and healthy conditions in their work. But some of these boys expect the Corporation to give them permanent jobs as conservancy staff, which is not the idea of the project at all.

At the policy level, there was no information on the labour regulations that should be met for the employees. At the organisational level, workers were provided with education and vocational training, the jobs were no longer in the informal economy, and secure and safety in the employment was provided through protective clothing and health care.
At the technical level, protective equipment was provided.

In assessing the performance level, the boys' income covered their basic needs, and provided a small level of savings. There was no increase in the level of employment in this type of alliance.

The young sweepers are keeping the streets clean and collecting the garbage from the streets. This contributes to a more effective cleansing of the neighbourhood with all the advantages for the local environment, and the reduction of the health risks from the garbage otherwise remaining in the streets. The waste is collected by the boys and deposited at the nearest collection point. From there, municipal crews transport it to the disposal site.
At the policy/regulatory level, it is not known whether this construction contravenes sanitation bylaws. At the organisational level, it is not known whether health inspectors keep an eye on the quality of the work carried out by the boys employed by the NGOs. At the

technical level, there is door-to-door collection of waste, as well as neighbourhood bins. They transfer the remaining waste to other areas, which transfers the problem rather than solving it. At the performance level, nothing can be said about the % of population (households) with regular solid waste collection, or the volume of collected and remaining waste. The frequency of service is daily, and the activity does contribute to clean neighbourhoods.

In terms of legitimacy the goal is achieved through the municipal partnership and the wide social acceptance. The public appreciated this service of the corporation, as their roads were kept clean. No legislation or law was involved to establish the partnership.
At the policy/regulatory level, the actors were not supported by law, but their activities were formalised through a contract with the Corporation.

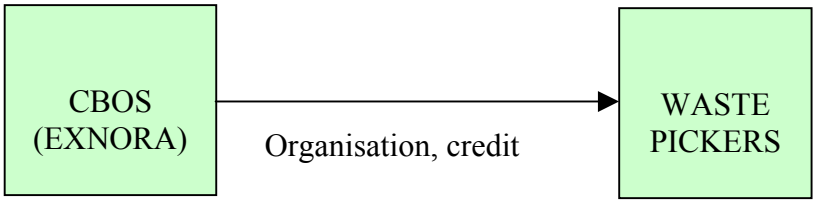
In terms of performance, there were no public objections, and the actors were not harassed or penalised.

Conclusions on strengths and weaknesses

It is clear from the sustainable development point of view that this alliance has a significant contribution to socio-economic benefits but a less important contribution to the environmental performance of the service. Based on the assessment above, this alliance contributes strongly to the improvement of the co-ordination of SWM activities, to the provision of safe and healthy employment and the legitimacy of the boys' activities. Only one indicator shows a contribution to the effectiveness of the service for a clean and healthy urban environment. Data regarding the financial viability is lacking, so that the extent to which there is a contribution or not of this alliance cannot be determined. In practise the work was stopped after two years due to various reasons. Delayed payment was the reason attributed by the NGOs and the Corporation officials told that the work was stopped as the NGOs started using the funds for their overheads.

3.2.2 CBO – Waste pickers

This alliance created on an initiative by Exnora International, a broad community-based voluntary organisation. The philosophy of this CBO is that collective participation can tackle and solve common problems. In 1990, Madras Corporation made an experiment with hydro containers at Karamaj Avenue. The dwellers were called to dump their garbage in these containers so that the Corporation workers could lift them directly into the trucks. Then Exnora came to take the responsibility that the garbage would be placed at the containers and not on the streets. So they decided to incorporate the local rag pickers in the system, by hiring them with a new designation as Street Beautifiers.



Exnora obtained a loan from the bank and bought a tricycle cart for the cleansing activities of the Street Beautifiers. Furthermore, Exnora provided them with protective and appropriate equipment for sweeping and collecting the garbage from the streets. The collected garbage is segregated and the Street Beautifiers sell all materials to dealers for recycling.

Contribution to sustainable development goals

Environmental aspects

The Street Beautifiers supported by Exnora introduced waste segregation and trade in their activities as an additional source of income. This has real environmental benefits by increasing the recycling of materials and reducing waste flows for disposal at the dump sites. There are no quantitative data to show to what extent this alliance contributes to the maximisation of recycling materials.

1. The activities do not contribute to the minimisation of waste materials.
2. It does contribute to increasing the recovery of waste materials through separation, and selling to wholesalers and recyclers.
   At the **policy/regulatory** level, there was no related legislation, and no incentives or barriers for recycling activities were known. At the **organisational** level, there was no information for these neighbourhoods on the length of the trading chains, and the existence of junkshops or compacting plants. At the **technical** level, there was separation of waste materials and trade in recovered materials.
   At the level of **performance**, there was no information on the % of the waste stream recycled, recovered or re-used.
3. The activities did not include disposal of waste.

Socio-economic sustainability

4. The **co-ordination of the SWM services** is not optimal through this alliance because there is no strong involvement with the local corporation in terms of official agreements or contractual schemes between the parts or even relative legislation for the role of each actor. This can be seen in practice when in some cases the breakdown has occurred because Madras Corporation has not picked up the waste from the transfer points. As the civic Exnora units have no means of transporting wastes to dumps, the transfer points rapidly become a nuisance without the transfer service from the municipality (C.Furedy, 1992). The weak point of this alliance related to the appropriate co-ordination of the SWM is the fact that the local authorities is not a part of this alliance making the alliance and the co-operation between CBO-waste pickers dependent on the secondary waste collection service from the municipality.
   At the neighbourhood level the co-ordination of SWM is well organised and cleared depending on the strength and influence that Exnora has to the community.

At the **policy/regulatory** level, there was no policy or legal framework for the division of tasks, roles, responsibilities. At the **organisational** level, there were no agreements, and there was no information available on the monitoring system or supervision. There were two actors involved in the co-ordination of SWM activities. At the **technical** level, there was no data on the way of monitoring involved.
At the level of **performance**, there were service interruptions, and no information on the extent of overlap between activities and responsibilities.

5. The households are paying about Rs.2-20 per month for the provision of the service, depending on the wealth and the location. The system can work effectively if most of the households keep up their payments. One street unit might collect approximately Rs. 800 each month. Of this around Rs.650 are going for Street Beautifiers' salaries and the rest are

used to pay off the bank loan and are saved into a sinking fund in case of defaults. So the system of **financial flows** (inputs-outputs) is viable for the organisation and produces a satisfactory income for the street beautifiers who have the incentive to earn more money by segregating and selling recyclable materials. As far as the households are charged with affordable fees and receiving regular provision of SW collection, they are willing to pay the fees.

At the **policy/regulatory** level, there are no barriers towards project level cost recovery, but there is no support either from the local government. No credit is provided from outside, nor is there a further policy of private commercial sector participation.
At the **organisational** level, the main source of revenue is the money paid by the households participating in the partnership, which makes the project vulnerable to their co-operation. The only other source of income for the street beautifiers is the sale of materials to the traders, whose reliability is not well known.
At the **technical** level, the revenue is collected from the households by the Exnora neighbourhood co-ordinators.

At the **performance** level, there is a high degree of cost recovery, as the project has to run itself. It is affordable to the neighbourhood residents, who mainly have a middle-class background. Residents are willing to pay for the services, because their effectiveness is guaranteed by the Exnora co-ordinators.
The stability of the prices for recycled materials is not known.

6. In terms of the goal of **safe and healthy employment**, there are no data that can illustrate if the work of the waste pickers is under safe and secure conditions.

7. The result of the alliance between Exnora, residents and the waste pickers is really clean neighbourhoods, in the areas where Exnora has been active. While Exnora focuses on environmental issues locally, there is some concern that the problem is transferred to areas outside of Exnora's activities, as the waste is collected but dumped elsewhere. Therefore, at the neighbourhood level **clean neighbourhoods** are promoted, but at the city level, the environmental costs of waste are externalised to other neighbourhoods.
   At the **policy/regulatory** level, there are no sanitation by-laws prohibiting externalisation between neighbourhoods. At the **organisational** level, there is no knowledge about the role of the health inspectors at the neighbourhood level. At the **technical** level, the waste is collected in a small-scale fashion, which is effective in terms of collection. It is dumped elsewhere, which makes the transfer problem almost 100%. There is no problem with accessibility of the area for the waste collectors.

At the **performance** level, the percentage of households with regular solid waste collection is expanded, with almost 100% of the neighbourhood level waste being collected once a day. The result is clean streets at neighbourhood level.

8. As was mentioned before this alliance is dependent on other actors' activities like the municipality (in terms of collection of waste from transfer points) and the households (in terms of payments). The alliance is not officially recognised or integrated into the formal SWM system. Consequently there is lack of harmonisation between the actors of this alliance and the local authorities. Although the alliance is recognized, there is not full legitimacy because the actors are not formalised or supported by the legislative framework. However, there are no public objections or harassment as far as is known.

Conclusions on strengths and weaknesses

The weakest points of this alliance is the co-ordination, and the legitimacy of the service which cannot be improved without closer involvement by local authorities and official recognition of the actors. CBOs like Exnora should be more directly linked to the municipality because SWM service falls under the jurisdiction of the municipality and hence the need to have this link whereby all are kept aware of what is being done in the communities.

The strongest points of this alliance are the contribution of the service to cleanliness at the neighbourhood level, the recycling activities which reduce waste flows and source separation (although existing information does not allow quantitative assessments) and the financial viability.

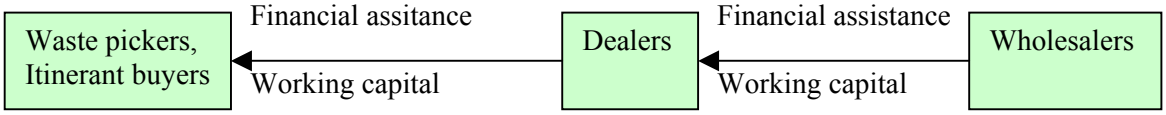
3.2.3 Traders in waste materials (vertical linkages)

1) Waste pickers, itinerant buyers - Dealers
2) Dealers – Wholesalers

This kind of alliance is a private-private partnership between different parties connected in a vertical commodity chain. Both actors benefit to some extent from this close relation. The main incentive is the financial profit for each partner and not their environmental awareness. In Madras, there is a vertical commodity chain between waste pickers, itinerant buyers - dealers - wholesalers - recycling enterprises. The pickers supply waste materials to traders in recyclable materials, who in turn provide them with assistance. This chain of actors in trade of secondary materials can be distinguished as two alliances in a chain.

Waste pickers collect materials, which form the main input for small and large-scale dealers. The waste pickers sell the materials to dealer shops, which sometimes provide them with interest - free loans for their activities. Sometimes they were given free medical treatment with support from medical NGOs, or gunny bags, and gifts during festivals in kind or cash. Dealers also work with itinerant buyers, advancing them the initial capital to buy recyclable materials (Rs. 500-1000). This is either deducted in easy instalments or not at all. Itinerant buyers work regularly in a neighbourhood, buying recyclable materials from households and selling the materials back to the dealer providing a loan.

The dealers sell the materials to specialised wholesalers who give them loans or advances free of interest which are recovered in instalments. Then the wholesaler, who specialises in one kind of material, sells the materials to recycling factories using that kind of material as raw material for production. Such linkages can be defined as alliances even if the financial assistance seems to be small, as this support provides some degree of financial security for a very vulnerable group of people. This is their only access to credit, liquidity and working capital.



Contribution to sustainable development goals

Ecological aspects

This series of alliance in a local commodity chain plays an important role in the whole recycling business in Madras. The total quantity of material recovered from waste by the informal recycling system is estimated to be around 11,800-15,600 tonnes per annum, or 320-430 tonnes per day. Of this total amount, itinerant buyers are estimated to contribute around 4% to total recovered materials, transfer station and dump pickers contribute 29% and street pickers 67% (ERM, 1996).
This whole commodity chain makes a significant contribution to recycling activities, both through source separation by households (in preparation for the itinerant buyers), and through recycling waste materials into new products. The assumption is that recycling has significant positive environmental effects through resource recovery, and less energy used in production processes and fewer emissions (however, this point remains to be proven).

1. This activity does not contribute to minimising waste.
2. Recycling activities
   It does contribute to greater recycling of materials, despite lack of relevant legislation at the **policy/regulatory** level. The semi-legal context in which dealers and recycling shops making intermediate products work, remain barriers for expanding and officially recognising this sort of activity. At the **organisational** level, there are long trading commodity chains, including the existence of junk shops. At the **technical** level, there is source separation and segregation of waste carried out integrally throughout the chain.

   At the level of **performance**, the percentage of the waste stream that is recycled, recovered or re-used amounts to 320-430 tonnes per day, or 16 % of total waste produced in Madras.
3. This method does not lead to better disposal methods.

Socio-economic aspects

4. For the socio-economic assessment of this alliance the goal of better co-ordination can be distinguished internally (between the actors involved) and externally (in relation to the municipality). Internally, the system seems to function well through self-co-ordination. But the fact that all these interrelations between the actors are based on economic motivations, without the support of legislation or covenant makes them vulnerable to external economic developments, which can undermine them. Externally, the comparison with the municipal SWM in the city as a whole, the system works parallel to the formal system. This leaves pickers, dealers and recycling enterprises open to harassment by the authorities.

At the **policy/regulatory** level, there is no legal framework for incorporating tasks, roles, and responsibilities. At the **organisational** level, there are no agreements, monitoring systems, or supervision. The number of actors is quite large. At the **technical** level, nothing is known about systems of monitoring.

At the level of **performance**, there is no information on service interruptions, or overlapping activities and responsibilities.

5. In terms of financial viability the system is vulnerable and depends on other factors. For example, the income of the waste pickers is mainly determined by the current prices of the

waste materials they collect. The prices depend upon the rates that the final unit using the secondary materials as raw materials is willing to pay. Such prices are influenced by the market prices for national and international substitute raw materials. The amount of materials and the prices vary daily, as does income earned; they also vary between the different groups involved. Waste pickers are able to earn around Rs 40-50 daily on average. Itinerant buyers are able to earn around Rs 50-75 daily. This amount of money covers only the basic needs of these groups. Itinerant buyers sell the materials daily to have working capital. Dealers are the first link in the commodity chain who buy materials. They have a low profit margin risk the waste pickers or itinerant buyers taking advantage of their loans to disappear without repaying it. A dealer's profits depend on the extent of the business. The level of investment varies approximately from Rs. 2,000- to more than Rs. 15,000. On average, wholesalers have a net profit of around 10-15%. The level of profit increases along the commodity chain from the lower level to the higher level (R. Dhanalakshmi & S. Sundaram, 1994).

At the **policy/regulatory** level, there is no policy stimulating cost recovery through sales of recyclable materials. Nothing is known about possible interest rated on credit provided. The sector is totally private.
At the **organisational** level, the dealers have access to credit, from their buyers. The knowledge about the reliability of suppliers is anecdotal. At the **technical** level, revenue collecting methods are often on a daily basis, except for the payments by the final recycling/production units. They pay after 2-3 weeks.

At the **performance** level, there is full cost recovery, and increasing levels of profitability up the commodity chain. The affordability is high, as is the willingness to pay for these materials. There is still little known about the stability of the prices of raw materials.

6. This vertical chain based on the recycling business gives jobs and income to many people, but it is not secure, formal employment with a long-term perspective. This kind of employment is market-led without any legislative intervention or employment guarantee for the workers. As the recycling chain is vulnerable to external and internal factors, the same situation applies for all those in the chain. However, at the lower levels of the chain they face a higher risk of losing their job.

At the **policy** level, no labour regulations apply. At the **organisational** level, there is no provision of training to the employees regarding SWM services. All those working in this sector, do so as part of the informal economy. There is no security of employment. At the **technical** level, there is no provision of protective equipment.

In terms of **performance**, income levels cover basic needs and a basic form of social security. It increases informal types of employment.

7. This alliance dealing the recycling of materials has a real effect on contributing to clean neighbourhoods, but also a clean city as waste materials are definitively removed from municipal waste flows. However, the extent to which it contributes to this goal cannot be determined well because of the lack of information on the indicators, as all activities take place in the informal economy.

At the **policy/regulatory** level, it is not known whether sanitation bylaws apply. At the **organisational** level, it is not known whether health inspectors concern themselves with these

activities. At the **technical** level, waste is collected by a variety of handpicking and sorting, and motorised transport. There is no transfer of waste to other areas. Accessibility of areas is maximised by these methods.

At the level of **performance**, nothing is known of the percentage of the population (households) with regular collection of recyclables, only estimated volumes of collected and remaining waste, and the frequency of the service, and the extent to which it leads to clean streets/neighbourhoods.

8. In terms of legitimacy this alliance functioning in the informal economy is neither accepted by the local authorities as formal partner or by society. There are many cases where policemen harass the waste pickers for their activities.

At the **policy/regulatory** level, the actors are not supported by law or formalised in any way. At the **performance** level, there are public objections and the actors are harassed/penalised.

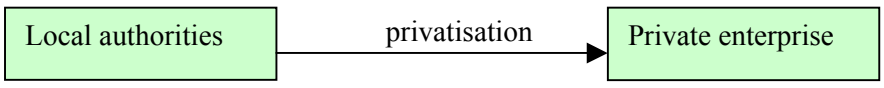
Conclusion for strength and weakness

Although this alliance was not initiated due to environmental awareness, it has widely positive environmental impacts, making an important contribution to the ecological sustainability goal of recycling.
The alliance contributes to several socio-economic aspects. It also contributes somewhat to the financial viability and employment goals. These actors connected in the commodity chain are always dependent in outside factors and vulnerable to changes in prices of raw materials that can act as substitutes. International trade had an impact on the local recycling trade, that can be quite negative (van Beukering, 1997). This implies that present levels of employment and income in the informal economy are not secure from future changes in the recycling business. Stability of prices and the supplies of recyclables is a vital factor to increase the performance of this alliance in terms of financial sustainability and secure employment. The weak points of this alliance are its lack of co-ordination and legitimacy. Local authorities not only haven't incorporated the recycling commodity chain into the municipal SWM system, but also penalise and harass its activities.

3.3 Manila (Philippines)

3.3.1 Local authorities – Private enterprise

The city of Manila has demonstrated privatisation efforts at the sphere of SWM services. Since 1992 Manila City Government has contract with only one private company called Leonel waste Management Corporation to handle the whole process of waste collection and disposal for the city. Leonel was awarded of the contract on December 1992 through a bidding process held every last month of the year and started its operation on 1993. As predetermined at the contract the corporation is getting P32 million a month from the local government for the equipment and services provided. To justify their billing, copies of barangay certification are submitted to the city government to prove that barangays are cleaned (D. Lapid, 1997).



The company utilises 180 compactors, 30 trailer vans, 7 mobile sweeper tracks and employed 650 personnel as drivers, street sweepers, zone managers and monitoring crew for the needs of the agreed activities (D. Lapid, 1997).

Contribution to aspects of sustainable development

Ecological sustainability

The company is not dealing with any waste minimisation activities. In terms of recycling, trade of recyclable materials and segregation at the source the company has specific regulations and rules. So the policy of the company is to prohibit any garbage sorting during the transport and the collection and trade of recyclables. This policy is according to the intention to avoid any delays of the transportation of the garbage and hence to maximise the effectiveness of the service. Waste picking and sorting is allowed only at the transfer station. So waste recovery is done by junkshops, itinerant buyers and waste pickers and not by Leonel.

1. There is no minimisation of waste in this alliance.

2. Recycling activities.
   At the policy level, the policy of the company prevents initiatives to increase the level of recycling activities, both within the company and by other actors. This means that at the organisational level, and technical level, there is no data on possible informal activities being carried out by company employees. In terms of performance, this alliance does not contribute to increasing % of waste flows that are recycled, recovered or re-used.

3. The disposal of the collected garbage is carried out in two phases. There is a transfer station, which is used as a temporary dumpsite. This operation reduces the time needed to transfer the garbage from the neighbourhood, increasing the trips to about three per day. The city government rents the transfer station from the Philippine Port Authority (PPA). About 260 trucks deposit their loads here daily, which comes to approximately 214 cubic meter of waste. Thus a total 6,418 cubic meter of garbage is collected monthly. In the second phase of the process, the garbage is transferred from the station to the final disposal site. Leonel Corporation uses its own trailer vans to transport the garbage to the sanitary landfill (D. Lapid, 1997). According to MMDA regulations, hospital waste should be segregated and treated separately. However, it is common to see hospital waste in dumpsites, despite the obligation of the hospitals to have waste separately collected/treated/disposed. Leonel takes no responsibility for hospital waste.

Assessment of disposal activities

At the **policy/regulatory** level, only the regulations are known and others are not. It is not known whether there are incentives or barriers to effective and safe disposal. At the **organisational** level, it is not known what inspection or regulations are applied. At the **technical** level, a sanitary landfill is used, but hazardous or hospital waste is not reduced or separated out by the private company. At the **performance** level, the way that waste is treated or disposed of could not be traced, so that nothing is known about the extent burned or dumped.

Socio-economic sustainability

4. There is a monitoring system which has introduced from the company for the implementation of the regulations and the duties of the Corporation. For each district the task of the zone manager is to cheque whether the garbage is all collected and the areas cleaned, to report any disobedience among the drivers and workers. Besides that the local authorities have their own monitoring work on the performance of Leonel. Everyday inspectors are checking the collection of garbage. So additional to the contractual scheme which stipulates the task and the duties between the local government and the private company there is also a well functioned monitoring and supervision system to assess the execution of the agreement and the performance of the service resulting in the improvement of the co-ordination of SWM system.

Assessment of co-ordination

At the **policy/regulatory** level, there is a legal framework for the division of responsibilities between local authorities and the private company. At the **organisational** level, there is an agreement, a monitoring system and supervision provided between the two actors involved. At the **technical** level, the way of monitoring is not known. At the **performance** level, there is minimal level of service interruptions, and no overlap of responsibilities.

5. There are very limited data to assess the contributions of this alliance to the goal of financial viability.

Assessment of financial viability

At the **policy/regulatory** level, cost recovery is done through real estate taxes, with no specific garbage collection fee being raised. The interest rate on credit provided fluctuates, and the policy towards privatisation is positive. At the **organisational** level, the main source of revenue is the internal revenue allocation made by the national government from the real estate taxes collected. At the **technical** level, the details on the annual real estate tax collection are not known, and the privatisation occurs through contracting out. At the performance level, there is sufficient profitability for the company, and the rates are affordable for the local authorities. There is no information on the willingness to pay by the users.

6. Concerning employment conditions, the company employs all 650 employees formally, so the company should meet official regulations concerning the labour force. There is no explicit information on their current situation. This alliance does not take into account the activities of informal sector waste collectors and itinerant buyers, and there is no effort to integrate them into the formal system. The informal sector is seen as a competitor and there have been some conflicts.

Assessment of employment

At the **policy** level, the labour regulations to be met for employees are not known. At the organisational level, no training is required for the collection crew. All employees are formally employed, with security of employment. At the **technical** level, there is no information on the provision of protective equipment. At the **performance** level, the employees receive minimum wages. There is no information on increases or decreases in the number of employees.

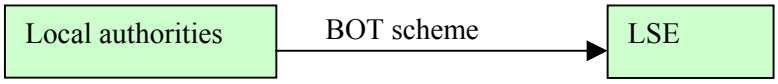
7. The local authorities seem to be satisfied with the effectiveness of the service of SWM provided by the private company contracted through the corporation. Manila City's approach to the solution of the solid waste problem has proven to be very successful as the city has been considered as the cleanest in Metro Manila. In a report from the Metro Manila Development Authority garbage collection in the city of Manila has been 97% efficient (D. Lapid, 1997)

Assessment of cleanliness
At the **policy/regulatory** level, there is no information on sanitation bylaws. At the **organisational** level, there is no information on the activities of health-environment inspectors.
At the **technical** level, there is door-to-door collection, but nothing is known about the extent to which certain areas are left out, or remain accessible to the collection crews. At the **performance** level, 85% of the households have regular solid waste collection (UNCHS, 1997), with around 97% of the waste being collected. The service frequency is 2-4 times per week, and residents find their streets/neighbourhoods to be cleaner.

8. The legitimacy of this alliance is fully achieved, as it is based on legislation and contracts for the transfer of the provision of the service from the public to private sector. Practice showed that there is no strong public opposition to privatisation efforts.

Assessment of legitimacy
At the **policy/regulatory** level, the actors are supported by law, and are part of the formalised system.
At the **performance** level, there are no public objections. The actors are also not harassed by the authorities.

3.3.2 Local authorities - Large scale enterprises



In recent years, many foreign large-scale enterprises have approached local governments in the Philippines to promote their method of MSWM. Municipalities often tend to believe that there are cheap quick-fix solutions for SWM under the Build Operate and Transfer (BOT) scheme through large companies. This is a public-private partnership whereby the private firm is authorised to finance, build and operate the service for an agreed period and on agreed terms before transferring it back to local government. Since large capital investments are involved, the main consideration of the private companies is economic viability. Other major concerns are efficient collection, transport and disposal of garbage. This has many implications for the role of micro- and small enterprises (Lapid, 1999).

Such a case of privatisation was the debate for the agreement between Metro Manila and a private firm. The firm would invest billions of dollars for the construction of an incinerator plant with state-of-the-art emission control devices, provided that the Manila Metropolitan Development Authority would guarantee a daily delivery of at least 3,000 tons of garbage. No BOT projects in MSWM have been approved and carried out yet.

Contribution to sustainable development goals

Environmental aspects

The main concern for the large private contractors is the profit that they can get from these activities rather than environmental considerations. Revenues depend on the volume of solid waste collected, transported, treated and disposed. The more garbage burned or disposed of in the landfill, the higher the tipping fees collected. The need for maximum and efficient collection is therefore evident. The government guarantee that 3,000 tones of garbage per day would be delivered at the incineration plant, would mean that more than half of Metro Manila garbage would be disposed of in this manner.

1. There is no minimisation of waste generation in this alliance. On the contrary, private contractors have an interest in incinerating recyclable materials, as this will increase their revenues.
2. No recycling activities are carried out.
3. There is effective disposal, although nothing is yet known about possible hazardous emissions.

Assessment of environmental aspects

At the **policy/regulatory** level, there is relevant legislation. The Clean Air Act was passed in the Philippines, which prohibits incineration, and mandates closure of open dumpsites within 6 years starting from 1998. This Act will prevent this alliance from continuing. At the **organisational** level, nothing is known about the way inspections take place. At the **technical** level, the method used is incineration, but nothing is known about the separation of hazardous or hospital waste. At the **performance** level, 3000 tonnes of waste (in the plan) will be treated daily. This alliance can only be assessed according to the plans made.

Socio-economic aspects of sustainable develoment

4. This kind of arrangement (BOT) could improve co-ordination of MSWM services because of the fixed agreement between Manila Metropolitan Development Authority and the private firm.

Assessment of co-ordination

At the **policy/regulatory** level, there is a legal framework for dividing tasks and responsibilities. At the **organisational** level, there is a legal agreement. However, nothing is known about the monitoring and supervision to be carried out between the two actors. This also applies to the **technical** level. At the **performance** level, the idea was that there would be minimal service interruptions, and no overlapping responsibilities.

5. However, the costs involved were too high. Metro Manila would have to pay a minimum of US$177,000 a day to burn 3,000 tons, or US$59.00/ton. The financial arrangement was too expensive for a local government. If the private contractors would be interested in recovering recyclable materials, this could lead to the marginalisation of existing systems of small-scale recovery and trade by itinerant waste buyers and junkshop operators (Lapid, 1999).

Assessment of financial viability
At the **policy** level and **organisational** level, cost recovery was through the tipping fee paid to the company and the sale of energy produced in incineration. There was no information about the interest rates on the credit possibly provided. The local government was in favour of privatisation. At the **technical** level, nothing was known about revenue collection methods. Privatisation was in the form of BOT. At the **performance** level, cost recovery is presumed to be profitable to the entrepreneur. For the local authority, the system was not affordable, and the willingness of users to pay for this expensive form of service was low. Nothing was known about the level and stability of prices of raw materials in comparison to other forms of fuel.

6. Explicit information about the quantity and quality of employment to be created was not available. There is an implicit competition between those working in recycling in the informal sector and the private company eliminating access to waste. However, the employment created by the company could draw in those workers for its SWM activities.

Assessment of employment
At the **policy** level, the labour regulations to be met for employees are not known. At the **organisational** level, there is no information on the provision of training to employees regarding their activities. None of the employees will be part of the informal sector. Nothing is known about the level of security and safety in employment to be provided. At the **technical** level, it is not known whether protective equipment will be provided. At the **performance** level, it is not known whether income levels will cover basic needs or have extended coverage. Employment levels could create conflicts and affect informal sector employment.

7. The contribution to the goal of clean urban environment is questionable. At the neighbour level, cleanliness could increase. However, the operation of the incineration plant could lead to harmful emissions containing cancer-causing dioxins, as well as present problems of handling and disposing of toxic ashes and other residues.

Assessment of cleanliness
At the **policy/regulatory** level, there is no information on sanitation bylaws pertaining to disposal problems. At the **organisational** level, there is no information on environmental inspectors. At the **technical** level, door-to-door collection is not applicable. There is also no transfer of waste to other areas. There is no information on the accessibility to areas of the city. At the **performance** level, performance is foreseen to cover the major portion of households, and services to be carried out several times per week.

8. In terms of legitimacy, the alliance has the legal backing based on contracting out of the service from the municipality to the enterprise. But there is little social acceptance by the public, due to the risks to public health from emissions of the incinerator plant.

Assessment of legitimacy
At the **policy/regulatory** level, the actors are legal and come under formalised agreements. However, public objections remain. The other levels remain to be seen in practice.

Conclusions on strengths and weaknesses

This type of alliance could achieve some ecological goals and solve serious problems for Metro Manila, in terms of disposal and the performance of the existing dumpsites.
However, given the high costs for the municipality and the social costs that could arise (such as increased unemployment for informal workers and polluting emissions), this partnership is unable to gain the acceptance of the host community even if it is supported by the legislative framework.

3.3.3 (Large Scale Enterprises -) Local authorities - Small Scale Enterprises

This kind of alliance links three actors in a functional way. Through the professional services of private companies, highly urbanised local governments will be assisted in the design, construction, operation and management of their sanitary landfills while phasing out their old open dumpsites. The programme called SWEEP (Solid Waste Ecological Enhancement Project) provides this type of partnership. One of the priorities of this project is micro-enterprise development, including mainly dealers and itinerant waste buyers. Under the Social and Ecological Support Program of SWEEP, these groups are encouraged to organise co-operatives, carrying out small-scale collection in densely built up neighbourhoods, street sweeping, sorting, recycling and composting. This is social integration or the formalisation of the informal sector in municipal solid waste management. This has not been done before in the Philippines. However, this project has not been put in practice yet (Lapid, 1999).

Local government is the project manager, and bears the cost of loan provided by the World Bank. It also retains the decision and policy-making powers on how to carry out solid waste management, through promoting waste minimisation and materials recovery.

Contribution to sustainable development goals

Environmental issues

The project to be carried out by this alliance is at a very early stage and does not provide any results or experiences yet. However, it can be analysed as far as its preparations and objectives allow. It is already said that the vision of the project is in line with Ecological Waste Management (EWM). Source separation, re-use, recycling, and composting are primary methods for handling and treating the waste in the project. Sanitary landfill is the option for final disposal of the waste.
Even though there are no results yet from the operation of the project, the ecological priorities set indicate the directions of the project and possible significant contributions to goals of sustainable development.

Assessment of environmental aspects

1. There is no minimisation of waste activities foreseen in the project.

2. Recycling is a major activity foreseen in the project.

At the **policy/regulatory** level, there is no information on the effects of relevant legislation or incentives/barriers to recycling activities. At the **organisational** level, there is no information on the length of trading chains, or existence of junk shops. At the **technical** level, separation at source and segregation of waste and trade activities are to be stimulated. At the **performance** level, it is hoped this process will increase, but there is no information on how much.

3. Reducing the amount of waste that goes to final disposal is a major goal of the project.

At the **policy/regulatory** level, the legislation requires closure of open dumpsites within 6 years of the law, starting in 1998. This is a major incentive to carry out this project effectively. There is no information on the **organisational** level on the ways of inspection and monitoring to be used. At the **technical** level, sanitary landfills will be used. There is no information on how hazardous and hospital waste will be treated. Nothing can be said about the **performance** level as yet.

Socio-economic aspects of sustainable development

4. This alliance is the first time in the Philippines that the informal sector will be widely integrated into the MSWM system, and accepted and recognised as an important actor in the process. It is clear that this kind of partnership involving formal and informal sector in functional co-operation with the local authorities provides significant improvements to the co-ordination of the service.

Assessment of co-ordination
At the **policy/regulatory** level, there is a legal framework for the division of tasks and responsibilities. At the **organisational** level, there is an agreements. There is no information on monitoring systems and supervision. At the **technical** level, there is no information on the way of monitoring. At the performance level, there is no information on service interruptions, or overlapping activities and responsibilities.

5. There are no specific data for the financial flows and costs of the project. However, through the introduction of resource recovery, the municipality is trying to prolong the life of the existing sanitary landfill to avoid the expenses of a new sanitary landfill.

Assessment of financial costs
At the **policy** level, cost recovery is to be done through fees paid for garbage collection, and commercial rates are to be charged for credit provided. At the **organisational** level, there is access to credit from the World Bank for development costs. Sources of revenues include real estate taxes and garbage fees, and there is no knowledge on the reliability of suppliers. At the technical level, it is not known how revenue will be collected.
The following **performance** level is predicted. There will be a low degree of cost recovery, and there is no question of profitability for the local government. It will be affordable for local government, and there should be a willingness to pay. The prices of secondary recovered materials will fluctuate.

6. The fact that the role of the itinerant waste buyers, junk dealers, and small recyclers will be safeguarded and expanded and the efforts of the local authorities to encourage these groups

to organise into co-operatives for small-scale collection should result in more secure and increased employment. If this is not the case, the local government already includes in its proposals full compensation or rehabilitation of affected persons/families.

Assessment of employment
At the **policy** level, there is no information on any labour regulations that should be met for employees. At the **organisational** level, there is no information on the provision of training to employees regarding their tasks. There will be an enormous increase in the formalisation of the activities of large numbers of people whose activity is currently part of the informal sector. This is supposed to provide them with more secure and safe employment. At the technical level, protective equipment is supposed to be provided. At the **performance** level, there is no information that can be used to predict performance in the future.

7. There are no reliable data regarding the effectiveness of the service to a clean urban environment as the project has not been in practise until now.

8. The legitimacy of the project is safeguarded in principle, as it is carried out by local government, and informal activities are condoned by the local authorities.

Assessment of legitimacy
At the **policy/regulatory** level, the actors are supported by law, and formalised. At the **performance** level, there are the following predictions. In one area, there are public objections. The actors are not harassed or penalised.

Conclusions on strengths and weaknesses

This alliance has not yet experienced any results so the assessment is more a prediction that based on an existing situation. The indicators used are a few qualitative indicators, which reflect a number of aspects of the alliance. Based on these indicators this alliance seems to contribute to environmental goals, through source separation, recycling and reduced necessity for sanitary landfills.

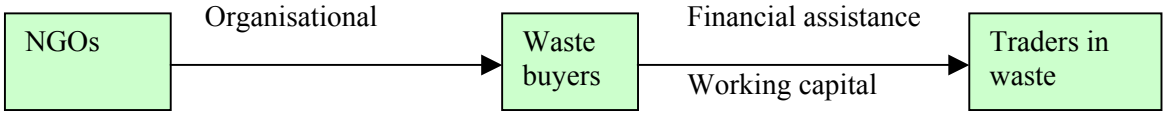
In terms of socio-economic aspects, the main aim of the project is to integrate the informal sector with formal sector activities. This improves co-ordination, formalises the unofficial employment of waste pickers, and provides a legal framework for the alliance.

3.3.4 NGOs - waste buyers - traders in waste materials

This alliance was an initiative for community-based SWM in Manila because of the increase in the quantities of waste and inadequate existing systems to collect and dispose the garbage. An NGO in the city, the Metro Manila Council of Women Balikatan Movement (MMWBM) has initiated a recycling programme by forming co-operatives of itinerant waste buyers and dealers (junk shops); providing them loans, and assisting them to increase the opportunities for recycling. The co-operatives have an apex body, the Metro Manila Federation of Environment Co-operatives. The NGO has negotiated soft loans for the recyclers co-operatives and supports them in developing more bargaining power and closer relations with large recycling enterprises.

MMWBM was started as a source separation project in San Juan municipality (Metro Manila). With the assistance of the Mathay foundation, the programme called Linis Ganda expanded to other areas of Metropolitan Manila. Individual households are encouraged to

separate their waste into wet and dry components. Appropriate and protective equipment is provided to traditional waste pickers and itinerant buyers - now called eco-aids - who are recruited and supervised by waste recovery materials dealers. Dealers and the project jointly fund collection carts to improve waste dealers' "micro-business". Eco-aids pay households for recovered dry MSW components with daily advances received from waste dealers. MMWBM organises the routes and schedules for the collection of the garbage and promotes source separation through campaigns.
The local government is not much involved with the project initiated by the NGO. However, its role could be a necessary complement to the project.



Contribution to goals of sustainable development

Environmental issues

The promotion of source separation and recycling of waste among a large number of households leads to an essential contribution to the goal of increasing the recycling of materials.
In San Juan, the number of households participating in the waste separation selling-programme has expanded to 20,000. The eco-aids collect 50 tonnes of recyclable materials per month during the dry season. The significance of the contribution of this alliance can be seen from the fact that recovery of solid waste in San Juan increased from 10% in 1983 to 35% in 1994 (Taylor, 1998).

In Metro Manila area the co-operatives of recyclers and middle dealers collect recyclable materials from 200,000 households, schools and commercial areas which includes around 1,989 ton of paper, 1,600 ton of plastic, 2,000 of glass, 3,000 of metal per month (I. Lardinois, C. Furedy, 1999).

Assessment

1. The alliance does not incorporate minimisation of waste activities.

2. There are contributions to maximising recycling. At the policy/regulatory level, the main incentive to increase recycling is the available given to collectors. There is no information on possible relevant legislation. At the organisational level, the length of the trading chains runs from households, itinerant buyers, to dealers and the recycling industry. There are junk shops, which buy materials. At the technical level, there is source separation by 200,000 households participating in Metro Manila. There is also segregation of waste and trade activities. At the performance level, 35% of the waste stream is recovered- 50 tonnes of collected recyclables per month (San Juan). This includes around 1,989 ton of paper, 1,600 ton of plastic, 2,000 of glass, 3,000 of metal per month (Metro Manila).

3. This alliance does not contribute to safe disposal; however, it does reduce the waste flows going for final disposal by a significant amount.

Socio-economic aspects of sustainable development

4. This alliance improves the co-ordination of the service, carried out by the actors involved. But the absence of the local authorities and the fact that the project is not integrated into local SWM systems has negative consequences for the co-ordination of SWM services as a whole. However, the recent legislative agenda seems to indicate that the local government has joined the crusade.

Assessment
At the **policy/regulatory** level, there is no policy for a clear division of tasks, roles, and responsibilities. At the **organisational** level, there are agreements in some cities. There is no monitoring system, but there is supervision. There are three actors involved. At the performance level, there is no information on service interruptions. There are no overlapping activities and responsibilities.

5. The eco-aides receive fixed prices for the various recovered materials regardless of market price fluctuations. The advocacy of MMWBM and other groups has recently led the Philippines' Department of Trade and Industry to approve a soft loan package (US$9,000) for eco-aides to use as working capital in their daily operations. The Federation can also access collateral-free soft loans for its member co-operatives from the Land Bank. The money is loaned to the federation at 6% annual interest with one year to pay. Then the co-operative dealers can re-loan this money at 12% annual interest with a negotiable payback period and use it as capital to maintain and expand their activities. The Department of Social Welfare and Development has also released financial assistance (US$3,600) to a group of eco-aides as seed capital for income-generating programmes. Based on calculations about the costs and benefits of the actors involved in the programme, the dealers increased their gross incomes from % 8.48 (big dealers) to 48.36 (small dealers). The itinerant buyers increased their income, due to better access to storage space and consequently increased sales (I. Lardinois, C. Furedy, 1999).

Assessment
At the **policy/regulatory** level, cost recovery was carried out through soft loans, direct financial assistance, and donations. The interest rate on credit was either 6% or 12%. This is a policy towards privatisation with NGOs. At the **organisational** level, there was access to credit. There was no information on the sources of revenue of the recyclers from their sales, or the reliability of their suppliers and buyers. At the **technical** level, there was no information on how revenues were collected by recyclers. At the **performance** level, there was a low degree of cost recover. Profitability was higher for dealers. Whether this was affordable for users is not clear, nor whether they were willing to pay for actual services. The project guaranteed fixed prices for raw materials, regardless of the market price fluctuations

6. In total, 572 dealers with more than 2000 itinerant buyers and employees have so far joined the project. In addition the "eco-aides" are working under improved job conditions and their role in cleaning the city is accepted by the public. This alliance results in a higher number of employees and a higher quality of employment (secure and safe).

Assessment
At the **policy** level, there is not information about any labour regulations that should be met for the employees. At the **organisational** level, there is no information on the provision of

training to the employees regarding their SWM services. A high number of the employees from the informal sector are incorporated in this project. It provides improved working conditions in terms of secure and safe work, as well as social security coverage. At the **technical** level, there is no indication of the provision of protective equipment. At the **performance** level, income levels are increased, and levels of employment also rise.

7. The last socio-economic goal is also achieved, as the system is really effective. More than 200,000 households in Manila receive are provided with a weekly service collecting their paper, plastics, bottles, cans, metals, car parts and batteries. In San Juan, the number of households participating in the waste separation selling-programme has expanded to 20,000. The eco-aides collect 50 tonnes of recyclable materials per month during the dry season. The widespread participation of households and the large amounts of materials that are recycled, indicate that fewer materials are considered waste and more as recyclables. This leads to improvements in the cleanliness of the urban environment.

Assessment
At the **policy/regulatory** level, there is no information on relevant sanitation bylaws. At the **organisational** level, we do not know whether health-environment inspectors are involved. At the **technical** level, there is door to door collection, but no information on the transfer of waste to other areas or the accessibility of all areas to waste collectors. At the **performance** level, more than 200,000 households in Manila, 20,000 in San Juan received services. The volume of collected waste was50 tonnes per month during the dry season. There are no regular routes and schedule, but clean streets/neighbourhood have resulted.

8. Even if the local authorities are not directly linked to the actors, this alliance is officially recognised and accepted by most of the local society. Therefore this alliance has largely reached the goal of high legitimacy.

Assessment
At the **policy/regulatory** level, the actors are not supported by law. The actors are formalised as members of co-operatives. At the **organisational** level, not much is known about he co-operatives themselves. At the **performance** level, there are no public objections, nor are the actors harassed or penalised.

Conclusions on strengths and weaknesses

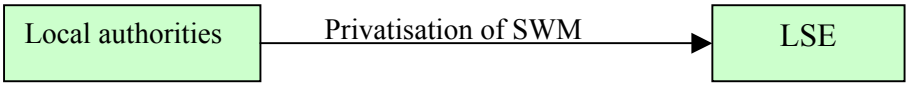
This alliance stresses the need to combine ecological priorities with socio-economic objectives as the base for success. This includes both separation at source and increasing recycling for a better environmental performance, as well as formalising informal economic actors (itinerant buyers, junk dealers) into the system in a more effective way. Results indicate the alliance is socio-economically viable in terms of employment and costs. All stakeholders seem to have benefited from the efforts.

3.4 Lima (Peru)

3.4.1 Local authorities - Large Scale Enterprises (LSE)

The poor quality MSWM service provided to municipality by Lima Metropolitana through the Municipal Cleansing Enterprise of Lima (ESMLL) during the past years and the new neo-liberal approaches, led to increased interest to privatise solid waste management in Lima. In

1996 a Peruvian-Brazilian consortium under the name RELIMA signed a contract with the municipality to carry out all SWM activities for ten years. It has the responsibility for cleaning, sweeping, collecting and transporting the waste in Lima Downtown (Lima Cercado) and managing two municipal transfer points and final disposal sites (2 sanitary landfills) for the waste produced in the whole city. There is a board called SUMSEL to control the operation of the private company and to co-ordinate with other municipalities. The 43 district municipalities within Lima Metropolitana are responsible for cleaning, sweeping and collecting within their jurisdiction, and for transport to the transfer points or final disposal. Each municipality seeks its own balance between public and private actors to accomplish this task. In some districts, micro-enterprises also have a role in the formal system.



Contribution to goals of sustainable development

Environmental issues

The agreement on provision of SWM services between the municipality of Lima Metropolitana and the private firm did not include any recycling or waste separation activities. The goals of minimising waste and waste recovery were totally ignored. But Relima succeeded in improving the sanitary landfill and as a result more waste is disposed at the landfills instead of dumped on public areas (de Bruin, 1998). In the first 11 months of operating, Relima treated 475,804 tons of waste, which is almost 42% of the waste produced in the Metropolitan area of Lima (Relima, 1997). Relima however has no possibilities to force the district municipalities to dump their waste at the sanitary landfill. Many district municipalities and private contractors prefer to evade a small charge levied on each truck entering the sanitary landfill, and prefer to dump the waste on illegal dumps.

Assessment

1. There is no minimisation of waste activities.

2. There are no recycling activities carried out in this alliance.

At the **policy/regulatory** level, legislation prohibits recycling activities until the waste reaches the landfill. This forms the main barrier to increase recycling and separation at source. At the **organisational** level, there are no trading chains involved in this alliance. There are no junk shops or composting plants in this alliance. At the **technical** level, there is no separation at source, or segregation of waste and trade activities. At the performance level, there cannot be an increase in the percentage of the waste stream that is recycled, recovered or re-used.

3. Disposal activities

At the **policy/regulatory** level, there is no information on relevant legislation, incentives and or barriers. At the **organisational** level, there is no information on monitoring and inspection systems. At the **technical** level, sanitary landfill is utilised. There is no information on reduction and separate disposal of hazardous or hospital waste. At the performance level, the proportion of treated solid waste is 42%. The main disposal method is the sanitary landfill in which 42% of the waste is put.

Socio-economic aspects of sustainable development

(Point 4 to 7) There are no available data to show the contribution of this partnership to the improvement of the co-ordination within the SWM sector, on the economic viability of the system, or on changes in quality and quantity of employment. In terms of effectiveness of the service in providing a clean urban environment , the fact that Relima collects 80-95% of the garbage produced in Lima Downtown indicates a successful collection system. This really has a positive effect on creating a clean and healthy local environment, and minimising health risks from the accumulated waste in the streets.

Assessment
At the **policy/regulatory** level, there is no information on relevant sanitation bylaws. At the **organisational** level, there is no information on health - environment inspection systems. At the **technical** level, there is no information on ways of waste collection, or accessibility of areas to collection crews. There is no transfer of waste to other areas. At the **performance** level, there is no indication of the percentage of households with regular solid waste collection. The volume of collected waste is between 80 – 95%. There is no information on the frequency of service provision, or the cleanliness of streets and neighbourhoods.

8. The alliance is enforced easily with the support of the metropolitan government, as far as the Metropolitan Municipality can enforce it. As soon as it comes to the relation with the district municipalities, they lack the necessary legitimacy.

Assessment
At the **policy/regulatory** level, the actors have legal support. The actors are also formalised. At the **performance** level, there are no public objections. However, the actors are harassed and penalised.

Conclusions on strengths and weaknesses

As far as the information allows an assessment, this alliance achieves better disposal management but no other environmental goal. In terms of socio-economic issues, its effectiveness lies mainly in the greater cleanliness of the urban environment.

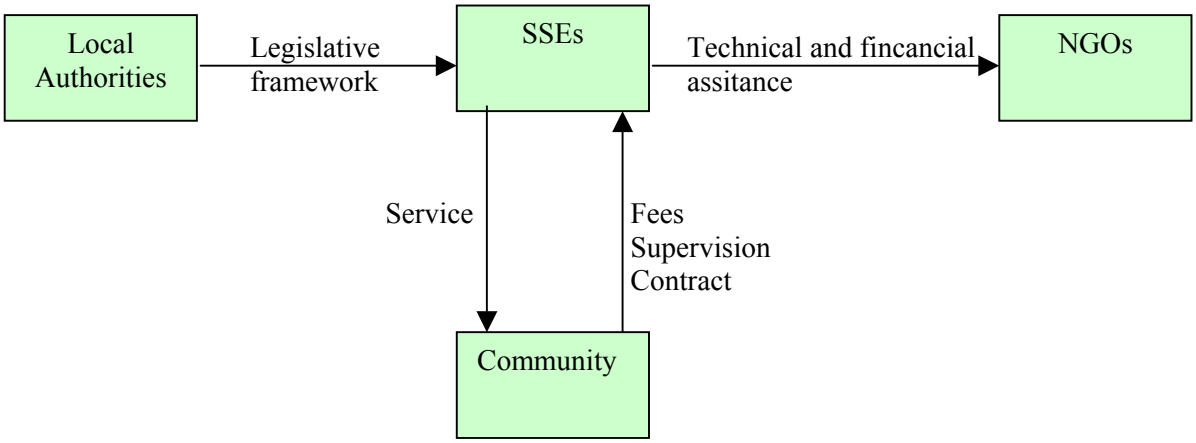
3.4.2 Local authorities - NGOs - Small Scale Enterprises

A massive expansion of small-scale enterprise started in 1989, when pilot projects showed the technical feasibility for collection and recycling through these enterprises. They basically operate in those areas where the municipality was providing inadequate service, and form an alternative in areas inaccessible to trucks. IPES is an NGO active in the field of SWM. They initiated a large programme to promote employment, health and environment in Lima, called PROESA. 140 micro-enterprises were formed with the help of IPES, and started operating in 14 districts. IPES also provided technical and financial assistance to the micro-enterprises and consultancy services to the municipalities. Women from low-income settlements formed the majority (70%) of the SSE entrepreneurs.

The programme demonstrated two different models of relationships between the actors. In the first model, micro-enterprises provided services to the local communities, with residents supervising the process. Residents pay the local authorities for the service, which in turn

contracts out and pays the small enterprise. This model did not work in practice because payments from the community to the municipality lagged behind, nor did the municipality pay the micro-enterprises regularly. In the end the micro-enterprises collapsed because of lack of income.

The second and more successful model is based on a closer relation between local community and micro-enterprises. The community who receives the service not only supervises and contracts out to the micro-enterprises, but also pays them directly when the waste is collected. The municipality retains responsibility only concerning the legislative framework of the small enterprise. These micro-enterprises have been able to survive by the direct relation with the beneficiaries and by charging the inhabitants affordable fees.



Contribution to sustainable development

Because the first model has not endured, only the second and successful model provides the basis for this assessment.

Environmental issues

The main activity of the alliance is collecting waste and sweeping the area. At this stage no other ecological considerations were taken into account. So no other environmental goals were achieved

Assessment

1. There are no activities designed to minimise waste.

2. There are no recycling activities.

3. There are no activities for cleaner disposal.

Socio-economic goals in sustainable development

4. This alliance makes significant contributions to socio-economic goals. This model has resulted in a real improvement of the co-ordination of the SWM services even though it was based on complicated linkages. The direct relation between micro-enterprises and community and the financial and organisational support from the NGO, and better legislation by local authorities resulted in the improvement of the co-ordination of the service.

Assessment
At the **policy/regulatory** level, a legal framework for the division of tasks, roles, responsibilities was set. At the **organisational** level, an agreement was made. There was supervision between the three actors, but how the monitoring system was carried out is not known. Neither is there any information at the **technical** level, on ways of monitoring. At the **performance** level, there is no information on service interruptions, or overlapping activities and responsibilities.

5. The system was proved economically viable, because of its low costs compared to the conventional system. The operational costs for the SSE were US$ 10-15 per tonne of waste instead of US$ 26, as in the conventional system. Also the fact that the residents can pay directly the additional fees for the provision of the service means that financial flows are viable for both sides (SSE and consumers).

Assessment
At the **policy/regulatory** level, cost recovery is through affordable consumer fee. There is no data on interest rates on credit provided. This is a specific type of privatisation policy. At the organisational level, there is no information on access to credit, the regularity of sources of revenue, or the reliability of suppliers. At the **technical** level, there is no information on regularity of revenue collecting methods. At the **performance** level, the degree of cost recovery is high. There are some doubts about the profitability for the micro-entrepreneurs. For users, the services are affordable, and they are willing to pay. There is no information on the stability of prices of materials from recycling and trade.

6. The official acceptance of the micro-enterprises established through this alliance, have led to a significant improvement of local employment levels. Employees' wages are set above the minimum wage and they also receive social security. Secure employment was one of the main objectives and priorities set at the beginning of this programme. Although the training provided by the NGO also included training in health, hygiene and safety aspects when dealing with waste, this was neglected by many of the workers.

Assessment
At the **policy** level, there is no information on labour regulations that should be met for employees. At the **organisational** level, nothing is known about the provision of training to the employees regarding the SWM services. There is also little information on the number of employees whose activities are part of the informal sector. The alliance does provide a measure of social security as part of secure and safe employment. At the **technical** level, there is provision of protective equipment. At the **performance** level, wage levels exceed the level needed for coverage of basic needs. The alliance has also led to higher employment levels, especially for women entrepreneurs.

7. Another objective was the removal of the waste from the city, the cleansing of the streets and the maintenance of the parks and gardens. The alliance proved viable, the service effective and the results were very hopeful and successful in terms of the maintenance of a clean and healthy urban environment. It should be noted however that the project was most successful in the richer districts of the city, where inhabitants pay regularly for solid waste collection and sweeping, and where clear and lasting relationships with the municipalities were established.

Assessment
At the **policy/regulatory** level, there is no information on relevant sanitation bylaws. At the **organisational** level, there is no information on systems of health /environment inspection. At the **technical** level, there is both door-to-door collection as well as neighbourhood dustbins. There is no information on the transfer of waste to other areas or the accessibility of areas to collection crews. At the **performance** level, there is no information on the percentage of households with regular solid waste collection, the volume of collected waste, or the frequency of the service provision. It has led to clean streets/neighbourhoods.

8. The fact that the local government provides the backing for the implementation of this model of SWM system gives official recognition to the actors involved. Additionally the direct relation between the SSEs and the local community through the contracting out, supervision and direct payment leads to greater acceptance from the vast majority of the community. Therefore, the legitimacy of the alliance is quite high.

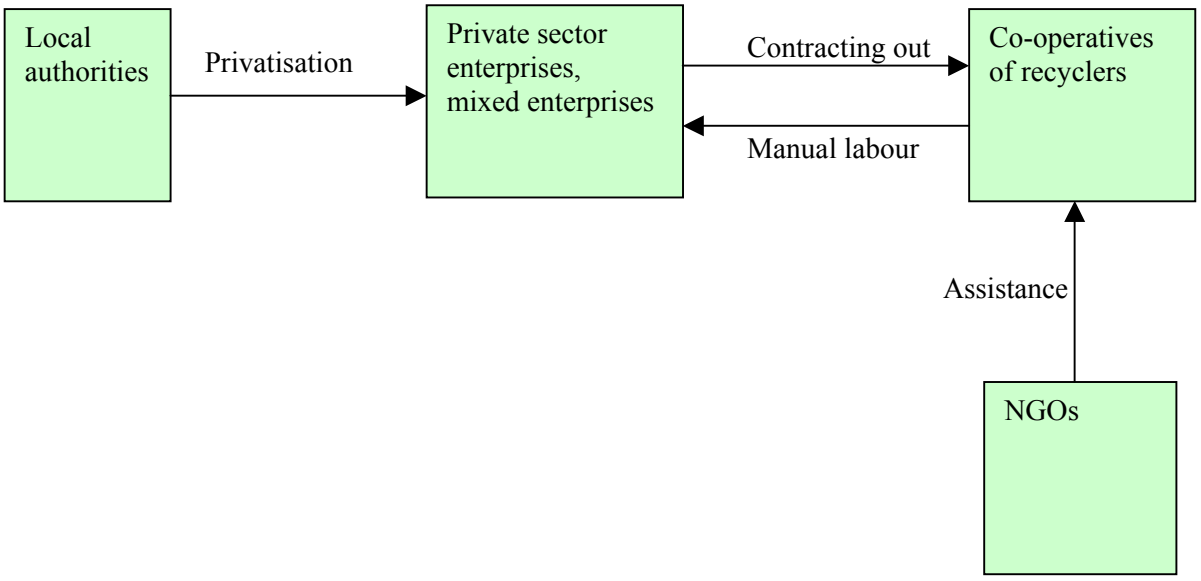
Assessment
At the **policy/regulatory** level, the actors are supported by law. They are also formalised. At the performance level, there were no public objections. The actors were not harassed or penalised.

Conclusions on strengths and weaknesses of the alliance

The main concerns of this alliance were social and socio-economic objectives, related to the formation of micro-enterprises and improved employment conditions. The main method used was incorporating the informal sector into the officially accepted system of SWM. The alliance has demonstrated that the objectives that were set can be achieved. This method is worth taking into account, because they can also include environmental goals within its priorities. Environmental goals were not included in the priorities of the alliance at this stage.

3.5 Manizales (Colombia)

3.5.1 a)Local authorities – private enterprises – b)recyclers - (NGOs)



In 1994 a law was approved which introduces obligatory privatisation of public companies. The mixed company Empresa Metropolitana de Aseo (EMAS) was created with the participation of private capital. The company provides waste collection services for the city of Manizales and operates the sanitary landfill. The company also continues the policy of contracting recycling groups as the City has supported organisations of recycling groups in the past.

Because recycling is prohibited within the company, another company was created with the recyclers called Ciudad Verde. Post – collection recycling and management of the new constructed plant at the landfill are the main tasks of this company. Local authorities and recycling co-operatives have both contributed capital for Ciudad Verde. Manual labour in waste collection is also subcontracted with Ciudad Verde, which has contracts with co-operatives of recyclers (Prosperar). Fundacion Social (Social Foundation) has launched different organisational processes for recyclers and provides assistance and support to co-operatives of recyclers.

Contributions to sustainable development goals

Environmental aspects

1. This kind of alliance does not contribute to the minimisation of waste during production processes, as its deals with collection of waste (EMAS) and recycling (Ciudad Verde).It was estimated in 1997 by Ciudad Verde, that the recycling plant recycled 8 % of the waste that arrived at the Esmeralda landfill. After the various materials are sorted, they are treated in various ways to become intermediate materials: compacting, cleaning and processing of plastic, and cut glass. The materials are subsequently sold to buyers and industries in Manizales, Medellin and Cali. The location of the plant at the end of the chain did not allow good quality material to be obtained, since the informal sector first extracted economically valuable materials and the co-operatives of recyclers went back to source separation activities (I. Duque, M. Sierra, M. Suremain, 1997).
   Manizales generates 180 tonnes per day, of which 25 % is recyclable. 80 % of the recyclable material is recovered: 10 % of this is recovered by Prosperar members, equivalent to 108 tonnes per month (J. A. Moreno, F. R. Rios, I. Lardinois, 1997).There is insufficient information on applied disposal methods, so the respective indicators cannot be used to assess the contribution of the alliance to this goal.

Assessment

There is no minimisation of waste activities. There are recycling activities carried out.

At the **policy/regulatory** level, there is relevant legislation. It prohibits recycling activities within the SW collection company, but permits it through a separate company (Ciudad Verde). There are legislative barriers to recycling activities. At the **organisational** level, there is no information on the length of the trading chains, or the existence of junk shops or composting plants. At the **technical** level, no information is available on separation at source or segregation of waste and trade activities. At the **performance** level, 8 % of the disposed waste goes through the plant, and 10 % of recyclable materials are recovered by Prosperar, equivalent to 108 tones per month.

2. There are no data on disposal.

Socio-economic aspects of sustainable development

3. The co-ordination of the SWM system was not well structured and functional in both companies in this alliance. Sometimes there were conflicts between EMAS and the co-operatives of street recyclers due to competition for materials. Many informal recyclers (not from the co-operatives) went back to their original recycling activities outside the plant, making the co-ordination at the plant more difficult. There were also conflicts with the inhabitants of some areas about the indiscriminate and inappropriate storage of materials in public spaces (I. Duque, M. Sierra, M. Suremain, 1997).
   At the operation of the plant from the Ciudad Verde there was friction between rigorous business practices in the new private company and the more flexible operations of the informal recyclers.
   The operations of the co-operative of recyclers (Prosperar) are subject to specific regulations. They begin as temporary co-operatives and must graduate to the full co-operative status within a set period of time. Within their development trajectory, they are supervised and members must take courses on co-operative organisation and management (J. A. Moreno, F. R. Rios, I. Lardinois, 1997).

Assessment

At the **policy/regulatory** level, there is a policy for the division of tasks and responsibilities for the co-operatives of recyclers. At the **organisational** level, there is no information on agreements, or monitoring systems. However, there is supervision for the co-operatives of recyclers in the alliance. The alliance concerns three actors. At the **technical** level, there is no information. At the **performance** level, there is no information on service interruptions. There are overlapping activities and responsibilities between the partners.

4. The financial and economic situation of the two companies was quite different. The EMAS company still continues to operate in contrast to the Ciudad Verde, which was shut down and liquidated. There is no explicit information on the financial condition of EMAS, but the fact that it still operates suggests it is viable. With regard to Ciudad Verde, in 1996, there was a loss of $250 million pesos and the situation did not improve in 1997. By the end of 1997 the company was in the process of liquidation (I. Duque, M. Sierra, 1997).

Assessment

At the **policy/regulatory** level, there is no information on ways of cost recovery, the interest rate on credit. There was a positive policy towards privatisation. At the **organisational** level, there is no information on access to credit, sources of revenue, or the reliability of suppliers. At the **technical** level, how revenue was collected is not known. At the performance level, there was a low degree of cost recovery. The profitability was lacking, as Ciudad Verde proved to have losses. The services were affordable for the users. There was no information on the willingness to pay by users, or the stability of prices of raw materials.

5. In terms of employment, EMAS provides about 256 jobs including the landfill operation. EMAS also offers education and training for its employees and informal recyclers. The recyclers are considered the last actor in the recycling chain. Thus, they are requesting more and better opportunities to improve their working conditions. They ask to be provided with basic services such as health, education and housing and support from local government. Presently, however, the job of a recycler is looked upon with mistrust in Manizales.
   On the other hand, the recyclers in the co-operatives (Prosperar) who are supported by the

Social Foundation are provided with a regular salary, health and social security and they also work in the field of environmental education for source separation (J. A. Moreno, F. R. Rios, I. Lardinois, 1997).

Assessment
At the **policy/regulatory** level, nothing is known about the labour regulations that should be met by the employers. At the organisational level, all employees are provided training regarding SWM services. It is not known how many of the employees also have activities in the informal sector. The members of the co-operatives have secure and safe employment. At the **technical** level, whether employees are provided with protective equipment is not known. At the performance level, salaries cover basic needs in the co-operatives. The employment level is 256 jobs (EMAS, and stable.

6. Manizales is currently (1997) generating 180 tons of waste per day. EMAS provides waste collection for the city of Manizales and for other towns in the Metropolitan Area with approximately a total 280 – 300 tons of waste per day. So the provision of the service seems to be effective based on the total amount of collected waste from EMAS.

Assessment
At the **policy/regulatory** level, nothing is known about sanitation bylaws. At the **organisational** level, there is no information on health/environment inspectors. At the **technical** level, there is no transfer of waste to other areas. There is no information on the accessibility of different areas. At the **performance** level, there is no information on the percentage of households with regular solid waste collection. The volume of collected waste is about 300 tons per day. The frequency of the provision of the service is unknown.

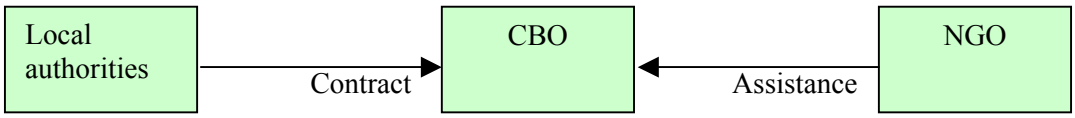
7. This alliance is based on a legislative framework, which was introduced to create the mixed company EMAS. Additional linkages between EMAS and the co-operatives of the recyclers go through contracting schemes and agreements. So all the actors are officially recognised and the scope of the alliance is fully enforceable, increasing the legitimacy of the alliance. Furthermore the fact that Manizales is a clean city compared to other Colombian cities, contributes to the social acceptance and recognition of the work of the recyclers.

Assessment
At the **policy/regulatory** level, the actors are supported by law. The actors are formalised. At the **performance** level, there are no public objections, nor are the actors harassed/penalised.

Conclusions

This alliance contributes to an increase in recycling activities at the plant. However, the problems in co-ordinating the SWM services arise because the sorting processes by informal recyclers have negative effects on the quality of the recyclables that reach the plant. Furthermore the Ciudad Verde company proved not to be economically sustainable and was liquidated. The service was very effective in terms of collection of the waste. Also the legitimacy goal is fully reached. The actors were supported by law and the public, which made the activities of this alliance enforceable.

3.5.2 Local authorities – CBO – NGO



CODOS is a co-operative group of 57 heads of households which can be defined as a community-based co-operative group. They basically provide collection and sanitation services to about 48,000 people. CODOS is supported by the Fundacion Social, an active NGO and is directly contracted by the local authorities. Presently, the services provided are paid for by EMAS, according to the volume of waste after collection. The group is in the process of developing, with very limited funding. Its basic aspirations are to acquire new equipment to expand coverage of their services, the number of members, and to continue to provide services to the City either through EMAS or directly (I. Duque, M. Sierra, M. Suremain, 1997).

Contribution to sustainable development goals

Environmental issues

This alliance does not deal with minimisation of waste or cleaner disposal activities. But they consider the management of organic materials to be very important, integrating this element into recycling. Other areas of interest include obtaining better training in recycling at source.

Assessment

1. There is no minimisation of production.
2. Recycling activities do take place.

At the **policy/regulatory** level, nothing is known about relevant legislation or incentives or barriers for recycling activities. At the **organisational** level, there is no information on the length of the trading chain, or the existence of junk shops or composting plants. At the **technical** level, there is separation at source and segregation of waste and trade activities. At the **performance** level, there is no information on the percentage of the waste stream that is re-used or recycled.

3. There are no disposal activities.

Socio-economic aspects

This alliance is very effective in terms of the organisation and co-ordination of SWM services. The CBO works parallel to the official collection service provided by EMAS and has a contract with EMAS, being paid according to weight after collection and disposal. In addition, the Fundacion Social supports its training and leadership process.

Assessment

At the **policy/regulatory** level, there is a policy and contractual framework for the division of tasks and responsibilities. At the **organisational** level, there is an agreement. There is no information available about monitoring and supervision systems. The alliance consists of three actors. At the **technical** level, the way of monitoring is not indicated. At the **performance** level, there are no data on service interruptions. There are no overlapping activities and responsibilities.

4. There is insufficient information to investigate the contribution of this alliance to the goal of financial viability. However, the operation of the CBO in MSWM and the establishment of the alliance proved to be viable over a period of seven years.

5. The lack of information regarding employment, does not allow us to make an overall assessment of the contribution of the alliance to healthy and safe employment. However, the fact that the CBO provides training to its members and to the community, indicates the potential of such activities on local employment and economy. Also the work is officially recognised and paid for by local authorities and EMAS.

Assessment
At the **policy/regulatory** level, it is not known what labour regulations should be met by the employer. At the **organisational** level, there is provision of training to all the members of the CBO. None of them are part of the informal sector. Nothing is known about how safe the employment is; the security would seem to be high as the local authorities recognise the services provided. At the **technical** level, it is not known whether protective equipment is provided. At the **performance** level, there is no data on income levels or increases in employment levels.

5. The group basically carries out collection of waste and sanitation services in the Comuna 2 area, which has about 48,000 inhabitants (the whole population of Manizales is 360,000). Their work is done with modern collection trucks. In less-accessible areas, they work on foot with baskets to collect solid waste. The collection amounts to approximately 7 tons of waste per day. So the service can be seen to be effective.

Assessment
At the **policy/regulatory** level, the sanitation bylaws are unknown. At the **organisational** level, there is no data on the health or environmental inspection system. At the **technical** level, there is no information on whether there is door to door collection or collection from neighbourhood dustbins. There is no transfer of waste to other area. There is no information on whether health inspections are actually carried out. Both mechanical trucks as well as manual technology is used according to level of accessibility of neighbourhoods. At the performance level, about 13% of the population receive regular solid waste collection (48,000 inhabitants)-13,3 % of the population. The volume of collected waste is about 7 tons per day. The frequency of the provision of the service is not known, nor whether it leads to clean streets/neighbourhoods.

6. The alliance has a high degree of legitimacy, as all the actors are officially recognised fby the local authorities. CODOS had a direct contract with the local government, and direct linkages with EMAS.

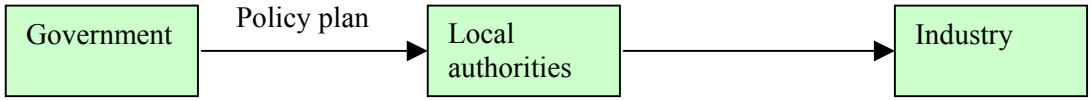
Assessment
At the **policy/regulatory** level, the actors are supported by law. The degree to which actors are formalised is not indicated. At the **performance** level, there are no public objections. The actors are not harassed or penalised.

<u>Conclusion</u>

This alliance focuses mainly on the collection of waste, but now takes environmental issues like source separation and recycling more into account. Because these activities are still at an

initial stage, the performance of this alliance in terms of contributions to environmental goals (recycling) cannot be assessed. The available information allows assessment only of its contributions to several socio-economic aspects. The strong points of this alliance are the improvement of the co-ordination and effectiveness of garbage collection and the adaptation of collection to accessibility of the various neighbourhoods. The areas that EMAS cannot access are served by the CBO through a contract with the company.

3.5.3 Government – local authorities - industries



The environmental policy of City of Manizales follows the governmental directives laid down in the National Program of Urban Environmental Studies. Presently the City of Manizales utilises the method of Economic Minimising of Environmental Impact of Industry (MEDIA). Implementing this programme, allows the development of procedures to prevent contamination by minimising emissions and waste generated by industrial processes. Industries that comply with city regulations and are located within the area of the development plan, are COLOMBIT, INDUSTRIA LICORERA DE CALDAS and PROGEL. The industries manage two types of waste: those related to production processes and waste coming from offices and cafeterias. In both cases the collection is done by EMAS. Charges are according to tonnage (I. Duque, M. Sierra, M. Suremain, 1997).

Contribution to sustainable development goals

Environmental aspects

1. In this section we will present details on how each factory implements the MEDIA programme and what environmental considerations are taken into account.

COLOMBIT: This factory works with highly toxic materials, such as asbestos, cement and cellulose. However, the factory uses computerised monitoring systems that continuously indicate the maximum and the minimum contamination levels. One hundred percent of the waste material is reintegrated into the production process. But there is no source separation of materials. Office paper is sometimes used as a raw material in its products or is incinerated.

INDUSTRIA LICORERA DE CALDAS: This is a state-owned company, which produces contaminants on a large scale. Its basic production is alcoholic beverages from sugar cane syrup. The company began negotiations with Manual MEDIA as a pilot company, due to high levels of contaminants and its economic importance in the area. One of the industry's solid waste products is glass, which is stored and then sold to glassmakers. Most of raw waste material is not re-used, such as the mud produced and the waste of raisins and carob. These waste products are used as agricultural fertiliser or bio-fertiliser. Although levels of external pollution have decreased significantly, the factory still produces high levels of waste materials. Nowadays there is an ecological group at the factory, that conducts internal recycling campaigns.

PROGEL: This company transforms the fleshy side of cattle hides to obtain basic gelatine. The consumption of raw materials is approximately 300 tons per week. Approximately 40 %

of raw materials are converted into waste, which is transported through special routes to the landfill by EMAS. It is not given special treatment and buried in selected areas.

In all these cases of waste produced by the factories, collection is done by EMAS with different routes and a specialised landfill area for industrial waste. There it is buried without any decontamination process. In conclusion, the city of Manizales does not use the most advanced technology in re-using and recycling or disposing of industrial waste. However, local authorities do strictly control the management and disposal of waste (I. Duque, M. Sierra, M. Suremain, 1997).

Assessment
At the **policy/regulatory** level, there is a policy for control of industrial waste. There is no information on incentives or barriers for CP. At the **organisational** level, there is a monitoring system for industrial waste production. The degree of compliance by factories with local government is high. At the **technical** level, the factories have cleaner production and cleaner technology, and one factory has some recycling activities. At the **performance** level, there is no information on the extent of reduction of waste produced

2. Overall, most factories do not have recycling activities.

3. Disposal is through simple burial, with no treatment.

Assessment
At the **policy/regulatory** level, there is no information on relevant legislation, incentives or barriers to safer disposal methods. At the **organisational** level, there is no information on inspection systems and sanctions. At the technical level, a degree of sanitary disposal measures are used at the dumpsite. However, the industrial waste is buried without any special pre-treatment. There are special routes and separate disposal areas for industrial waste. At the **performance** level, there is no information on the proportion of treated solid waste or the % of waste disposed of according to the different methods.

Socio-economic aspects

This kind of alliance stresses environmental considerations and is focused particularly on waste minimisation and safe disposal. The information available on socio-economic aspects is not sufficient to assess the contribution of this alliance to socio-economic aspects of sustainable development.

4. In terms of co-ordination of SWM activities, the alliance seems to function well, improving service co-ordination. The co-operation of the actors is based on the MEDIA programme with a clear division of responsibilities of each actor. Government acts as initiator, industries undertake activities to minimise waste from production processes, and local authorities and EMAS take care of appropriate transportation and disposal of the remaining industrial waste.

Assessment
At the **policy/regulatory** level, there is a policy for division of tasks and responsibilities. At the **organisational** level, there are agreements. There is no information on other aspects, such as monitoring systems, and systems of supervision. At the technical level, there is no information on Monitoring systems. At the **performance** level, there are no data on service interruptions. There are no overlapping activities and responsibilities.

5. Information for all the socio-economic aspects of sustainable development is not available. It would have been interesting to explore the financial viability of the companies introducing cleaner production technologies and better management of waste products, and the balance between extra costs of new technology to recycle waste, as well as decreasing costs through reduced waste production and lower demand for raw materials).

6. Implementation of new environmental policies may affect employment, which is another area of interest for the overall performance of the alliance.

7. There are no specific figures to indicate the effectiveness of the SWM services that this alliance carries out.

8. This alliance is fully legitimate, as all the actors are formalised and supported by law and the introduction of waste minimisation efforts does not raise any public opposition.

Assessment
At the **policy/regulatory** level, the actors are supported by law, and formalised. At the performance level, there are no public objections. Neither are the actors harassed or/penalised.

Conclusions
This alliance makes a significant contribution to waste minimisation, which is at he top of the SWM pyramid and has the greatest potential to contribute to environmental aspects of sustainable development. This alliance also shows ways of ensuring cleaner disposal and strictly controlled separation of industrial waste. The existing information is not enough to assess what contributions are made to socio-economic aspects of sustainable development. The available data only allows an assessment of the co-ordination of the SWM system, which is very functional, and the degree of legitimacy, that is fully achieved.

3.6 Overall presentation of case studies' results

The following tables show the overall results of the alliances and their contribution to the various aspects of sustainable development that were analysed in the context of different cities. It is a comparative picture of the existing alliances to illustrate the various areas to which alliances are contributing.

Table 10: Environmental aspects - comparison of alliances by city and contributions to the aspects of sustainable development at different levels

TYPES-CITY/Goals-levels	**Minimisation of waste**				**Re-use/recycle**				**Disposal**			
	P/R	**O**	**T**	**P**	**P/ R**	**O**	**T**	**P**	**P/R**	**O**	**T**	**P**
CHENNAI												
L.a. - NGOs - waste pickers	x	x	x	x	0	-	+	-	x	-	x	x
CBOs - waste pickers	x	x	x	x	x	-	+	-	x	-	x	x
Traders in waste, dealers, recycling enterprises	x	x	x	x	x	x	+	+	x	-	x	x
MANILA												
L.a. – private enterprise	x	x	x	x	x	-	x	x	-	-	+	+
L.a. – LSEs	x	x	x	x	x	x	x	x	x	-	+	+
(LSEs) –L.a. – SSEs	x	x	x	x	-	-	+	-	0	-	+	-
NGOs, waste buyers, traders in waste	x	x	x	x	+	+	+	+	x	-	x	x
LIMA												
L.a. – LSEs	x	x	x	x	x	-	x	x		-	+	+
L.a. – NGOs – SSEs	x	x	x	x	x	x	x	x	x	x	x	
MANIZALES												
L.a. – private enterprise-recyclers	x	x	x	x	+x	-	x	+	-	-	-	
L.a. – CBOs –NGOs	x	x	x	x	-	-	+	-	x	x	x	
Gov. – L.a. –industries	+	-	+	-	x	x	x	x	-	+	-	

Symbols:

L.a. = Local authorities, **LSE** = Large Scale Enterprises, **SSE** = Small Scale Enterprises, **NGOs** = Non Governmental Organisations, **CBOs** = Community Based Organisations

P/R: Policy/Regulatory level, **O**: Organisational level, **T**: Technical level, **P**: Performance level

+ = contribution to the goal , **x** = no contribution to the goal, **-** = insufficient information, **?** = some indicators not used because of lack of data, **0** = neutral contributio

Table 11: Socio-economic aspects and legitimacy - comparison of alliances by city and contributions to the aspects of sustainable development at different levels

TYPES/ CONTRIBU-TION/ COUNTRY	**Co-ordination**				**Financial viability (costs)**				**Employment**				**Clean urban environment**				**Legiti-macy**	
	P/R	**O**	**T**	**P**	**P/R**	**O**	**T**	**P**	**P/R**	**O**	**T**	**P**	**P/R**	**O**	**T**	**P**	**P/R**	**P**
CHENNAI																		
L.a. – NGOs – waste pickers	+	+	-	+	0	-	-	-	+	+	+?	+	-	-	-	+?	+	+
CBOs – waste pickers	x	x	-	x	+	-	-	+	-	-	-	-	-	-	x	+?	x	-
traders in waste, dealers, recycling enterprises	x	x	-	-	+	+	+	+0	x	x	x	+0	-	-	-	-	x	-
MANILA																		
L.a. – private enterprise	+	+	+	+	-	+	-	-	x	-	0	-	-	-	-	+	+x	-
L.a. - LSEs	+	+	-	-	+	-	-	x	-	0	-	-	-	-	+	+x	+	x
(LSEs) -L.a. - SSEs	+	+	-	-	+	+	-	+o	-	+	-	+	-	-	+	+	+	+
NGOs - waste buyers – traders in waste	+	+	-	+	+	+	-	+	-	+	-	+	-	-	+	+	+	+
LIMA																		
L.a. - LSEs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	±	±	+	+
L.a.–NGOs-SSEs	+	+	-	-	+	-	-	+	-	+	+	+	-	±			+	+
MANIZALES																		
L.a. – private enterprise-recyclers	±	±	-	x	-	-	-	x	+	±	-	+	-	-	±	+	+	+
L.a. – CBOs - NGOs	+	±	-	+	-	-	-	-	±	±	-	-	-	-	±	+	+	+
Gov. – L.a. - industries	+	-	-	±	-	-	-	-	-	-	-	-	-	-			+	+

Symbols:

L.a. = Local authorities, **LSE** = Large Scale Enterprises, **SSE** = Small Scale Enterprises, **NGOs** = Non Governmental Organisations, **CBOs** = Community Based Organisations

P/R: Policy/Regulatory level, **O**: Organisational level, **T**: Technical level, **P**: Performance level

+ = contribution to the goal , **x** = no contribution to the goal, **-** = insufficient information, **?** = some indicators not used because of lack of data, **0** = neutral contributio

CHAPTER 4 CONCLUSIONS

4.1 Discussion on analytical framework and indicators

The analytical framework that was used to analyse the alliances between different actors in municipal SWM in developing countries was developed from the concept of **sustainable development** and from the concept of Integrated Sustainable Waste Management (ISWM) and adapted to the SWM sector. The concept of sustainable development embodies the two basic tenets of meeting environmental goals as well as promoting socio-economic equity; from this basis, three **environmental issues** and four **socio-economic aspects** were defined as basic areas for assessing the SWM sector. Furthermore one more goal was added to complete the framework and to integrate legislative and political factors. The goal of **legitimacy** should be met by each alliance, so that it can be enforceable by legal backing and has social, public acceptance.
The eight goals were then analysed in such a way as to include the different dimensions of the partnerships. These includes the policy /regulatory dimension which refers to the regulatory and policy framework that the alliances are based on, the organisational dimension which describes the way that the actors are linked and involved in the alliance, the technical dimension which indicates the technical and technological means and ways that are used to carry out the activities that the alliance is dealing with. Additionally the performance dimension shows the outcome and the performance of the activities that the alliance is carrying out. The analytical model sets out the dimensions of sustainable development goals on the vertical axis, and the different goals of sustainable development on the horizontal axis. In table XX, the relevant indicators are shown to express the contribution of each alliance to the goals on different dimensions.
This analytical framework attempts to fill a gap in the existing literature in elaborating an integrated set of indicators relevant to alliances in MSWM from the actors' perspective. Although the broad used Driving Force – State - Response (DSR) framework, which was elaborated by UNCSD, includes social, economic, environmental and institutional aspects of sustainable development, it starts from primarily environmental considerations at the systems level and does not take into account the dynamics of various partnerships and alliances.

The indicators presented in the table below were selected in the first chapter and are based on a review of the existing literature related to indicators and goals for sustainable development, on the criteria for the selection of indicators. In the next section, they will be again examined in the light of the case studies of specific cities.

After a review of the existing literature, a first list of indicators was compiled. Based on the criteria for selecting indicators that were relevant, reliable, and measurable, a core set of indicators was selected to use in assessing alliances in the different cities. These indicators were divided into four dimensions, which were then used to study each alliance. Some indicators were very difficult to answer because of the complexity in gathering the relevant information. The indicators that were adaptable and answerable were used to analyse the different alliances in the selected cities. The indicators that were not used for the assessment of the various alliances could be studied to see whether they can be improved in definition and availability of data, so that they might be included with a core set of indicators in the future. The indicators selected from the literature review and used for the analysis and assessment of the case studies are presented in the table below. Some conclusions can be drawn from their analysis.

A first general conclusion is that the indicators in the existing literature refer mainly to the performance level without taking into consideration the variations in the policy/regulatory context, or the organisational and technical dimensions of the alliances. The DSR framework (and the list of indicators that are included in this) is the first analytical framework where institutional and socio-economic aspects are integrated as main factors of sustainable development. However this systems model does not take into consideration the dynamics of actors and their partnerships. These dynamics should be understood so that reasons behind changes in the performance (environmental and developmental) of the services that they carry out can be understood.

The literature review on indicators showed that there is considerable variety of specific indicators for each goal related to sustainable development in the sector of solid waste management.
Regarding the minimisation of waste it was difficult to find and define indicators applicable for third world cities, as this issue is very new for developing countries and requires appropriate approach (policy, instruments, technology). Currently, most policy makers still focus more on handling produced waste (end of pipe solution) than in preventing its generation at source.
There are many indicators that focusing on recycling activities but the most of them are not pertinent to the context of developing countries, as it is impossible to gather specific data for the complex indicators used. In addition, some indicators are immeasurable or hardly measurable (e.g. Amount of material recycled per person as a ratio of total waste generated, Usable material entering landfills).
A similar conclusion can be obtained regarding the indicators related to cleaner disposal. Some indicators (e.g. SW landfilled per capita per year) cannot be applied, as there is great difficulty in finding and counting precise and complex figures and data. The more complicated the indicator and the more difficult the data acquirement, the less reliable the information becomes.

Regarding the socio-economic issues, the literature proved to be short of indicators linking waste management and socio-economic issues. Evidently some indicators were found to be relevant to employment and health aspects and can be applied to the analytical model. As employment is a vital factor in development and a main concern for developing and developed countries there are many indicators that indicate aspects of employment. Some of them like the number of employees trained for jobs that are available in the local economy (H.E.D., 1999), and the percentage of the employees whose activity is part of the informal sector, were integrated into the analysis and could be easily applied in the case studies. Health and safety aspects of employment are also important issues in developing countries, so it was considered important to define indicators to cover these aspects (Furedy, 1997). However, the review literature did not provide many specific indicators related to these aspects. The existing literature focusing on health - environment indicators, did not take into account specific issues like indicators for health threats from waste. On the other hand, indicators regarding the collection of solid waste were very common and widely used, revealing the priorities in the waste management agenda (more oriented to a public health perspective than to recycling or prevention of waste production).
Concerning the indicators for the financial viability of alliances in SWM systems the selected indicators are broadly accepted as criteria for sustainable financial systems for all actors and activities involved. Profitability for the entrepreneur, affordability, and willingness to pay, for the municipality and for the users of the service are the main indicators to assess the financial performance of SWM systems. There are additional indicators related to the policy dimension

(ways of cost recovery), the organisational dimension (access to credit, sources of revenue) and technical dimension (interest rate on credit, revenue collecting methods) which complete the financial conditions of the SWM system.
As regards the goals of the improvement of the co-ordination of the SWM services and the legitimacy the literature was very limited, indicating the recent interest in these perspectives which still need to be integrated in SWM research.

The literature review also showed some indicators are mainly applied in specific alliances and activities, and not for others. Indicators concerning minimisation of waste and cleaner production technologies are mainly used to analyse alliances between government - local authorities – industries as they have the main responsibility for dealing with such activities and making efforts to minimise and prevent waste through changes in production processes and products.
Alliances in the recycling sector and on the trade of recyclable materials (e.g. traders in waste-dealers-recycling enterprises, NGOs – waste buyers – traders in waste) are assessed mainly through indicators that concern the goal of maximising recycling. There are also some indicators for such alliances concerning their financial viability. These indicators are the stability of prices of raw materials and the reliability of suppliers, which can be used in the analytical model only for an assessment of alliances dealing with trade of recyclables and recycling activities.

Table 12: contributions to sustainable development for each alliance per city

SUSTAINABLE DEVELOPMENT			Policy / Regulatory	Organisational	Technical	Performance
	Environmental goals	**Minimsation of waste**	- Relevant legislation - Incentives or barriers - Compliance with government	- Monitoring system of production	- Cleaner production technologies? - Separation and recycling by company? - Monitoring production system	- % of reduction of waste production
		Maximisa -tion of recycling	- Relevant legislation - Incentives or barriers	- Length of trading chains - Existence of junkshops, compacting plants	- Separation at the source? - Segregation and marketing of waste?	- % of waste stream that is recycled, reused
		Clean disposal	- Relevant legislation - Incentives or barriers	- Maintenance of regulation	- Sanitary disposal methods? - Reducing and separate disposal of hazardous, hospital waste	- Proportion of treated waste - Disposal methods and proportion
	Socio-economic goals	**Co-ordination of SWM**	- Legal framework for the division of tasks, roles, responsibilities	- Agreements, covenants - Monitoring system - Supervision - Number of actors involved	- Way of monitoring	- Service interruptions - Overlapping activities
		Financial viability	- Ways of cost recovery (fees, taxes, subsidies etc.) - interest rate on credit - Policy towards privatisation	- % of the employees whose activity is part of the informal sector - Security of employment	- Revenue collecting methods	- Cost recovery - Profitability - Affordability - Willingness to pay - Stability of prices of raw materials
		Employme nt (safety and health)	- Labour regulations? - Training for the employees?	- % of the employees whose activity is part of the informal sector - Security of employment	- Provision of protective equipment	- Provision of protective equipment
		Clean and healthy environment	- Sanitation bylaws?	- Health environment inspectors?	- Way of waste collection? - Transfer of waste to other areas?	- Way of waste collection? - Transfer of waste to other areas? - Clean streets/neighbourhoods? - Frequency of the provision of the service?
		Legitimacy	- Are the actors supported by the law - Are the actors formalised? (y/n)			

4.2 Alliances and their contributions to sustainable development

In this section, the alliances existing in the different cities studied are assessed using the indicators selected through the literature review. The table at the end of the previous chapter (Table 10 and 11) show the assessment of each alliance in the city using the selected indicators for the different dimensions of the alliances.

Table 12 in this section summarises the contributions to sustainable development for each alliance per city. It clarifies where there is insufficient information (-) to assess the contribution of an alliance to a particular aspect of sustainable development. This provides information on the areas where further research is needed to cover the lack of information for a more in-depth analysis and assessment. The table also indicates in what areas an alliance has a positive (+) contribution or not (x) to a goal. This provides the basic information to assess the contributions of the various alliances to specific aspects of sustainable development. This makes it possible for analysts and policy makers to make informed choices between types of alliances, in accordance with the local priorities they set in urban SWM.

4.3 City Comparisons

4.3.1 Manila, Philippines

I. Local authorities - large scale enterprises

Ecological sustainability

In this public-private alliance, the large private contractors have an incentive to maximise the amount of waste they dispose of as they are paid by the amount. Their demand for a guaranteed minimum amount of 3,000 tonnes of garbage would mean that more than half the Metro Manila garbage would be taken care of by them.

Socio-economic and public health goals

The costs of the contract between Metro Manila and the company were too high for a local authority (US$59.00/ton). In addition, the private contractors would also recover recyclables to increase their revenues, marginalizing itinerant waste buyers and junk shop operators (Lapid, 1999).

An assessment of employment opportunities was impossible, as no information was available on the comparison between loss of employment in the informal sector and gains in employee recruitment by the large contractor.
The contribution to the goal of clean urban environment is questionable because the operation of the incineration plant could lead to harmful emissions, and create difficulties in handling and disposing of toxic residues.

The strength of the alliance was that it could achieve some ecological goals and solve the problem of disposal and the performance of the landfills. Its weaknesses were the high costs for the municipality and the social costs like expected increase of unemployment and emissions, which made this partnership unacceptable to the host community.

II. Large scale enterprises - local authorities - small scale enterprises

Ecological sustainability

This tripartite public-private alliance is in a very early stage and can be examined through looking at its preparations and main objectives. The aim of the project is strongly oriented toward ecological goals, including source separation, recycling, and composting. The use of sanitary landfills as final disposal of the waste is a secondary aim.

Socio-economic and public health goals

Partnerships involving the SSE sector in functional co-operation with the local authorities make significant improvements in the co-ordination of the service.

There are no specific data on the costs of the project but the introduction of waste minimisation and resource recovery means the municipality is trying to prolong the life span of the existing disposal site to avoid the high cost of a new one.
The safeguarding of the activities of itinerant waste buyers, dealers and small recyclers by the municipality, and their encouragement to organise co-operatives creates more secure and long term employment. The municipality also includes social security benefits to families affected by the project.
This alliance has many strong points on ecological and socio-economic grounds. However, it remains to be proven on the ground.

III. NGOs - waste buyers - traders in waste materials

Ecological sustainability

In this NGO-private alliance, source separation of waste by large numbers of households leads to essential contributions to the goals of waste minimisation and increased recycling. The recovery of solid waste in San Juan municipality increased from 10% in 1983 to 35% in 1994.

Socio-economic and public health goals

This alliance has improved the co-ordination of the service among the actors involved. But the local authorities are not involved so that these activities are not integrated into SWM as a whole system.
The data is insufficient to assess the financial viability of the alliance. The buyers receive fixed prices for recovered materials regardless of market price fluctuations. The NGO has provided the buyers with access to credit from government sources for working capital, and for seed capital for other income-generating programmes
Almost 500 dealers with more than 2000 itinerant buyers and employees have so far joined the project. Better working conditions and greater public acceptance of their work lead to more and higher quality employment.
The large-scale participation by households and the large amounts of materials recycled contribute to a cleaner urban environment.
The strength of this alliance was to combine ecological and social objectives for greater effectiveness. Separation at source and increased recycling contribute to better environmental performance as well as higher quality employment. Even if the local authorities are not directly linked to the alliance, it is accepted by much of society.

4.3.2 Chennai, India

Local authorities - NGOs - waste pickers

Ecological sustainability

This public – community – informal private alliance connecting local authorities, NGOs and waste pickers was the first of its kind in Chennai and its ecological contribution, although small in an absolute sense, is still very interesting. From the ecological point of view, the young waste pickers do not directly reduce the amount of generated garbage, but their segregation and trading of waste materials for income constitute recycling and reduce the amount of waste going to the final disposal site.

Socio-economic and public health goals

The alliance contributes to better co-ordination of SWM services at the neighbourhood level. The financial viability for the Corporation is increased as this arrangement lowers their costs. The financial security of the waste picking boys is also increased through a regular monthly wage, complemented by building up savings. The Corporation thus provides a more secure form of regular employment to street children as well as free medical treatment, non-formal education and vocational training. Through training the boys can move out of waste picking, enhancing their social acceptance and sense of identity.

The protective clothes and gloves provided increase the quality of their employment, making it safer and healthier.
The fact that the young sweepers keep the streets clean and collect the garbage from the streets contributes to an effective cleansing of the neighbourhood. No reliable data are available on the extent to which environmental costs are externalised to other neighbourhoods. Legitimacy is achieved through the municipal partnership and the wide social acceptance.
This alliance has a significant contribution to socio-economic benefits but a lesser absolute contribution to the environmental performance of SWM as long as the areas covered remain limited.

CBO - waste pickers

Ecological sustainability

In this community – private alliance, the Street Beautifiers supported by Exnora introduced waste segregation and trade in their activities. This increases the extent of material recovery, and reduces waste levels at the disposal site.

Socio-economic and public health goals

The co-ordination of the SWM services is not optimal in this alliance because the Corporation is not involved. In practice this often leads to a breakdown because the Corporation does not pick up the wastes from the transfer points rapidly enough, leaving waste in the neighbourhood (Furedy, 1992).
The financial system is viable for the organisation, and provides a satisfactory income for the street beautifiers.
The result of the co-operation of the CBO, waste pickers and households is clean neighbourhoods. However, the city as a whole does not become cleaner, because the problem is externalised to the transfer point.

This alliance depends on other actors' activities like the municipality (collection of waste from transfer points) and the households (payments). The weakest point of this alliance is the lack of co-ordination with the Corporation. CBOs should be more directly linked to the Corporation to make sure that waste pollution is not externalised to other neighbourhoods. The strongest points of this alliance are the effectiveness of source separation, financial viability and increase in quality employment for the Street Beautifiers.

Traders in waste materials: a) Waste pickers, itinerant buyers - dealers; b) dealers - wholesalers; c) wholesalers - recycling enterprises

Ecological sustainability

Private – private alliances in trading and recycling exist throughout the city and involve many people. The total quantity of waste materials recycled is estimated at 320-430 tonnes per day. Itinerant buyers are estimated to contribute around 4% to total recovered materials, transfer station and dump pickers 29% and street pickers 67% (ERM, 1996). The whole process reduces waste significantly through the sorting of waste fractions by the various actors and their use as raw materials for recycling. Recycling itself contributes to ecological sustainability through resource recovery, less energy used in production processes and fewer emissions, and a longer life span of disposal sites for solid waste.

Socio-economic and public health goals

These alliances contribute to better co-ordination of activities among the actors themselves. Relations are mainly financial, with possible exploitation of those with less bargaining power. A negative link is the total lack of co-ordination with the municipal system; both groups of actors regard each other with the greatest suspicion, and avoid contact.
The financial viability of the system is vulnerable to external factors. Prices of materials fluctuate widely, influencing levels of incomes of pickers and dealers. They are influenced by the availability of virgin materials and the import regulations concerning certain raw materials.
Waste pickers and itinerant buyers earn daily wages, enough to cover only their basic needs. Small dealers have a low profit margin and often run the risk of financial failure. Levels of investment vary from Rs. 2,000 to more than 15,000. Wholesalers have higher average net profits (10-15%) (Dhanalakshmi and Iyer, 1999).
The trade and recycling alliances provide employment to many groups of people. It is not a secure employment, as it exists outside the legal framework. However, few better alternatives currently exist for these social groups (mainly low-caste rural immigrant groups). .
These alliances contribute to a cleaner city, as they remove waste fractions from the municipal stream, and reduce the amount left for final disposal.
Although these alliances are not based on environmental awareness, they make an important contribution to ecological sustainability.
Socio-economically, these alliances are beneficial in terms of creating extensive employment, but the weak point is their vulnerability to price fluctuations and regulations, and the lack of formal recognition from the municipality. This means that employment and incomes are not terribly secure.

4.3.3 Lima, Peru

Local authorities – large scale enterprises

Ecological sustainability

The public-private alliance in which the private firm provides services at the Metropolitana level did not include recycling or waste separation activities, so no contribution to minimisation and recovery of waste was achieved. Effective recovery is constrained by the law that limits authorisation for waste separation activities to the final disposal site. All separation activities between collection and disposal are illegal, and the actors are harassed by the authorities. However, the firm improved the disposal site, so that more waste is dumped there instead of in other public areas. The firm, however, has no mandate to force other district municipalities to dump their waste properly, and many are still evading this because of the small charges levied on the trucks. Based on the available information, the strength of this alliance in ecological terms is better management of disposal.

Socio-economic and public health goals

There are no data to assess possible improvements in co-ordination, in financial viability, or quality and quantity of employment. The service does contribute to a clean urban environment as the firm now collects 80-95% of the garbage generated in Lima Downtown.
Socio-economically, the strong point is a more effective cleanliness of the urban environment. The alliance has legitimacy within its own municipality, but lacks the mandate to force co-operation with the district municipalities in Lima.

Local authorities – NGOs – small scale enterprises (SSEs)

Ecological sustainability

The main activity carried out in this public - community – small-scale private alliance is sweeping the area and collection of waste. Within pilot projects, contributions have been made to increased re-use and recycling of waste by support to small-scale actors in the waste and recycling sector.

Socio-economic and public health goals

This alliance makes significant contributions to socio-economic goals. It improves co-ordination of SWM services even though linkages are complicated. The system was financially viable because of the low cost compared to conventional systems (50% less). Residents pay additional fees for the service, which means that cost recovery is viable for both provider and consumers.
This alliance has a significant impact on secure employment, with higher than minimum level wages and social security benefits. Although the training in health, hygiene and safety aspects was provided, workers ignored this, reducing health and safety of employment.
The alliance proved effective in contributing to a clean and healthy urban environment locally, although it is more successful in middle-class areas than in poor ones.

4.3.4 Manizales, Colombia

Local authorities-private enterprises-recyclers (NGOs)

Ecological sustainability

The alliance does not contribute to waste minimisation. It does contribute to recovery and recycling of waste materials, through the tri-partite connection with the NGOs and the co-operatives of small-scale enterprises. The legal framework prevents the large collecting company from carrying out separation and recycling within its own confines.

Socio-economic and public health goals

The co-ordination of recycling by the collection company did not work out; the co-ordination with small-scale recyclers through the NGO was successful. The legitimacy of the alliance was high, so that the work of recyclers could be carried out effectively. There remained a large difference between the employment conditions of the collecting company, where the situation was good and that of the recyclers, who asked for better provisions.

Local authorities-CBO-NGO

Ecological sustainability

The alliance between local authorities, the co-operative of recyclers and the NGO which supports them, contributes mainly to waste material recovery and recycling. It does not contribute to waste minimisation or safe disposal.

Socio-economic and public health goals

This alliance is effective in terms of co-ordination through the NGO, is financially viable (having existed now for 7 years), and is legitimate in the eyes of local authorities. There is insufficient information to assess the extent of healthy and safe employment created by the alliance. The collection service is effective, and is well adapted to collecting waste from neighbourhoods which are difficult to access through large-scale methods.

Government-local authorities-industries

Ecological sustainability

National government policies designed to make industries shift to cleaner production are promoted by the local authorities. Some companies are adopting policies to re-use waste materials in production, but others still only dispose of them in a slightly safer manner. Although there is a move to higher levels of recycling and safer disposal, the extent remains unclear. Nevertheless, this is the only example where this type of alliance was encountered, with a cleaner production perspective.

Socio-economic and public health goals

The co-ordination and legitimacy of this alliance are well done, but there is insufficient information on employment aspects and financial viability to fully assess its contribution to socio-economic aspects of sustainable development. This is an area which should be further explored, as it is a rare example of this type of alliance.

4.3.5 Conclusions on alliances and their contributions to sustainable development

The existing alliances show a clear preference by local authorities to privatise services through large-scale enterprises. They are generally reluctant to create alliances with small-scale enterprises, waste traders and waste pickers both because of their unofficial status and the number of units involved. The elusiveness of such informal activities is at odds with the enforcement of rules and regulations (including sanitary codes and health standards) and could make effective sanctions in case of malpractice difficult to enforce. Besides, official attitudes towards such undertakings in many countries are still overwhelmingly hostile, especially when they relate to activities that are socially stigmatised as dirty, unhealthy, chaotic and illegal.

However, in those cases where 'informal actors' are integrated into the official system through the mediation of NGOs or CBOs, there are positive spin-offs in terms of socio-economic and ecological sustainability, and public health aspects. In particular, the waste trading and recycling actors contribute to cleaner urban neighbourhoods, financial viability, reduced volumes of disposed waste through recycling, re-use and composting, and employment creation for predominantly poor people.

If the privatisation of SW-collection, transportation and disposal is restricted to large enterprises only, the financial viability and disposal levels may improve, but the prospects for achieving ecological gains are gloomy. Apparently large-scale enterprises in solid waste collection do not seem to be interested or able to capitalise on waste separation and resource recovery, unless they involve small-scale operators.

Minimisation of waste has not become part of the urban agenda in the cities studied, as most local authorities do not consider it part of their mandate. However, waste prevention does not always require costly new technology. Manizales forms an exception. There, initiatives are under way by the government (national and local) and industry to change production processes in such a way that waste production is reduced.

These results suggest that the concept of 'partnerships' as used in the literature should be more inclusive of a wider range of actors than are generally acknowledged by proponents of public sector reform, in order to obtain the added benefits to greater ecological sustainability and socio-economic and public health goals. It also indicates that a wider range of alliances is feasible in practice, as those discussed above have only partially occurred in a project setting. Finally, there are clear remaining roles for local authorities as 'enabler' 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.

Table 13: Ecological sustainability -Alliances in different cities

Types/Contribution/ Country	Minimisation of waste				Re-use/recycle				Disposal			
	CH.	M.	L.	M(C)	CH.	M.	L.	M(C)	CH.	M.	L.	M(C)
L.a. – LSEs (private enterprise)	-	-	-	+	-	x	x	+	-	+	+	+
L.a, - SSEs	-	-	-	-	-	+	-	-	-	+	-	-
L.a. - traders in waste	-	-	-	-	-	-	-	-	-	-	-	-
L.a. - waste pickers	-	-	-	-	-	-	-	-	-	-	-	-
L.a. – recycling enterprises	-	-	-	-	-	-	-	-	-	-	-	-
L.a. - NGOs/CBOs	-	-	-	-	-	-	-	+	-	-	-	+
L.a. - NGOs - waste pickers/traders/SSE	x	-	-	-	+	-	+	-	na	-	+	-
NGOs/CBOs - waste pickers/traders	x	-	-	-	+	+	+	-	na	x	-	-
waste traders- recycling enterprises	-	-	-	-	+	-	-	-	na	-	+	-
Gov.-L.a.-industry	-	-	-	+	-	-	-	+	-	-	-	+

Symbols: **C** = Chennai (Madras), **M**. = Manila
L. = Lima, **M**.(C) = Manizales (Colombia)
L.a. = Local authorities, **LSE** = Large Scale Enterprises, **SSE** = Small Scale Enterprises
NGOs = Non Governmental Organisations, **CBOs** = Community Based Organisations
+ =existing alliance, **-** = not existing alliance, **?** = no sufficient information

Table 14: Socio-economic goals and Legitimacy - Alliances in different cities

Types/Contribution	Co-ordination				Financial viability (costs)				Employment				Clean urban environment				Legitimacy			
	C.	M.	L.	M(C)	C.	M.	L.	M(C)	C.	M.	L.	M(C)	C.	M.	L.	M(C)	C.	M.	L.	M(C)
L.a. – LSEs (private enterprises)	-	?	?	+	-	?	?	+	-	+	?	+	-	+	+	+	-	+	+	+
L.a, - SSEs	-	?	-	-	-	?	-	-	-	+	-	-	-	+	-	-	-	+	-	-
L.a. - traders in waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L.a. - waste pickers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L.a. - recycling enterprises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L.a. - NGOs/CBOs	-	-	+	+	-	-	-	+	-	-	-	+	-	-	+	+	-	-	+	+
L.a. - NGOs - waste pickers/traders/SSE	+	-	+	-	+	-	+	-	+	-	+	-	?	-	+	-	+	-	+	-
NGOs/CBOs – waste pickers/traders	**?**	+	+	-	+	+	-	?	?	+	-	-	?	+	+	-	?	+	-	-
Waste traders-recycling enterprises	+	-	+	-	+	-	+	-	+	-	+	-	?	-	-	-	x	-	+	-
Gov.- L.a.- industry	-	-	-	+	-	-	-	?	-	-	-	?	-	-	-	?	-	-	-	+

Symbols: **C** = Chennai (Madras), **M**. = Manila
L. = Lima, **M**.(C) = Manizales (Colombia)
L.a. = Local authorities, **LSE** = Large Scale Enterprises, **SSE** = Small Scale Enterprises
NGOs = Non Governmental Organisations, **CBOs** = Community Based Organisations
+ =existing alliance, **-** = not existing alliance, **?** = no sufficient information

ANNEX 1: PRELIMINARY EVALUATION OF PROVISIONAL INDICATORS AND SELECTION OF CORE SET OF INDICATORS

Table A: Maximisation of recycling & reuse

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Maximisation of recycling & reuse					
Policy /regulatory level	Relevant legislation	1	1	1	A
	Incentives or barriers	1	1	1	A
Organisational level	Length of trading chains	1	1 / 2	1	(B)
	Existence of junkshops, compacting plants	1	1	1	A
Technical level	Separation at the source	1	1	1	A
	Segregation and marketing of waste	1	1	1	A
Performance level	Amount of material recycled per person as a ratio of total waste generated	1	2	3	B, C
	% of waste stream that is recycled	1	1	2	A, (C)
	Number or % of hhs participating at separation of waste at source	1	1 / 2	2	(B), C
	Usable material entering landfills (Thomas Jefferson Sustainability Council, 1998)	1 / 2	2	3	C

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

Table B: Cleaner disposal

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Cleaner disposal					
Policy/ regulatory level	Relevant legislation	1	1	1	A
	Incentives or barriers	1	1	1	A
Organisational level	Maintenance of regulation (inspection, sanctioning)	1	1	1	A
	Disposal site selection criteria (P. Rushbrook, 1998)	1	1/2	2	B
Technical level	Reducing and separating disposal of hazardous, hospital waste	1	1	1	A
	Sanitary disposal measures methods (type of landfill)	1	1 / 2	1	A
Performance level	SW landfilled per capita per year (Thomas Jefferson Sustainability Council, 1998)	1	2	3	C
	Proportion of treated solid waste in official dump site	1	1	1 / 2	A, (C)
	Disposal methods and proportion	1	1 / 2	1 / 2	A, (C)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

Table C: Better co-ordination

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Better co-ordination					
Policy/regulatory level	Legal framework or policy	1	1	1	A
Organisational level	Agreements, covenants	1	1	1	A
	Monitoring system (long term)	1	1	1	A
	Supervision	1	1	1	A
	Representational relationships	1	1 / 2	1 / 2	B
	Existence of one body responsible for the SWM activities	1	1	2	B
	Number of different actors involved for the co-ordination of SWM system	1	1	2	C
Technical level	Way of monitoring (simple / complex)	1	2	2	C
Performance level	service interruptions	1	1/2	1/2	A, (B)
	Overlapping activities/regular conflicts	1	2	1 / 2	A, (B)

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

Table D: Financial viability

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Financial viability					
Policy/regulatory level	Ways of cost recovery (fees, taxes, subsidies etc.)	1	1 / 2	1	A, (B)
	Interest rate on credit	1	1	1	A
	Control of prices (trade recyclables)	1 / 2	1 / 2	2	B
	Policy towards privatisation	1	1 / 2		???
	Cost sharing public - private	1	2 / 3	2	B, C
Organisational level	Access to credit	1	1	1	A
	Sources of revenue	1	2	1	A, (B)
	Reliability of suppliers of raw materials (recycling & trade)	1 / 2	1 / 2	1	A, (B)
	Kind of privatisation	1	1	1	???
Technical level	Revenue collecting methods	1	1 / 2	1	A, (B)
Performance level	Degree of cost recovery	1	1	1	A
	Profitability (enterprises)	1	1	1	A
	Affordability - L.a. - Users	1	1	1	A
	Willingness to pay (hhs)	1	1	1	A
	Stability of prices of raw materials	1	1	2	(C)
	Costs of waste/ton	1	1	3	B
	% of operating vehicles	1	2	3	C

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark colour: selected indicators

Table E: Safe and secure employment

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Safe and secure employment					
Policy/ regulatory level	Labour regulations	1	1 / 2	1	A
Organisational level	Number of employees trained for jobs that are available in the local economy (H.E.D., 1999)	2	3	3	B, C
	Training for the employees	1	1	1	A
	% of the employees whose activity is part of the informal sector	1	1	2	A, (C)
	Security of employment	1	1 / 2	1	A, (B)
Technical level	Provision of protective equipment	1	1	1	A
Performance level	Income level, extended coverage (basic needs)	1	1	1	A
	Employment level	1	1	2	A, (C)
	Absence rate	1	1 / 2	3	C

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark color: selected indicators

Table F: Clean and healthy urban environment

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Clean urban environment					
Policy/ regulatory level	Sanitation bylaws	1	1	1	A
Organisational level	Health -environment inspectors	1	1	1	A
Technical level	Ways of waste collection	1	2	1 / 2	A, (B)
	Transfer of waste to other areas	1	1	1 / 2	A
	Cleansing campaigns	1	2	2	C
	Health inspection actually carried out	1	1	2	C
	Type of vehicles technology	1	1 / 2	2	C
	Accessibility of areas	1	1	1 / 2	A
Performance level	%of population (households) with regular solid waste collection	1	1	1 / 2	A
	% collected waste	1	1	2	A
	Clean streets / neighbourhoods	1	1	2	A, C
	Frequency of the provision of the service	1	1 / 2	1	A
	Effects on public health	1	2	2	C

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark color: selected indicators

Table G: Legitimacy

Indicators/Criteria		Relevance	Validity	Measurability - availability	Future work
Legitimacy					
Policy/regulatory level	Are the actors supported by the law	1	1	1	A
	Are the actors formalised?	1	1	1	A
Performance level	Are there any public objections	1	1	1	A
	Are the actors harassed/penalised	1	1	1	A

Note: 1= satisfactory, 2 = average, 3 = not satisfactory
A= immediately accessible, B = Improve development of definitions and conceptual base, C = Improve data availability, measurability and country coverage
Dark color: selected indicators

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