

Integrated Sustainable Waste Management in Bamako

Lessons learnt from the UWEP Programme in Mali



UWEP City Series
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ABBREVIATIONS

ALPHALOG	Association Libre pour la Promotion de l'Habitat et du Logement
APAPE	Association Pour l'Assainissement et la Protection de l'Environnement
APUGEDU	(Agriculture Péri - Urbaine et Gestion des Déchets Urbains)
BIFAC	Bureau International de Formation, Animation et Conseil
BUPE	Brigade Urbaine Pour la Protection de l'Environnement
CEK- <i>Kala Saba</i>	Cabinet d'Etudes Kéïta – <i>Kala Saba</i>
COFEPE	Coopérative Féminine pour la Protection de l'Environnement
COFESFA	Coopérative Féminine pour l'Education, la Santé Familiale et l'Assainissement
COGEVAD	Comité de gestion et de valorisation des Déchets
Commune IV	Bamako is divided in municipalities called Communes. There are 6 Communes in total
COPIDUC	Comité de Pilotage des Déchets Urbains
CPAC	Coordination des Partenaires de l'Assainissement en Commune IV – Working Group on sanitation in Commune IV
CREPA	Centre Régional pour l'Eau Potable et l'Assainissement à faibles coûts
DGIS	Direction de la Coopération au Développement des Pays - Bas
DNACPN	Direction Nationale de l'Assainissement et du Contrôle des Pollutions et Nuisances
DRACPN	Direction Régionale de l'Assainissement et du Contrôle des Pollutions et Nuisances
DSUVA	Direction des Services Urbains de Voirie et d'Assainissement
GIDD	Gestion Intégrée et Durable des Déchets urbains (ISWM in English)
GIE	Groupement d'Intérêt Economique
ISWM	Integrated Sustainable Waste Management (GIDD in French)
KaR	Knowledge and Research Programme (a programme financed by DFID, UK) on strategic planning for municipal waste management
MSE	Micro- and Small Enterprises
MSWM	Municipal Solid Waste Management
OMS	Organisation Mondiale de la Santé
ONG	Organisation Non Gouvernementale
PDUC- IV	Programme de Développement Urbain en Commune IV
PP	Pilot Project (They are numbered for identification from 1 till 6)
UWEP	Urban Waste Expertise Programme

CHAPTER 1 INTRODUCTION

The Urban Waste Expertise Programme, funded by the Dutch Ministry of External Affairs, Division for International Co-operation (DGIS), and implemented by WASTE, Advisers in Urban Environment and Development, lasted from 1996 to 2004, in two sub-programmes, now referred to as “UWEP I” and “UWEP Plus”. UWEP I focused on understanding local processes in waste management and recycling, and then on applying the general lessons learned in four specific intervention cities, called the Pilot Project Settings, or PPS cities. UWEP Plus focused on abstracting from those lessons an integrated approach for Northern and Southern partners to work together on systematic improvement of the urban environment. This approach, called Integrated Sustainable Waste Management (ISWM), now forms the basis for a number of other initiatives, including the ISSUE programme, “Integrated Support for a Sustainable Urban Environment”, which takes Ecological Sanitation as its main subject. In UWEP Plus ISWM was used for integrated waste management assessment and planning in the four PPS cities, and the assessment methodology was crystallised, applied and validated in an additional five cities, for a total of nine UWEP cities world-wide.

The goals of the programme were strongly related to building capacity and generating knowledge, with the goal of supporting Southern stakeholders to mobilise and improve their own urban environment. The initial subjects were solid waste, liquid waste, and sanitation, with solid waste and recycling having the main focus between 1996 and 2004. Over the course of the programme, there were three major activities: research on solid waste and recycling (1995-1998); application of the lessons in four PPS cities (1997-2001); and ISWM assessment and planning in nine UWEP Plus cities (2001-2004). The PPS cities were also the focus of innovative research on the relationship of integrated waste management to cycling of carbon and nitrogen and generation of greenhouse gases.

A very important line throughout the UWEP programme years has been working with local experts, supporting their expanding capabilities and connecting them in networks, as local capacity has a key relationship to knowledge management and sustainability. During UWEP Plus, especially, the regional organisations and local experts co-ordinating ISWM activities became increasingly autonomous and took on ever more directive roles in the decentralised management of the programme. Bearing this in mind, a fourth activity can be described as exploring and implementing horizontal partnerships between North and South in service to participatory urban environmental development.

1.1 The ideas behind the UWEP Programme

The Urban Waste Expertise Programme (UWEP) was formulated in response to a complex of problems that Klundert and Rijnsburger saw in their work in East Africa in SNV, the Dutch voluntary service. These problems included the following:

1. The way that development assistance was done meant that neither the agencies in the Netherlands, nor the local host organisations, had any significant institutional memory or tools;
2. Most knowledge came from the North and was applied in South settings without sufficient attention to the local context, and also, without local consultation with stakeholders;
3. There was an assumption that more, better, or more appropriate technology would solve all of the problems

4. The informal sector and small business were not a focus of the development community, but they were clearly an interesting but highly stressed sector; and
5. There was within development assistance, neither a critique nor an active discourse about these problems and about whether it was important to develop a different way of working.

1.2 Desired results of the UWEP Programme

In a real sense, the UWEP programme was developed most directly in relation to number 5, and constituted a long-running attempt to foster discourse and explore alternative and sustainable modalities of working between committed partners in the North and South. While the formal goals of the programme have to do with improving waste management, there is the most to be seen from the five desired results, quoted here below:

1. “A comprehensive set of appropriate waste related knowledge and experience has been generated and customised for dissemination, both at the practical level of organisations in the South and at the policy level of authorities and development agencies.
2. Local waste handling and waste management expertise has been acquired which responds to the demand for expertise by organisations in the South, and y authorities and development agencies developing community and micro-enterprise-related waste policies.
3. Organisations in the South have gained access through local sources in their respective country or region to appropriate waste-related knowledge and experiences.
4. Responsible governments and donor agencies have been subject to promotion of community and micro-enterprise oriented waste policies.
5. Organisations in the South have received assistance to develop and formulate qualitative proposals for improvement and to channel these through responsible governments and donor agencies.

These five results can be characterised by the short names: (1) appropriate knowledge, (2) local expertise; (3) facilitating Southern access to information and expertise; (4) community and MSE policy focus; and (5) Northern experience in service to Southern goals.

1.3 Methodology in development: the hallmarks of the UWEP Programme

1.3.1 Co-operation with the South

The major methodological focus of the UWEP programme was and has remained on the South: southern stakeholders formulate their needs and agendas, southern researchers and local experts execute programmes; management is shared between Northern specialists (who also mobilise Northern funds) and Southern experts and stakeholders; and there is horizontality and mutual respect in every aspect of the North-South relationship.

1.3.2 Thematic focus on locally relevant aspects of recycling and waste management

The second methodological focus was pursuit of themes which arose inductively from local research, and therefore which have inherent relevance to the local situation. This created a need for Southern involvement in all phases of the programme, from identifying the themes to evaluating the results of the activities. The themes were devised based on needs and activities identified in the field, based on identification and characterisation by the local researchers themselves.

1.3.3 Regional information exchange

The third methodological focus was formulated as regional information exchange, and can be interpreted as having both a substantive and strategic element. The substantive element is to make information from one region available and accessible to those in another region with a similar type of activity and a corresponding general level of technological complexity. This makes the knowledge more directly applicable.

The strategic element focuses on counterbalancing traditional post-colonial dependencies, as a result of which information, energy, transport, and goods and services flow North-South between former colonial masters in the North and former colonies in the South, by creating or strengthening South-South channels of information exchange and empowering regional nodes to take on this function.

1.3.4 Focus on South professionals

The UWEP programme had a strong focus on working with and on behalf of a quite specific target group: local experts. The strong emphasis on local research, involving younger specialists or students, and the commitment to contracting work to young professionals relate strongly to the idea of building knowledge and expertise in the South.

1.3.5 Sharing, co-operating, and facilitating access to information and knowledge

These three aspects of the UWEP approach focus on identifying and filling gaps in a collaborative mode, rather than re-inventing the wheel or competing for economic niches. The strategic edge here is to reduce Southern (and donor) dependency on (high-cost) Northern professionals, in order to be able to use more of the available funds for development goals in the South.

1.3.6 Pushing the boundaries of knowledge and information

In UWEP I, this had mainly to do with “daring” to focus on the activities of the informal sector, and to criticise the activities of the formal political authorities for failing to do so. A second radical element in UWEP I was the idea that communities could have a voice, even a systematic one, in the development of urban infrastructure in their own communities and the city as a whole.

In UWEP Plus, WASTE and its partners took the further radical step of analysing the effects of waste management interventions on the cycling of carbon and nitrogen, a line of work done locally by scientific researchers and at WASTE by the C-N Theme Co-ordinator. UWEP Plus was also innovative in the extent to which the regional programme management partner organisation set their own agendas for activities in their regions.

1.3.7 South focus, ownership and sustainability

The leitmotif of South focus has an important effect on, ownership and sustainability. In reducing dependency on the North and supporting knowledge and knowledge-based nodes in the South, there is a commitment to building continuity that doesn't depend on political fads or international donor funds. The focus on ownership puts both the process and results of the interventions into the hands of key city stakeholders, including but not ever limited to the formal local authorities. This ensures, first, that what happens is relevant and important to the local citizens and businesses, and secondly, that they retain control, so that the exit of the

programme, donor, or external consultant has only a minor impact and the activities continue on their own.

1.4 Overview of The UWEP Programme: Development co-operation and waste management

The UWEP Programme operated for nine years, with a first contract from 1995-2001, and an extension called UWEP Plus running from 2001 through June 2004. The practical focus and activities are shown in Table 1.

Table 1. Overview of activities in UWEP I and UWEP Plus

UWEP Phase	Regions or countries	Activities
UWEP 1-1 Research	Latin America, Asia, W. Africa	Intensive research on local waste management and recycling using young local researchers, complemented by periodic working meetings for the researchers
1-2 Formulation of themes and topics	same	From Gouda, identification of themes such as community participation, linkages, knowledge and expertise-sharing, social sustainability, stakeholder platforms, micro-privatisation, and the like
1-3	parallel to UWEP	Based on the themes, and parallel to the UWEP process, articulation of the concept and framework of Integrated Sustainable Waste Management (ISWM)
1-4 Design of Pilot Project Settings	Central America, Philippines, India, Mali	Working with local organisations, design and implementation of practical pilot projects, and documenting them increasingly using the ISWM framework
1-5	All	Reflection, refining the ISWM concept, and formulation of follow-up activities.
UWEP Plus phase 1	Central America, South America, Philippines, India, Mali, Middle East, Eastern Europe	Engagement of the local authorities for an ISWM Assessment and planning process; mobilisation of stakeholders and execution of a Memorandum of Understanding (MoU)
U+ phase 2	All	engagement of stakeholders in an ISWM assessment and planning process in nine cities
U+ phase 3	Central America, Philippines, India, Mali	additional capitalisation of pilot projects and completion of pilot project cycle
U+ phase 4	Central America, Philippines, India, Mali	Validation of the ISWM approach to planning
U+ phase 5	Research in the regions on C and N cycles	Material balance analyses of the effects of integrated approaches to waste management on the emissions of carbon and nitrogen to atmospheric cycling of these materials and to climate change.
U+ phase 6	All	Increasing importance of the ISWM discourse, together with reflection and discussions on peer relations, partnerships, horizontality and transparency, and the like.
U+ Closing	All	discussions about programme exit, careful exit strategies, explicit (and ceremonial) transfer of project ownership to local stakeholders

1.5 The concept of Integrated Sustainable Waste Management (ISWM)

1.5.1 The dimensions of ISWM

The concept of Integrated Sustainable Waste Management (ISWM) recognises three important dimensions in waste management: (1) the stakeholders involved in waste management, (2) the (practical and technical) elements of the waste system and (3) the sustainability aspects of the local context that should be taken into account when assessing and planning a waste management system.

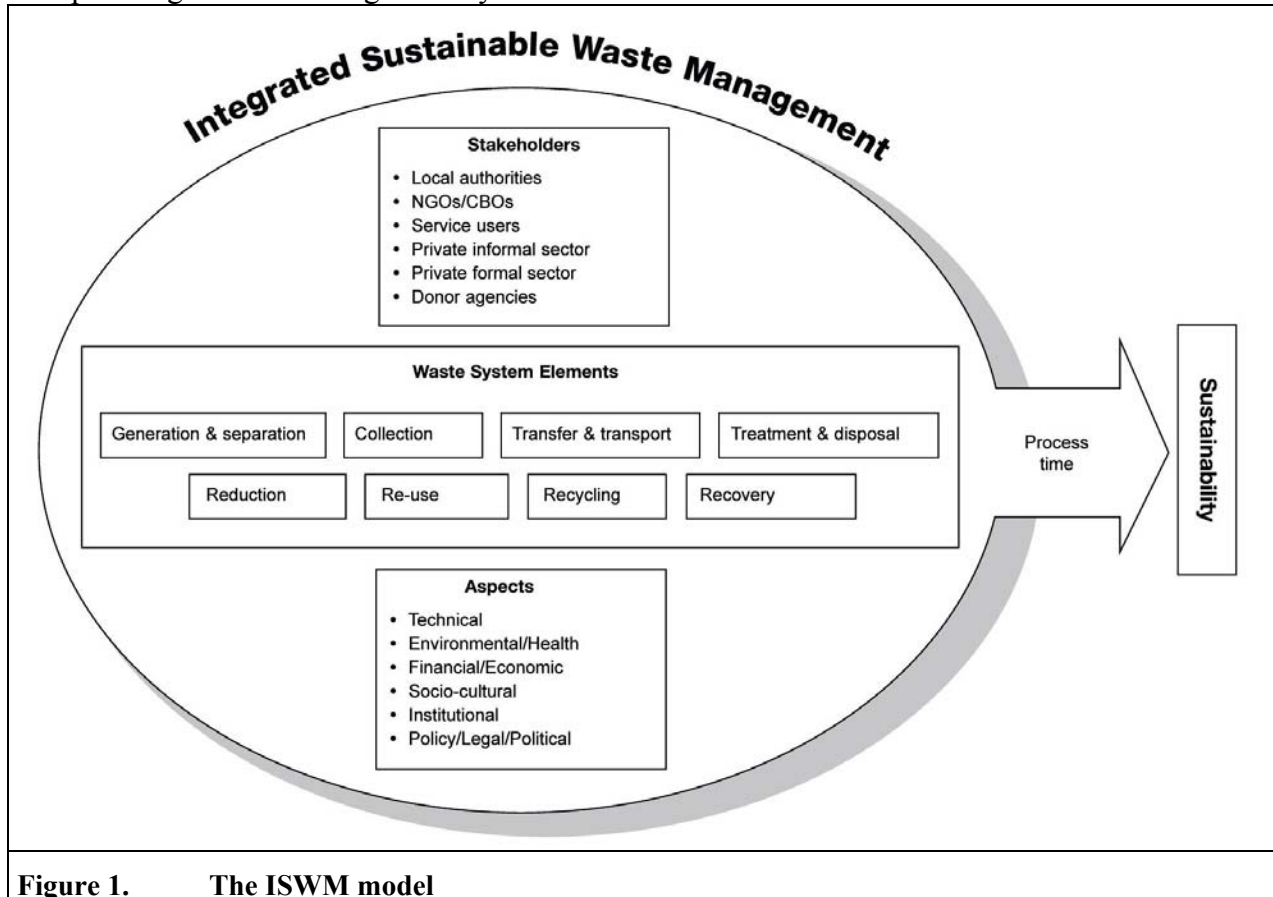


Figure 1. The ISWM model

1.5.2 Stakeholders, the first ISWM dimension

The first ISWM dimension is the **stakeholders**. A stakeholder is person or organisation that has a stake, an interest, in –in this case- waste management. A number of potential stakeholders are listed in below. However, stakeholders in waste management differ in each city, so they need to be identified in the local context. Stakeholders may vary in the intensity or breadth of their roles and interests in relation to waste management, but they can co-operate for a common interest. In addition, the stakeholders in a particular city or region share a common social and geographic context, and may be bound together by other systems in addition to solid waste¹. Some typical stakeholders in ISWM are:

- ◆ local authorities
- ◆ community groups
- ◆ NGOs, CBOs

¹ For example: clan, caste, ethnicity, professional affiliation, religion, school or university background, commercial relationship, kinship, sport.

- ◆ local, regional or national institutions, such as schools, hospitals, trade unions, the military, government departments, national parks; tourism associations
- ◆ recycling industries
- ◆ private waste management companies and their clients
- ◆ social and religious groups
- ◆ activists and lobbyists
- ◆ politicians
- ◆ private sector industry and commerce and the associations or trade industry lobbyists that represent them;
- ◆ small and micro-enterprises and entrepreneurs
- ◆ other self-identified parties and individuals with **a stake** in the urban environment in general, and solid waste in particular.

1.5.3 *Waste system elements, the second ISWM dimension*

The waste system elements are sometimes referred to as the technical components of waste management. Most waste system elements are also stages in the life cycle of materials. This life cycle movement, or flow, begins with extraction of natural resources, and continues through processing, production and consumption stage towards final treatment and disposal. The waste system elements generally form the “back end” of the life cycle.

ISWM labels the technical side of waste as the basic waste activities:

- ◆ Waste prevention and minimisation
- ◆ Reuse and repair
- ◆ Collection
- ◆ Transfer
- ◆ Street sweeping
- ◆ Recycling, also called materials recovery
- ◆ Composting, also called macro-nutrient cycling or organic materials recovery
- ◆ Energy recovery
- ◆ Safe disposal

Many countries have prioritised these waste management activities into the so-called *waste management hierarchy*, which varies between an operational policy guideline and an injunction that is part of a national environmental law. This waste management hierarchy, shown in Figure 2, is also a cornerstone of the ISWM approach and has been a governing principle in the UWEP programme.

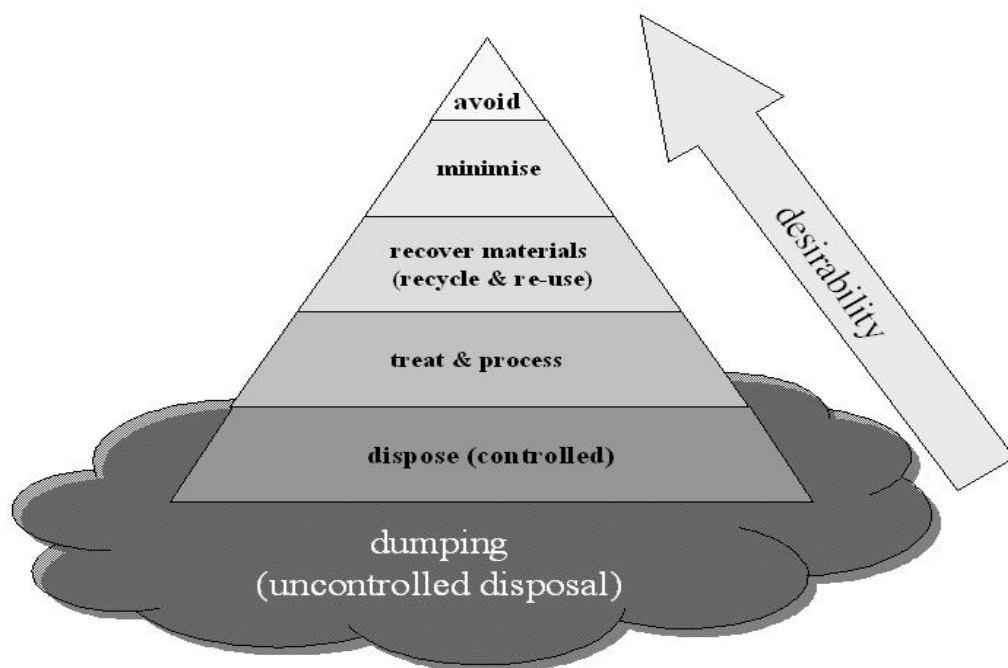


Figure 2. The Waste Management Hierarchy

Source: combined ideas about the hierarchy from Dutch and English-language sources.

1.5.4 The third dimension: Sustainability aspects

Within ISWM the third dimension consists of six sustainability aspects, or lenses, through which the existing waste system can be assessed and with which a new or expanded system can be planned. The sustainability aspects, ranging from political-legal to technical and performance, cover the range of factors influencing solid waste activities and include.

- ◆ The policy or legal aspect;
- ◆ The institutional and organisational aspect;
- ◆ The cultural and social aspect;
- ◆ The financial and economic aspect;
- ◆ The technological and technical aspect; and
- ◆ The environmental aspect.

1.5.5 ISWM as a framework for the UWEP Programme activities

ISWM developed in parallel with the UWEP programme activities, and is in that sense interwoven with their history. The paper where the ISWM concept was articulated for the first time was given at the Ittingen conference in 1997, an event that launched the CWG, a professional information-sharing group of international waste management specialists.

During UWEP I, the pilot projects were designed to capture and apply insights from extensive field work in the regions, but especially in Latin America. There was not, at the time of design, any clear methodological approach, and the ISWM framework was in some sense articulated, based on practical experience, to fill the methodological void, capture the successful approaches tested in the field, and introduce consistency and comparability across cities. ISWM became the main activity and methodological focus of the UWEP Plus phase of the UWEP Programme.

1.6 City case studies

The UWEP programme was active in the four PPS cities: Bamako, Mali; La Ceiba, Honduras; Bangalore, India; and Batangas Bay, Philippines; for a period varying from seven to nine years. It was and remains unusual, in development co-operation, for a Northern organisation to co-operate horizontally with South partners, for such an extended period of time, in the same locations. The kinds of information that emerge from such a long period of intervention can be useful for colleagues both in the North and the South. For this reason, WASTE and its partners have decided to prepare case studies of the four PPS cities, highlighting both process and results.

This is one of four city case studies, documenting the work of the Urban Waste Expertise Programme in Mali, Honduras, India, and the Philippines. This work focused on bottom-up solid waste management and development in four communities, and was based on, and contributed to, the concept of Integrated Sustainable Waste Management (ISWM).

The purpose of these case studies is:

1. to document the activities of the UWEP programme and the results achieved in the cities;
2. to capture the institutional memory of the UWEP programme and make it available to future initiatives that build on these results;
3. to make data and information available to the city itself;
4. to enrich the methodological information on integrated sustainable waste management (ISWM).

The case studies are designed to be read by:

- ◆ present and incoming staff of the local authority and provincial, regional, and national government representatives;
- ◆ consultants working on urban services, recycling, or waste management;
- ◆ representatives or staff of other local stakeholders including community groups, NGOs, and the private sector;
- ◆ entrepreneurs wishing to expand or strengthen their solid waste portfolios;
- ◆ academicians and scholars in urban environmental management;
- ◆ the press, especially when seeking background materials;
- ◆ donors interested in supporting future waste management activities;
- ◆ local experts interested in using or replicating the results;
- ◆ other interested parties.

Each of the four case studies focuses on one of the so-called “Pilot Project Setting” cities. These four cities differ widely in climate, character, socio-economic circumstances, and on many different parameters.

The four PPS cities were selected in UWEP I in the period 1996-1998, based on opportunism, serendipity, and a rather loose application of certain criteria, including:

- ◆ a demonstrated interest in improved solid waste management;
- ◆ a commitment to bottom-up processes;
- ◆ willingness to host one or more pilot projects, and ideas about focus for it/them;
- ◆ involvement of a regional programme co-ordination organisation and a local pilot project co-ordinator; and

- ◆ presence of a local NGO or local expert counterpart (with the exception of La Ceiba, where such a counterpart was created by the UWEP programme partners);

CHAPTER 2 THE PROCESS OF IMPLEMENTING UWEP

2.1 Case Study: Bamako, Mali, Commune IV and VI

This case study of the activities of the UWEP programme in Bamako, Mali features activities in two of the seven municipal units of Bamako, which is structured as a federation of six communes, each its own independent municipal unit, together with an overarching unit for the entire city.

UWEP operated in Mali for longer than in any other PPS city, a total of nine years. The focus of the early activities in the UWEP I period was primarily in Commune IV; in UWEP Plus, based on a request from Commune VI, this municipality was added, and Commune I also joined UWEP Plus for certain activities (but these are not covered in this case study).

The implementing agency or UWEP programme partner for all Mali activities was, from the beginning, CEK, Cabinet d'Etudes Keita-Kala Saba. This is a small, consulting company, which is also associated with a number of NGOs. The founder and CEO of CEK is Dr. Modibo Keita.

2.2 Introduction to the Bamako case study

2.2.1 *How was contact with UWEP initiated?*

In 1993 the director of the SNV in the Hague, Mr. Rob Boom established contact between WASTE and the PDUC IV programme that supported GIEs (community based organisations) active in sanitation in Commune IV in Bamako. The first contact was with Arnold van de Klundert and Inge Lardinois who visited Bamako. The visit resulted in a plan for WASTE to offer technical assistance to the stakeholders in the sanitation activities in Commune IV.

In 1995 SNV, the Dutch Organisation for Development, asked Jaap Rijnsburger, at that time director of WASTE and adviser for the UWEP programme, to carry out an identification mission in Mali. He needed to identify how SNV could support the micro- and small waste management enterprises in Mali, the so-called GIEs (Groupement d'Intérêt Economique). During his mission Rijnsburger came in contact with Anne Keita, who worked for SNV in Mali and through her made contact with CEK, Cabinet d'Etudes Keita.

The same year, the mayor of Bamako Commune IV attended a water forum in the Hague, and visited WASTE to request for participation in solid waste management in Bamako. His visit to the Netherlands resulted in collaboration of the Commune IV with SNV/PDUC IV and as a result with WASTE and the UWEP programme.

2.2.2 *Description of the geographic area and statistics about the city*

Bamako, the capital of Mali, has a population of 900,000 according to the official census, and a population of 2 million according to unofficial sources. While the precise size can therefore not be established, it is clear that Bamako is expanding rapidly due to a strong rural-urban migration.

The district of Bamako is divided into **6 Communes** or municipalities: Commune I till VI. Each Commune is subdivided into ‘Quartiers’ (wards) of 4,000-8,000 inhabitants. Each Quartier in turn is subdivided into a number of ‘Secteurs’ (sectors).

Table 2. Urban Characteristics of the six Communes

Communes	Population	Main economic activities	Characteristics
I	199 651	Mainly primary and tertiary sector.	Semi –urban
II	128 090	Secondary sector	Urban
III	97 389	Tertiary sector	Urban
IV	185 856	Primary and tertiary sector Le secteur primaire et tertiaire	Semi-urban
V	184 715	Tertiary sector	Semi-urban
VI	220 466	Tertiary sector	Semi-urban
Totaux	1 016 167		

Source DNSI (1998) : Recensement général de la population et de l'habitat

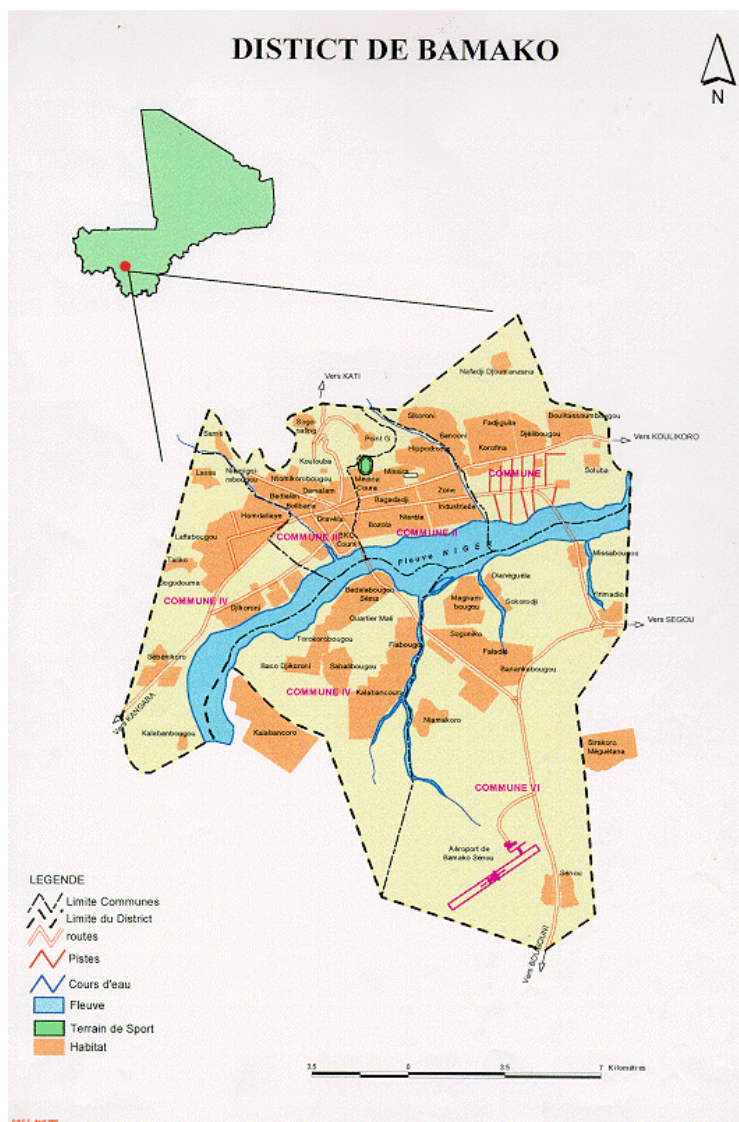


Figure 3 Map of Bamako and Mali

2.2.3 Description of waste management in Bamako

In 1998, when the UWEP programme was operating, there were 2000 m³ of waste produced: in all of Bamako, of which 1200 m³ (60%) was estimated to be adequately collected by the GIEs and co-operatives from households and public places like markets, Hotels etc. to the transfer station (primary collection). From there, the DSUVA.(Direction des Services Urbains de Voirie et d'Assainissement). removes, at irregular intervals, a small fraction of the collected wastes to final disposal around the edge of the town i.e. in open areas, farming fields or wherever it looks like possible. It has to be noted that Bamako has no sanitary landfill.

Most of the waste (60%) is organic waste, and another large proportion (nearly 40%) of the remaining waste consists of sand, grit, and dust, which enters the household waste stream through women sweeping the dirt floors of the household compounds. Other components, less than 1%are: paper, glass, metals, textile, plastic, charcoal, used batteries and stones. The proportion of sand, grit and dust varies with the dry and wet season.

The Waste System: Primary collection, secondary collection, disposal, recycling

Key actors in waste collection include:

- ◆ Communes and the District of Bamako
- ◆ DSUVA (operating on behalf of the District at Communes level)
- ◆ GIEs and cooperatives,
- ◆ household waste generators
- ◆ waste management associations
- ◆ Technical Services either of State or District : Sanitation, Hygiene, Housing/Habitat, Environment
- ◆ State, Government.

Figure 4 gives an overview of the dimensions of waste management in Bamako.

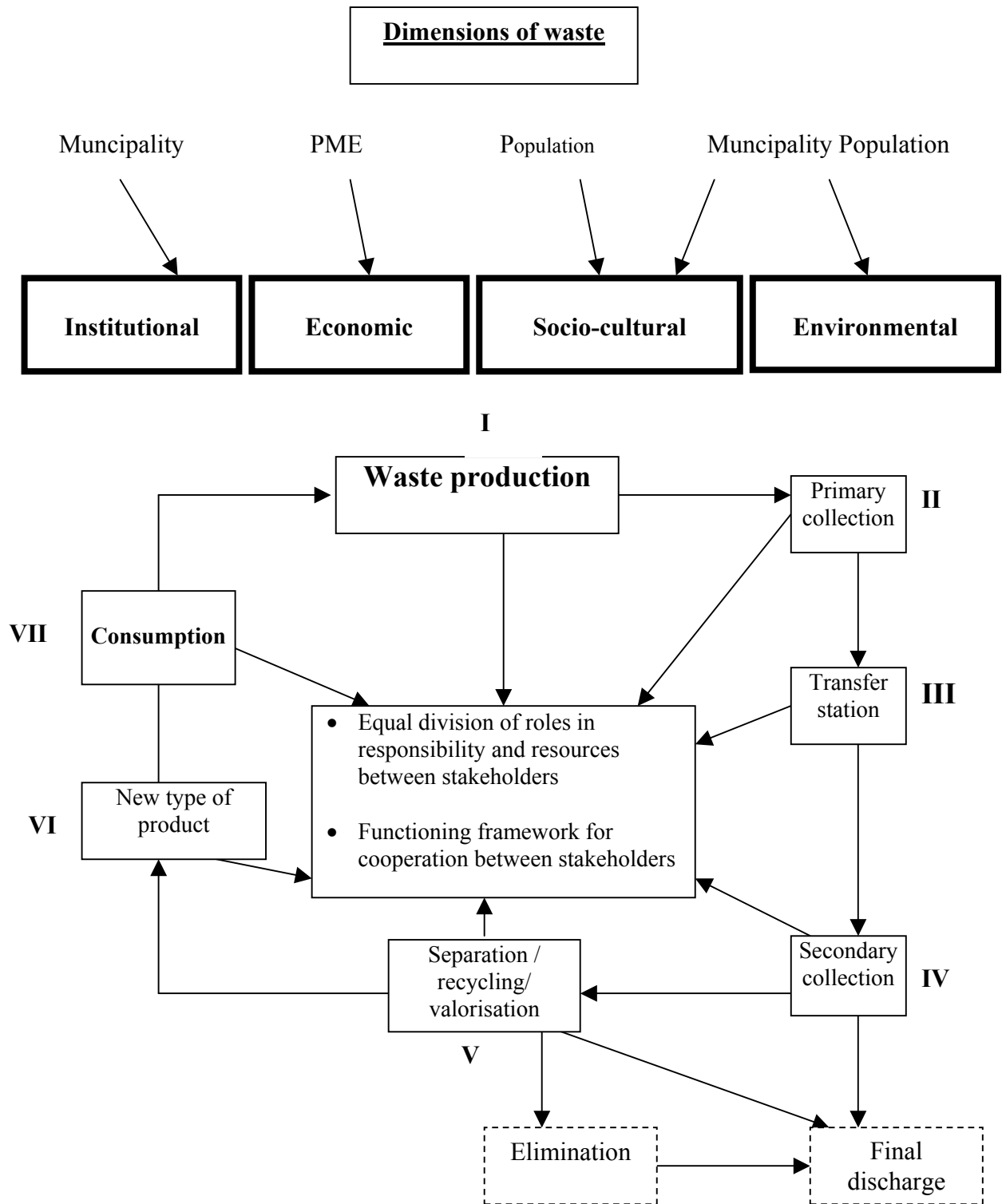


Figure 4. Flow chart of waste management in Bamako

2.2.4 Description of CEK and how it became involved

CEK, Cabinet d’Etudes Keita, is an private independent consultancy firm that specialises in advising on development issues. It preferably works for the benefit of communities and civil society organisations to empower them to solve their own problemson an autonomous basis.

CEK is interested, like WASTE, in enhancing grass root development initiatives. The Chairman of CEK, Dr Modibo Keita, met Jaap Rijnsburger in 1996 during his explorative missions in Mali. Jaap was interested in the advising and cultural capacity of Dr Keita in implementing UWEP, because he had already good relationship with SNV/Mali, ALPHALOG and CPAC and was well known by them. At that time Dr Keita worked for CED (Cabinet d'Etudes pour l'Education et le Développement) that changed into CEK in 1996.

The position of CEK changes from advising WASTE in its work with CPAC and ALPHALOG towards becoming the main partners in the execution of the pilot projects. This change happens in mutual consent as CPAC has trouble in executing the programme and PDUC IV has shortage of personnel. CEK remains adviser for CPAC and continues to collaborate with the PDUC. Thus the PP are done in a participative and collaborative way with a substantial support in technology and methodology aspects from WASTE. Additionally the CPAC received some financial support from UWEP I for capacity building of their organization to enable to manage the PP in a suitable way/

2.2.5 What motivated the partners and stakeholders to ask for UWEP support?

During the identification mission of WASTE in 1995 Jaap Rijnsburger came in contact with a number of local stakeholders in waste management in Bamako. These included CPAC², a multi-stakeholder coordinating body including micro and small enterprises (GIEs) and the local municipal authorities of Commune IV, and the PDUC IV, an urban development programme that the local NGO, Alphalog, was managing in Commune IV. CPAC sent a letter to WASTE stating its interest in a partnership, and its intention to enter into co-operation with the UWEP programme. This resulted in the signing of a Memorandum of Understanding (MoU) in October 1996 between WASTE/UWEP, the municipality of Commune IV, CPAC and PDUC IV.

CPAC asked for UWEP support, because at that time they were seeking sustainable solutions for environmental sanitation in Commune IV, and were already a partner of Alphalog in its PDUC IV programme. The programme PDUC IV of Alphalog focused on support to GIEs and co-operatives, who were filling the gap in waste management at the local level. PDUC IV of Alphalog was specifically interested in support from the UWEP programme because the programme provided the possibility of capacity building for the stakeholders of the sanitation programme in Commune IV. They were especially interested in enhancing their capacities in the field of appropriate technology for the GIEs and the sanitation cooperatives and improving their skills in participative approach to mobilise the population in Commune IV. Finally the municipality of Commune IV was interested in signing the MoU, because they encouraged any assistance with waste management, an issue with which they were struggling themselves. Who were the key owners of the process?

The key owners in the process of UWEP implementation changed over time. At the outset they were the organisations which had asked for assistance, specifically, CPAC, PDUC IV, the municipality of Commune IV and CEK. When WASTE accepted Commune IV as a PPS site, WASTE itself became a stakeholder, and the role of CEK, as formal partner of UWEP in Mali, increased gradually. In UWEP Plus, the role of CEK became even stronger, while WASTE's direct role decreased.

² Coordination des Partenaires de l'Assainissement en Commune IV

During UWEP Plus, the assessment and planning activities were extended to Commune VI (with UWEP Plus and KaR funding) and Commune I (with funding from Action Against Hunger - ACF). CEK and the municipal authorities of Commune IV and VI played an important role in UWEP Plus, since planning is primarily a public authority function. To strengthen the process, in UWEP Plus two multi-stakeholder platforms were created, one in Commune IV (COPIDUC) and one in Commune VI (COGEVAD). They played an active role in UWEP Plus in the assessment and planning of waste management. These platforms also functioned as steering committee for the implementation of pilot projects. In the exit phase, ownership of the process was officially transferred to COPIDUC for Commune IV and COGEVAD for commune VI.

2.3 Overview of the UWEP interventions in Bamako, 1995-2003

2.3.1 UWEP I

The division of tasks and responsibilities during UWEP I was as follows:

- WASTE: backstopping and monitoring, training, formatting/editing/publishing publications
- CEK and other local researchers: project management; goal-setting; stakeholder mobilisation and contact; conducting research; formulating and implementing pilot projects; writing publications
- The municipality of Commune IV, CPAC, PDUC IV/Alphalog, waste management associations in various neighbourhoods in Commune IV and VI had various partnering roles in pilot projects; provided input for researchers; provided feedback on pilot projects through monitoring committees.

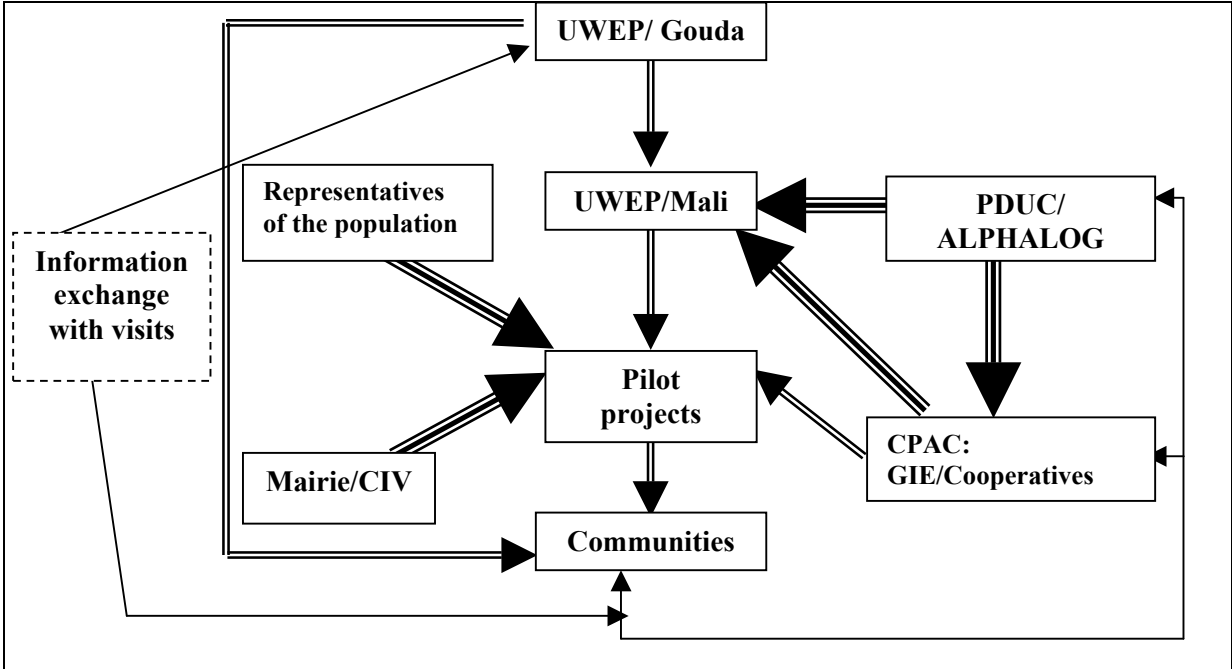


Figure 5. Intervention strategy during UWEP I in Commune IV

The main stakeholders during UWEP I were:

- ◆ the municipality of Commune IV
- ◆ CPAC
- ◆ Organisations of the Civil Society based in Commune IV
- ◆ PDUC IV/Alphalog, SNV
- ◆ Farmers and their organisations in Commune I, IV and VI
- ◆ WASTE
- ◆ CEK
- ◆ Waste management associations in various neighbourhoods in Commune IV and VI
- ◆ CREPA, WHO
- ◆ Head of the ward of Lafiabougou (who happens to be also the coordinator of the group of chef de quartier of Commune IV)and his representatives
- ◆ LEI-DLO, IIED (in APUGEDU)

2.3.2 *Activities under UWEP I*

Under UWEP I a number of activities took place that are described below. The main types of activities were:

- ◆ Research
- ◆ Pilot projects
- ◆ Capacity building
- ◆ Planning, monitoring, capitalising
- ◆ Community mobilisation for sanitation and waste management

MoU for UWEP I

An MoU was signed in 1996 between WASTE, the municipality of Commune IV, the multi-stakeholder group CPAC and PDUC IV/Alphalog. The MoU was amended in January 1998 to include an additional pilot project on participation of low-income population in waste management in Commune IV.

Stakeholder Mobilisation

In Commune IV, UWEP I benefited from the fact that stakeholders already had been mobilised by ALPHALOG since 1993. They were organised in the CPAC (bringing together the GIEs and other association in the Commune IV) and a committee of wise men consisting of traditional leaders. UWEP I made it possible to bring the mobilisation a step further and mobilise other groups in the civil society, such as households, women and associations in the commune who were not directly involved in sanitation.

The mobilisation of the stakeholders in UWEP happened in several stages. Important were:

- ◆ The participative assessment on the waste management and sanitation in the eight wards of Commune IV.
- ◆ Validating and linking back the results of the research to the inhabitants of the wards
- ◆ Formation of committees for sanitation in 6 of the 8 wards.
- ◆ Formulating together a list of actions to be taken, putting these in practice and evaluating these in a participative way
- ◆ Putting women forward to lead the association.

In 1998 UWEP added to its list of activities the setting up of a five year waste management plan. This happened on request of the municipality of Commune IV, the Regional direction of Health of Bamako, the WHO (Healthy Cities programme) and de CREPA. The intervention of the UWEP programme resulted in the founding of a platform for sanitation and waste

management in Commune IV, it is preceded by the mayor and all stakeholders of the Commune are included.

Inventory of Local Situation, and Problem identification and formulation of pilot project proposals

As part of the stakeholder mobilisation, CEK facilitated a community consultation in Commune IV. Among other a workshop was organised in 1996 to identify problems and formulate pilot projects in solid and liquid waste management in Bamako. The following participants in this workshop were present

- ◆ CPAC (representing the GIE: OPAL, Faso Kanu and Ladamu, and the women cooperatives: COFESFA et COFEPE)
- ◆ The Mayor of Commune IV
- ◆ The Mayor of the District (M. Joseph Marie Diarra)
- ◆ PDUC IV (ALPHALOG/SNV)
- ◆ WASTE (Jaap Rijnsburger and Maria Muller)
- ◆ CEK (at that time still named CED representatives were Modibo Kéita and Birama Sissoko)
- ◆ The president of the chefs of the wards in Commune IVThe Committee of wise men

Five pilot projects were designed/envisioned during this workshop and the planning process it has launched:

- ◆ Development of alternative technology for household waste collection (**PP1**)
- ◆ Construction of an experimental station for solid waste treatment (**PP2**)
- ◆ Construction of a treatment station for wastewater and latrine sludge (**PP3**)
- ◆ Conducting of an intensive community mobilisation (**PP4**)
- ◆ The use of organic waste in urban and peri-urban agriculture, a separately funded project referred to as APUGEDU, but sometimes also as **PP5**. This was a collaboration between CEK, Alphalog, WASTE, and several Dutch universities, funded by the EU. The main goal was to look at the nutrient value of raw waste and at the feasibility for composting.

PP1 looked at replacing donkey-carts with motorised transport. Two prototypes were developed in 1998, but they continued to have several technical weaknesses. The non-motorised prototype was rapidly abandoned, whereas the motorised one experienced many improvements and could go through all planned tests (these have been completed during UWEP Plus). The whole process is well documented. During the UWEP Plus period, an additional activity was undertaken by SNV-Bamako and key stakeholders in Commune I (i.e. Municipality of Commune I, DRACPN, GIE and CEK in advising position), who did succeed with an experiment in implementing motorised traction for collection based on lessons drawn from CEK/WASTE experiences in Commune IV.

PP2 and PP3 began during UWEP I, but could not be completed, due to the fact that both involved substantial “hard” capital investment, which the UWEP I programme could not provide. Both were continued, and largely completed, in the UWEP Plus phase. In this sense, it could be said that UWEP I in Bamako had large ambitions for capital projects, but that the programme was not structured to satisfy these ambitions. As a result, the main focus of the activities of UWEP I was on PP4. PP4 was an action-research in Commune IV around community participation in waste management.

Research and knowledge generation

The experiences of PP4 were summarised in a Working Document: *"Implication des populations défavorisées dans les actions d'assainissement dans le district de Bamako, Capitalisation d'une expérience de recherche-action en Commune IV"*, D. Traoré, M. Keita, B. Sacko, 2001, Maria S. Muller.³

In addition, during UWEP I, several studies were organised on:

- ◆ Recycling of used batteries, funded by UWEP based on a request from a local MSE that processed used batteries, but wanted to do it in a more environmentally friendly way;
- ◆ Use of human excreta as fertilisers in agriculture, in cooperation with KIT preparing the PP5
- ◆ An analysis of waste composition in Bamako (with focus on Commune IV) by Anne Baker, then volunteer of UNAIS and adviser of the GIE Ladamu.
- ◆ Dye waste treatment device : action-research co-funded by the Dutch Embassy in Bamako (The study failed in UWEP I, but got prolonged in UWEP Plus).
- ◆ The environmental health situation in Mali has been assessed with special emphasis on hazardous waste, such as hospital waste, industrial waste, used oil, excreta. Aspects looked at were treatment and impact on public health.
- ◆ Valorisation of plastic waste in Bamako.

The last study resulted in the forming of a group working on the problem of plastic waste and finally in an educational video *"La vache qui ne rit pas"*. The video has been used extensively to inform the public on the problem of plastic waste, especially plastic bags. It has had a great impact and has reached nearly all levels of the public, e.g. schools, national broadcasting, municipalities, women groups.

Other activities under UWEP were:

The support of a project set up by women in the Quartier Toguel (a neighbourhood in the city of Mopti) in cooperation with 'Vive l'Initiative' a Dutch NGO that finances the project. The contribution of UWEP in this project was: Technical support for the Dutch NGO, creation and enforcement of the women's group in Toguel. PASIB, an NGO based in Mopti, has taken over from UWEP since 2000.

A workshop on Gender and Waste has been held on 12 September 2000 in Bamako. The discussion was based on the Gender and Waste publication of WASTE (1998)⁴. The workshop was organised by CEK and hosted by the German Embassy. The workshop was attended by several Mayors, important NGOs and funding agencies.

Furthermore BIFAC (Bureau International de Formation, Animation et Conseil) was asked study the possibilities for the stabilisation of plastic waste. The assignment was to develop a technology to produce granules or other re-usable plastics for the local plastic industry. The suggestions made have not yet been put to the test due to lack of equipment.

Workshops that were held:

Waste management for enterprises working in waste and sanitation. (October 2000). The workshop dealt with general issues of waste management such as possibilities in waste treatment, pricing of waste services such as household collection and an introduction to

³ Also published in English in 2003 : *"Citizen Involvement in CleanUp Activities in Bamako, Lessons from an Action Research Project in Commune IV"*, D. Traoré, M. Keita, B. Sacko, M. Muller, 2003.

⁴ Gender and Waste, Electronic discussion group 9-31 May 1998, A summary, A. Scheinberg, M. Muller, 1998

Integrated Sustainable Waste Management methodology. pGIEs, waste management cooperatives and local government from Commune IV and other communes have participated.

In November 1998 CEK organised a training on environmental management for the women's association COFEPE (Coopérative Féminine pour la Protection de l'Environnement). It was a broad training offering a range of relevant subjects in relation to the environment e.g. agriculture, cattle breeding, change in patrimonial culture, household waste and more general subjects such as climate change and desertification.

In March 2000 journalists were invited to participate in a workshop on integrated sustainable waste management with the aim to offer the journalists more insights in the existing problems of waste management and give them tools to pose relevant questions to decision-makers and how to inform the public. 15 journalist from different media were present and have since then worked regularly with UWEP.

Documentation of UWEP and UWEP-related activities were prepared for radio and television programmes, such as:

- ◆ a documentary film on recycling of used batteries in collaboration with the National Radio and Television network of Mali, 1998.
- ◆ a programme on waste management associations in Bamako on the National radio, 1999.
- ◆ a 30 minute film on national television on community participation in waste management in Commune I (with financing of Action Against Hunger - ACF), 2003.
- ◆ a 18-minute film on the problems for cattle raising which are associated with film plastics in the waste stream (GTZ and the "Groupe Déchets Plastiques"
- ◆ a documentary film about resident involvement in waste management activities at grass root level in poor neighbourhoods.

Other research undertaken as part of UWEP I concerned the following subjects and subsequent publications:

- ◆ *"Traitement de Boues de Vidange"*, UWEP Working Document 3, M. Diarra, 1997.
- ◆ *"Community Participation in Urban Solid Waste Management in Bamako - Mali"*, A. Diarra and S. Togola, ENDA-WASTE, 1998.
- ◆ *"Community Participation in Urban Solid Waste Management in West Africa - a synthesis report"*, El Housseynou Ly, ENDA-WASTE, 1998.
- ◆ *"Community Participation in Urban Solid Waste Management in West Africa - a workshop report"*, B. Kanouté, ENDA-WASTE, 1998.

Several presentations were given by UWEP/CEK staff during international conferences (among others Melissa in Accra, Ghana in 1998, The CWG in Manila in 2000 and in Dar es Salaam in 2003, and Africities in Yaoundé, Cameroon in 2003), in various international workshops and meetings organised by CREPA in Ouagadougou (2000 – 2004).

Capacity building

Once CEK began to profile itself as the programme partner of the UWEP programme, a number of requests for training were submitted. As a result, training workshops to build the capacities and share experiences were organised as follows.

- ◆ Organisation of a workshop in February 1998 on plastic recycling and composting with organisations active in this field and two experts from WASTE: Inge Lardinois and Mounir Bushra.

- ◆ Organisation of a workshop in June 1999 with the Ministry of Environment of Mali to present the results of the research on recycling of used batteries and other non-biodegradable waste and to enlist long-term support from decision-makers.
- ◆ Organisation of a workshop in 1999 with the NGO CREPA-Mali to develop a five year plan of hygiene and environmental sanitation activities in Commune IV.
- ◆ Organisation of a workshop in November 1999 to support GIEs to analyse their own financial operations and understand the process of fee-setting (even though they were not, at that time, free to change the fees set by the Commune IV city council).



photo 1. PP4 Workshop

©CEK

A number of study tours were organised during UWEP I, among others:

- ◆ Study tour to Dakar and Cotonou to study the experiences with treatment of latrine sludge by Mamadou S. Diarra, UWEP consultant, and representatives of CPAC (1996). Prof. Diarra has also attended two other international workshops (one in Morocco and another in CREPA, Ouaga) about exchange of experiences about the same topic (at the beginning of UWEP Plus).
- ◆ Organisation of two missions to Dakar and Ouagadougou to identify and exchange on plastic recycling technologies. (by Inge Lardinois from WASTE and Bani Sacko from CEK). (1997)
- ◆ Organisation of a study tour by Bakary Diallo to Senegal and Burkina Faso regarding local experiences in composting (2000)

2.3.3 Pilot projects under UWEP I

Seven pilot projects were formulated in the Bamako Communes IV and VI Region. They were implemented in the period 1998 to 2003. The projects were about:

1. PP1: Development of alternative technology for household waste collection
2. PP2: Construction of an experimental station for solid waste treatment (completed in UWEP Plus)
3. PP3: Construction of a treatment station for wastewater and latrine sludge (completed in UWEP Plus)

4. PP4: Enhancement of community participation in environmental improvement and planning
5. PP5: Linking urban agriculture and waste management

Two additional ones were begun in UWEP Plus

6. PP6: Testing of a dye wastewater treatment unit : to make dye wastewater environmentally friendly when being dumped on soil, river or wherever (2002-2003)
7. PP7: Development of equipment for film plastic recycling

Table 3. Details of pilot projects in Bamako Communes IV and VI in UWEP I

	Pilot projects	Objectives	Duration
1	Development of alternative technology for household waste collection (Commune I and IV)	To develop an efficient and low-cost motorised technology for household waste collection	1996-2003
2	Construction of an experimental station for solid waste treatment (Samako II, Commune IV)	To build a station for the treatment of organic waste that can serve as example for other Communes	1996-2004
3	Construction of a treatment station for wastewater and latrine sludge (Samako II, Commune IV)	To construct a small-scale station for the treatment of wastewater and latrine sludge that can serve as example for other Communes	1996-2004
4	Enhancement of community participation in environmental improvement and planning (Commune IV, Commune I)	To assess the feasibility of an action-research approach to encourage community participation in waste management in low income areas To replicate the action-research approach in other Communes of Bamako	1997-2003
5	Linking urban agriculture and waste management (Bamako, Communes IV + VI + I Ouagadougou)	To investigate the possibilities of using urban organic waste in (peri-)urban agriculture	2000-2002
6	Testing of a dye wastewater treatment unit	To make dye wastewater environmentally friendly when being dumped on soil, river or wherever	2002-2003
7	Development of equipment for film plastic recycling	To develop appropriate equipment with local parts to recycle thin plastics (film)	2003

The pilot projects were designed as complementing existing efforts of other donors or technical support agencies active in waste management in Bamako, such as:

- ◆ SNV-ALPHALOG
- ◆ World Bank project on planning for SWM, focusing on landfills and secondary collection; and
- ◆ Support to GIEs in testing motorised primary collection (several donors, e.g. SNV, World Education, AFVP, and the like).

PP1:

The initial workshop with local stakeholders in waste management organised by UWEP in 1996 had revealed that the GIEs suffered from technical and financial problems, as 50% of their customers did not pay or did not pay in time. As a result, the donkeys that were used to pull carts to collect the waste were structurally underfed and overloaded. They could not maintain the workload with insufficient calorie intake, and, as a result, were dying within a relatively short period of eight months to one year. The problem was complicated by the tendency of the municipalities to close nearby designated transfer stations and offer new ones that were increasingly further away from the waste collection routes. In addition, the Governor of Bamako district prohibited animal traction on main roads in 1996, meaning the donkey carts either had to make a long trip to reach transfer, or use the roads illegally and risk

finances and harassment. This made the search for affordable motorised means of transport a matter of priority.

PP2 and 3:

UWEP chose to focus more on treatment than on collection and transfer, because without proper treatment environmental problems would be transferred to other areas.

Originally a transfer station for solid waste was planned that included recycling operations. Gradually, as it turned out to be difficult to find a location for the stations of PP2 and PP3, the idea emerged of combining the two stations (for wastewater and solid waste) on one site. This ultimately occurred in UWEP Plus.



photo 2. Stakeholders are informed with clear images, PP4 in action

©CEK

PP4:

At the time that UWEP was beginning, the political climate in Mali began to open up to more democratic forms of decision-making and good governance. There had been a general movement towards democratisation and decentralisation in Mali since 1992, and this was accelerating. And in 1998 it was the first time that the municipality of Commune IV was democratically elected. The local government acknowledges the importance of community organisations to reach the public and to involve them in their own local development. Specifically, the existing 'comités des sages' (committees of wise men, mainly traditional leaders) were not functioning well, and were coming to represent only limited groups. Waste management and cleanliness became more and more an issue for the local population. Waste management associations could play a role in:

- ◆ serving as a focus for the demand for cleaner and healthier places to live;
- ◆ organising demand for better waste management services, and translating that demand to payment for the GIEs providing that service;
- ◆ monitoring waste management operations of GIEs and municipalities;
- ◆ communicating with the households and local authorities;
- ◆ stimulating better waste-related behaviour in communities; and
- ◆ Organising occasional neighbourhood clean-ups.

PP5:

As mentioned before, organic waste is the largest fraction of household solid waste in Bamako. In addition, urban and peri-urban agriculture is quite common in Bamako and other African cities. In Bamako, loads of mixed waste which consist predominantly of organic waste and dirt are regularly “sold” to peri-urban farmers. Up until the APUGEDU/PP5 research project, it was not clear whether this practice was dangerous to human health or to the farmers themselves, or, in contrast, whether it represented a good use of resources. The APUGEDU project (Agriculture Péri - Urbaine et Gestion des Déchets Urbains) was financed by the European Union, it took place in Ouagadougou (Burkina Faso) and Bamako (Mali) in 1999 and 2003. CEK worked together with IER (Institut d'Economie Rurale). The research was based on participation and included stakeholders in urban waste management and in urban and peri-urban agriculture. The research did not only include interviews, problem analyses and mapping, but also experiments on the composting of household waste.

Especially the composting was greatly appreciated by the farmers as it was of better quality than the not sorted household waste they usually used. Additionally a result from this research was the forming of two platforms in Mali, one in Commune IV (COPIDUC : Comité de Pilotage des Déchets Urbains) et en Commune VI (COGEVAD ; Comité de Gestion et de Valorisation des Déchets). Both still active.

PP6:

Aside from organic waste, the household waste fraction in Bamako consists largely of film plastics, which are too wet or too dirty to be directly recycled. These not only create anaerobic micro-environments in the waste, but they are an active danger to cattle grazing in the transfer areas. In 2002, CEK participated in making a short video showing a veterinarian operating on a cow who was ill and dying from eating plastics. The film shows a 20 kg mass of film plastics being surgically extracted from the cow's stomachs, an operation that cost the farmer almost more than the cow was worth. This is representative of the larger problem of film plastics in the waste stream, a problem that PP6 attempted to approach with a preliminary study.

2.3.4 State of the pilot projects at the close of UWEP I

At the close of UWEP I in April 2001, the status of the pilot projects in Bamako was as follows:

1. PP1 state at the close of UWEP I: Tests had taken place in Commune IV. SNV agreed to take over technology development work in Commune I.
2. PP2 state at the close of UWEP I: No movement, due to problems with finding a site that was approved and allocated by the municipality.
3. PP3 state at the close of UWEP I: No movement, due to problems with finding a site that was approved and allocated by the municipality.
4. PP4 state at the close of UWEP I: Completed, disseminated at various occasions, summarised in Working Document 13, served as example for other donors.
5. PP5 state at the close of UWEP I: Just starting. Research in Bamako on the way.
6. PP6 state at the close of UWEP I: Study tours conducted regarding plastic recycling, little progress on the ground.

2.4 UWEP Plus

As UWEP Plus came to a close, WASTE and its partners were interested in creating the possibility to continue. WASTE and the partners prepared proposals for UWEP II, but at that time it also became clear that this could not be funded by DGIS, which was undergoing a reorganisation of its subsidy programmes. A much smaller “add-on” to UWEP I was formulated, referred to as “UWEP Plus,” which was designed to:

- ◆ build on the progress in UWEP I by engaging the host municipalities in an ISWM planning process;
- ◆ finalise and complete pilot projects, for which some additional capital was made available;
- ◆ distill the experiences of UWEP Plus and UWEP I in a trajectory elaborating the ISWM methodology and framework; and
- ◆ begin to explore the relationships between ISWM and climate impacts of waste management interventions.

In Bamako, UWEP Plus had several important areas of focus, including:

- ◆ the reservation of funds for capitalising PP2 and PP3, either separately or combined;
- ◆ a KaR planning process co-financed by DFID;
- ◆ research on C and N releases to the atmosphere, and the potential to capture these gases through actions and interventions developed in relation to the integrated sustainable waste management approach.

Important actors during UWEP Plus were:

- ◆ CEK
- ◆ the municipalities of Communes I, IV, VI and Manden (neighbouring Commune IV and situated in the Cercle of Kati, i.e. outside of the District of Bamako)
- ◆ COPIDUC and COGEVAD
- ◆ Civil Society Organizations in Commune I, IV and VI and Samanko II
- ◆ GIEs and co-operatives for cleansing
- ◆ Alphalog, SNV, ACF
- ◆ DRACPN (State Office for Sanitation and Pollution Control)
- ◆ ERM, WASTE

2.4.1 Activities under UWEP Plus

Stakeholder analysis/assessment and mobilisation

CEK argued successfully at the beginning of UWEP Plus that the stakeholder mobilisation was not only completed in UWEP I, but that this process was continuously updated in the course of normal CEK interactions with the community. For this reason, CEK and WASTE agreed to consider this step unnecessary, and to move directly to planning in the KaR-UWEP combined framework.

ISWM assessment and planning in relation to the KaR project

The KaR project had a focus on Commune VI, and in general was structured in the same way as in La Ceiba and Bangalore: to add value to the UWEP Plus assessment and planning process through use of the World Bank-ERM Strategic Planning Guide. The focus of KaR activities in practice included:

- ◆ Workshops and presentations (particularly an inception workshop and a dissemination workshop);
- ◆ Formulation of a baseline;

- ◆ Formation and activities of working groups on improving solid waste collection system;
- ◆ Facilitation of working groups to make proposals to the City;
- ◆ Interim and final results:

The result of this line of activity was an ISWM Assessment and ISWM-Strategic Waste Management Plan document, which was presented to at a well attended workshop in July 2003. The workshop even got national TV coverage. The conclusions of the workshop were that that the Commune VI was very well prepared and it is included in the National Sanitation policy. It was noted however that women should be more closely involved in the implementation of the plan.

Capacity building

A number of workshops and training events were organised as part of UWEP Plus. For detailed information on the workshops and meetings in Commune I please see Annex 2. The most important workshops organised by CEK included

- ◆ Organisation of a workshop in April 2003 to gather feedback on the results of the dye wastewater treatment tests. Participants from different West African countries were present.
- ◆ Organisation of a workshop in May 2003 together with SNV to disseminate and validate the results of the tests with motorised waste collection prototypes (Commune I and IV). The stakeholders involved in the tests were invited and also delegates from the municipalities of both Communes were present to participate in the discussion and the evaluation. The workshop ended in a proposal for further testing of waste collection vehicles.
- ◆ Stakeholder mobilization for a participatory assessment of waste management situation in Banconi (Commune I)

Two workshops were organised by COPIDUC:

- ◆ To develop cooperation strategy with other actors intervening in waste management in Commune IV. This workshop was attended by the municipality, technical waste management services and NGOs and CBOs (GIEs). Major problems in waste management and possible solutions to improve the waste management situation were discussed. The workshop resulted in a plan of action to enhance the waste management sector in Commune IV. The second workshop was a direct result of this plan of action

In September 2003 a workshop aiming at revitalising waste management associations in Commune IV was organised. A SWOT (Strength, Weakness, Opportunities and Threats) analysis was done on the APAPE (Association Pour l'Assainissement et la Protection de l'Environnement). Some mayor problems were discussed and a plan was drawn up to revitalise APAPE.

Organisation of one internal workshop by COGEVAD:

- ◆ To evaluate the functioning of the platform (October 2002)

Creation of multi-stakeholder platforms COPIDUC and COGEVAD in 2001 and building of their capacities through:

- ◆ Developing statutes and internal regulations
- ◆ Developing administrative and financial management procedures
- ◆ Establishing an office and meeting room with office equipment

- ◆ Training of the members in Commune IV in project management, participative assessment, management of small enterprises. Trainees were members of the platform among other the technical services department from the municipality and small enterprises.

On-the-job training on implementation of studies, follow up on pilot projects, organisation of workshops, creating links with other partners IV. For example a composting training in Sibiribougou et Lassa for urban farmers and organisations dealing with waste in those neighbourhoods. Also an practical alphabetisation and marketing training was given in Banconi.

During UWEP Plus efforts have been made to institutionalise COPIDUC and COGEVAD in the municipalities of Commune IV and VI.

The local farmer organization, as member of COGEVAD has submitted a project proposal to cover further financial assistance and study tour to Burkina Faso regarding composting to PASAOP (Programme d'Appui au Secteur Agricole et Organisations Paysannes).

Capacity Building in Commune I

A series of workshops and informal training procedures have been carried out for stakeholder mobilisation, ISWM assessment and implementation in the ward of Banconi (which is one of the poorest neighbourhoods of Commune I and Bamako). This process is very well documented and is still going on. Most activities are geared towards practical alphabetisation and Marketing.

C-N research

This environmental research on the carbon and nitrogen cycles and their interactions with waste management practices, in short the C-N research, has been part of (UWEP Plus). The aim of the research was to calculate greenhouse gas emissions under current practices of solid waste and waste water management in the South and to subsequently forecast the reduction of these emissions if sustainable waste management approaches were applied.

CEK asked the consultant Mamadou Diallo to direct the research. An interesting an unexpected outcome of the research was the description of an ancient sanitation system in Djenné (a city in Mali), which was never properly described. Toilets were placed on the flat roofs of the houses and the excreta fell down in a chimney, which was emptied every once in a while. The excreta were by then thoroughly dried, odourless and harmless. This sanitation system has been described in a Case Study⁵.

On the front of the C-N Cycles, the conclusion was that the Carbon from organic waste was brought back in the peri-urban agriculture in a haphazard way, as the household waste from Bamako is largely organic and is strewn over their land by farmers without proper separation or even composting. Also unsorted waste is simply dumped outside Bamako.

The observations in the research of the Nitrogen cycle was:

- ◆ 95% of the 1 300 tonnes of nitrogen contained in household liquid waste get lost annually in nature or contribute to polluting rivers and underground waters
- ◆ Nitrogen losses can be simply reduced through an improved sanitary and collection system.

⁵ Rapport de Mission sur l'Assainissement Ecologique à Djenné, Cheickna KONDE, Bakary DIALLO, CEK Kala Saba, 2003

- ◆ A clean valorisation of this immense potentiality will contribute to a sustainable cleanness of the environment and fight poverty

Other research:

- ◆ Research regarding the organisation of waste recycling in Commune IV and VI (by COPIDUC and COGEVAD respectively)
- ◆ Research on hazardous waste management in Commune IV and VI (by COPIDUC and COGEVAD respectively)
- ◆ Research on green spaces in Commune VI (by COGEVAD)

Pilot projects under UWEP Plus

All pilot projects that were started during UWEP I, continued during UWEP Plus. Two more pilot projects were added in Commune VI:

- ◆ Construction of a composting station (Faladiè, Commune VI and Commune IV)
- ◆ Testing of a dye wastewater treatment unit (Commune VI)

Table 4 shows the details of the two additional pilot projects started under UWEP Plus.

PP1 has been financed by SNV that further developed the prototypes of waste collection technology.

Table 4. Details of additional pilot projects in Bamako Communes IV and VI in UWEP Plus

	Pilot project	Objectives	Duration
1	Construction of a composting station (Faladiè, Commune VI)	To build a station for the treatment of organic waste that can serve as example for other Communes	2001-2003
2	Testing of a dye wastewater treatment unit (Commune VI)	To build a prototype treatment unit for dye wastewater that can be used by the textile dyeing craftwomen	2002-2003

The reasoning behind PP7, composting station, relates to PP5. Organic waste is the largest fraction of household solid waste in Bamako. In addition, urban and peri-urban agriculture is quite common in Bamako. The research carried out under PP5 showed that there was potential for linking urban waste management with (peri-)urban agriculture. PP7 put this into practice (improving the quality of farming soils and production making them healthier).

PP8 Dye wastewater:

Textile dyeing industry is a widespread cottage industry in Bamako. In hundreds of small-scale workshops in Bamako, mostly women dye cloth using chemicals without knowing what the dangers are, and generally without sufficient environmental or health precautions. The businesses are livelihood businesses, in or near the informal sector, and can't on their own make investments in research into pollution prevention in their operations. The focus of the research was on collective strategies that allow for the wastes to be properly treated.

State of the pilot projects at the end of UWEP Plus:

1. PP1: Testing with SNV in Commune I completed in 2003. A workshop was held in May 2003 to disseminate and validate the results of the pilot project both in Commune IV and Commune I.
2. PP2: Construction of sorting and composting station completed in 2004 and is functioning in shake-down mode (Commune VI and IV).

3. PP3: The treatment station for wastewater and latrine sludge was officially inaugurated in December 2003 and has been functioning since then. The capacity of the vehicles and treatment station is approximately 480 m³ per month
4. PP4: Completed in 2000, disseminated at various occasions, documented and summarised in Working Document 13, served as example for other donors. More experiences on community participation have been gained in Banconi since then.
5. PP5: APUGEDU project completed in 2002. Results showed that the appropriate use of waste in peri-urban agriculture was not dangerous, but the use of compost would be better.
6. PP6: Limited progress on the ground: end of 2003 some parts for the plastic recycling technology had been assembled and integrated with PP2
7. PP7: Construction of the composting station was completed in 2003. It is currently functioning under the umbrella of COGEVAD and Commune VI. Replication in the form of a second station in Senou has been provided by the Spanish NGO Area Metropolitana.
8. PP8 state at the close of UWEP Plus: Tests with dye wastewater treatment have been completed in 2003. Results were disseminated during a workshop in April 2003. Negotiations with Ministry of Environment/DNACPN and textile dyeing enterprises in 2003 to put into practice the results.

2.4.2 Conclusion

PPS Bamako was more ambitious and had a higher budget for pilot projects in UWEP Plus than any other PPS. This was both a benefit and a burden in the UWEP context. Significantly more occurred in terms of ultimate results than the other PPS cities, due to internal problems with WASTE (substantial follow up by WASTE was very weak/ not existent) –Commune I– from 2000-2002.

CHAPTER 3 FEATURED CASE STUDY: PP1

3.1 Introduction

For this section, PP1, one of the pilot projects in Bamako, receives the focus. PP1 was about developing efficient and low-cost alternatives to non-motorised transport. The choice to focus on PP1 may require some explanation, since it was in fact discontinued and taken over by another organisation, SNV. However, the topic is of broad interest: many cities in the South have a desire to move from primary waste collection with animal (or human) traction to “more modern” motorised traction. The key is not to “throw out the baby with the bath water.” That is, animal traction – or human muscle traction – and the use of small push- or animal carts is a technology well-suited to waste collection in areas with narrow, unpaved, rutted streets and steep inclines. It also works in informal settlements where the dwellings are not arranged around streets at all.

The alternatives which are usually offered don't work well, particularly when these involve imported second-hand compactor trucks donated by sister cities or imported by private waste collectors. Even if the trucks can be operated and maintained, which is not always the case, their high rate of fuel use generally puts the operations out of reach of the MSE and CBO collection sector. So the Bamako experiment with a modest approach to replacement of animal traction is particularly interesting, not only for the UWEP partners, but for other cities as well.

3.2 Why there was a need for this initiative

The initial workshop with local stakeholders in waste management organised by UWEP in 1996 revealed that the GIEs suffered from several problems, including technical shortcomings that made the job of collecting waste with donkey carts, the prevailing technology at that time, dangerous, expensive, and unsustainable. These problems included:

- ◆ the fact that the streets and roads were narrow, unpaved, rutted from grey, black, and rainwater run-off, and choked with litter. This resulted in frequent delays, as well as persistent damage to the donkey carts;
- ◆ the donkey carts had limited loading capacity and could only take small payloads;
- ◆ the GIEs were experiencing a very high rate of donkey mortality, especially during the rainy season. Donkeys were dying within as little as eight months of beginning to be used for collection;
- ◆ political decisions about land allocation related to rapid urbanisation (and the resulting increase in demand for land) were resulting in closing nearby transfer sites which and opening of new sites much further away from the collection routes;

The Bamako communal municipal authorities also, in the same period, made it increasingly clear that they did not see donkey carts as being appropriate for modernised waste management in their “modern city”. In line with this, the Governor of Bamako district prohibited animal traction on main roads in January 1996. This forced the carts to take the long way around, or risk a fine. This made the search for affordable motorised means of transport a matter of priority, as without a proper alternative GIEs and cooperatives would not be able to survive.

3.3 Featured Pilot Project Activities under UWEP I

The objectives of the featured pilot project, PP1, were: to develop an alternative to the existing donkey cart used by GIEs in Bamako that is technically more effective efficient and affordable, and therefore sustainable.

The following activities were undertaken as part of UWEP I, to prepare and begin the pilot project:

3.3.1 Project orientation workshop

Many workshops were conducted in 1996 - 1997 with key stakeholders in waste management in Commune IV for launching the different PP. Participants were the CPAC members, representatives of PDUC IV, of the households/Comités des Sages (Heads of the ward of Lafiabougou and one or two others, municipality, CEK and WASTE. For PP1 technical specialists (local craftsmen) joined the group. The goal was to decide on the key features needed for implementing the PPs (planning, use of logical framework in case of PP4) and to ensure a wide information about the next steps, the expected methods and tools to be used, time table etc..

Later in process of implementation , a monitoring committee was set up so as to ensure good communication between the leading institutions (Municipality of Commune IV, ALPHALOG/PDUC, CEK and CPAC). In 1998 an half year self evaluation workshop was held for the good communication sake. These meetings were not entitled to reschedule the planning or to decide upon major changes in the PPs (this was not possible without demanding other key stakeholders like WASTE and the heads of wards). They focalised on practical issues, which prevented the implementation of the PPs to move forward (exchange of news, settling of on going or coming disputes, any practical problems worth of sharing with each other) This committee developed a work plan which stated: [

3.3.2 In-depth study

More detailed study and tests of different means of waste collection were made in order to arrive at the key criteria for designing a prototype

Various workshops were also organised with the principal partners to review the results of the studies and to define a strategy for implementation of the project. There were sub-projects focusing on types of engines, developing a ToR for the manufacturer, choosing the pilot area for the tests, selecting the responsible GIE, and the like. This all took place in the years 1997-1998

3.3.3 Manufacturing of the prototype

Three prototypes were developed: two motorised prototypes and one improved donkey cart that could collect more waste. A contract was signed with two local manufacturers who developed the various designs. Sander Smit, a Dutch industrial design student, assisted in developing the design in the context of his internship with WASTE.

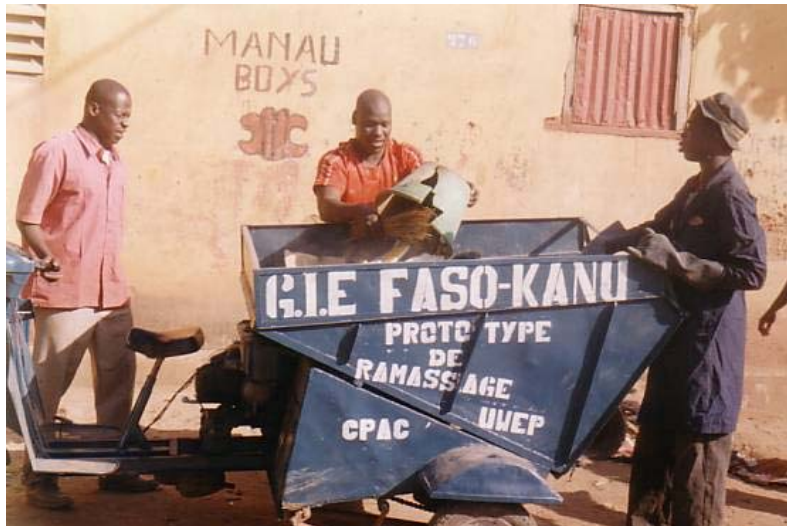


Photo 3. Picture of one of motorized prototype

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3.3.4 Testing of the prototype

A test protocol was developed indicating the criteria used for testing.

The three prototypes were tested for the following parameters, which had been agreed upon among key users in previous workshops:

- ◆ resistance to breakage;
- ◆ fuel consumption;
- ◆ maintenance costs;
- ◆ acceptance by the drivers;
- ◆ acceptance by the local population;
- ◆ acceptance by the workers; and
- ◆ cost and availability of spare parts.

The tests were firstly performed by CPAC, but after some difficulties the FASO KANU (a GIE) continued and finalised the testing in June 2002. The tests showed that the developed prototype was more efficient than the cart. Figures show that while the cart can collect up to 1200 kg of waste per day, the prototype could collect 1800 kg in the same time. Even though the costs of using the prototype was higher, the returns were sufficiently higher to make it profitable.

Collection type	Number of household serviced per day	Payments received per month (based on = 1000F CFA/household/month)	Exploitation costs per month	Generated income
Prototype	226	452 000	115 000	337 000
Cart	150	300 000	83 917	216 083

3.4 Conclusions from PP1 under UWEP Plus

Around the inception of UWEP Plus, SNV took over PP1, and CEK, together with SNV, took the investigation several steps further.

The three prototypes tested were:

1. Mini-tractor prototype Commune I, with diesel engine (18 hp), 3 wheels, without tipping mechanism, capacity 2,8 m³.
2. Motorised prototype Commune IV. Self-propelled cart equipped with Vespa engine, using mixed fuel, with tipping mechanism and 3 wheels, capacity 0,4 m³
3. Improved donkey cart with capacity 0,72 m³, without tipping mechanism.

Each prototype was compared with an ordinary waste collection truck. The methodology used for the comparison included tests and surveys carried out in Commune I and IV. The main axes of the testing process included testing the prototypes for: technical performance, organisational aspects and environmental aspects

The different parameters were evaluated and ranked for each technology in the following manner:

- ◆ 1 = very bad/weak
- ◆ 2 = bad/weak
- ◆ 3 = mediocre
- ◆ 4 = good/high
- ◆ 5 = very good/high

The resulting technical performance is presented in the following table

Table 5. Performance tests

	Mini-tractor	Motorised cart	Donkey cart	Truck	Comments
Resistance	5	4	3	5	Resistance: especially on rocky underground the animal traction was problematic, raising maintenance costs.
Fuel consumption	4	4	NA	3	Fuel consumption: the more powerful the engine, the higher the fuel consumption.
Maintenance costs	4	4	4	3	Donkey: use of animal park, food, veterinary care (F CFA 65,000/donkey/year). On rocky ground maintenance costs increase, especially for trucks.
Acceptance by the drivers	4	4	3	5	All of the prototypes were considered more delicate and less robust than the truck.
Acceptance by the local population	4	4	1	5	Motorised prototype poses less danger for security of persons and goods
Acceptance by the workers	3	4	2	5	loading and emptying. Emptying appeared to be more important for the workers than e.g. loading height, although height is more important for health considerations.

	Mini-tractor	Motorised cart	Donkey cart	Truck	Comments
Cost of spare parts	4	4	5	4	wheels and tyres are constraints for the donkey cart, while 'suspensions' and 'disque d'embrayage' appeared to be constraints for the truck
Availability of spare parts	4	4	5	3	

3.4.1 Organisational aspects

The main conclusions in terms of organisational aspects include two which were known before the testing even began:

- ◆ The prototypes are new, so there are no materials for training drivers
- ◆ With new prototypes, there are not so many manufacturers

A third conclusion is also independent of the pilot project itself:

- ◆ GIEs seldom have staff which is capable of making useful calculations, on the basis of which they can make rational decisions about choosing or combining different collection technologies.

3.4.2 Environmental aspects



Photo 4. Picture of testing a motorized prototype by stakeholder in Commune IV

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The only environmental aspects discussed were visual and noise pollution. That is, the test did not consider the environmental or emissions effects of fossil fuels and emissions, as against the effects of feeding donkeys and cleaning up their manures. In terms of visual pollution, this is considered by the stakeholders to be highest with donkey cart, whereas noise pollution is highest with the truck.

3.5 Stakeholder involvement and ownership

A number of stakeholders – persons or organisations that have an interest in the activity- were involved in PP1 during UWEP I and/or UWEP Plus. These stakeholders and their roles are listed in Table 6.

Table 6. Stakeholders and their roles in the featured pilot project

Stakeholder	Role
GIEs and CPAC	Indicated need and conditions for improved technology, led process of design, testing, etc.
Designers/manufacturing enterprises	Developed design
CEK	Advising, intermediation
WASTE/UWEP and SNV	Financed design and manufacturing of the prototypes. Led process of design, testing, etc.
Municipalities of Commune I and IV	Served as host communities
Workers and drivers of GIEs	Gave feedback on design
Local population	Gave feedback on design
Dutch design student	Technical advising in process of design, testing, etc.
Faso Kanu, Djèya Walé (GIE Commune I)	Did the final testing

3.5.1 Ownership of the prototypes

Some problems occurred on the issue of ownership of the prototypes.

- 1 Giving ownership to several of the GIEs would have required additional funding to manufacture more units. The GIEs in Commune IV expressed their wishes to do this, but lacked sufficient funding
- 2 Giving ownership to the municipality so that they could lease the prototypes to GIEs and use the rent to set up a revolving fund was a popular option, and is actually happening in Commune I.
- 3 Giving ownership and rights to manufacture to the manufacturing enterprise was controversial, as the GIEs feared that this would make the units too expensive so that the GIEs could not afford them.

No organisation could take ownership of the prototype as the financial consequences of it were unclear. At the end of UWEP Plus intellectual ownership remained with WASTE, CPAC, SNV, the municipality and GIE of GIE Commune I.

3.6 Conclusion

Key stakeholders agreed that, technically the two motorised prototypes good alternatives to the donkey carts commonly used by GIEs. The financial issues are less clear: it is not obvious whether the cost of fuel can be recovered as long as the collection rates are determined by the commune city councils without reference to actual costs. As a result, full-scale commercialisation of the prototypes to meet real demand from the GIE private sector still remain to be done.

CHAPTER 4 THE IMPACT OF UWEP ON THE REGION

4.1 Situation in Bamako before UWEP

The specific UWEP-Plus goals are to contribute to:

- ◆ **Building of *capacities* of local actors**
- ◆ **Development of appropriate *models***
- ◆ **Establishment of functional *systems***

With respect to these three goals, the situation before UWEP began was as follows.

4.1.1 *Capacities of local actors*

Before UWEP residents were not well organised to intervene on large scale in public life including playing a role in public services such as waste management. Waste management associations did not exist yet. What existed were ‘comités des sages’ (committees of wise men) and other informal community groups, who played a limited role in community mobilisation.

The ‘chefs du quartier’, representing the municipality at quartier level, had a key role in legitimising activities.

Before 1999 the municipalities (Communes) within Bamako district were not autonomous. They depended on the national government to a large extent. The relations between the Communes and the district were hierarchical. Cooperation with civil servants was only possible through good personal relations.

GIEs and cooperatives were responsible for primary collection in many areas, but they had problems in getting the population involved, recruiting and keeping customers and in collecting user fees.

The cooperation between the Communes and GIEs was rather formal and one-way: the municipality set the conditions. It was not really a partnership. The situation sometimes led to tensions, as, for example, when CPAC, the platform of collectors, decided to remove the Commune from its structure. There was no legitimate structure for defending the interests of the population in this cooperation between the Communes or the GIEs.

4.1.2 *Appropriate models*

The models existing before UWEP were:

- ◆ Traditional animal-drawn waste collection technologies used by GIEs and cooperatives were functioning, but were burdened with technical problems. The system of fee collection functioned poorly, so all GIEs were experiencing financial shortcomings. Furthermore, the model of GIE collection was not really co-evolving with the goals and perceptions of the local authorities, who wanted to modernise the city services, so they did not fit the local situation anymore.
- ◆ Even with the GIEs, the main approach to waste management was top-down, focused on technical issues and selected participation of community leaders, and treating the clients as objects, not subjects, of the service relationship. This partially participatory approach to waste management allowed few opportunities for community participation on the whole. Also the relationship between the Communal authorities

and the GIEs, although they could be called public-private partnerships, were hierarchical and one-way, with little exchange of information or co-operation on new initiatives.

- ◆ The textile-dyeing industry, in particular, is one example of the potential victims of top-down, enforcement-oriented policy-making. It was the stated intention of the national government to ban the textile dyeing industry, to close all small dye shops, and to force the industry to move out of Bamako because of the pollution caused by dyeing wastewater. A law in this direction was about to be implemented in 2001.

4.1.3 *Functional systems*

- ◆ Waste management was becoming more and more a problem due to growing population (rural-urban migration) and rising incomes, which implied increasing levels of consumption and also an increasing volume and diversity of packaging materials.
- ◆ The capacities of DSUVA, technical service of Bamako district (and the six communes) which was the agency in charge of secondary collection, were limited. DSUVA had only 10 vehicles, each with a capacity of seven cubic metres, to serve all 6 Communes. Given these limitations of DSUVA, GIEs had been initially encouraged by the municipalities to take larger roles in waste collection, and were filling the gaps, but they did not have the support of the city in any practical way, and were especially delinquent in providing secondary collection and transfer to support the GIEs primary collection operations.
- ◆ As a result, the proliferation of GIEs and cooperatives in Bamako resulted in the collection of increasing volumes of solid waste, wastewater and latrine sludge. However, the disposal capacity did not rise to meet this increase. No controlled disposal sites existed. Predictably, the final disposal of solid waste, latrine sludge, and waste water were uncontrolled, except for limited sales of waste to the peri-urban farmers. Waste materials were being released to common property land, water, and air resources, specifically to agricultural fields, quarries, water courses, and via open burning.

Waste was not separated at source. Reuse of organic waste and excreta in agriculture was occurring, but on an uncontrolled basis, with many contaminants that created risks for hygiene and the health of farmers.

4.2 **Situation in Bamako now**

With respect to these three goals, the situation in Bamako now can be characterised as follows.

4.2.1 *Capacities of local actors*

More and deeper cooperation between stakeholders, among others through the creation of the multi-stakeholder platforms COPIDUC and COGEVAD. Cooperation depends less on personal relations, but is more structural and linked to institutions. There are permanent and open channels

As a consequence of UWEP, and primarily of PP4, the role of ‘comités des sages’ had decreased and was taken over by waste management association, a more formal, modern

structure. Preserving the traditional relationships, the ‘chefs de quartier’ continue to play a honorary role in these associations.

The interests of the population are better defended through waste management associations and their membership in COPIDUC and COGEVAD. Waste management associations were created in Commune I, IV, and VI. Because of this, conflicts and tensions are more easily resolved, and there is more flexibility, transparency, and mutual acceptance between local stakeholders.

Local stakeholders, both governmental and non-governmental, feel stronger and more confident. During the UWEP implementation they had opportunities to build their capacities, specifically in the field of communication, community mobilisation, organisation of clean-ups, project preparation and management. The KaR programme provided additional training in these fields to the Commune, waste management associations and the ‘chefs de quartier’ in Commune VI.



Photo 5. Picture of COGEVAD members in Commune VI during a workshop

©CEK

The capacity building with the local stakeholders from GIEs and waste management associations were able to have their voices heard during the implementation of the UWEP programme, and then later were motivated and able to take on political roles. Two were chosen for the municipal council of their commune, and one even became mayor later on (Bankoni, Commune I).

Communes IV and VI have become credible partners for development. Various donors now want to work with them (World Bank, SNV, UNICEF, DED, Metropolitana, etc.).

4.2.2 *Appropriate models*

In terms of waste collection technology, PP1 contributed to legitimising appropriate technology equipment. The two motorised prototypes and one improved donkey cart which were developed during UWEP, providing alternatives to conventional trucks, which are more suited to local circumstances, both in Bamako and in other West African city contexts. This benefits the operations of the GIEs and cooperatives.

Waste management has also shifted from a technically oriented “top-down” affair, where the users are merely objects, to a more mature, participatory, urban service with providers in communication and partnership with users in a transparent relationship. In effect, this represents a political modernisation of governance around waste management, and it has gained acceptance among local authorities of the Communes and also among other donors. For example USAID embraced the ISWM approach in its waste management activities. In other parts of Mali the idea of stakeholder platforms and waste management associations have spread, based on replicating the models pioneered by UWEP in Commune IV and VI. For the 1st time women play a key role in public life based on local cultural values with support traditional leader.

The building of capacities at local level has had an important effect on national approaches to urban environmental management and governance. For example, there are now individuals posted to offices at national (DNACPN) and regional level (Gouvernorate) level, who have experience and knowledge of ISWM and are interested in using integrative and participatory approaches.

The multi-stakeholder platforms COPIDUC and COGEVAD were institutionalised in the municipalities, which allocated them a budget and a formal advisory function. The function both as examples of new governance structures, and as strong advocates and supporters of the process of democratisation and decentralisation taking place in Mali at large.

The experimental treatment of dye wastes resulted in delaying the punitive actions of the government, they did not go through with their plans to ban this industry from Bamako. Both the textile dyeing industry and the regional and national technical services (DRACPN and DNACPN) have indicated their interest in the results of the dye wastewater treatment experiments. Up until the present time, the unit developed was too expensive for the industry to implement on its own and the Minister of Environment had some reservations regarding the research techniques used and potential risks for environmental health. Further development of the treatment methods will depend on the outcome of negotiations between these groups, but this is a project which would be an ideal subject for a PPP project, between the authorities, the industry, and a private-sector provider. The Communes and the dye craft women are willing to take over the initiative and continue the tests on an independent base.

Following the practical examples provided by PP2, PP5 and PP7 municipalities in Bamako take into account the use of organic waste in (peri-)urban agriculture in their waste management strategies, and consider this a legitimate end-use.

All municipalities and State organs are very interested in appropriate treatment of wastewater and excreta (big or small size treatment station)

Waste management associations are increasingly becoming a common feature of neighbourhoods in Bamako, because of the political support they enjoy and the opportunities they offer to citizens to influence waste management services. These associations also give

donors a practical way of supporting community governance and improving the urban environment, and the donor support in turn reinforces the legitimacy of the associations as a governance institution.

4.2.3 Functional systems

A number of capital structures were built with funding from UWEP. These included:

- ◆ Samanko wastewater treatment station (Commune IV)
- ◆ Samanko solid waste sorting and treatment station (Commune IV)
- ◆ The composting station in Faladiè (Commune VI)

Three *quartiers* in Commune VI now have waste management systems which rely on household separation of organic waste at source. In these *quartiers* the organic is composted in the composting station at Faladiè, and provided to peri-urban farmers as a safer and more reliable source of nutrients than mixed waste. Another composting station is planned in Commune VI with financial support from the Spanish NGO Area Metropolitana.

The waste collection prototypes are used by GIEs in Communes I and IV, where they can be afforded.



Photo 6. Picture of Samako WWT station

©CEK

4.3 Lessons learnt:

1. The engagement of local government units, and in the traditional structures as well, which began during UWEP I and was intensified in UWEP Plus, has been very vital in implementing ISWM programme. It is important that the local chief executive understands and is committed to any project. The public support for projects is also critical to bring the local chief executive on board.
2. Any intervention in a locality should be demand-driven and rooted in the local culture and tradition, while at the same time integrating traditional structures into the process

of modernisation. The work on community participation in Commune IV is a clear example of how focused facilitation can work with latent demand for a cleaner environment. This type of latent demand is frequently expressed as dissatisfaction, pessimism, high levels of complaints, or low payment rates. PP4 mobilised the traditional elders and the residents, and through a long period of contact and capacity building, supported the community to build its confidence that it was possible to change things. As the latent demand became more focused, a dialogue with the local authorities and GIEs became increasingly possible, and the stakeholder found that they could work together to improve the urban environment in their community.

3. Soft interventions like support for planning and capacity building are necessary but not sufficient conditions for modernising urban environmental systems and infrastructure. Modest amounts of capital for adaptation of technology (PP1) or for building facilities suited to the local environment and waste stream (PP2-3 and 7) can improve the performance of the urban environmental system.
4. Structural involvement and participation of system clients, system providers, and other key stakeholders results in higher levels of awareness and understanding of the beneficial effects of organised solid waste management for households and communities. This in turn translates to a more positive and co-operative attitude, and higher levels of compliance and payment of fees. Knowledge building, hands-on experience of stakeholders in the implementation of ISWM activities and ownership of the program have been very important components to ensure sustainability.
5. Particularly in countries which have had a social democratic or state socialist history in recent times, pockets of personal or institutional resistance to ISWM concepts/practices will remain. In Bamako, this resistance is focused on the conviction that it is government that should manage solid waste, since they get paid for it. Changing this attitude and dissolving the resistance will depend, to a certain extent, on changing the way the fees are set and collected, and on further work to make the fiscal structures responsive to governance, and not the other way around.
6. Development programs including SWM are not immune to negative impacts of political conflicts.
7. Bamako was the only PPS city, other than La Ceiba, Honduras, where a formal MoU between stakeholders was signed at the start of the UWEP I programme. This MoU was helpful in engaging local authorities at the beginning of the process, but it also may have resulted in the somewhat over-ambitious capital investment plans for PPS Bamako.
8. Multi-stakeholder platforms and participatory, consultative processes, need time, at least 2-3 years, to grow organically. Because an essential element of their success is building trust, they cannot be expected to bear fruit immediately, when they are replicated in other areas. This is even more the case in public-private partnerships, where, in addition to the stakeholder participation, there is a relationship with some elements of competition or negotiation. The partners need time to understand each other's interests and motivations, and to build respect for disagreements.

9. Connections to other issues such as health and tourism can enhance appreciation of SWM management program. Many people relate better to the ISWM when they appreciate the benefits in other aspects of their lives.
10. The lack of a national legal framework hampers work in solid waste and implementation of the project, although at the same time, it may create openings and opportunities to shape that legal framework when it is finally put into place. Without such a framework, it becomes necessary to work at multiple levels at the same time: the household, community, local authority, regional and national administrative/legal level. Good relations with local, regional and national governments are crucial in influencing policies and programmes at a larger scale.
11. In most African cities, urban governance is managed at national level by the Ministry of Local Government and the Ministry of Finance. However, for solid waste and excreta management, it is also critical to engage the Ministry of Environment and Ministry of Health. These are key national-level stakeholders, whose representatives need to be included in any laboratory analysis of waste and excreta reuse projects; such involvement can help to enlist their support and to avoid criticism later about potential risks. In a like manner, the Ministry of Trade and Industry needs to be involved in industrial pollution prevention activities such as the dye waste project, and the Ministry of Agriculture (Forests and Fisheries) is a key stakeholder in strengthening traditions of making and using organic waste, excreta, fish and fruit processing wastes, and compost.
12. Having a “champion” or “spark plug” in the community is key to building the political will of the local officials in ISWM or other participatory, “bottom-up” projects on development or modernisation. Without this individual, there is a tendency for the project to collapse when the programme is finished and the intervention agents are gone. CEK played this role throughout the UWEP programme, and was effective in part because it was *in and of* the community. In the UWEP Programme, only Mythri in Bangalore had a similar relationship.
13. It is necessary to be cautious and very conservative in informing project stakeholders and beneficiaries about project funds, to avoid creating unrealistic expectations that result in disappointment, disillusionment, and cynicism. There is a tendency among beneficiaries to consider project funds as “free money” that they can get just by asking for it, rather than something that is related to work and deliverables. This is one area where transparency is not helpful.
14. Baseline and local initiatives studies, as well as a history of recent interventions, are critically necessary at the start of all programmes and initiatives. They help to identify key stakeholders, to capture and capitalise on institutional memory, and to avoid repeating or reinvesting in errors or failures. Baselines describe the existing situation and facilitate the identification of problems, issues, resources and concerns of key partners and stakeholders. They provide an important guide to planners and development agents.
15. Hiring skilled, dedicated and committed project staff is important to project success. The staff can make or break the project since they are on the front lines in the “battle field” of urban environmental management programmes.

4.4 Obstacles and barriers

Finding a suitable location for PP2 and PP3, the treatment stations for solid waste, wastewater and latrine sludge, was difficult because of competing demands for land, a lack of urban planning, and the institutional confusion created by decentralisation. Several times, the request for allocation of a site was begun under one regime, with lobbying of appropriate officials and preparation of required documents. When, after a long period of no response, it appeared that a different regime had come into force, the whole process had to begin all over again.

Finally a site was chosen at the edge of Bamako, in Commune of Manden, around 16 km from the centre of Bamako.

Like in many other cities in the South, stakeholders in waste management in Bamako were fragmented in their neighbourhoods, and operated in an isolated manner, without any community or governance structures to help: the traditional tribal structures were no longer functioning, but nothing new had come in their place. Creating a kind of integration between stakeholders and activities was one of the greatest challenges of the UWEP programme.

Low-income groups can generally cover the costs of primary collection from their own neighbourhoods, when this is provided by enterprises which are built in their own local economic context. However, they are usually not able to pay for transfer and secondary collection. Therefore waste collection and transfer from low-income areas needs to be subsidised. When the local authorities do not do this, as was the case prior to UWEP, waste is removed from streets, but accumulates in informal dumps which are also dangerous to health of people and animals.

The capacity of local technical services was much more limited than expected. UWEP counted on their support for the waste management associations, but it turned out, at least in the beginning, that they could not provide this. It was not only communities, but also local authorities and technical services who needed capacity building and training. In particular, a key part of modernising governance is training officials to listen to and respond to the public, rather than expecting to give orders and have the public obey. In Commune VI one person from the regional technical service (DRACPN) was sent to Germany for training, paid by InWent, a German NGO.

ANNEX 1 ISWM-KAR ASSESSMENT FOR BAMAKO, MALI THE CONCLUSIONS FROM THE REPORT

Conclusion

The KaR project has been carried out in Commune VI from November 2001 to July 2003. The process has been implemented by COGEVAD which is a structure created by the Municipality of Commune VI and chaired by the Mayor himself. This mechanism has facilitated the starting of the KaR project activities. The Local and Regional Coordination's supports have been of key importance in driving the process. The consensual lines reached include the following statements:

- ◆ The coherence of the approach of the Commune VI with the solid waste management strategy of the District of Bamako (worked out by PDUD).
- ◆ The deep involvement of the civil society, which shows its interest for the participatory planning process.
- ◆ The necessity to set up appropriate transit sites.
- ◆ The necessity to set up structures similar to COGEVAD in the other communes as asset in municipal waste management.
- ◆ The necessity for focusing on selected priorities in the strategic planning of waste management (incremental approach).
- ◆ The importance of using waste as economical resource (reuse, recycling etc.).
- ◆ The necessity to preserve areas for intra and peri-urban gardening.

The C VI hopes that the dissemination of the strategic planning method will allow him to tie new contacts whose contribution for the implementation of the strategic plan will be determining. It thankfully appreciates the opportunity offered to him by ERM and WASTE to initiate the stakeholders in the solid waste management area in Commune VI to strengthen their capacities in the strategic planning of municipal solid waste management.

ANNEX 2 REFERENCES

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