WASTE PROJECT EXPERIENCES

The projects have been listed by main issue dealt with, even though more often than not multiple issues have been dealt within WASTE projects.

INTEGRATED WASTE MANAGEMENT

UWEP Plus - Urban Waste Expertise Programme Plus (2001 – 2003)

UWEP is the Urban Waste Expertise Programme, the UWEP-Plus (2001-2003) follows and completes the UWEP-I (1995-2001). In UWEP Integrated Sustainable Waste Management (ISWM) has become the core concept for understanding and planning waste management in developing cities. ISWM interrelates with strategic planning and management concepts and tools development in complementary sectors like Environmental Sanitation and Integrated Water Resource Management.

This programme seeks support to enrich and extend the UWEP programme framework for a period of two years, with four areas of activity:

1. ***Upscaling of stakeholder collaboration*** in the current four cities for UWEP's intervention and support in the South, with ***complementary pilot project execution***, particularly in waste and wastewater infrastructure with an investment component that could not be furnished in UWEP-I.
2. Working with local partners in a comprehensive and ***participatory ISWM planning process*** to produce an Integrated Sustainable Waste Management (ISWM) plan. This will operationalise methods and tools for ISWM in the current four intervention cities, with ***validation of the developed methodologies*** in three reference cities in different development regions.
3. Making some methodological advances by means of ***local research on the environmental aspect*** of ISWM, in understanding the local carbon and mineral material cycles as managed by the city, and build argumentation on the national and international relevancy of good waste management practice, in particular for the mitigation of green house gas emissions.
4. ***Consolidating and disseminating the ISWM knowledge*** generated in the UWEP programme, and ***increasing the access*** for beneficiaries from countries in development and in transition via an internet portal for the ISWM framework.

The current four UWEP intervention cities are La Ceiba Honduras (Central America), Bamako Mali (West Africa), Bangalore India (South Asia) and Batangas Bay Philippines (SE Asia). Three reference cities for the validation of ISWM planning will be chosen in different

development regions: South America (Peru), Middle East and North Africa (MENA, Egypt or Yemen) and Central and Eastern Europe (CEE, Bulgaria or Macedonia).

With regards to the development objectives and beneficiaries UWEP-Plus continues to contribute to a better environment and livelihood for the urban poor. It builds the local capacities to take away obstacles in the development process. In terms of results, the participative ISWM planning will not only capacitate the local stakeholders, the validated methodologies and mechanisms will facilitate ISWM planning in other cities. The pilot projects will not only improve the local infrastructure to evacuate and treat waste and wastewater, on its operational experience will be built in other cities. The substantive research will not only deliver the knowledge for better local management of water and nutrient cycles, it will create arguments for national sector policy making and the importance to support good waste management practice from the global environmental perspective.

UWEP-Plus will be executed in the SURCO consortium which WASTE forms with NGO-consultancies from Costa Rica, Mali, India, Philippines (for the four intervention cities) and Peru, Egypt, and Bulgaria (for the three validation cities). WASTEs role, as in UWEP-I, will remain to deliver expert and management backup in a transregional facilitation of local research and implementation, regionally managed by the SURCO partners in the four intervention cities on the basis of demand driven multi-actor development contracts.

Urban Waste Expertise Programme (UWEP), 1995-2001

Background

The decreasing ability of the public sector to fully cope with the growing magnitude of the waste management and related environmental health problems has shifted the emphasis towards solutions from private sector enterprises. Privatisation is considered as the grand solution. The widespread role of community efforts and the (informal) small and micro-enterprises has been largely neglected or marginalized. Yet, these enterprises can and do play an important role in the collection, re-use and resource recovery of large amounts of "waste" materials, saving natural resources and public spending.

The Urban Waste Expertise Programme (UWEP), was funded by the Netherlands Ministry for International Cooperation (DGIS). It's short-term aims were:

- enabling organisations in the South to develop activities and initiatives to improve waste management in low-income areas and waste handling by micro-enterprises
- promotion of community and micro-enterprise based waste management to local authorities and development agencies

Activities during UWEP

At the start of UWEP a broad range of research projects in Latin America, West Africa and South-West Asia were set up. Subjects for research were:

- Several waste materials (organic, plastic, human, health care waste),
- Sources of waste (harbour & ship waste),
- The role of actors (MSEs, community groups and the linkages between them),
- The processes (waste collection and separation at source)
- The financial aspects of waste management and recycling.

The results of these studies formed one of the starting points for the execution of pilot projects with partners in Bamako (Mali), Batangas Bay (the Philippines), Bangalore (India)

and La Ceiba (Honduras).

Thirteen pilot projects were identified:
Bamako, Mali
- Collection technology: development of appropriate technology for household garbage collection
- Development of a depot for the recycling of both solid and liquid waste to achieve waste valorisation
- Establishment of Associations for the management of solid waste and sanitation
- Research on the links between the generation of organic waste and its use by (peri-) urban farmers

Bangalore, India
- Bringing to scale community based waste management
- Improving intramural health care waste management and integrating an improved feasible neighbourhood based system into an municipal waste management system
- Strengthening the role of the Swabhimana (citizens) platform in a decentralising governmental framework

Batangas Bay. Philippines
- Establishment of a waste management co-ordinating body in Bauan
- Development of community based waste management system at Barangay level including the commercial junk shop operation
- Enhancement of the MSE in the recycling sector through establishment of recycling co-operative (BBREC)
- Development of an integrated sustainable waste management system on Tingloy island

La Ceiba, Honduras
- Improvement of waste system performance and promotion of ISWM, through strengthening the role of the association of MSEs in waste collection and recycling as a way to achieve social privatisation
- Improving the management capacity of the municipality through developing a waste management information system (dropped, replaced by:)
- Environmental education and organisation of a participatory urban consultation
- Improving the working conditions of the dump pickers

Result of UWEP
As the programme ended in 2001 several insights have been listed.
- The existence and importance of people working in waste, whether in the formal of informal sector has been acknowledged and is taken into account when setting up projects.
- In the four cities and surrounding areas where UWEP is active an infrastructure has been realised enabling interaction of stakeholders, beneficiaries and community groups. There are now platforms in which the municipality and MSEs talk with each other.
- Mechanisms on Community management have been developed.
- The knowledge generated by the programme has resulted in the development of the Integrated Sustainable Waste Management concept (ISWM).
- Results of pilot projects and researches have been made available to a wider public with the publication: *Integrated Sustainable Waste Management, A set of five tools for*

decision-makers as a final product

The UWEP programme has a follow-up in the two-year programme UWEP plus.

UNIDO, Dar es Salaam, Tanzania (2001-2003)

There is quite a lot of plastic and paper waste at dump sites and transfer stations in Dar es Salaam, Tanzania, so more money is spent on transport and more space is used up at the dump site. The quality of the recycled paper and plastic is low, the collectors don't get much money for it and some secondary materials of higher quality are even imported. The big paper mills and the plastic factories are working below their capacities.

UNIDO, the UN Industrial Development Organisation, has therefore formulated the Recycling Centre Project (RC) as a strategic intervention that will strengthen the secondary materials market place. The RC will help the MSE and CBO sector to reach the market, strengthen their performance and open up new domestic and export markets. It will provide intermediate processing: sorting, grading and baling of paper, sorting, washing, shredding and eventually pelletising of plastic waste.

WASTE is contracted as the leading technical partner in creating a recycling processing centre in Dar es Salaam. The Centre, has opened its doors in December 2003, focuses on adding value and increasing marketing options for paper and plastics collected by the informal and semi-formal MSEs and CBOs who collect waste and recyclables in Dar es Salaam neighbourhoods.

The project is financed by the government of Norway and can be defined as both an infrastructure project and a market intervention, designed to open up the South African paper recycling market to receive Tanzanian waste paper.

Urban Environment days, Ministry of International cooperation/DGIS, Den Haag, Nederland (2001)

Every year the ministry organizes workshops for its staff abroad at its embassies to discuss problem areas identified by the staff to make them familiar with new insights and developments. This year one of the workshop themes was: the Urban Environment. One of the sub themes was urban solid waste. WASTE had been invited for a two days set of presentations and discussions on the importance of urban environmentalists, in which WASTE presented the Integrated Sustainable Waste Management concept (ISWM). WASTE explored links between ISWM and urban development and climate change. Urban waste proved to be an important proxy for urban development and 'good governance', one of DGIS's policy themes and through an ISWM approach of waste management considerable reductions of CO2 and NH4 emissions can be achieved in transportation and land filling.

Socially Responsible and Economically Sustainable Waste Management in Bulgaria (2000-2001)

In 1999 WASTE, together with a Bulgarian partner, IES, won a PHARE Partnership Grant to provide technical assistance to Bulgarian municipalities to modernise their waste management systems. The project allows municipalities to specify the form and focus of the technical

assistance. Sub-projects include: plastics recycling in Sofia; integrated solid waste planning in Byala and Varna, Bulgaria; feasibility for a regional landfill in Gorna Oriahovitza; research on Roma ("gypsy") informal sector involvement in waste management in Bulgaria and the Balkans, and a few small projects.

WASTE CEE Staff Projects

WASTE staff in Bulgaria have been doing projects for several years in association with WASTE, but under Bulgarian contractors. These include experimenting with composting and small-scale transfer in villages; and working with separate collection and citizen participation in high-rise housing estates. WASTE staff in Bulgaria also serve on local expert commissions and participate in municipal development projects.

Socially Responsible and Economically Sustainable Waste Management in Bulgaria (2000-2001)

In 1999 WASTE, together with a Bulgarian partner, IES, won a PHARE Partnership Grant to provide technical assistance to Bulgarian municipalities to modernise their waste management systems. The project allows municipalities to specify the form and focus of the technical assistance. Sub-projects include: plastics recycling in Sofia; integrated solid waste planning in Byala and Varna, Bulgaria; feasibility for a regional landfill in Gorna Oriahovitza; research on Roma ("gypsy") informal sector involvement in waste management in Bulgaria and the Balkans, and a few small projects.

Waste management feasibility study, Lacote/Kenya, 1999

A proposal had been made by Lacote, Kenya (an industrial cleansing company), based on a rather new technological development: the installation of a energy producing incineration plant. Under the authority of the International Environmental Technology Centre, (IETC/UNEP), Japan, the mission elaborated on existing documents and had thorough discussions with key actors with regards to the (waste) management situation in Nairobi: legislation, reliability of stakeholders, operation and management, the environmental dimensions, contracting procedures and made a financial analysis. The mission came to the conclusion that the proposed option would not be the most optimal solution for the current situation in Nairobi. A more integrated approach to waste management should be established, whereby cooperation of stakeholders should be sought at several levels and whereby serious bottlenecks need to be tackled first with regards to several aspects.

Dar Es Salaam Integrated Solid Waste Management, Tanzania, 1998

The International Labour Organisation (ILO) in collaboration with the UNCHS Habitat assists the Dar es Salaam City Commission in the implementation of an integrated solid waste management programme. The ILO has asked WASTE to provide assistance in the field of community-based waste management and small-scale recycling. WASTE assisted in the development of a waste collection plan for two communities and presented options for the enhancement of the waste paper, plastic and sheet metal recycling sector. CBOs were trained in running their own waste collection businesses.

Solid Waste Management, Karachi, Pakistan, 1995-1996

The Karachi Metropolitan Corporation (KMC) secured a loan from the Asian Development

Bank to improve its solid waste management system. Included in the loan were the procurement of equipment; the setting up of consultancies on community participation, valuation of assets, privatisation and recommendations for an improved solid waste management system. WASTE provided a Solid Waste Management adviser, whose task it was to review all consultancy reports, prepare and scrutinise the tender procedure and to come forward with designs, studies and recommendations for a further strategic planning of the solid waste management system for the city of Karachi.

Medan Urban Development Project I and II, Indonesia, 1989-1993

Solid waste management is one of the components of the Medan Urban Development Project I and II, financed by the Asian Development Bank. In this project, led by DHV Consultants, a WASTE consultant advised the municipality on creating an autonomous body to provide the waste collection service. After the establishment of the semi-governmental Solid Waste Management Enterprise (PDK Medan), the WASTE consultant provided assistance through tariff studies for cost-recovery and revenue collection systems, and advised on design and implementation of an accounting system and a financial budgeting and management system.

COMMUNITY-BASED ENVIRONMENTAL IMPROVEMENT

ILO, Dar es Salaam, Tanzania (2001)

In Dar es Salaam, Tanzania, a gradual shift of the local administration took place by the end of the nineties. During that shift also the role of the private sector in the provision of urban services grew such as in solid waste management. Besides the large(r) firms that were interested in the commercial running of a cleansing service several other 'informal' groups took local initiatives too in e.g. road maintenance, water tap monitoring and waste collection. The International Labour Organisation (ILO) was asked by UNHabitat to develop a support programme for these groups. ILO asked WASTE to develop work plans and practical guidelines to strengthen these CBO's and MSEs in their new role. A survey was made of the major material flows in the city, actors, were mapped, interviews held and several workshops organised to create co-operation, to develop a business insight and to show the potential of the waste recycling sector. ILO built upon this initial advice a strong and growing small scale waste collecting sector. This project was succeeded by the UNIDO Recycling Centre project in October 2001.

Recycle Valley, Beuningen The Netherlands (2001)

The region of Beuningen, the Netherlands, is effected by urban growth and new town development, by expanding cross roads in the national grid of highways, by the development of the area as transportation node and a variety of industrial development a.o. a large waste incinerating plant. Furthermore the villages in the area were abandoned by the youth leading decreasing services in the villages, rising housing prices for urban yuppies. WASTE had been invited as waste management and recycling expert to participate in one of a series of three sessions through which citizens of Beuningen could air their views and express themselves on various issues in their region. As a result of the discussion 'recycling' was considered one of the major elements of the region which had its name subsequently changed into 'Recycling Valley'. In a second meeting research into the recycling activities and potentials were

discussed and a competition was developed for the most innovative and creative new recycling option.

DECISION – State Community co-management of urban environmental quality: water supply, sanitation, waste management and water pollution control (2001)

This research project was executed by the Terra Team and WASTE in co-operation with a research team of the University of Don Bosco in San Salvador, El Salvador. Universities in Chile and Mexico participated too. In this research an attempt was made to develop a digital decision making tool to assist decision makers in making the most effective and efficient choice in the planning and implementation of urban infrastructure for waste, sanitation and solid waste. The challenge was to develop non normative indicators to value each step in the decision making process both in technical as well as in other social and institutional aspects. All the indicators were to be made into a model which once filled with the right data could present the best possible option. WASTE participated in both the technical as well as in the social indicators development by providing sets of options to choose from as the basis for a digital processing. The project was funded by the World Bank.

The Quetta Katchi Abadies Environmental Management Project - Qkaemp (2000 – 2003)

Assigned by the Dutch embassy in Pakistan WASTE has reviewed the Quetta Katchi Abadies Environmental Management Project (QKAEMP). The aim of this assignment is to assess its operational performance, the realised aims and objectives of the improvement of environmental conditions and public health and sustainability of the project. QKAEMP is a large sanitation project in Quetta, Pakistan, which was far behind schedule in 2000. The project is financed by NEDA and managed by PIEDAR en Ferguson Associates. QKAEMP had set physical targets (Underground Sewer lines, Pour Flush Toilets, Solid Waste Depots, Water Supply Lines and Open Drains). Furthermore, it had included institutional development aspects and target group orientation.

WASTE made recommendations concerning a range of institutional, gender, target group orientation and sustainability aspects which include changing the project management set-up to allow for a greater decision-making and management role of the NGO's implementing the project activities as well as improving the chances of sustainability of the low-cost sanitation by switching from a supply driven approach, emphasizing physical targets, to a demand-driven approach based on capacity-building.

Moreover the introduction of a gender-sensitive approach has been recommended whereby the traditional gender roles are opened up to allow for a greater participation of the women's organisations in decision-making on and operation and maintenance of the infrastructure as well as a greater role for the men's organizations in hygiene education and awareness-raising activities. Finally, a recommendation has been made to replicate the pilot community Solid Waste Disposal and Collection systems throughout all the project areas.

Vive Mopti, Mali (2000-2001)

This project has been financed out of the WASTE fund for special causes (FBD).
Vive l'Initiative is a Dutch/Malian NGO supporting a women resident's initiative to upgrade the Toguel neighbourhood of Mopti (Mali). The initiative includes primary waste collection,

sanitation and drainage. WASTE is rendering strategic and logistic support, also through CEK the local partner for West Africa. One of the achievements is the transfer of experiences and field support in Mopti by UWEP partners in Bamako.

Equipment Catalogue (2001)

This project has been financed out of the WASTE fund for special causes (FBD).
As WASTE receives requests on small-scale, cheap equipment for waste quite regularly. Considering the peculiarity of the solid waste recycling business in the small-income countries, WASTE decided to make an inventory on the possibilities to produce an equipment catalogue specifically tailored to the needs of these small-scale businesses. The result of this project is a report offering suggestions for a suitable tailor made catalogue. The catalogue should present information about small-scale equipment for reprocessing of solid waste (paper, glass, metal, plastic, rubber, textile, and organic waste). The information should preferably include points of sale, technical details and if available building drawings to make own construction possible. It should be accessible via internet and regularly updated. The funds for continuation and realisation of this project are not available.

User platforms for Non Motorised Transport, Dar es Salaam, IHE/World Bank 1997-1999

The Institute for Hydraulic and Environmental Engineering (IHE), Delft, under authority of the World Bank, executes the Non-Motorised Transport project in Dar es Salaam and Morogoro, Tanzania. It comprises a technical component (e.g. speed reduction measures to enhance non-motorised transport) and a social-institutional component: the establishment of User-Platforms and the development of its tasks. Over a period of time, WASTE has assisted this latter component through commenting on Inception, Progress and Planning reports and has finally been asked to carry out a mission to facilitate the final reporting by the User-Platforms themselves.

Evaluation of urban projects, SNV, Cotonou, Benin, 1998

In November and December 1998 WASTE carried out three missions in close cooperation with IHS/Rotterdam, several local experts from CBDD, MPREPE, the Ministry of Planning and an independent consultant on request of the Netherlands Embassy of Benin to (i) evaluate the present activities of SNV/Benin in the projects PADEB, PAssEF and PREFAL and to (ii) identify changes in these projects or to propose a new urban programme to be established. The mission made recommendations with regards to the Women Development Organisations (literacy, association establishment, credit), the support to Community Development efforts and the priorities in this field (flood mitigation and prevention), a concentration of activities in the present areas and an expansion to strategic stakeholders outside the intervention areas and an emphasis on capacity building activities.

Improving neighbourhood-based waste collection, Mali, 1995

In Bamako, and other towns in Mali, the collection of door-to-door refuse is performed by small enterprises in nearly every neighbourhood. It has become the most important element in the Malian waste management system. ALPHALOG, a Malian NGO, supports a number of these small refuse collection enterprises in Commune IV in the city of Bamako, and in the town of Ségou. It has initiated, and facilitated, the formation of a coordinating body amongst

the neighbourhood-based small enterprises and the municipality. ALPHALOG and the coordinating body of Commune IV (called CPAC) invited WASTE to assist with systemising the ongoing developments in Bamako and Ségou, and with identifying further opportunities for income generation from waste recycling and liquid waste collection services.

Urban environmental activities, Guinea Bissau, 1993-present

The government of Guinea Bissau is engaged in a large urban renovation programme and the formulation of a habitat policy. SNV (a Dutch development organisation) carried out an urban renovation programme in cooperation with the Agencia Municipal. Goals of the project are:

- Strengthening organisations involved in urban renovation and providing an economic basis through the establishment of public-private companies
- Achieving strong community participation in all the stages of the renovation process and strengthening their economic capabilities in order for them to be able to finance a sustainable renovation of their neighbourhoods

In May 1993, WASTE participated in an Environmental Assessment mission. In a second mission, WASTE contributed to the development of an Environmental Action Plan, in close cooperation with the local partners. The plan identifies needs, priorities and appropriate and sustainable income and employment generating activities that can address problems regarding solid waste removal, the provision of proper sanitation, drainage, water supply and the greening of the city.

Aden Municipal Services Project, Yemen, 1995

The Aden Municipal Services Project is part of a larger project administered by the Government of Yemen and the Dutch Ministry for International Cooperation. The project focuses on the privatisation of solid waste collection services in four cities and the establishment of centralised storage facilities for spare parts for the collection vehicles. WASTE participated in a mission to formulate project proposals to strengthen the institutional and financial capabilities of the Municipality of Aden for promoting the effective delivery of waste collection services. A proposal was formulated for an Environmental Health Education Programme in support of the AMSP, taking community participation and gender issues into account.

Improvement of Urban Neighbourhoods, Cotonou, Benin, 1994

In Cotonou efforts have been made by PADUC, a local NGO working with youth and neighbourhood groups, to initiate income-producing and environment-related activities. However, citizen support for environmental issues has so far been lacking. WASTE participated in a mission to support these efforts and to develop a five-year action plan, in close cooperation with the PADUC staff and representatives of the various stakeholders. WASTE focused on the potential for employment creation as a means of improving the environmental situation in the various neighbourhoods. Through a participatory methodology the staff will be able to involve the neighbourhood groups in identifying their problems, possible directions for solutions and the implementation of the proposed activities.

Linking Formal & Informal Solid Waste Management Systems, Bangalore, India, 1994

In collaboration with the Department of Social Geography at the University of Amsterdam,

WASTE implemented the Livelihood and Environment Research Programme. The team performed research into the importance of the informal sector waste collection service as part of an overall solid waste management system in Bangalore, Madras and Hydrabad, and the manner in which the formal and informal systems could be linked. WASTE was involved in the development of a research manual to study the role of small enterprises and community groups in solid waste handling. A paper was written entitled The "pros and cons in recycling urban solid waste", which was presented during a workshop in Bangalore in which all actors of the local solid waste management system participated.

Pasig River Rehabilitation Project, Manila, the Philippines, 1991

The Danish Government had assigned Carl Bro International to undertake a feasibility study on the rehabilitation of the Pasig River. The study included the environmental assessment of the water quality of the river and the impact of encroaching settlements along its banks. WASTE was asked to execute and analyse field surveys in squatter areas of Manila to assess the potential for community participation in solid waste management in low-income areas. The research was done together with a group of local sociologists. The project team prepared proposals to actively involve the residents in the environmental upgrading of their settlements and to improve the quality of the Pasig river through income generating activities, environmental health education and community organisation.

RESOURCE RECOVERY

Applying ISWM to the Electronic Waste Material Stream (2003)

In February 2003, WASTE together with its Costa Rican counterpart, ACEPESA, started a one year project, which applies the ISWM methodology to the Waste Materials Stream from Electronic and Electric Equipment (WEEE) in Costa Rica and The Netherlands. This project is executed in Costa Rica together with the Unit of Technical Assistance to the Industry (UATI) of the Costa Rica Chamber of Industry (CICR) and the School of Chemistry and the School of Electronics of the Costa Rican Institute of Technology (TEC). The funding for the project is provided through the bi-lateral Sustainable Development Agreements (SDA) between Costa Rica and The Netherlands, together with own contribution of the implementing organisations and the participating companies and institutions. The project aims to formulate an integrated and sustainable strategy for WEEE in both countries that encourages reduction and minimization and establishes the appropriate technologies and methodologies for the management and/or treatment of these wastes, making use of innovating experiences undertaken by Dutch companies. For this purpose an ISWM assessment has been conducted in both countries to assess the magnitude of the problem of the generation and management of electronic components wastes.

The project will finalise in the first half of 2004 with the dissemination of the formulated strategy in both countries.

Dye Waste , Bamako, Mali (2001)

This project has been financed out of the WASTE fund for special causes (FBD).
WASTE has carried out a research in Bamako, Mali. The main objectives were to gather

information on the dying procedure, the polluting effect of dying on waste water, the occupational health hazards. With this knowledge, alternatives were sought: Ways for cleaner production, investigation of a simple method to purify the waste water and development of ways to improve the working situation. The results of this study have led to a possible sequel in which more inventory will be done, and exchange for information is sought by organising a seminar.

Conakry (2001)

The Ministry of Urban Development and Housing of the Republic of Guinea selected WASTE to execute a pre-feasibility study on the composting of solid waste. This project is part of the Third Urban Development Plan (PDU3) and is financed by the World Bank. And it is linked with the urban and peri-urban sector in Conakry. A workshop with all the stakeholders was organised and resulted in the establishment of a steering committee. This project has shown that there is an opportunity for composting, especially for landscapers and vegetable gardeners. The implementation of the composting unit at the landfill site was planned for 2002. A training for trainers on composting was held on which 12 persons attended. The consultant worked closely on a weekly basis with the executive agency (**SPTD**). Additionally, relevant document for the selection of a suitable private operator were prepared.

PHARE, Bulgaria (2001)

In September 2001, WASTE and The Institute for Environmental Strategies of Sofia, Bulgaria, completed their PHARE partnership project on Sustainable and sound waste management. The project worked with about six municipalities on a demand-driven basis. WASTE's work focused on an ISWM assessment of the small Black Sea city of Byala, Bulgaria, a comprehensive recycling and composting plan for Bulgaria's third largest city, Varna; technical assistance to IES's work on plastics recycling in Sofia; and short TA projects for a few other municipalities. The PHARE project served also as the basis for identifying Kavarna, on the Black Sea coast north of Varna, as the lead city for the ISWM assessment of UWEP Plus.

ILO, Dar es Salaam, Tanzania (2001)

In Dar es Salaam, Tanzania, a gradual shift of the local administration took place by the end of the nineties. During that shift also the role of the private sector in the provision of urban services grew such as in solid waste management. Besides the large(r) firms that were interested in the commercial running of a cleansing service several other 'informal' groups took local initiatives too in e.g. road maintenance, water tap monitoring and waste collection. The International Labour Organisation (ILO) was asked by UNHabitat to develop a support programme for these groups. ILO asked WASTE to develop work plans and practical guidelines to strengthen these CBO's and MSEs in their new role. A survey was made of the major material flows in the city, actors, were mapped, interviews held and several workshops organised to create co-operation, to develop a business insight and to show the potential of the waste recycling sector. ILO built upon this initial advice a strong and growing small scale waste collecting sector. This project was succeeded by the UNIDO Recycling Centre project in October 2001.

PHARE, Bulgaria (2001)

In Septemeber 2001, WASTE and The Institute for Environmental Strategies of Sofia, Bulgaria, completed their PHARE partnership project on Sustainable and sound waste management. The project worked with about six municipalities on a demand-driven basis. WASTE's work focused on an ISWM assessment of the small Black Sea city of Byala, Bulgaria, a comprehensive recycling and composting plan for Bulgaria's third largest city, Varna; technical assistance to IES's work on plastics recycling in Sofia; and short TA projects for a few other municipalities. The PHARE project served also as the basis for identifying Kavarna, on the Black Sea coast north of Varna, as the lead city for the ISWM assessment of UWEP Plus.

APUGEDU, Bamako, Mali (2001)

The International cooperation from the European Union asked WASTE together with other partners to analyse the potentials of development of urban and peri-urban agriculture with the usage of recycled urban waste. First WASTE compiled a literature review focussing on experiences in southern country. Also WASTE analysed the solid waste management system in view of recycling. Following, stakeholders, vegetable gardeners and cereal crop owners have been identified. WASTE prepared a workshop on the composting techniques based on the existing waste streams and selected the one's to be executed. During the implementation period WASTE was active as back stopper. The project has allowed to promote composting activity, compost application and management of natural resources. As a result composting is being developed as a waste treatment activity at transfer sites in several collection zones in Bamako and 70% of the waste stream is diverted from final disposal.

Dhamar Region Municipal Services project, Yemen, 1997, 1999

In a Dutch funded project in Yemen, WASTE executed a study to look into the feasibility of small-scale composting for the city of Dhamar. The study recommended to integrate composting activities into the municipal solid waste collection service. A design for a small-scale composting plant was made and a private contractor has been identified to run the plant. In May 1999 WASTE executed an evaluation mission on request of the Dhamar Regional Municipal Services Project (DRMSP) to the small-scale compost plant. The mission found that progress had been made in the technological development, attracting clients (the most important bottleneck), but that considerable improvement in the delivery of quality still had to be achieved. Subsequent proposals had been submitted.

Ports Environmental Improvement Project, Indonesia, 1995

In 1995, the government of Indonesia decided that it was necessary to improve the environmental conditions in harbours and the marine environment in general in order to meet the maritime pollution regulations (MARPOL). In this World Bank financed project, WASTE contributed to the DHV Consultants team by developing a solid waste and oily waste management system for eleven major ports in Indonesia. The systems designed by WASTE are based on public-private partnerships and incorporate the existing informal waste recovery sector by involving scavengers and private entrepreneurs in the clean-up activities. The systems include waste separation and sorting inside the port area.

Waste Recycling Nairobi (WAREN), Kenya, 1990-1995

At the request of the Undugu Society of Kenya, a Kenyan NGO, WASTE and a team of six consultants from other areas of the third world worked cooperatively to research the potential for recycling of organic wastes, plastics, rubber, tin cans, motor oil, cooking oil, broken glass, photo chemicals, household batteries, and bones and horns. The goal of the project was for the recycling of these materials to serve as a source of income for people in the low-income areas of Nairobi, Kenya, at the request of the Undugu Society of Kenya, a Kenyan NGO. The research was carried out in six major cities in Asia and Africa: Cairo, Manila, Calcutta, Bamako, Accra and Nairobi. In each city, the consultant team's assignment was to learn from and document the experiences of waste and recycling micro-entrepreneurs in these cities. WASTE and its consultants have used this research as the basis for four publications, which disseminate the knowledge and information to other interested parties. The publications have appeared in the Urban Solid Waste Series and are entitled "Organic Waste", "Plastic Waste", "Rubber Waste" and "Hazardous Waste".

Source Separation project, Cairo, Egypt, 1992

WASTE and the Association for the Protection of the Environment (APE) worked together to develop a project proposal to initiate the separation of recyclables at source. A primary goal of the separation was to reduce the level of heavy metals occurring in the compost produced by the APE plant. The consultants facilitated the formation of a committee to consider the idea and to seek the cooperation of the Zabbaleen community. In the process of proposal development, it became clear that lack of recognition of the importance of their work was a persistent problem for APE. In response to this, the proposal sought to introduce changes that would:

- Raise the awareness of the city authorities and the general public in relation to the role of the Zabbaleen community in garbage removal and community sanitation
- Produce cleaner organic waste, with a resulting improvement in compost quality
- Obtain higher prices for the non-organic waste fraction

Currently, APE is independently carrying out the pilot project amongst 600 households, and focussing on their willingness to separate waste at source and to monitor the heavy metals content of the waste.

The project APUGEDU related to potentials of development of urban and peri-urban agriculture in relation to urban waste management, on going project, started in March 1999 with LEI (Agricultural Economics research institute), RIKILT (the state institute for quality control of agricultural products), CEK, CEBAS, the centro de edafologia y biologia applicada del segura, IER, institut d'economie rurale, INERA, Institut de l'environnement et de recherche agricole, IIED, International Institute for Environment and development and CREPA, centre regional pour l'eau potable et l'assainissement.

Reports available: review of literature (3 reports), map in progress of peri urban sites, participatory and rapid appraisal farming reports, quantitative farm management surveys.

Resume of the project: it aims to explore and develop effective and operational linkages between the urban agricultural and urban waste management in bamako and ouaga through the application of urban organic products in agricultural production.

SANITATION AND WASTE WATER

Ecological Sanitation in The Netherlands (2003)

Gouda's main problems with the sewer system are caused by the peat-soil consolidating and damaging the sewerage. Therefore the municipality is searching alternatives to treat the wastewater in the peri-urban areas, within the boundaries of the upcoming European law. They asked WASTE to carry out a feasibility study on ecological sanitation as a possible alternative for a sewer system. This system will be compared with common systems that are used in the Netherlands for the handling of wastewater. Ecological Sanitation is based on the idea that urine, faeces and water are resources in the food chain. Urine and faeces are separated at source in this system, with the usage of a urine diverting toilet.

RELATIM, Lake Timsah, Egypt (2001-2002)

WASTE was assigned by WL / Delft Hydraulics to make an assessment report on the sanitation of the pollution sources of Lake Timsah and see into a possible option for Dry/compost santation for collection and reuse of human excreta.
The objectives of the assessment mission for the sanitation of the polluting sources of Lake Timsah were:

- To assess the feasibility of an dry/compost sanitation pilot project, in terms of institutional, financial and social willingness and ability among Egyptian stakeholders to support and be involved in the project;
- To suggest a potential location(s) for the pilot project along the Mahsama drain east of the Lake Timsah, within the governorate of Ismailiyah. The target group should include middle-income and poor families;
- To describe the current sanitation situation and practices along the Mahsama drain;
- To develop a framework design for the pilot project.

WASTE talked with several potential stakeholders on the feasibility of a pilot project, visited the area, examined the sanitation situation in the project area and identified relevant project partners. This resulted in the outline, location and partners for a pilot project. The donors accepted the recommendations as the basis for a follow-up mission that will formulate a project proposal.
The relevant organisations in Egypt to be involved in the project are: Egyptian Ministry of Local Development, Governorate of Ismailiyah, Terre des Hommes and its local community based partner organisation, the Urban Training Institute.

MAPET Congo - Pit Emptying Technology project in the Republic of Congo, Kinshasa. (2001)

The International Rescue Committee in the Republic of Congo asked WASTE to assess and evaluate pit latrine emptying in the capital Kinshasa.
Until then households had two alternatives. The use of mechanical pumping with a so-called spiro-truck of to close their sanitation facility. Both options were expensive. WASTE introduced a cheaper and more sustainable alternative, MAPET (Manual Pit Emptying Technology), which consists of a manual pumping device with a cistern. The contents of the pit goes into the liquid waste stream at the depot.
The technology of MAPET, which already is being used in Tanzania, has been recently been actualised and made more effective. The MAPET system is now introduced and carried out by a community in Kinshasa that is responsible for the maintenance and cost recover

themselves.

Manual Pit Latrine Emptying in a Municipal Framework, Addis Abeba, Ethiopia, 1994

After the end of the military regime in 1991, the city of Addis Abeba experienced such an influx of people that the public infrastructure could not keep pace with the demand for services. The regional municipal authorities, together with some NGOs, have been operating a latrine emptying service using donated suction trucks that can only empty a limited percentage of the various types of latrines. Insufficient profitability has to date prevented the entry of any private companies into the market.
At the request of the Christian Relief and Development Association, WASTE carried out a mission to identify whether the Manual Pit Emptying Technology (MAPET) operated by small entrepreneurs in Dar es Salaam would be suitable for the low-income areas of Addis Abeba. The mission concluded that there is a scope for the application of the MAPET approach after various technical adaptations, but the fact that government authorities, NGOs and the public expect that services should be provided almost free of charge, represents a serious potential barrier.

Comparative Study on Latrine Pit Emptying Technologies (COMPET), Tanzania, 1991-1993

COMPET was a joint field study executed by the Dar es Salaam Sewerage and Sanitation Department and WASTE. The study compared the performance and effectiveness of three pit emptying technologies, i.e. large vacuum tankers, mini vacuum tankers and the Manual Pit Emptying Technology (MAPET). All three technologies were operational in Dar es Salaam in 1993. The study identified a set of parameters to guide the choice of technology for pit emptying in order to evaluate the effectiveness and efficiency of each service. For Dar es Salaam, the accessibility to the latrines appeared to be the key parameter in selecting one of the three technologies. The COMPET study concluded that in a city with a wide variation in residential situations, different types of pit emptying technologies must be utilised. The responsible agency should therefore endorse and support the use of all technical approaches, in order to enjoy the advantages of each of the technologies in varying circumstances.

Manual Pit Emptying Technology (MAPET), Dar es Salaam, Tanzania, 1988-1993

In close cooperation with the Dar es Salaam Sewerage and Sanitation Department, pilot equipment and a pilot institutional framework were developed to perform a pilot collection trial using a public-private pit latrine emptying service for the urban fringe areas of Dar es Salaam. Local small industries were involved in the development of hand-operated equipment, including a pump and handcart. Micro-entrepreneurs were contracted to secure clients, to engage in price negotiations, and to perform the actual emptying. The municipal sewerage department leased the equipment to the entrepreneurs, took care of major repairs, trained the micro-entrepreneurs and monitored their performance. Before the start of the pilot emptying service, surveys were conducted to assess the needs and demands of the (potential) customers. The pilot project proved the potential for such a service: the small entrepreneurs supplied the service using the test equipment even beyond the pilot period and the customers were willing to pay for a slightly more expensive service, providing it would prove to be reliable. This project was awarded second prize in the Dutch Award for Environment and Development, 1993.

Rada Water Supply & Sanitation Project, Evaluation Mission, Yemen, 1993

In 1986 the Rada Water Supply and Sanitation project started providing the rapidly growing town of Rada with the appropriate infrastructure facilities for water supply, sanitation, waste disposal and drainage. The existing infrastructure could not cope with the pressure of rising demand. WASTE participated in an Evaluation Team to make an independent assessment of this $ 35 million project, to recommend follow-up activities and advise on other aspects of development planning in Yemen.

Dhamar Health Improvement & Waste Disposal Project, Yemen, 1993/1996

The Dhamar Health Improvement and Waste Disposal project has been in operation since 1989 and aims at an improved general health status among the population of Dhamar by providing environmental health education and improving the present waste collection and disposal practices through the provision of appropriate facilities and relevant training. WASTE participated in a team, which evaluated the objectives of the project and formulated proposals for further support in the field of urban environmental health improvement in Dhamar and related areas.

Fayoum Drinking Water and Sanitation Project, Egypt, 1993-1996

The Governorate of Fayoum has embarked on a long-term project to improve the supply of drinking water and the sanitary conditions in the governorate, an area south of Cairo with a population of approximately 300,000. The project is led by IWACO Consultants; the recipient organisation is the Fayoum drinking water company, El Azab Water Works. A WASTE consultant participated in the project giving advice and assistance to the financial management department on the following issues:

- Development of a strategy to improve cost recovery comprising ways in order to increase the revenue collection performance and to reduce the operational inefficiencies
- Development of financial management capabilities including introducing accounting and budgeting systems, as well as training for management and staff
- The procedures and requirements for the transition of the organisation into a semi-autonomous body

MICRO-ENTERPRISE AND PRIVATISATION

EcoLinks Blagoevgrad, Bulgaria (2001)

This project in which WASTE participated (indirectly) through its Bulgaria joint venture IEM focused on using market mechanisms to explore micro-privatisation of urban waste services. The USAID- funded project which ended in June 2001 had four main activities, based on a needs assessment in Blagoevgrad. First, the landfill was stabilised and the use pattern re-designed to allow for more stable and long-term filling and better recycling opportunities for the informal sector. Secondly, an organics source separation pilot in a large housing estate proved conclusively that Bulgarians are willing and able to separate organic materials for composting at source. The third activity was strengthening and expanding the ongoing source separation of stove ash from home heating. But the most daring activity was an experiment in Roma ("Gypsy") environmental entrepreneurship and micro-privatisation, in which a firm was created as a vehicle for contracting to Roma street sweepers on a commercial basis the

sweeping of three districts.

Rapid Appraisal of the Environmental Impact of MSEs in Bolivia, PROMMI/European Union, 1998

On request of PROMMI (MSE support organisation) WASTE executed a mission in close cooperation with a local consultant to (i) make a rapid appraisal the present environmental impact of MSE in various sectors (brick making, carpentry, metal work, tannery) in several cities (a/o La Paz, Sucre, El Alto) and (ii) to come up with a proposal as to how PROMMI could best assist the MSE to tackle the identified environmental problems. The mission found that the impact on the environmental was relatively small, but that the effect on the health of neighbouring residents and the work force was of more importance. MSEs and Local Authorities do know the environmental problems but have insufficient financial and technical means to mitigate the problems. It was proposed to employ a short-term environmental expert to work with the MSEs, to develop in some sectors pilot projects after in depth study of the environmental impacts had been done and as preparation an awareness raising workshop was to be organised.

Private Formal & Informal Sector Involvement in Solid Waste Management, 1995

The Urban Management Programme (UMP) and the UN Habitat (UNCHS) requested WASTE to prepare a paper entitled "Community and Private Formal & Informal Sector Involvement in Municipal Solid Waste Management". The paper was presented during a workshop organised by the UMP in Ittingen, Switzerland. A selected group of twenty SWM specialists had been invited for this workshop. The paper described bottlenecks and potentials for the integration of the informal sector into formal waste handling systems, and drafted an Action Plan.

CAPACITY BUILDING, TRAINING AND DISSEMINATION

Guest lecturer in UNESCO-IHE Refresher Course, Nepal (2003)

WASTE was invited as a guest lecturer in the refresher seminar “Solid Waste Management and Engineering” for South East Asia held in Kathmandu, Nepal from 17 to 28 November 2003. This course was organised and held by UNESCO-IHE Institute for Water Education UNESCO-IHE Institute for Water Education in collaboration with NAAN (Nepali Association for Alumi). 20 former IHE Msc students from 9 different countries including Pakistan, Sri Lanka and Papua New Guinea joined. The participants were mainly senior officials and employees of Governmental Agencies and Departments, Universities, Training Institutions, all with a background in engineering.

The concept of Integrated Sustainable Waste Management (ISWM) formed the basis of the course, focussing on the role of stakeholders, the different waste system elements involved in waste management and the focus on aspects such as social, legal and economic. The seminar was conducted on the basis of active learning and involved a combination of interactive lectures, group work, individual exercises, guided field visits and discussions. Field visits were made to the landfill and transfer site in the capital Kathmandu and to the newly constructed sanitary

landfill in western city of Pokhara. In addition, the majority of the participants gave presentations of the situation in their cities related to solid waste using the ISWM approach as a guidance.

The lectures were conducted by the UNESCO-IHE projectleader Dr. Ljljiana Rodic, Ir. Jeroen IJgosse from WASTE and local guest lecturers from Nepal.

KAR Capacity Building (2001 – 2003)

This project financed by DFID and proposed in cooperation with ERM-UK began on October 1, 2001. The main focus is to research delivery of the ERM strategic planning guide and WASTE's ISWM planning methodology (there is a large overlap between the two). Capacity Building is based in three of the four UWEP cities, Bangalore, Bamako, and La Ceiba. In each one, a comprehensive literature review looks at both the resources and needs in English, French and Spanish. Then KaR supports the assessment phase of the ISWM planning process, with an emphasis on how the ideas can best be delivered and assimilated by stakeholders. The KaR inception phase finishes at the end of February, then the project moves more into producing of products.

Advanced Training for the Autonomous Private Sector in Dar es Salaam (2000-2001).

The International Labour Organisation (ILO) asked WASTE to design a two-week advanced training course for private sector micro and small enterprises (MSEs) who have been working with the ILO for two years. The project included a diagnostic mission which assessed the current level of institutional, technical, and financial sophistication of the MSEs; design of the training programme and materials; and conducting the training with a secondary emphasis on training trainers in the local technical institute.

Experiences, RUAF (2002)

The resource centre on urban agriculture and forestry (RUAF) asked WASTE to contribute to their trimester magazine with two articles. The first contribution from WASTE consisted of a review of the literature available on reuse of solid waste in the urban agriculture sector. All aspects were assessed and arranged by themes. In total, six themes were explored. The second contribution, based upon WASTE experiences, presented the state of the art of recycling urban waste in Southern countries and more in particular its organic fraction. The analysis included the overall evaluation of the current limitations and problems together with the opportunities and recommendations. Eventually, it allowed WASTE to present the new project for 2002 consisting in the planning of the recycling centre in Bamako, Mali. This centre is based upon a multiple waste flow and the involvement and participation of all stakeholders and its link with all systems, including agriculture.

Publications and working papers

WASTE, in collaboration with TOOL Publications, edited a series of publications called the Urban Solid Waste Series. Knowledge and experience gained in the course of the work are also disseminated in the form of working documents.
WASTE has experience with the production of audiovisuals and exhibitions (in collaboration with Johannes Odé productions), and in the organisation of conferences and workshops.

Solid Waste Management Course Development, the Philippines, 1991

WASTE developed a Solid Waste Management Course for the International Training Centre (ITN/TNC) in Manila, the Philippines. The course was developed specifically for members of Philippine NGOs dealing with environmental sanitation issues, in order to strengthen their knowledge of solid waste systems. The course enabled them to take appropriate action based on experiences from various other countries.

Various courses & lectures

WASTE regularly contributes to international postgraduate courses through lectures and thesis supervision at the Institute of Hydraulic Environmental Engineering (IHE), Delft, the Netherlands. The lectures cover various topics on Solid Waste Management and Recycling in third world countries and in the Netherlands.

Publications and working papers

WASTE, in collaboration with TOOL Publications, edited a series of publications called the Urban Solid Waste Series. Knowledge and experience gained in the course of the work are also disseminated in the form of working documents.

WASTE has experience with the production of audiovisuals and exhibitions (in collaboration with Johannes Odé productions), and in the organisation of conferences and workshops.

Solid Waste Management Course Development, the Philippines, 1991

WASTE developed a Solid Waste Management Course for the International Training Centre (ITN/TNC) in Manila, the Philippines. The course was developed specifically for members of Philippine NGOs dealing with environmental sanitation issues, in order to strengthen their knowledge of solid waste systems. The course enabled them to take appropriate action based on experiences from various other countries.

RECENT EXPERIENCES IN THE MIDDLE EAST AND NORTH AFRICA

Study on private sector participation in solid waste management in Egypt, World Bank/Haskoning, 2001

A World Bank Trust Fund was made available to study the successes and pitfalls of private sector participation in solid waste management in Egypt. The Dutch firm Haskoning subcontracted WASTE to assist with the planning and implementing this study. The assignment included the collection of data on solid waste management and private sector participation policies, review data provided by local consultants, interviews with governmental officials and private sector companies, an in-depth assessment of solid waste management systems and policies on private sector participation in Qaliubeya and South Sinai Governorates, a study of foreign donor policies, and assistance with compilation of the final report.

Training workshops on solid waste management in Aswan and Beni Suef Governorate, Egypt, Royal Danish Embassy, 2000 - 2001

The Royal Danish Embassy sponsored seven workshops in Aswan and Beni Suef Governorate on solid waste management for representatives of the Governorate, local government officials and members of community-based organisations, implemented by WASTE. The workshops focus on private sector participation in solid waste management, technical, institutional, social and financial issues related to solid waste management, solid waste management in villages, solid waste management by community-based organisations and small-scale enterprises.

WASTE's task included overall project management, preparation and organisation of the workshops, training needs assessments, coordination with trainers and venue, provide part of the training, and evaluate the workshops.

Training of Arab NGOs on solid waste management and recycling, RAED/EU, 2001

The Arab NGOs Network for Environment and Development (RAED) is implementing the Regional Community Solid Wastes Management Programme (RCSWMP) together with TAUW, The Netherlands. The programme is funded by the European Union and it consists of awareness-raising, training, and setting up a segregated collection system and demonstration recycling units in four Arab countries with NGOs that are member of RAED. TAUW asked WASTE to develop the curriculum for training of the NGOs and to assist in giving the training. The target group of the training consist of members of four NGOs from Egypt, Lebanon, Tunisia and Morocco. After the training course these NGOs were expected to implement solid waste management and recycling pilot projects in their respective countries.

WASTE has developed a curriculum for a five-day intensive training course for NGOs on solid waste management and recycling in Cairo, Egypt.
Subjects covered include among others the selection of collection and recycling technology, various recycling techniques, running a waste-related business (financial and management aspects), supply and demand research, and stakeholder participation in solid waste management.
Besides, WASTE's consultants compiled case studies, designed a role-play and organised a field visit. They also gave part of the training course.

Solid waste management training course in Cairo, Egypt, with NEDA/TRHUD, 2001

The Training and Research programme in Housing and Urban Development (TRHUD), funded by NEDA and implemented by the Institute for Housing and Urban Studies (IHS), The Netherlands and the Egyptian Ministry of Housing, has commissioned WASTE's consultants to assist in the design and implementation of a two-week course on solid waste management. The course is intended for staff of local governments and Governorates, private sector, non-governmental and community-based organisations, and training and research institutes. WASTE's consultants were involved the compilation of case studies and the preparation of training material, and gave sessions during the course.

Assessment of policy and institutional frameworks in solid waste management in Egypt, Tunisia, Syria, Lebanon and Cyprus, CEDARE/UNEP-MAP, 1999-2000

CEDARE initiated a study to assess policy and institutional frameworks in solid waste management in five countries in the Mediterranean Region, in cooperation with UNEP-

Mediterranean Action Plan and MED-CITIES. This assessment was considered necessary because of the increasing problems in solid waste management experienced in the Middle East and North Africa region with privatisation, cost recovery, weaknesses and inefficiency of governmental institutions. The study looks at the country context, policies and legislation, structure and authority of the local government regarding solid waste management, conditions for private sector participation, financial performance, involvement of the informal sector, coordination between stakeholders, and technical performance of solid waste management (collection rate, coverage, existence sanitary landfill, etc.).

WASTE's consultants are responsible for reviewing the terms of reference of the national consultants, giving feedback on the reports prepared by the national consultants, and writing a synthesis report based on the national reports.