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**PROGRAMME PLANNING AND EVALUATION: MONITORING AND EVALUATION:  
REVIEW OF SELECTED PROJECTS IN THE THEMATIC AREA OF  
POVERTY REDUCTION**

(Item 7 (b) of the provisional agenda)

**COMMUNITY-BASED SOLID WASTE MANAGEMENT**

*Note by the secretariat*

**SUMMARY**

The present document contains a report on the implementation of one of the secretariat's Section 23 field projects, on community-based solid waste management. Its objective is to assist local government officials and civil society organizations in towns to introduce solid waste management systems that are decentralized and community-based and at the same time reduce the extreme poverty of informal sector waste pickers.

The document provides a description of the project, assesses the progress made thus far, analyses the lessons learned and outlines possible follow-up of the project.

The Committee may wish to review the progress made in implementing the project and advise the secretariat on any improvements to be made in its implementation strategy.

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## INTRODUCTION

1. In 2004, ESCAP decided to use part of its resources under Section 23 (now known as Section 22) to undertake three field projects. That on community-based solid waste management was one of the three field projects funded through Section 23 funds. The project is scheduled to be completed in the course of 2007.

### I. NEEDS IN THE REGION

2. The growth of urban populations and economies in Asia and the Pacific has resulted in a corresponding growth of solid waste, and municipal governments are finding it difficult to dispose of that waste. Existing dumpsites are filling up, and finding land for new ones is becoming increasingly difficult owing to a scarcity of land within the municipal boundaries and the fact that surrounding rural communities, cities and towns are refusing permission for dumpsites to be located in their vicinity.

3. Solid waste in the least developed and low-income developing countries of the region is characterized by its high organic content. As much as 70-80 per cent of the waste generated is organic. Because of the nature of the waste and the costs involved, it is not feasible to have incinerators in the cities and towns of most developing countries. Moreover, it should be noted that incineration is a waste reduction approach and not a waste disposal approach. It is still necessary to dispose of ash from incinerated wastes. As it often contains toxic and hazardous materials, it requires special disposal sites and technologies.

4. Many local governments devote a substantial portion of their annual budgets to collecting, transporting and disposing of solid wastes. The traditional approach to solid waste management focuses on end-of-line solutions that are capital- and technology-intensive, and therefore costly.

5. Alternative and more suitable ways of tackling these issues can be found by looking at the life cycle of the waste and reducing it at as many stages as possible. Normally, municipal solid waste undergoes three stages in its life, generation, collection and disposal. The life cycle approach requires minimizing waste by reducing, reusing and recycling solid waste at all stages in the life cycle. Thus, practices such as banning the use of plastic bags, working with manufacturers and retailers to reduce packaging material, and using recyclable materials or home-based composting, minimizes waste at the waste generation stage. Sorting waste at source and recycling, and extracting and using methane from landfills, reduces waste at the collection and disposal stage. Employing all these strategies significantly reduces the amount of waste that reaches dumpsites, extending the duration of their use and reducing collection and disposal costs.

6. Another concurrent attitudinal change required is to adopt a "trash is cash" approach, in other words, looking at waste as a resource rather than as refuse. Estimates from several cities and towns of developing countries of Asia and the Pacific show that as much as 20-30 per cent of the waste

generated in cities is recycled by the informal sector. This amount can be increased significantly if existing informal waste recycling systems are incorporated into municipal solid waste management systems.

7. The informal sector recycling system often comprises several categories of waste pickers who collect recyclable wastes from households, street-side public dumpsters and municipal landfill. It also comprises middlemen who buy the recyclable waste from the waste pickers, and sort, clean and sell it to small-scale enterprises that recycle the waste. Among these actors, the waste pickers are perhaps the most disadvantaged. They are an integral part of an informal industry that provides them with a subsistence income while recycling waste generated by the urban society. However, their working and living environments are unhygienic and often life-threatening because they are exposed to dangers from hazardous waste.

8. Waste picking is one of the easiest informal labour markets that new rural-urban migrants can enter to survive in cities, as it requires relatively few skills and often serves as a springboard to better employment opportunities in cities.

9. While this reality exists in most cities and towns of developing countries of Asia and the Pacific, municipal solid waste management systems, at best, ignore the existing informal recycling system and, at worst, actively undermine that system, thereby reducing not only the level of recycling but also the incomes of waste pickers.

10. By the time waste reaches dumpsites, its “recyclability” is diminished and thus the waste pickers obtain lower prices for it. In many cases, rules and regulations restrict the access of waste pickers to waste at the household and community levels. The informal sector recycling that takes place in cities of Asia and the Pacific exists in spite of the rules and regulations and not because of them. If the waste pickers were organized and their collection of recyclable waste at the source was facilitated, not only would the quality of the recyclable goods be higher and thereby fetch better prices, but it would also allow the waste pickers to move from the unhygienic environment of garbage dumps.

11. Given the fact that the solid waste generated is 70-80 per cent organic, even with 100 per cent recycling the bulk of the disposal problem will remain. This means, for example, that savings in terms of transport costs would be minimal as organic waste would still need to be collected with the same frequency. Moreover, as the prices of recyclable materials fluctuate considerably, the increase in average income among the waste pickers would also be marginal. Thus, recycling is part of the solution, not the whole solution.

12. A new approach that treats organic wastes as a resource, “trash to cash”, is needed. From the perspective of local governments and informal sector waste pickers, such an approach should: (a) reduce transport costs; (b) improve collection services; and (c) provide waste pickers with higher and regular income and better working conditions.

13. Most of these criteria can be met by decentralized community-based solid waste management projects. Several local governments, non-governmental organizations and research and training institutes have undertaken such projects with varying degrees of success.

## **II. PROJECT DESIGN**

14. The project was designed to identify an innovative practice that meets most of the above criteria, analyse it and assist two towns, one in South Asia and the other in South-East Asia in adapting the practice to their local situations. Based on this experience of transferring and adapting innovative practices, the project will develop policy options for mainstreaming and upscaling the adapted model.

15. Thus the project will produce three outputs:

Output 1: An analysis of innovative practices in community-based solid waste management

Output 2: Successful adaptation of an innovative practice in community-based solid waste management in two different local settings

Output 3: A policy paper on options for mainstreaming and upscaling the adapted model

## **III. PROJECT IMPLEMENTATION**

16. As the first activity of the project, in collaboration with the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET) and the Kitakyushu Initiative Network for a Clean Environment, ESCAP undertook a survey of potential innovative practices. This process resulted in the identification of the decentralized integrated resource recovery centres, initiated by Waste Concern, a non-governmental organization in Dhaka, Bangladesh, as meeting most of the above criteria.

17. A regional workshop to study the experience of Waste Concern was organized in Dhaka in September 2004. Local governments and non-governmental organizations interested in solid waste management were invited to participate in the workshop. Based on the outcomes of the project and subsequent negotiations, two towns, Matale, Sri Lanka, and Quy Nhon, Viet Nam, were selected to participate in the project. A key criterion for selection was the demonstration of political commitment to the project by the local government through the allocation of land free of cost to the demonstration project.

18. The other key criterion was the willingness of a country-wide non-governmental organization that had experience in both environmental matters and community-based approaches to partner with the local government. The reason for selecting an experienced country-level non-governmental organization as the partner for the local government was the lack of capacity at the local level to organize communities and translate lessons learned into feasible actions on the ground.

19. Two advisory services from Waste Concern were organized to assist each participating town in planning and designing their decentralized integrated resource recovery centres. Surveys of local solid waste management conditions and potential sites for locating the centres were carried out. Based on the outcomes of the surveys, the planning and design of each centre was completed.

20. At present the centres are under construction in both towns. They are located within the neighbourhoods that they serve and are designed to service households within cycling distance of each centre. Operations are to commence by the end of 2006.

21. Each centre is designed to service around 1,000 households and to treat between 2 and 3 tons of waste per day. Each centre will provide a daily door-to-door collection service using cycle carts operated by teams of two former informal sector waste pickers, who will be provided with uniforms and safety equipment such as masks, boots and gloves. Households will be trained to separate waste at source into organic and inorganic waste.

22. Once collected, waste will be brought to the centre, where it will be sorted by hand into compostable waste, recyclable waste and rejects.

23. Waste will be composted using the aerated box method. Strict quality control will be maintained ensuring optimum levels of temperature, moisture and efficient micro-organism content. On average, about 80 per cent of the daily waste will be composted. Once composted, it will be sieved, with larger pieces reintroduced in the composting stream. Sieved compost will be enriched with nitrogen, phosphorous and potassium (NPK) to make organic fertilizer. The NPK values will be tailored to the requirements of farmers around the town.

24. Recyclable material, roughly about 15 per cent of the waste, will be sold to junk dealers, and rejects comprising about 5 per cent of the waste will be collected once every two to three weeks by municipal solid waste management service trucks and taken to the dumpsite. Each centre will be a profit-making enterprise. The business plans for each centre show an average of around 15 per cent internal rate of return from three streams of income: (a) collection fees from serviced households; (b) sale of enriched compost and (c) sale of recyclables to junk dealers.

25. It is expected that once the centres are operational, instead of the local government spending money on solid waste management it will be earning a profit of around 15 per cent. This profit can be used to expand solid waste management services to other neighbourhoods of the town.

26. Community-based composting is not new. It has been practised in China, Indonesia, India and the Philippines. However, the key problem with municipal compost has always been the inability of its producers to sell it. Compared with chemical fertilizer, it has low nutritional values compared with its bulk. It is also unsuitable for hybrid seeds, which most farmers use, and is often laced with toxic and hazardous material, making it unsuitable for agriculture.

27. The key innovation of the model used in this project is the enrichment of organic compost with NPK to make it organic fertilizer, which is more cost-effective and beneficial for the farmers as compared with chemical fertilizer. Unlike chemical fertilizer, organic fertilizer returns organic matter to the soil, thereby replenishing it and reducing the amount of fertilizer needed.

28. This approach provides several benefits to all participating stakeholders:

(a) Because it uses cycle carts and provides treatment of solid waste within the neighbourhood, it minimizes the transport costs for the local government;

(b) It improves the collection service for the participating households as it provides daily door-to-door collection service, where previously only curbside service was available;

(c) Finally, it provides higher and regular income and better working conditions for waste pickers as it relies on two relatively stable sources of income, user fees and sale of compost.

29. It is also an elegant solution to two urgent problems in urban and rural areas. In urban areas, it contributes to solving the problem of collecting and disposing of solid waste, while in rural areas it contributes to addressing the problem of deteriorating soil conditions by returning organic matter to the soil.

30. Thus this approach completes a benefit cycle between rural and urban areas. Food produced in rural areas is consumed in urban areas. The consequent waste is turned into enriched compost/organic fertilizer and is consumed in the rural areas to produce food for urban areas.

#### **IV. LESSONS LEARNED**

31. Community-based solid waste management is a complex process that requires inputs from the public, private formal and informal sectors, the community and civil society organizations. The coordination of these inputs is a demanding task at the local level. It is therefore not entirely surprising to find that the design and implementation of country activities were time-consuming, requiring frequent missions to the countries concerned.

32. Moreover, the project requirement of land allocation and the introduction of new technologies and approaches, namely, aerated box composting, the use of efficient micro-organisms in composting and locating decentralized integrated resource recovery centres in the neighbourhood that is being serviced by it, required approvals from higher levels of government. This further reduced the pace of implementation.

33. The key lesson learned is that multi-year projects that seek to transfer innovations from one country to another require flexibility in project planning and design to ensure that the project meets the real needs of the participating countries. The results-based management framework, if applied properly, provides this planning flexibility.

## V. FUTURE DIRECTIONS

34. The project has generated considerable interest among local governments and there are demands from towns in other countries that the project be implemented there. The secretariat is looking at various funding opportunities to meet these requests.

35. The secretariat is also looking at the Clean Development Mechanism as a means of financing the mainstreaming and upscaling of this approach. Under the Kyoto Protocol to the United Nations Framework Convention on Climate Change,<sup>1</sup> by 2012, signatory countries have to reduce their greenhouse gas emissions to levels at least 5 per cent lower than in 1990. The assigned reduction amount of each country is divided into units that equal one metric ton of carbon dioxide. These units are called certified emission reductions.

36. The Protocol allows countries with high emission levels (primarily developed countries) to undertake or finance projects in countries with low emission levels (primarily developing countries) to reduce the greenhouse gas emissions of the countries concerned or to create carbon sinks that would absorb greenhouse gases. In return, they receive certified emission reductions which they can use against their own reduction commitments. This process is known as the Clean Development Mechanism.

37. Methane, the gas produced by untreated organic waste, is 21 times more harmful as a greenhouse gas than carbon dioxide. Thus, reducing one metric ton of methane is equivalent to reducing 21 metric tons of carbon dioxide; under the Clean Development Mechanism, 21 certified emission reductions are awarded for every ton of methane.

38. The composting of organic waste has been approved by the Executive Board of the United Nations Framework Convention on Climate Change<sup>2</sup> as a baseline methodology for reducing methane. Thus, a considerable amount of financing can be generated to upscale and mainstream the centres through the Clean Development Mechanism. The project will explore this in greater detail in a policy seminar scheduled for the third quarter of 2007.

39. The Committee may wish to review the progress made in implementing the project as well as the lessons learned and the proposed future directions, and suggest any improvements in the secretariat's implementation strategy.

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<sup>1</sup> [http://unfccc.int/essential\\_background/kyoto\\_protocol/items/2830.php](http://unfccc.int/essential_background/kyoto_protocol/items/2830.php)

<sup>2</sup> [http://cdm.unfccc.int/UserManagement/FileStorage/CDMWf\\_AM\\_JM3KZ437F81Y363Q8QQL5K3I075QIZ](http://cdm.unfccc.int/UserManagement/FileStorage/CDMWf_AM_JM3KZ437F81Y363Q8QQL5K3I075QIZ)