

# Waste and Climate Change

Global Trends and Strategy Framework

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# Waste and Climate Change:

### Global trends and strategy framework

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The Executive Director of UNEP has been enthusiastically following up on UNEP Governing Council Decision 25/8 on Waste to build capacity on waste management. UNEP, based on its successful and continuous support on waste management, has received a lot of requests from national governments and other entities to develop a strategy for co-benefits of waste management in the context of climate change. To develop this strategy, UNEP carried out an intensive review of linkages between waste management and climate change. Accordingly a draft paper to highlight the linkages and draft strategy was prepared and presented during a keynote presentation at ISWA/DAKOFA Conference on Waste as a pre COP event in Copenhagen during 2009. This draft paper attracted a lot of interest and technical feedback. A revised version, based on the feedback was prepared and presented at a Co-Benefits Workshop in Thailand and at Mayor of London's Conference on Waste and Climate Change under C40 Leadership Initiative. The governments and local authorities, in addition to experts, provided good inputs as well as technical and political feedback. Based on that feedback, third draft was prepared and uploaded at UNEP IETC website (<a href="https://www.unep.or.ip">www.unep.or.ip</a>) in July 2010 for further comments and feedback.

Taking this opportunity, we would like to thank all those experts and government officials, who provided valuable feedback to realize this publication and future path for our activities on waste in the context of climate change. We are also very grateful to Dr. Jessica North of Hyder Consulting Pty Ltd. (Australia) for her work and patience to work with different stakeholders on this publication.

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#### **Executive summary**

At a global scale, the waste management sector makes a relatively minor contribution to greenhouse gas (GHG) emissions, estimated at approximately 3-5% of total anthropogenic emissions in 2005. However, the waste sector is in a unique position to move from being a minor source of global emissions to becoming a major saver of emissions. Although minor levels of emissions are released through waste treatment and disposal, the prevention and recovery of wastes (i.e. as secondary materials or energy) avoids emissions in all other sectors of the economy. A holistic approach to waste management has positive consequences for GHG emissions from the energy, forestry, agriculture, mining, transport, and manufacturing sectors.

The Governing Council of the United Nations Environment Programme (UNEP) has directed its International Environmental Technology Centre (IETC) branch to take action in the area of waste management. There are substantial co-benefits of waste management in the context of climate change. As a first step to realize these co-benefits, this paper seeks (a) to examine the potential climate impacts and benefits of different waste management activities, and (b) to present a UNEP-led framework strategy to assist member countries in prioritising their resources and efforts for waste management and climate change mitigation. The framework strategy is intended to align with the internationally recognised waste management hierarchy, in which waste prevention receives the highest priority, to optimise the co-benefits for climate change mitigation.

Every waste management practice generates GHG, both directly (i.e. emissions from the process itself) and indirectly (i.e. through energy consumption). However, the overall climate impact or benefit of the waste management system will depend on net GHGs, accounting for both emissions and indirect, downstream GHG savings. The actual magnitude of these emissions is difficult to determine because of poor data on worldwide waste generation, composition and management and inaccuracies in emissions models. Although currently OECD countries generate the highest levels of methane, those of developing nations are anticipated to increase significantly as better waste management practices lead to more anaerobic, methane-producing conditions in landfills.

Estimates of GHG emissions from waste management practices tend to be based on life-cycle assessment (LCA) methods. LCA studies have provided extremely useful analyses of the potential climate impacts and benefits of various waste management options. However, due to data availability and resources, LCA studies are primarily focussed on scenarios appropriate for developed countries. Due to the key, underlying assumptions on which these assessments are based (such as local/regional waste composition, country-specific energy mix, technology performance, etc) the results are not necessarily transferable to other countries. This makes it generally impossible to make global comparisons regarding the GHG performance of different waste management technologies.

The climate benefits of waste practices result from avoided landfill emissions, reduced raw material extraction and manufacturing, recovered materials and energy replacing virgin materials and fossil-fuel energy sources, carbon bound in soil through compost application, and carbon storage due to recalcitrant materials in landfills. In particular, there is general global consensus that the climate benefits of waste avoidance and recycling far outweigh the benefits from any waste treatment technology, even where energy is recovered during the process. Although waste prevention is found at the top of the 'waste management hierarchy' it generally receives the least allocation of resources and effort. The informal waste sector makes a significant, but typically ignored, contribution to resource recovery and GHG savings in cities of developing nations.

A range of activities focussed on waste and climate change are currently being led by international organisations, including UNEP. There is clear recognition of the considerable climate benefit that could be achieved through improved management of wastes. UNEP is

involved in a variety of relevant partnerships and programmes, such as Integrated Waste Management, Cleaner Production, and Sustainable Consumption and Production. There is also strong interest in Clean Development Mechanism (CDM) projects in the waste sector. CDM activity has focussed mainly on landfill gas capture (where gas is flared or used to generate energy) due to the reduction in methane emissions that can be achieved.

However, there is a lack of a cohesive approach, which has resulted in gaps, duplication, and regional disparity is programmes offered. A central mechanism is needed to collaborate with existing organisations to ensure accessibility to and dissemination of relevant information across the globe, effective use of resources to achieve climate benefit through integrated waste management, promotion of best practice, and rapid transfer of simple, effective, proven technologies and knowledge to developing countries.

UNEP is clearly positioned to help catalyse enhanced action for climate change mitigation within the waste sector, collaborating with existing organisations to ensure more effective delivery of initiatives across the globe. As the designated authority of the United Nations system in environmental issues, UNEP has a key role to play in providing leadership and encouraging partnerships in the fields of waste management and climate change. The development of a framework strategy to implement the proposed mechanism requires input from a range of stakeholders. To this end, the current report is intended as a further step in a global dialogue to engage the international waste community, identify the key issues, and create a strategy that will deliver significant climate benefit in the waste sector.

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