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Evaluating potentials for waste sorting in the Arctic: waste separation studies from Greenland

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In small Arctic communities, the traditional waste management solutions are uncontrolled waste dumps and simple incinerators with no or limited flue gas treatment. This is also the case for the waste management system in Greenland (Eisted and Christensen, 2011), although other treatments of the waste are sought for. At the same time, data on waste amounts and composition from the Arctic regions are limited, thus new waste management decisions are difficult to implement and scale. In the second largest town in Greenland (Sisimiut), voluntarily separation of glass and metal at public collection containers at several locations in the town was implemented in 2012 and source separation of organic household waste for a compost pilot project for parts of the town was initiated in 2014.

The aim of this study was to a) investigate the composition of waste in different Greenlandic settlements to add to the amount of waste data for the Arctic and evaluate potential fractions that could be sorted and b) evaluate sorting efficiency in the town Sisimiut, when households can separate glass, metal and organic waste.

Sorting campaigns were made in three settlements (114-252 inhabitants) and in Sisimiut (5,500 inhabitants). In the settlements, household waste from 15-30 % of the households was separated into organic, paper/cardboard, plastic, metal, glass and a residual fraction. In Sisimiut, waste from residential areas, shops and canteens was collected during summer periods of 2013-2015 and separated into several fractions, with focus on glass, metal, organic and the residual fraction. The organic waste collected through the compost pilot project was also investigated for amounts, composition and impurities.

The daily waste production in the settlements was in the range of 0.8 – 1.2 kg/person. The results showed that the main waste fraction in the settlements was organic waste, with up to 48 % of the waste found in this fraction. The paper/cardboard and plastic fractions were the second largest fractions with up to 25 % and 16 %, respectively.

In Sisimiut, the main waste fraction of the restaurants and supermarket was also organic waste, where up to 86 % the waste from supermarkets was organic waste. The other fractions of waste from these sources were connected to different containers in relation to food such as plastic containers, plastic wrappings, cardboard, metal containers and glass, the two latter of which there is a public collection system for. Up to 52 % organic waste was found in the collected household waste. Collection of organic waste through the compost pilot project from households in Sisimiut was limited. The daily waste production from households in Sisimiut was 1.6-1.7 kg/person both before and after implementation of the organic waste collection possibility. Ideally, if the sorting options for these households were fully utilized, the residual fraction should be dominant and the daily waste production reduced.

All separation campaigns revealed a large organic waste fraction and stresses that the highest potential for separation of a single fraction from the other waste is the organic fraction. Removing most of the organic fraction would further reduce the amount of waste to incineration or disposal. The collection of organic waste is successful for restaurants and supermarkets through the initiated separate collection system, whereas for households very little organic waste was collected and efforts should be made to optimize this collection. This supports the continuation of the composting initiated in Sisimiut, especially for the commercial sources and might be a solution for other towns and settlements in Greenland.

Eisted, R. and Christensen, T.H. 2011, 'Wastes management in Greenland: current situation and challenges' *Waste Management & Research*, vol. 29, pp 1064–1070.