Wastewater Production, Treatment, and Use in Malawi

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In Malawi, wastewater is generated throughout the country i.e. both in rural and urban centres. Wastewater generation has increased due to increase in population, urbanisation and industrialisation. Wastewater treatment works are done in cities of (1) Blantyre at Blantyre, Soche, and Limbe, (2) Lilongwe at Kauma, (3) Zomba at Chikanda and (4) Mzuzu at Moyale. These have offsite sewage systems but only 15% of the population is connected to waterborne sewerage and 15% to septic tanks (National Environmental Action Plan, 1994). The dominant treatment types are the primary and secondary type which mainly removes just about 30% of the organic wastes and 50% of suspended solids and bacteria. Sewage system break down, sewer lines blockages occur due to poor maintenance, improper design of some sections, and also lack of public awareness on use of the sewerage systems (Agrifor Consult, 2006). Lack of adequate waste water treatment causes severe water pollution and outbreaks of waterborne diseases especially in THAs and squatter areas in urban areas.

Wastewater use/disposal:

In Malawi, industrial effluent is collected in septic tanks or discharged into the sewerage systems. The City assemblies do clear septic tanks but very little waste water is treated in any way before being discharged to rivers or open quarries. In THAs and squatter areas, wastewater is usually discharged into storm drains, road sides, streams and rivers. Agricultural wastewater reuse is an important supply source in Malawi's urban food systems as well as a critical food security valve for poor urban households. About 20 % of the population live in urban areas where more than 50% of the urban population use wastewater for irrigated agriculture. The short-term benefits of wastewater reuse in urban agriculture could be offset by the health and environmental implications. Wastewater composition varies according to its origins; domestic, hospital and industrial. Wastewater contains chemical pollutants such as heavy metals, pathogens and helminths, such as roundworms, hookworms and guinea worm that threaten the health of humans as well as the environment (Madyiwa *et al*, 2002). The worst-case situation occurs when untreated wastewater is used to irrigate vegetables or salad crops that are eaten raw.

Policies and institutional set-up for wastewater management:

In Malawi, the requirement to treat wastewater is underscored by the existing regulatory framework, institutional arrangements, and policy guidelines. In addition, formalized national effluent standards exist. Polluted water needs to be dully treated in order to minimize its negative effects on people, animals, birds, and aquatic biota. Polluted water is unsuitable for drinking, recreation, agriculture, and industry. It diminishes the aesthetic quality of surface water sources (Kuyeli, 2007). The National Sanitation Policy (NSP) (Malawi Government, 2007) stipulates the need to improve delivery of improved sanitation services. Some of the strategies for accomplishing this objective include: (1) To provide adequate wastewater disposal facilities at all wastewater generation points and (2) To ensure adequate provision of wastewater treatment and

disposal facilities for all new piped water supply connections. One of the specific goals in the National Water Policy (NWP) (Malawi Government, 2005) is to ensure water of acceptable quality for all needs in Malawi. In addition, formalized national effluent standards exist in Malawi (Malawi Bureau of Standards, 2005).

Research/practice on different aspects of wastewater:
Research studies done in Malawi so far have established higher levels above the recommended Malawi standards and WHO guidelines of chemical, physical and biological parameters in effluents from the three major wastewater treatment works in the city of Blantyre and Kauma treatment plant in Lilongwe City (Chipofya *et al*., 2010; Mtethiwa *et al*., 2008 and Kuyeli, 2008). Earlier studies have indicated that surface water from these streams is used by local residents for washing clothes, bathing and irrigating crops which may be eaten raw, and in some cases, the streams are used as a source of drinking water (Malawi Government, 1995; Lakudzala *et al*., 1999; Sajidu *et al*., 2007; Mkandawire *et al*., 2008). There is no information on the quantities of wastewater generated in Malawi at the moment. Guidelines and information on wastewater use is not available (cropping patterns, types of crops etc). The management of wastewater for reuse purposes is also not clear, i.e. (cost of pumping, treatment and supply regime, downstream impacts etc). The use of raw wastewater was noted in some high density suburbs, though this is against policy framework in Malawi.

Status and need for the knowledge and skills on the safe use of wastewater:
Wastewater disposal, management and use practices are generally very poor in Malawi. Wastewater treatment and disposal is thus a matter of concern that needs to be addressed, but the countries' prospects for economic and social development, poverty and priorities for industrial investments form obstacles in making decisions about public waste facilities. There is need for human capacity to generate data on quantity and quality of wastewater and plan for an efficient wastewater management system which can help reduce the potential public health risks associated with wastewater management. Further work is also required to determine the risk to public health of users and decontaminate polluted water resources. Human capacity development is required for identifying a combination of treatment and crop restrictions, of safe wastewater application methods and control of human exposure which will help to ensure safety to the public as well as the environment.

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