

Wastewater Production, Treatment, and Use in Ghana

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Background

It is projected that Africa's population will triple by 2050 and the bulk of this phenomenal increase will primarily be in the urban and peri-urban areas. Also, by 2015, about twenty-five countries in Sub-Saharan Africa will have higher urban populations than rural, and this number is expected to increase to 41 countries by 2030 (UN-Habitat, 2001). Currently, about 44% of the population in the West African sub-region live in urban areas (UNPD, 2004), compared to only 4% in 1920. The same 44% applies to Ghana, and this number is expected to rise rapidly due to the high annual growth rates of between 6-9% (GSS, 2002). The increasing urban population comes along with increasing demand for sanitation infrastructure. In Ghana, current urban sanitation infrastructure is inadequate and seems not to be keeping pace with population growth rate, about only 4–5% of the population is linked with – infrequently functional – sewage systems and sewerage treatment plants. Most untreated wastewater ends up in storm-water gutters, streams and other water bodies which are often used as sources for irrigation water (Keraita et al. 2002). In many urban and peri-urban, especially, water-stressed areas, wastewater constitutes the only available surface water for irrigation in the dry season

Wastewater production and Treatment

The actual annual total waste production in Ghana has not been estimated yet. This is due to fact that no little or no data exist on commercial and industrial wastewater production, except o domestic wastewater. In 2006, the estimated total amount of wastewater (domestic- grey and black waters, produced in urban Ghana was estimated to be approximately 280 million m³. With increasing spread of processing facilities into inland areas future increases in the percentage of wastewater from industrial sources could be expected. It is estimated that urban wastewater generation in Ghana will increase from about 530, 346 m³/day (36%) in 2000 to about 1,452,383 m³/day (45%) in 2020 (Agodzo, 2003). Wastewater treatment in the ten regions of Ghana is very abysmal, only less than 8% of wastewaters (domestic) in Ghana undergo some form of treatment. Most industries are located along the coast discharge their effluent directly into the ocean without any form of treatment, while those located in land discharge their effluent into major streams and urban storm drains. Thus, existing wastewater treatment facilities are used for treating domestic wastewater. The most dominant wastewater treatment plant is the stabilization ponds, which exist in almost all the regional capital cities, followed by the trickling filter and activated sludge respectively.

Wastewater Use and Disposal

Only about 10% of urban wastewater emanating from domestic and municipal sources is disposed off through sewage networks connected to treatment plants. As has been earlier, virtually all commercial and industrial wastewaters are disposed of into the natural environment (ocean, streams and wetlands) untreated. Currently, about 20% of households do not have toilet facilities, and this increases to about 70% in the three northern regions, which are the poorest among the ten regions of Ghana. 22% of households mainly from rural areas use pit latrines therefore their wastewater (blackwater) is not available for use while about 38% of the

population dispose off liquid waste by throwing them in the streets or outside their houses, 21% dispose off liquid waste directly into gutters, 35% in the compound and about 1% in other places (Obuobi et al., 2006).

In Ghana, wastewater usage falls under the informal irrigation sector due to the fact that wastewater is used predominantly as diluted untreated wastewater, untreated wastewater or partially treated wastewater (Cornish *et al.*, 2001). Currently, over 500ha of land is being cultivated county-wide using wastewater with an average farm size of 0.02ha. According to Agodzo et al., (2003), if only 10% of the 280 million m³ of wastewater from urban Ghana could be (treated and) used for irrigation, the total area that could be irrigated with wastewater alone could be up to 4,600 ha, and with an average dry-season farm size of 0.5 ha, this could provide livelihood support for about 9,200 farmers in the peri-urban areas of Ghana. However, as described earlier, there is inadequate sewage conveyance capacity and in most cities and towns, untreated wastewater flows from drains into streams, which are usually used for irrigation.

Policies and Institutions set-up for wastewater management

Ghana's Environmental Sanitation Policy (revised 2010) mandates the metropolitan, municipal and district assemblies (MMDAs) the core the responsibility to "ensure the availability of facilities for handling and disposal of domestic, commercial and industrial wastewaters, which include excreta disposal facilities and systems for conveyance (sewage, vehicular, manual) treatment and final disposal of liquid waste". The policy empowers the MMDAs to regulate, control and co-ordinate the activities of all individual, communities organizations and agencies involved in liquid waste management services (MLGRD, 2010). Based on the above, a number of by-laws have been passed and being enforced by local government authorities towards enhancing sanitation and food safety Other institutions such as the Ministry of Food and Agriculture (MoFA), provides extension services to farmers including operators of urban and peri-urban agriculture (UPA) through its metropolitan, municipal and district offices across the country. The Environmental Protection Agency (EPA) is responsible for ensuring total environmental safety by enforcing compliance with all existing environmental regulations by individuals, and public and private organizations. The Hydrological Services Department monitors river/stream flow rates, design and ensures the maintenance of urban drain. CSIR-WRI has a core mandate to research into the development of technologies for pollution control, pollution prevention and poverty reduction through water use. IWMI-Ghana, an international NGO has carried out extensive research projects related to widespread practice of wastewater and excreta reuse in Greater Accra, Kumasi and Tamale. IWMI has worked extensively in addressing health risk management associated with reuse. **EDEN Tree (private sector operator)** is a private sector commercial entity involved in the purchase, wholesaling and distribution of fruits and vegetables from UPA operators. The company has over the years collaborated with MoFA to educate operators on safe use of irrigation water and handling of produce. The company itself ensures safety of produce through the use of post-production safety procedures.

Research/practice on different aspects of wastewater

Currently, research a lecturer from University for Development Studies (UDS) on low-cost wastewater treatment using clay-pot filtration of wastewater for vegetable irrigation in Tamale is on-going.

Research on Heavy metals concentrations on various vegetables being irrigated with wastewater is on-going.

Status and need for the knowledge and skills on the safe use of wastewater

Data on commercial and industrial wastewater production are not existent. Knowledge and on safe wastewater use in agriculture is virtually non-existent. Wastewater treatment, especially, low-cost technologies are lacking in Ghana. Capacity carrying out microbial and chemical analysis for the assessment of health risk, Epidemiological studies is available. Most importantly, funding for research into low-cost treatment of wastewater is unavailable. There is therefore the need for skill development in the area low-cost treatment technologies, funding for research into assessment of health risk, health protection measures, monitoring and monitoring and system assessment, environmental implications and public awareness creation on the cost and benefit of safe use of wastewater agriculture as an alternative source of livelihood in Ghana.

Reference

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