Success story: Ghana

Use of wastewater from a sewage treatment plant for agriculture. How safe is it in Accra, Ghana?

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Why was this study done?

Sewage treatment plants receive influent (contaminated water) containing high concentrations of bacteria and antibiotics, rendering them hotspots for bacterial multiplication and antibiotic resistance development. The Legon sewage treatment plant in Accra treats sewage and then discharges the effluent (treated water) directly into the local Onyasia stream, which is used to irrigate farms, for fish farming and to provide water for animals (Fig. 1). Thus, bacteria in the stream that might be resistant to antibiotics can spread to humans and animals, leading to serious health implications. Assessing whether the plant is achieving its purpose of eliminating bacteria is essential to know if the wastewater is safe for agriculture and to take actions to address the problem of resistance.

Lady Adomako, a Microbiologist at the CSIR Water Institute in Accra, conducted a study supported by SORT IT to assess bacterial counts and antibiotic resistance patterns in water from: influent and effluent of the Legon sewage treatment plant.

Fig. 1. Onyasia stream showing water being used for irrigation and lettuce farming.

What did the study show?

The study showed that the Legon sewage treatment plant significantly reduced bacterial counts of *Escherichia coli, Aeromonas hydrophila and Pseudomonas aeruginosa* by over 99% in effluent discharged into the local stream. However, bacterial counts (especially *Escherichia coli*) increased by 99% between 1000 metres of upstream and downstream points in the Onyasia stream, suggesting intense contamination from faecal sources beyond the outfall point of the sewage plant. These bacteria were resistant to 'highly or critically important antibiotics' used to treat humans.

How did the study impact policy and/or practice?

Based on the study findings, the Accra Metro Sewerage Unit, Ministry of Sanitation, took the following measures:

- As the bacterial counts were low in effluent at the discharge point from the treatment plant, the study reinforced a decision to continue re-utilizing the water for fish farming.
- To improve stream water quality for lettuce farming, the use of Biochar filters to remove bacteria is being piloted in collaboration with the University of Bochum in Germany.
- Other actions under way include informing communities on the need to boil stream water before household use, ensuring disinfection of vegetable products grown along the stream, and providing farmers with protective wear such as boots and gloves to reduce contact with contaminated water.

Effluent water from the Legon sewage plant being used for fish farming.

Use of Biochar filters for purifying water for lettuce farming.

A lettuce farm that uses cleaned water from the Onyasia stream in Accra, Ghana.

Publication title:

Adomako, L.A.B et al. Reduced Bacterial Counts from a Sewage Treatment Plant but Increased Counts and Antibiotic Resistance in the Recipient Stream in Accra, Ghana—A Cross-Sectional Study.

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