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An attendant showcases a carrot and salad vegetable garden at the Source of the Nile Agricultural Show grounds in Jinja. The plants grow under irrigated agricultural practice PHOTO/LOMINDA AFEDRARU

Farmers warned on overuse of farm inputs, drug residues

Farmers growing vegetables across the country do irrigate the crops with contaminated water, often sourcing it from contaminated rivers, wetlands, or agricultural runoff containing pesticides and fertilizers

LOMINDA AFEDRARU

Farmers have continuously used contaminated water - drug, pesticide and fungicide residue - to irrigate their vegetable farms. These end up in crop leaves, leading to stunted growth and a reasonable amount of yield loss in farmer fields. It can also be a danger to consumer health.

The findings by a team of scientists from the University of Johns Hopkins in the US and published in Environment Science and Technology, contend that this scenario applies to crop fields of farmers growing vegetables such as tomatoes, lettuce, cabbages and carrots, among others across the globe.

In Uganda and other African countries, the scenario is that most contaminants that are washed into water sources used by farmers to irrigate their vegetables are pesticides

and fungicides.

Farmers either apply them to the vegetables directly or end up in water bodies, particularly swamps, which farmers use to irrigate the crops.

Case of Uganda

The programme leader of Horticulture and Oil crops at the National Crops Resources Research Institute in Namulonge, Dr Gabriel Ddamulira explains that "most farmers growing vegetables in the country have the tendency of over applying pesticides and fungicides in their vegetable farms. This is not only harmful to humans but dangerous to the vegetables because it affects their growth."

He notes that pesticides and fungicides can be a contaminant to both crops and humans if not regulated.

This is because the category of these inputs can stay long in air and water, including crop leaves on which they are sprayed.

"That is why farmers are obliged to read the application instructions written on the package of every input because it is where the quantity to be applied is prescribed. Farmers are also advised not to use contaminated water for irrigating their farms, especially those growing crops in swamps," Dr Ddamulira notes.

Dr Ddamulira says overuse of pesticides and fungicides is common

THE RISK

The practice of irrigating crops with contaminated water, often sourced from contaminated rivers, wetlands, or agricultural runoff is driven by water scarcity and reliance on surface water, sometimes leading to reduced yields, crop damage and soil degradation.

among farmers growing tomatoes and traditional vegetables such as nakati, buga and cowpeas among others.

Sensitisation

Dr Ddamulira contends that his team has been sensitising farmers growing vegetables for local consumption and for export.

Those farming chilli have responded positively because they mainly grow it for export, where standards have been set by countries purchasing from them.

In 2018, the government banned chilli export to European markets due to lack of the required standards.

The practice of irrigating crops with contaminated water, often sourced from contaminated rivers, wetlands, or agricultural runoff, is driven by water scarcity and reliance on surface water, sometimes leading to reduced yields, crop damage and soil degradation.

In areas lacking alternative clean water sources, farmers have been known to use polluted surface water, with some areas facing challenges where water turns green and smelly.

This mainly occurs in rice growing areas such as Agoro Irrigation Scheme and others, leading to disease infection.

However, there are efforts to improve water quality, including investments in solar-powered irrigation to provide cleaner water, although many of these systems are underutilised.

Other measures include for farmers observing the interval of 14 days to

harvesting, making sure there is no input application during this period to any crop, including vegetables.

Overall, farmers are advised to embrace best practices right from planting to harvesting of the plants.

Research results, US case study

The scientists from Johns Hopkins University discovered that in regions where freshwater supplies are limited, farmers sometimes rely on treated wastewater to irrigate crops.

This practice helps conserve scarce water resources, but it also raises concerns among regulators and consumers.

Wastewater can contain trace amounts of various chemicals, including psychoactive medications, commonly prescribed for mental health conditions.

The researchers discovered that certain crops, including tomatoes, carrots and lettuce, tend to store these compounds mainly in their leaves.

That finding may offer some reassurance for people who eat tomatoes and carrots, since the edible portions of those plants are the fruit and roots rather than the leaves.

The study is part of an ongoing effort to evaluate whether using municipal wastewater for agriculture can be done safely.

In most cases, this water has already passed through treatment facilities before being reused for irrigation.

"Farming practices place a high demand on freshwater resources. With limited rainfall and droughts threatening global water supplies, we're looking at a future with shortages that may only be met by repurposing treated wastewater," said Daniella Sanchez, a doctoral student at Johns Hopkins University and lead author of the study.

She noted that to continue to use wastewater safely, they need a more sophisticated understanding of where and how crop species metabolize, or break down agents in the water.

Tracking pharmaceutical drugs inside plants

Sanchez focused on four psychoactive medications frequently detected in treated wastewater and the include carbamazepine, lamotrigine, amitriptyline and fluoxetine.

These drugs are used to treat conditions such as depression, bipolar disorder and seizures.

To investigate how crops handle these compounds, the researchers grew tomatoes, carrots and lettuce in a temperature-controlled chamber. Each plant received a nutrient solution containing ultrapure water, salt nutrients and one of the medications. The experiment ran for up to 45 days.

The results showed that pharmaceuticals and their breakdown products largely build up in leaves.

Tomato leaves contained more than 200 times the concentration of pharmaceuticals found in tomato fruits. Carrot leaves held about 50 times the levels detected in the carrot roots.

The researchers emphasized that these measurements should not be interpreted as a health warning.

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