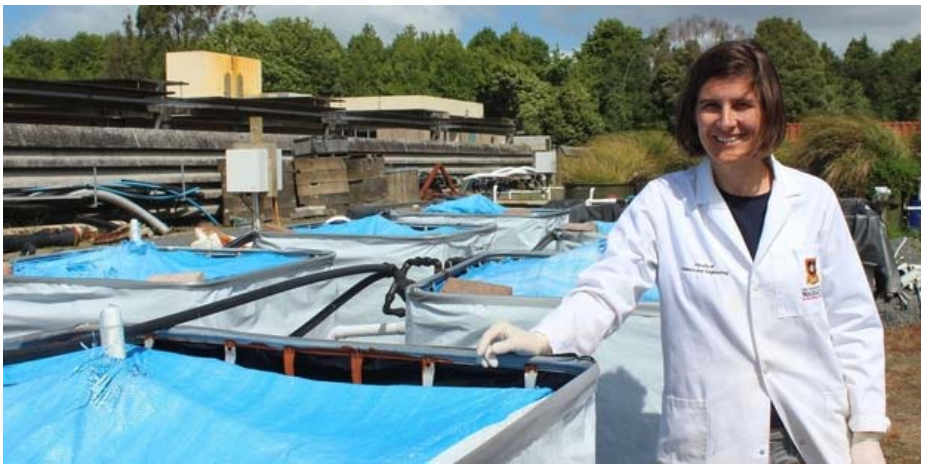
Hamilton NEWS

Finding natural solutions for wastewater treatment

By Gary Farrow



Femke Rambags, a PhD student, is working with NIWA as part of a team conducting a project to develop an effective system to treat wastewater naturally. Photo / Danielle Nicholson

In the midst of the various specialised structures that make up the Pukete Wastewater Treatment Plant lies a small, yet significant, scientific experiment.

Femke Rambags, a PhD student at the University of Waikato who is currently working with NIWA, is part of a team conducting a project to develop an effective system to treat wastewater naturally.

"In rural, less populated areas, where no sewage system is available, on-site wastewater treatment (OWT) systems can be used to dispose and treat wastewater," said Rambags.

"About 20 per cent of New Zealand households are not connected to central sewage. They often use a septic tank, and then dispose of the waste on to land, and we're actually looking into improving the small scale on-site systems."

The hope in the NIWA study is that new approaches could ensure the wastewater is treated in such a way that it would be an ecologically as well as financially sustainable method.

"There are many different types of OWT, and they are designed to treat wastewater to varying levels before being released back into the environment," said Rambags.

"The most common example of an OWT system involves two stages. The first is treatment in a septic tank, allowing solids to settle and scum to float, and the second is when the effluent is dispersed into land, often through an infiltration trench, to eventually recharge groundwater."

Nutrients and pollution from wastewater that make their way into groundwater can be environmentally damaging, and also pose a risk to human health, particularly when there are a lot of disposal sites within a certain area.

The experiment involves a variety of small ecosystems, designed with the intent of cleansing the water naturally by getting rid of unhealthy pathogens and microbes.

"Too much nitrate can cause overstimulation of growth of aquatic plants and algae, using up all the oxygen as they decompose. This can lead to a decrease in animal and plant diversity in lakes. Additionally, too much nitrate in drinking water can be harmful to young infants," said Rambags.

"These systems we're trialling are called denitrifying bioreactors. Denitrifying bioreactors are a simple technology for removing nitrate from wastewater and agricultural drainage waters, such as from tile drains.

"Simply, these are structures containing a slowly degrading carbon source, such as woodchips, through which water containing nitrate is passed. The woodchips support denitrifying microbes that convert nitrate to nitrogen gas, which is released to the atmosphere.

Natural on-site wastewater treatment systems have been tested throughout the world, and Rambags thinks they could be of a particularly good benefit for New Zealand.

"The ultimate goal of our research is that our findings can be used to develop these robust, cost-effective, low energy, high rate systems that could be used for small communities in New Zealand."

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