

Clean water, naturally

Yolandi Schoeman, a Klerksdorp innovator and owner of Baoberry Ecological Engineering Innovations, took top honours in the 2016 Global Cleantech Innovation Programme for SMEs in South Africa (GCIP-SA) with her water re-use and recycling solution called aWetbox.

For Schoeman, who holds a Masters degree in environmental management from the University of the Free State, it is all about ecological engineering innovation, sustainability leadership and entrepreneurship.

“The idea of aWetbox came about after I had spent quite some time in rural communities while doing studies on water security,” says Schoeman, a certified environmental impact assessment practitioner with the Environmental Assessment Practitioners of South Africa Association. “I saw how people carried water home from rivers over long distances. Others had to use water from boreholes that isn’t very clean; some had access to rainwater, but only during the rainy season.”

In some municipal areas people don’t have access to water at all and in some areas people do not have access to water for up to 20 hours a day as a result of issues with water supply and failing water infrastructure.

“The current ways of water treatment in poor communities is very limited, and people are often advised to boil water before they use it. This is not always effective, and people are exposed to smoke at installations where the water is being boiled.”

She says she felt there had to be a more natural way to improve water quality.

“Initially I thought it would be ideal if I could create an artificial wetland that people could install outside their houses to clean water for domestic use. That way they could also reuse their grey water for domestic purposes and even integrate rainwater harvesting.

“But artificial wetlands need a lot of space and that made me think of a solution that is mobile and not as space-intensive. That is how the development of ‘a wetland in a box’ started.”

The plants used in the aWetbox can be harvested and used by downstream businesses as biofuel and oils. aWetbox also contributes to reducing the carbon footprint of such businesses. The system can be scaled from 1 000 litres to 50 000 litres or more for residential developments, holiday resorts, corporate units, and so on.

A lot of research went into the concept to ensure its efficiency, says Schoeman. “I did a considerable amount of work on floating islands and conducted tests to ascertain which of the

plants could remove the maximum amount of contaminants from the water. The research on the floating islands significantly contributed to refine the concept of aWetbox.”

aWetbox is a nature-based solution that mimics the workings of a natural wetland – but in a box, or a tank. Grey water is run through it, where it goes through a natural biological filter (consisting of a sand and gravel filter that also adjusts the pH) as a first phase in cleaning up the water, removing solids in suspension and other contaminants and solids.

In addition, the acidity of the water is adjusted while the growing of beneficial bacteria to remove more contaminants (metals and non-metals) also happens during the first phase. During the next phase, the water is exposed to thousands of microscopic and other roots of “intelligent” plants that remove the remaining contaminants. The plants are referred to as “intelligent”, as they have phytoremedial properties.

Phytoremediation is the name given to a set of technologies that use different plants as a containment, destruction or extraction technique. Tests have shown that this is more cost-effective than conventional treatments.

aWetbox is a patented and cost-effective solution that is available in an easy-to-assemble kit-form. The payback time once installed is under 12 months. It eliminates 99% of disease-causing microorganisms and improves the water quality for household use by up to 80%.

“We are in the process of getting aWetbox ready for market and should be able to offer it to clients by the second quarter of 2017. aWetbox for a family of four is expected to cost between R8 000 and R10 000,” says Schoeman.

According to Schoeman the GCIP-SA made a world of difference to her business. As the 2016 winner, she received a cash prize and an all-expenses paid trip to Silicon Valley in the US to compete against top performers of other GCIP programmes from across the world. In addition, she won a cash prize for the most promising woman-led team.

“The programme includes everything an entrepreneur needs to derisk and scale up a business. It helped us to think and rethink our innovation and go-to-market strategy, unravelling the fine print of getting our business on the road to success and ultimately putting us on the map.

“Participating in the GCIP-SA programme is not easy, it will stretch your capabilities as an entrepreneur and you will grow in ways that you did not even think were possible. I do recommend this programme to all green- and cleantech entrepreneurs, as it will provide you with a significant advantage when you are ready to enter the market,” she says.

Schoeman is currently a DTech candidate in Environmental Engineering (Civil Engineering) at the Tshwane University of Technology, specialising in Industrial Ecology (completion date 2017). She is also in the process of completing her masters in Integrated Water Resource Management through Monash South Africa, focusing on the diffusion of eco-technology / green infrastructure.

aWetbox in a nutshell

aWetbox is wetland in a box that treats water for reuse using a unique biological filter. It is a low-tech, low-maintenance and low-cost solution that can be integrated into a rainwater and grey-water recycling system. aWetbox can be installed in communities, with or without the collaboration of the local government, as it also comes as a do-it-yourself package.

About the GCIP-SA

The Global Cleantech Innovation Programme for SMEs in South Africa (GCIP-SA) is part of a global initiative that aims to promote clean technology innovation aimed at addressing critical energy, environmental and economic challenges facing the planet. It combines an annual competition and a business accelerator programme where SMEs and start-ups are trained and mentored aimed to the development of more marketable and investor-attractive products and businesses.

The Programme is implemented by the United Nations Industrial Development Organization (UNIDO) with funding by the Global Environment Facility (GEF). In South Africa UNIDO is partnering with the Technology Innovation Agency (TIA) as the execution and hosting institution for the GCIP, while the US-based Cleantech Open serves as the main knowledge partner of the global programme.