From South to North — the sand filter takes hold in Canada

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A water filter used widely in developing countries may prove equally popular across North America, and could have prevented disasters like Walkerton and North Battleford, says its inventor.

David Manz, a former civil engineering professor from the University of Calgary, developed a water filter in 1988 to provide cheap, safe, drinking water for communities in developing countries.

Sand – a natural filter

At the heart of the filter was a centuries-old design called the "slow sand filter." The concept: pour water through a layer of sand, and a naturally-forming biological layer purifies the water. The big improvement of Manz's filter was that it didn't require a continuous flow of water to keep the top layer of sand from drying out.

Easier than boiling water and surprisingly untechnical, the design achieved big success overseas. It's used in over 50 countries, says Manz from the Calgary office of his company, Davnor Water Treatment Technologies. Davnor now has a factory in Bangladesh, which has produced about 30,000 filters, and operates in Nigeria and South Africa, he adds. The filters are also used by charities and development agencies like Canada's International Development Research Centre (IDRC), which tested the filter in communities in Chile.

A proven way to purify water

Barney Dutka, recently retired from the National Water Research Institute, tested early designs of Manz's filter. "If it's set up properly, it works quite nicely," he says. Tests showed it removed 100 per cent of giardia, 99.98 per cent of Cryptosporidium, and over 90 per cent of E. coli, says Dutka. Cryptosporidium was the cause of the tainted water outbreak in New Battleford, Saskatchewan, while E. coli was behind the Walkerton water contamination.

"Walkerton problems would not have existed had they put their water through a slow sand filter," says Manz. "You could have had the same operator, quite successfully, and it would never have caused a problem."

Ironing out difficulties

Ironically, a problem with the early models of Manz's filter – used in Chile in the mid-1990s in a project supported by IDRC – led to the discovery that the filter would be useful in Canada. "I got all these calls back from Chile that the filters were plugging up all the time. Nobody could tell me what was going on," says Manz. "And so IDRC flew me back down and it was pretty obvious why they kept plugging up – they were being used for iron removal."

"It was very important to the communities in Chile because they were no longer staining their clothes doing laundry and the water tasted better," adds Manz. Although iron doesn't affect the safety of water, water containing enough iron will stain clothes an orange colour. Iron also happens to be one of the biggest problems with water in Canada --"A *huge* problem – all over the world," stresses Manz.

Sand filters on Canadian farms

The filter was modified to remove iron without clogging. "I presented this here in Calgary to a group at the University and they got all excited about iron removal and said 'well could you do that in a farmhouse?' and I said 'well yes, of course we could, this is natural'."

Since then, the filters have been used for almost six years in farming communities across Alberta, as part of a project sponsored by Agriculture and Agri-Food Canada's Prairie Farm Rehabilitation Administration (PFRA). "It's just operating tickety-boo," says Manz of the PFRA project. "Not only do we remove iron now, we know how to remove hydrogen sulfide, iron bacteria, and all the other nasties that you can find in wells."

Use by corporations and communities

The filter has evolved from the simple bucket-like design to include large automated systems. Larger filters are used in a native reserve West of Calgary, and will be used by the oil company Chevron for communities in Nigeria, says Manz.

The filters range in price from about $150 for the smallest, manual models, which filter about 20 litres of water an hour, to almost $250,000 for very large, automated systems capable of supplying water to towns and communities.

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