Chile. Perform first crop irrigation with purified water through the Vetiver System

BORON RESEARCH

Sandra Ugalde, Project Technical Coordinator

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The procedure, which is located in the Region of Arica and Parinacota , has successfully responded with boron, lead, arsenic and manganese, and is becoming a real alternative to use scarce water resources in the area.

Cleaning contaminated water for it use in irrigation and to increase productivity in Arica and Parinacota Regions, is the aim of a project funded by the Foundation for Agriculture Innovation (FIA) and the Ministry of Agriculture. The project is being implemented by the University of Tarapaca. The first irrigation of agricultural crops with water purified by the Vetiver System was done the last Wednesday in Lluta Valley.

the project launch was attended by Jorge Alache , SEREMI Agriculture of the Region; Fernando Bas , executive director of FIA , and Vitellius Goykovic , Dean of the Agriculture Faculty at the University of Tarapaca. A strong emphasis was placed on the concerns of the Ministry of Agriculture to find a sustainable alternatives for the best use of the water resources in the northern area of the country.

Fernando Bas said at the meeting that " in the field of phytoremediation , the Vetiver System integrates principles on an ecological scale, and provides significant benefits from an environmental and social point of view that is not covered with other species."

He added that "this technology has many advantages over conventional methods of treating

contaminated water, because it is cost-effective and it has a regenerative impact on the soil and water in the places it is applied ."

This method, - which is implementing a technology platform for the decontamination of irrigation waters through phytoremediation techniques with Vetiver- , was a system initially developed by the World Bank for soil and water conservation in India in mid- eighties. In the last decade, the Vetiver System has emerged as the most innovative, cost effective, and environmentally least invasive system of all existing remediation systems.

“To operate this system , the tropical plants –Vetiver Grass- stand for a few weeks on rafts in the water to be treated, and they are able to extract from the water and soil , a number of contaminants such as heavy metals, pesticides , hydrocarbons and radioactive compounds, which accumulate and are stored in their roots, which effectively act as a capture filter”, said Sandra Ugalde, technical coordinator of the project.

Thus in agriculture, the system can recover and clean contaminated water for reuse, which currently is discarded due to its toxicity. In the Lluta Valley case, in the Region of Arica and Parinacota, whose primary water source is the river Lluta , currently uses water at a rate of about 1,000 liters of water per second , which , according to estimates by the University of Tarapaca, serve to irrigate about 2,200 additional Ha .

The first results of the implementation of the system, have shown that water high in boron, in a volume of 3000 liters a decrease from13.35 mg /l to 7.1 mg / l, obtained in 5 days.

Moreover, the tests performed with heavy metals such as lead, manganese and arsenic metalloid showed further significant declines, said Sandra Ugalde, technical coordinator of the project. For example, in the case of lead, the test began with 2 mg /l, and after 15 days no lead was detected.

Also, manganese levels, which initially were 1 mg /l, were reduced to 0.24 mg /l after 15 days. Furthermore, arsenic in contaminated well water with 0.33 mg /l decreased to 0.06 mg /l over 5 days .

"This type of innovation helps to better take advantage of the scarce water resources available to us in the region in a sustainable manner , and with some choice to replicate , in the future in other areas of the country facing the same problems ," said SEREMI Agriculture Arica and Parinacota, Jorge Alache .

International Experience

Remediation through plants, or phytoremediation, is a sustainable emerging technology with proven effectiveness and an adequate cost - benefit ratio.

There are various other technologies that are used to clean sites contaminated with heavy metals and hydrocarbons. While they may be fast, they tend to be relatively insensitive to the heterogeneity of the contaminated matrix. They can often be inefficient, more costly and even harmful to the environment.

Phytoremediation has been used successfully in India, Australia , China , South Africa , Thailand and Venezuela, as it integrates scientific principles related to hydrology , soil

mechanics and natural processes that are assimilated with the management of land and water .

However, at present, does not exist in the domestic market a technology that is economically, ecologically sustainable and able to remediate contaminated a large scale. Therefore, this project would provide a new alternative, initially for the agricultural sector, but could be further applied in the mining sector in the region.