SINGAPORE RESEARCHERS IDENTIFY 12 TROPICAL PLANTS THAT REMOVE TOXIC HEAVY METALS FROM SOIL

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SINGAPORE (The Straits Times/Asia News Network): Plants easily found in Singapore are now being tapped to rid the soil of toxic contaminants, with 12 tropical species identified to do the job.

Since the beginning of April, a pilot project to remove heavy metals and semi-metals involving more than a hundred tropical plants has started at an industrial site in northern Singapore.

The three-month pilot uses the results of an island-wide study released in February by researchers from Nanyang Technological University (NTU) and the National Parks Board. The study identified 12 plant species that can effectively extract metals and semimetals that are potentially toxic to humans.

Although the plant-based method has been used in some wetlands here, the study paves the way for a sustainable approach using a range of naturalized or native vegetation that has minimal impact on ecosystems, said Professor Lam Yeng Ming, Chair of the NTU School of Materials Science and Engineering, on Wednesday (April 13).

This is particularly relevant for a small nation like Singapore, where developed land could be reallocated to support new development plans, she noted.

Associate Professor Tan Swee Ngin, of the Academic Group of Natural Sciences and Science Education at NTU's National Institute of Education, said that during the study such properties were found to contain higher concentrations of heavy metals and metalloids that could affect the environment as well as health of flora and fauna.

While elements like cadmium, arsenic and lead occur naturally in soil, heavy metal particles from air pollution, household sludge and synthetic products like pesticides and batteries can cause these to reach higher levels over time.

The method proposed by the study uses phytoremediation, which uses plants that can take up heavy metals through their roots to remove pollutants.

Phytoremediation is a greener alternative compared to industrial methods such as soil washing and acid leaching, Prof Lam said, adding that these approaches carry the risk of negatively impacting soil health and exposing humans or animals to heavy metals.

The team is also working on recovering metals and metalloids from discarded plants to contribute to the circular economy, Prof Lam said.

Globally, phytoremediation has been used in countries such as the United States, Ukraine, and Zambia.

In 1996, for example, wild grasses were used to clean up radioactive waste near the Chernobyl power plant in Ukraine.

Prof Tan said that although the method has existed for decades, overseas studies tend to include foreign plants, some of which may not survive in Singapore's climate.

Through a field study with a total of 46 tropical plant species tested with soil from natural parks and industrial areas, the team identified 12 plants, including one aquatic species.

These include cow grass (Axonopus compressus), a grass native to South America that is often seen in gardens and parks. It has been found to have the potential to enrich multiple elements including cadmium and antimony.

However, the method can take anywhere from months to half a year depending on the extent of the pollution, Prof Tan said.

To improve plant growth and the uptake of pollutants, the team is currently testing the incorporation of inorganic particles into these plants.

In the coming months, the public who want to use the plants to clean the soil can also look forward to a picture guide released by the research team.