Treating lunar soil to create fertilizer for growing plants on the moon

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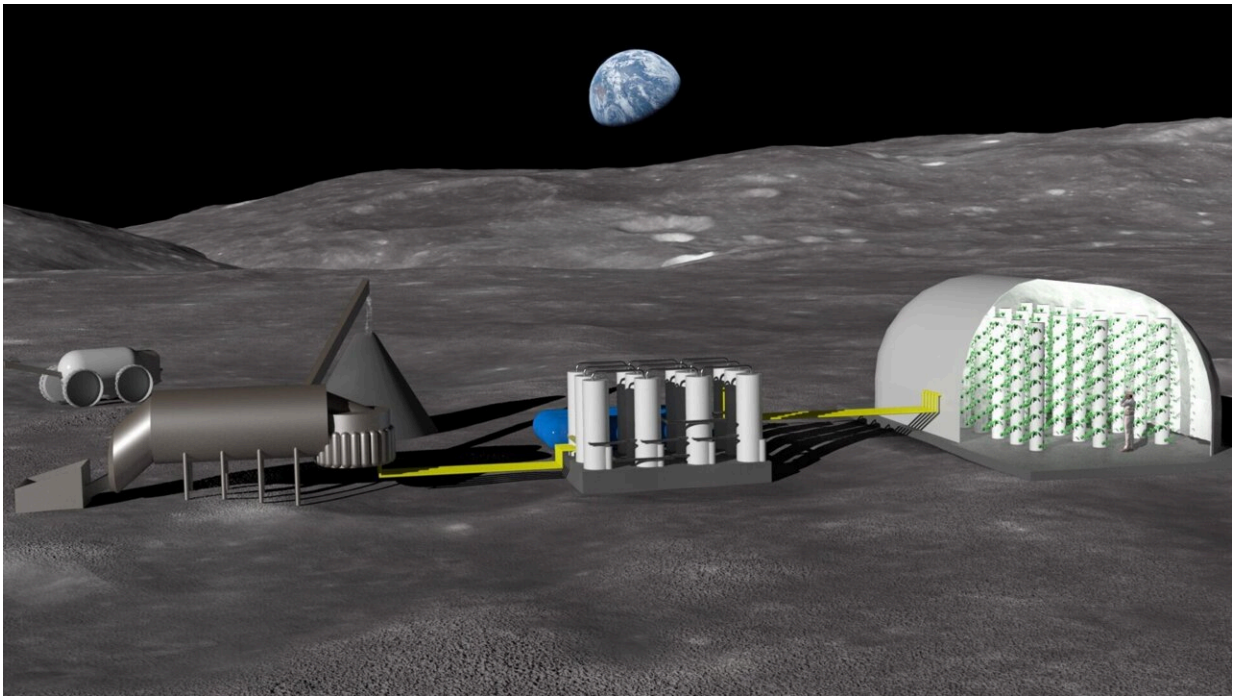

Credit: Solsys Mining

Sooner or later, settlers on the moon will have to become farmers. A new ESA Discovery project led by Norway's Solsys Mining is looking into the treatment of lunar soil to create fertilizer for growing plants.

The good news is that analysis of lunar samples returned to Earth in the past by moonwalkers and robots shows sufficient essential minerals are

available for plant growth, apart from nitrogen compounds. The bad news is that lunar soil (or "regolith") compacts in the presence of water, creating problems for plant germination and root growth.

Hydroponic farming therefore offers a practical alternative; this type of agriculture involves feeding plant roots directly with nutrient-rich water, without the need for soil. The potential is still there however to put lunar regolith to work, on the basis of "in-situ resource utilization"—or living off the land.

The "Enabling Lunar In-Situ Agriculture by Producing Fertilizer from Beneficiated Regolith" project, led by Solsys Mining with Norway's Geotechnical Institute (NGI) and Centre for Interdisciplinary Research in Space (CIRiS), involves studying a combination of mechanical, chemical and biological processes to extract mineral nutrients from the regolith. Valuable elements might need concentrating before use, while undesirable ones would be removed.

The left of the artist's impression seen above shows a mechanical sorting area for the regolith, passing through to the central module for more advanced processing, such as chemical leaching. Finally extracted nutrients would be dissolved in water to be pumped to the hydroponic garden, seen to the right.

"This work is essential for future long-term lunar exploration," comments ESA materials and processes engineer Malgorzata Holynska. "Achieving a sustainable presence on the moon will involve using local resources and gaining access to nutrients present in lunar regolith with the potential to help cultivate plants. The current study represents a proof of principle using available lunar regolith simulants, opening the way to more detailed research in future."

The Solsys Mining team is optimistic, having already cultivated beans

using simulated lunar highland regolith as a nutrient source.

Provided by European Space Agency

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