Cost-Effective Method for Reclamation of Arid & Semi-Arid Lands

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Description of Technology

Arid and semi-arid regions make up a large percentage of the Earth’s land by area. Generally, the quality of the soil and lack of available water resources makes plant growth difficult in these regions. These challenges are exacerbated when these lands are intentionally disturbed or impacted by natural causes. This recently developed low-cost reclamation method addresses the soil quality and water concerns by greatly reducing evaporation (up to 85%), reducing percolation, and reducing salt contents in the plant or vegetation zone. The new method has been shown to improve overall soil quality, reduce soil erosion, and accelerate the generation or re-generation of vegetation.

The present method uses two capillary barriers of sand or other material located above and below existing soil inside a trench or pit. The depressions in the soil capture and retain water during non-precipitation times due to the strong matric forces of the soil and the upper unsaturated barrier reducing solar radiation and evaporation. With the inability of water to move up or down, water loss is significantly reduced and water resources become more available for vegetation. During precipitation events, the low water holding capacity of sand readily releases water into the underlying soil, which also flushes salts and other minerals through the barrier. These events then leave the soil less saline, which promotes greater growth of vegetation.

The capillary barriers can be composed of a variety of materials including, coarse or fine sand, silt, or gravel. The method also uses native soils and sands already found or located near the lands needing reclamation, or uses soils that are existing (such as disturbed or stockpiled soils), to improve water retention and to reduce salt content. This method does not require any engineered soils that are designed or manufactured to replicate native soils.

Applications

The method of the present invention is of particular value to the oil and gas industries working in arid or semi-arid conditions where reclamation efforts post-drilling can be costly and challenging. This method uses low-cost, readily available materials to greatly increase the success of reclamation and recovery efforts. The method of the present invention can be applied to any land or region where water resources are limited, with particular value in arid and semi-arid regions having greater than normal salinity.

Features & Benefits

- Improved soil quality
- Reduction in soil erosion
- Improved water availability to plants
- Cost-effective
- Use of existing soils and sands
- Promotes greater growth of vegetation in arid & semi-arid lands

Marketing Opportunities

With gas and oil companies being required by the government to improve and reclaim lands after operations, the present invention proposes a cost-effective method for improved vegetation growth in arid & semi-arid lands. Existing reclamation methods require costly engineered soils and land preparation.