



Design and Development of a Hollow-Stem Auger Soil Corer with Basket Core Catcher for Undisturbed Sampling

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Soil core sampling is widely used in environmental, agricultural, and geotechnical studies to obtain intact soil profiles for reliable analysis of physical, chemical, and biological properties. However, conventional sampling methods often lead to sample disturbance and loss during extraction, limiting data quality in field investigations. This study presents the design and development of a manually operated soil corer based on a hollow-stem auger soil corer, equipped with a basket-type core catcher to improve sample recovery and integrity. The proposed system is designed to collect soil cores with diameters ranging from 50 mm to 58 mm and sampling depths between 0.5 m and 1.0 m, making it suitable for applications of blue carbon ecosystem assessments and other shallow subsurface investigations. The hollow-stem auger enables efficient soil penetration while accommodating an inner sampling tube, thereby minimising disturbance during core retrieval. In addition, a basket-type core catcher is integrated at the base of the inner tube to securely retain the soil sample and prevent loss during extraction. The design material selection and structural optimization to enhance durability, portability, and ease of field operation. Compared to conventional sampling approaches, the developed system provides improved sample retention and operational efficiency under field conditions. As a future enhancement, the conceptual integration of a sensor-based monitoring system for real-time measurements of soil parameters such as pH, moisture content, temperature, and salinity is proposed. The overall design demonstrates a cost-effective and practical solution for improved soil sampling in field environments, contributing to accurate environmental monitoring and sustainable land management practices.

Keywords: *Soil corer, Hollow-stem auger, Sampling, Core catcher, Undisturbed soil profile*