The Pedosphere and its Dynamics

A Systems Approach to Soil Science

VOLUME 1:

Introduction To Soil Science and Soil Resources

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Preface

Soil is the biologically active, structured porous medium that has developed below the continental land surface on our planet. The pedosphere is the envelope of the Earth where soils occur and soil forming factors are active. This book is the first volume in the series, 'The Pedosphere and Its Dynamics: A Systems Approach to Soil Science' because I wanted to show how the soil is connected to the four spheres (lithosphere, atmosphere, biosphere and hydrosphere) from which it develops, and to other disciplines of Earth Systems Science.

The study of the connections and the interactions between the atmosphere, hydrosphere, biosphere, cryosphere, pedosphere, solid earth, and near space is emerging as the foundation for Earth System Science. Current issues dealing with global environmental change require an integration of knowledge across spatial and temporal scales and the convergence of disciplinary interests in Earth System Sciences. Soils are natural, three-dimensional bodies in the landscape and can be studied using a systems approach. Soils are also the foundation for life in terrestrial ecosystems and affect the energy budget, water exchange, nutrient cycling and ecosystem productivity. Therefore, they are worthy of study in their own right.

The advent of the internet has resulted in a revolution in teaching and learning. Learners, according to Elliott Massie (http://www.masie.com), expect: (1) choices in the format of learning; (2) more intensity (higher levels of engagement), simulation (immediate ability to practice with consequences) and collaboration (multi-learner and real-time access to expertise models); (3) material with excellent and relevant content; (4) coaching and mentoring; and (5) assessment.

In order to address the above expectations, our team has developed accompanying web sites which have server based interactivity in the form of questions and answers, tutorials and on line content. Our expertise lies in the integration of three spheres of knowledge (teaching methods, subject area expertise and information technology) and has been recognized on the University of Alberta Campus. The on-line text book provides content and interactivity for learning and exploring soil science and soil resources at an introductory level. The content is organized in 12 sections. Each subsection has three headings: definitions, concepts and applications. I have done this to ensure that the reader can master the terminology necessary to understand the major concepts being presented and apply these to solve problems. This approach also makes active use of the glossary. The web-based interactivity, and design of the mid-term tests and the final examination also follow the same design as the content. This is a very useful method to provide quick and precise feedback.

Developments of interactive web based material require human and network resources, skill, commitment, time, perseverance, cooperation, help, guidance, and opportunity. The challenge to teach between 250 to 300 students enrolled in Soils 210 at the University of Alberta and 30 students enrolled in the Soils course offered in the Environmental Resource Management Program of the Faculty of Extension, University of Alberta, has been a tremendous opportunity. Current technology is allowing our team to go beyond the classroom and disseminate the knowledge of soils to a global audience.

We have created these resources to: (1) raise the profile of the discipline of Soil Science; (2) show how Soil Science is or can be integrated with other disciplines in Earth System Science; (3) set a global educational standard which would aid in the evaluation and transfer of credits for Introductory Soil Science courses among different institutions around the world; (4) help instructors deliver Soil Science courses using a systems approach to address current issues in agriculture, forestry, ecology and environmental sciences; and (5) create a global awareness of the importance of Soil Science to humanity.

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Noorallah G. Juma
June 13, 1999

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The end of these two is never reached:
knowledge and understanding.

--Hazrat Ali