



## FROM THE EDITOR

From its inception, the Institute for Alternative Agriculture has regarded soil quality as a key issue related to the sustainability of agriculture. Development of evaluation criteria for soil quality can lead to enlightened policy-making, improved education programs, and farming practices designed to enhance our soil resources throughout the world. The papers in this special issue present some of the first conceptual perspectives on the nature and importance of soil quality. It is our hope that they will contribute to a new and vigorous discussion in what we view as an evolutionary process aimed at developing and refining our understanding of soil quality as an underlying foundation for agricultural sustainability.

The Institute commends the Rodale Institute for its foresight and leadership in initiating this dialog on the need to document changes in soil quality and soil resources on a global scale. The July 1991 conference, which was made possible largely through their support, coupled with the papers from that conference which appear here, are major steps in that direction.

This is the third time we have included two Journal numbers in a single issue. As before, the material included here greatly exceeded the Journal's normal length. In our view, publishing these papers in separate issues would have made it difficult to retain the sense of wholeness represented by the 10 papers that form this special issue.

We note that the additional research articles and commentaries found in these pages stand apart from this issue's emphasis on soil quality. Nonetheless, these analyses of additional aspects and issues of agricultural sustainability serve as reminders of the scope and complexity of this profoundly important subject.

Finally, we wish to thank Drs. James F. Parr and Robert I. Papendick for their outstanding leadership in making this special issue possible.

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Editor

# Soil quality—The key to a sustainable agriculture

Soil is the world's most vital component for food and fiber production: preservation of this critical natural resource is paramount for protecting the environment, and ensuring that current and future populations are healthy and well-fed. In many countries of the world, including the United States, soils are being degraded at an alarming rate by wind and water erosion, desertification, and salinization resulting from misuse and improper farming practices. Often the topsoil is lost at a rate that far exceeds the capacity of natural processes to regenerate it. With soil degradation, there is a concomitant decline in soil quality, i.e., the soil's capacity to produce healthy and nutritious crops, resist erosion, and reduce the impact of environmental stresses on plants. Many decades of research have consistently shown that the best means of improving and restoring soil quality and productivity is by proper and regular additions of organic materials mainly through the use of crop rotations, cover crops, crop residues, animal manures, composts, and reduced tillage.

Presently, there is no scientifically acceptable method or procedure for quantifying and measuring the attributes of soil quality so that the effects of management practices could be evaluated on a field, watershed or regional scale. If properly characterized, soil quality should serve as an indicator of the soil's capacity to produce safe and nutritious food, to enhance human and animal health, and to overcome degradative processes. A quantitative assessment of soil quality could provide much needed information on the ade-

quacy of the world's soil resource base in relation to the food and fiber needs of a growing world population. It would also allow governments to formulate realistic food policies and to allocate scarce resources for programs that would conserve, protect and improve the quality of agricultural soils throughout the world.

The goal of agricultural sustainability relates directly to maintaining a healthy soil that is resilient to stresses imposed on it either by natural forces or farming practices. But how can soil quality and its changes due to management practices be evaluated so that steps can be recommended that will regenerate and sustain this vital resource? It was in response to this critical need that the Rodale Institute Research Center sponsored and convened a workshop on Assessment and Monitoring of Soil Quality during July 11-13, 1991, in Emmaus, Pennsylvania. The critical importance of nurturing the concept of soil quality and soil health was emphasized by John Haberern, President of the Rodale Institute, in his opening remarks.

The themes addressed by speakers representing national and international agencies, institutions and universities included the relevance of soil quality to agriculture and the environment, a global assessment of soil degradation, criteria for characterizing soil quality and its attributes, and prospects for developing useful soil quality indices.

In their opening paper, Parr et al. emphasize that the attributes of soil quality should not be limited to soil productivity and its rate