EXECUTIVE SUMMARY SOIL HEALTH—Importance, Assessment, and Management

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The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and Extension programs.

Soil health has become pivotal for sustainable land management, especially in the face of land degradation, soil erosion, and weather uncertainties that are affecting the performance and productivity of agroecosystems in New Mexico and elsewhere.

Soil health is the ability of the soil to provide sustainable ecosystem services, such as production of crops, support for animal production and other agricultural products, retention and filtration of water, habitat for diverse organisms, and recycling of nutrients.

There has been an increasing demand from stakeholders to know more about soil health, and this demand has led New Mexico State University to increase research and Extension efforts on soil health assessment and management.

Managing soil health relates to how we can change the physical, chemical, and biological attributes of the soil through practices that either maintain or enhance the soil's performance. The activities of the physical, chemical, and biological aspects of the soil are not mutually exclusive. They operate synergistically and interact in a very complex manner to deliver specific soil services and to enhance ecosystem functions, such as nutrient availability, erosion control, and water infiltration. Changing these different attributes of the soil demands an understanding of how soil functions and responds to different agricultural practices in croplands and rangelands. While some practices can improve soil health, others can be detrimental. Farmers and ranchers in New

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Mexico have requested information about various practices that are available for soil health improvement.

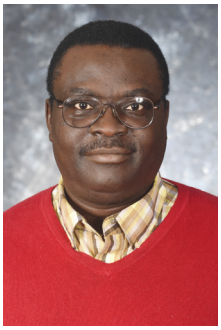
Before an effective soil health management strategy can be put in place, there must be a good quantitative assessment method that will help land users evaluate the current status and directional changes in soil health due to management. There is no single test that can assess soil health, but by using a combination of selected soil measurements based on research, it is possible to estimate the state of soil health. These selected measurements, known as soil health indicators, can vary with agroecosystems and the type of agriculture being practiced. For example, soil health indicators needed to evaluate soil health in a rangeland system are different from cropland systems. A good selection of soil health indicators often includes measurements that spread across the soil's physical, chemical, and biological attributes. Apart from quantitative soil health assessment, there are several qualitative methods that farmers and ranchers can use, such as the presence of earthworms in croplands and plant species diversity in rangelands.

There are many soil health options available for managing crop and rangelands, including crop rotation, cover cropping, diversifying production, adding organic amendments, integrating livestock, reducing soil disturbance, using diverse plant species, and practicing sustainable grazing. Since each farm and ranch is unique, the specific soil health practices that will deliver optimal performance will differ from place to place. Farmers and ranchers need to inform themselves and carefully plan an appropriate soil health management strategy that will work for their specific conditions. Lack of proper understanding of how to implement a specific soil health practice may lead to negative results. Therefore, land users and managers in New Mexico are encouraged to connect with their local NMSU Extension (https://aces.nmsu.edu/county/) or USDA Natural Resources Conservation Service office to seek information and guidance on soil health practices suitable for their lands.

Soil health assessment and management will continue to play a prominent role in agricultural production systems of arid and semi-arid agroecosystems. Healthy soil will be more resilient against fluctuations in growing conditions and will be able to cope with variations in abiotic factors such as drought and weather. Building and improving the soil health of New Mexico crop and rangelands will ensure continued productivity, enhance farmers' incomes, and promote food security.

Soil health improvement is a long-term strategy that requires education, thinking, planning, reading, discussion, and investment. Building soil health is not an easy task in the arid and semi-arid Southwest, especially in the face of droughts and other production challenges. With the resolution of the farming and ranching communities, it is possible to adopt soil health practices that will maintain and improve soil productivity, which will lead to the sustainability of the farming and ranching communities.

For a more detailed discussion of soil health and soil health management practices, refer to the companion to this summary, available at https://aces.nmsu.edu/pubs/_circulars/CR694B.pdf.



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