



SOILS:

WHERE FOOD BEGINS



Multistate Research Fund

IMPACTS

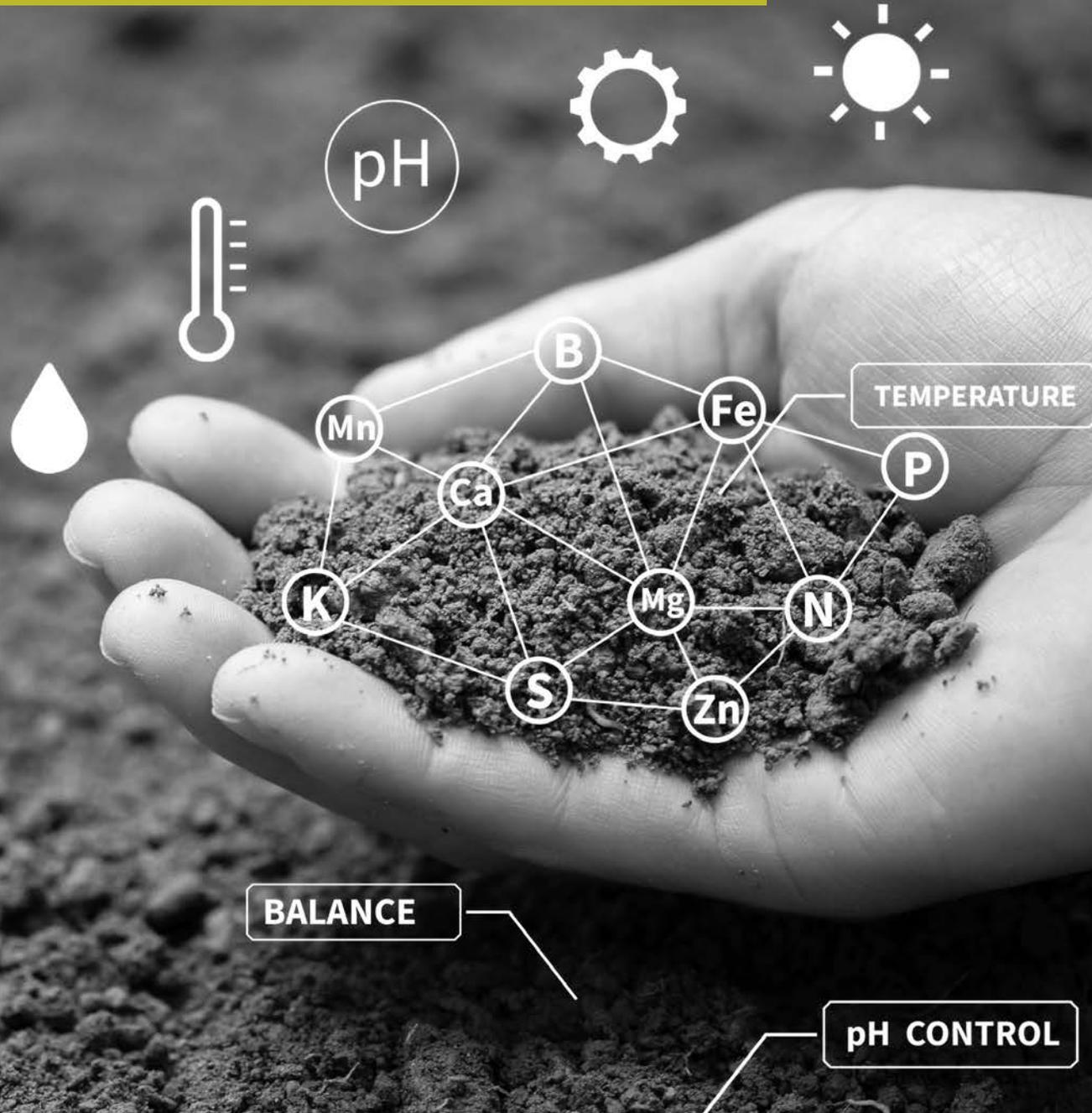
Human activities, including farming, can degrade soils. If not managed sustainably, soils will produce nutrient-deficient plants.



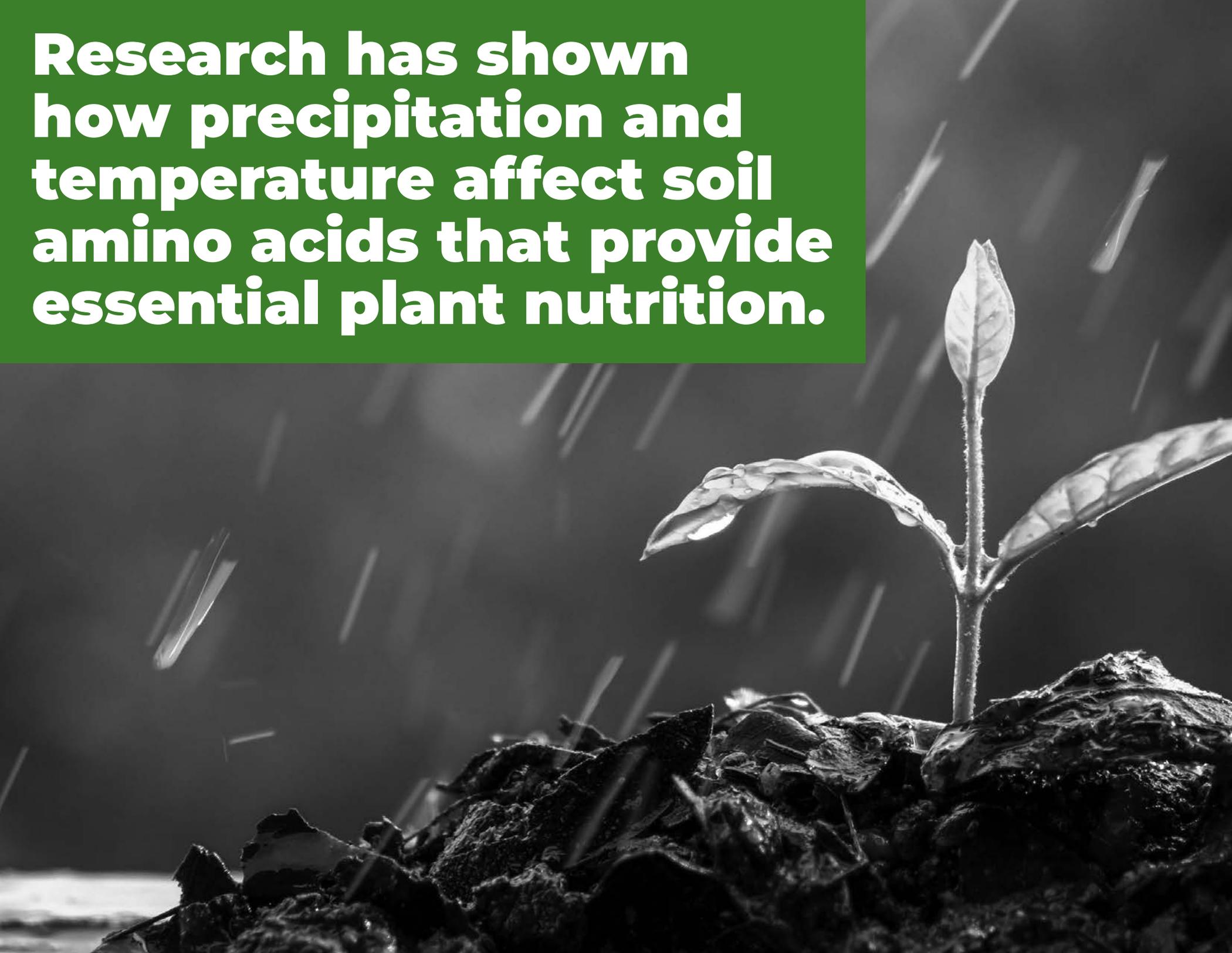


Multistate research projects are working to improve soil health.

Like us, soils and plants need nutrients to be healthy.



Research has shown how precipitation and temperature affect soil amino acids that provide essential plant nutrition.



**Scientists
also identified
fertilizer
formulations and
additives that
make nutrients
more available
to plants...**



...and found that adding solid wastes to soil can boost crop yields on farms with acidic, phosphorous-poor, or drought-stressed soils.



Other studies showed that cover crops can increase soil organic matter, suppress weeds, and reduce erosion.



Multistate projects have also led to improved sensors, models, and other tools for soil sampling and analysis.



For example, new DNA sequencing methods can identify the entire microbial community in a soil sample, which is critical for understanding soil health.



Some soil microbes are good for plants. Some are not. Each year, soil microbes cause over \$10 billion in crop losses in the U.S.





Scientists have developed cost-effective chemical products, biocontrol options, and cover crops to manage soilborne diseases.



Scientists also found that covering soil with plastic can raise the temperature and kill pathogens. Plus, it's affordable.



**Plants can absorb
pollutants from soils.**

Scientists showed that adding compost and treated sewage sludge to soils reduces plant uptake of lead and arsenic.



Similarly, biochar (charcoal produced from plant matter) can immobilize organic pollutants in soils, decreasing crop uptake.



Scientists also identified factors that influence levels of pharmaceutical residues in soils and crops.



Researchers have partnered with university Extension and government agencies to share their findings and tools widely.



This kind of collaborative research and extension is essential for healthy soils, healthy plants, and healthy people.





These projects are supported in part by the Hatch Multistate Research Fund, administered by the USDA National Institute of Food and Agriculture.



Each project is led by two or more land-grant universities along with other partners.



**To learn more about
the projects and the
universities involved:
*bit.ly/MRFSoilResearch***



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