

Building a 21st century soil information platform for US and world soils

A Collaborative Transformation

In 2012, a report from the US President's Council of Advisors in Science and Technology concluded that the US is not adequately prepared to face the agricultural challenges that lie ahead. One such major challenge is to adequately protect, properly manage and, where necessary and viable, restore one of our nation's most critical strategic assets and one of humanity's most fundamental assets; our land and soil resources. While reliable data are scarce, one global estimate suggests that more than 50% of land used for agriculture is "moderately to severely" degraded (UNCCD). And while the US can properly point to significant success in its public investments and programs that have supported farmers in maintaining and improving their overall land productivity over decades, there are growing signs of problems ahead especially if farmers face more variable and extreme conditions. One necessity in better preparing ourselves to face these emerging challenges that will also enable pro-active, targeted and cost-effective responses is to transform the land and soil resource information architecture and functionality that underpins our ability to characterize these resources in near real time.

In 2016, a consensus from land managers, soil scientists, government and technology communities began to focus on a concept for soil information that would better serve contemporary and future needs – both public and private - for improved land and soil resource information in ways that fully leverage the unparalleled technological opportunities to capture, curate, share, and explore more granular and dynamic data and knowledge resources in a learning, deeply interactive, open system. Recognizing that such a bold vision lies beyond the capability of any individual entity, including government, we hold as a core value that long-term success will only be achieved through the coordinated collaboration of motivated stakeholders.

While the global challenge is more daunting, the pathway to our vision for the US builds on the unique foundation established through the longstanding efforts of USDA (NRCS) and leverages the examples in Australia. The soil measurement, monitoring and open reporting systems established by NRCS have served the nation well. But there remains significant scope for

Making a Difference

An example of the changing information needs driving our call to action is the increasing exposure to risk in agricultural production, national food systems, and global food security triggered by the simultaneous and interacting effects of climate change, the environmental effects of agricultural intensification and extensification, and increasing water (and land) competition and scarcity. A critical strategic element in mitigating these effects is improved management and use of soils in crop and grazing lands. Healthy soils coupled with good management practices, such as ground cover and water control measures can; accumulate organic matter and nutrients – making soils both more fertile and more significant carbon sinks, reduce erosion, increase rainfall infiltration into the root zone that help reduce yield variability during dry spells as well as increase recharge to aquifers and reduce overland flow. While such measures are feasible, obtaining timely information on *where* systems are under *what* type of stress, and providing intelligence on what might be appropriate and cost-effective responses requires a suitably dynamic, scaled, and skilled soil and land resource information and knowledge management platform.

17 July 2017

modernization, more holistic perspectives on the current and future needs for land and soil resource information (e.g. across multiple scales and beyond the agricultural sector) and, through a more nimble, pluralistic, collaborative approach undertaken in learning systems that leverage professional and informally provided insights, we believe there may be enhanced capacity for aligning shifting information priorities with accessible capabilities. The National Weather Service was born when a need for synthesized, national weather data were recognized to be crucial for the future of our country. Likewise, we feel it is time to recognize the importance, complexity, dynamic nature of soils, and their importance in a century with so many crucial stresses converging beneath our feet.