EPA's Role in Advancing SoilVigor

"The soil is starving, naked and has a fever... this is not sustainable. Restoring the health of soil can play a key role in addressing many of our environmental problems." *Clay Pope, CSP,LLC/USDA Southern Plains Climate Hub.*

The fundamentally essential role of soil health vigor to agriculture is well understood. What are becoming increasingly valued are its environmental benefits (nutrient cycling, water infiltration & availability, filtering & buffering of pollutants and carbon sequestration). To advance soil healthvigor advances EPA's core mission to protect clean water, clean air and against the negative impacts of climate change.

Without addressing whether EPA has the power to do so, the FRRCC is emphatic that EPA should not regulate soil health. Nevertheless, it should promote soil health vigor not just to advance its mission but as a means to transform how the agency engages agriculture. Improving soil health is a powerful message for farmers because it will help them achieve higher yields and improve crop productivity. By adding organic matter to the soil, increasing the soil's biological activity and improving the soil structure, crops develop stronger root systems and use nutrients more efficiently. For EPA Transformation is necessary in order for EPA to be more effective, the Agency. To be effective it must successfully recruit the near universal participation of farmers, ranchers and producers in the sustained delivery of essential environmental services. Starting with an emphasis on improving soil health can change the dynamics of the dialogue. Only through a new paradigm of collaboration and partnership can it EPA hope to achieve clean water, clean air and resilience to climate change without

The conceptual epitome of soil health (the soil properties that influence productivity) is pristine undisturbed soil. Leaving all soil undisturbed does not accommodate the need to feed and clothe humanity at the scale the earth is currently populated. Tilling the soil changes its biogeochemistry by stimulating microorganisms to quickly metabolize the soil's organic matter for food. It can also change the soil's chemical, biological and physical properties. Yet there must be at least a modicum of soil health to sustain agriculture (life). We know that there is great room for improvement to universally achieve the minimum state of healthy soils. Much work is necessary to know what that state is and how to reach it.

Soil health is valuable to Agriculture.

- Nutrient Cycling (primarily affected by organic matter, microbial biomass, pH, topsoil depth)
- Water (infiltration & availability) (primarily affected by infiltration, aggregation, bulk density)
- Filtering & Buffering of pollutants (primarily affected by microbial biomass, organic matter, aggregation, bulk density)
- Physical stability & support (primarily affected by aggregation, organic matter)
- Habitat for biodiversity (primarily affected by microbial biomass)

Soil health is valuable to EPA. In 1993, the National Academy of Sciences concluded that conserving and enhancing soil quality is the fundamental first step to preventing water pollution. Since then, soil health has also been positively linked to clean air and the mitigation of climate change.

- Clean water (better nutrient cycling, pesticide and water retention, reduced runoff and leaching potential, reduced erosion potential, increased capacity to degrade pesticides)
- Clean air (improved carbon sequestration, reduced wind erosion)
- Mitigating the negative impacts of Climate Change through carbon sequestration (healthy soils also buffer against weather variability and can decrease field nitrogen losses (nitrous oxide is a potent greenhouse gas)

By leading with soil health EPA can

- Achieve environmental goals through the support of those who manage a colossal land base which can make monumental contributions good and bad to the environment.
- Improve its reputation with and overall effectiveness in working with the agricultural community by pursuing a non-regulatory, collaborative, supportive relationship.
- Adapt its institutional behaviors to better engage and engender greater acceptance of environmental values in a purely voluntary setting.

What is soil health?

Soil Health is "the continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals and humans." The soil properties that influence productivity are an overlapping combination of chemical (nutrient availability, pH and soil cation exchange capability (CEC), physical (density, infiltration, water retention and aggregation) and biological (organic matter, biological activity, roots and organisms) properties.

Principals of planning for soil health include:

- Keeping the soil Covered at all times
- Disturbing the soil as little as possible
- Incorporating as many different species of plants and animals as practical
- Keeping living roots in the soil as long as possible

What are the barriers to farmers adopting soil building practices?

1. Awareness – Do farmers know enough about Soil Health in order to appreciate its applicability to their operations?
2. Knowledge -- Do farmers know what to do in order to improve Soil Health?
    a. How to establish a cover crop across the diversity of growing zones, soils and cropping systems.
    b. How to operate/maintain equipment
    c. How to control weeds?
    d. How to irrigate crops?
3. Economics – Do they have
    a. The right technology at the right price?
        i. The right crops (e.g. perennial wheat)
        ii. The right equipment.
    b. The right markets?
        i. Market value for crops grown under a soil building system.
        ii. Compensation for environmental services?

c. The right regulatory framework that provides a safe harbor and flexibility while solutions are being developed.

4. Economics – Maintaining Soil Health is a never ending process. For many it represents a fundamental change in their management/decision making processes.
    a. How does the farmer pay for the necessary investments in no/low till equipment?
    b. How does a farmer keep the cash flowing while s/he learns how to do it right?
    c. How does a farmer deal with the variability in commodity markets so that s/he can stay in a soil building regime? What will be the support system to offset forces/factors that lead the operator astray? "Can't just make sense, it must make dollars and sense".
    d. How can it be sustained in the near, intermediate and long term?

How does EPA encourage soil building behaviors?

Build trust with the agricultural community.

- Establish collaborative relationship between EPA and farmers/ranchers/producers. (What is needed is to go to the grass roots and the people who really know what is happening on the ground level with agriculture.)
- EPA needs a stronger regional agricultural presence not for regulatory purposes but to collect and disseminate information. The non-agriculture community's lack of knowledge and accurate information about agriculture engenders conflict between farmers and the rest of community. EPA needs to understand the barriers, motivations and needs to both be profitable and contribute to environmental goals
- EPA must recognize and accommodate "local" conditions that will require tailored solution(s). There are few things that are economical and effective everywhere. There must be flexibility to develop and adapt solutions to achieve agreed upon outcomes.
- Pursue voluntary programs (incentives are important) I

Establish broad collaborative relationships with the purpose of advancing soil health with

- Sister agencies (USDA, NOAA)
- Agriculture Industry Organizations
- Environmental/Conservation Organizations
- Land Grant Universities, State and Community colleges

Examine its own programs to identify what is working (e.g. Regions) and opportunities to align policies in support soil health.

- Agriculture
- Air Quality
- Conventional and Alternative Energy Production
- Energy Efficiency and Global Climate Change
- Pollution Prevention
- Product Labeling
- Technology
- Transportation Programs
- Sustainable Materials Management
- Water quality, quantity, and efficiency in use
- EPA's Regional partnership programs

Resources

I would like to see a discussion of what is being done today – somewhat like the following short discussion (I need some MidWest assistance here):):

Soil health/Vigor is very much on the minds of America's farmers. There is increased interest in farming techniques that support organic matter retention, cover crops, erosion control and other techniques of soil protection. A good example is the rapidly growing employment of no-till and limited-till farming techniques. The moldboard plow that first broke the prairie sod has pretty much been relegated to yard art status.