

Societal support for the outcome of soil health

by Ralph C. Martin

There are compelling reasons to protect water quality and to adjust our lives in order to have enough water in the future. In addition, clean air is crucial for our health and well-being. Both water and air are accepted as public goods. All citizens, including farmers, want clean air and water, now and in the future.

Healthy soil is also a fundamental environmental attribute. Soil organic matter when at high levels along with soil aggregate stability and active microbial populations can moderate drought by holding water for plant roots to exploit. Similarly, soil organic matter and associated soil characteristics improve infiltration of water into soil when there is excess precipitation. Climate change is expected to be about increased volatility with too much or too little water, or temperatures that are too high or too low, at vulnerable stages of crop growth.

When considering soil health, conversation often turns to best management practices. There is increasing evidence that animal manures and other organic amendments improve soil health. Forages and cover crops as well as complex rotations also have positive effects. No-till practices can conserve soil organic matter and result in improved soil aggregate stability. Crop residues are highly beneficial.

Sometimes payments for environmental goods and services are proposed as a reasonable way for society to reward farmers for practices that enhance soil health. There has been some success with this system in Europe and New Zealand. Farmers appreciate compensation for practices which may require cash costs which are higher than economic returns, at least initially.

The difficulty with payments for environmental goods and services is that every farmer employs a different combination of practices depending on soil type, climate, topography, markets etc. It may be appropriate to pay farmers for planting cover crops but the potential soil benefit may be trumped by too much tillage, removal of crop residues and lack of animal manure. To get closer to the desired outcome of soil health by paying for a full suite of practices can be costly to government. It is also tricky to fairly compensate each farmer for the particular combination of practices, he or she chooses, based on the particular situation of the farm. Furthermore, if not assessing outcomes, i.e.

improved soil organic matter levels, aggregate stability and microbial populations, then how do we know that public money has been well spent?

Let's suppose that society might accept that soil organic matter and associated soil health characteristics constitute a public good. It then becomes necessary to be able to measure this outcome of soil health in a cost effective, rapid and representative way on each complex field.

Most urban folks don't really care how farmers integrate their cropping practices they understand it is important for soil health to be maintained or improved for food security and ecological benefits, today and in future generations. Politicians and companies with emphasis on corporate social responsibility are catching on too. However, farmers, in my experience, don't respond with enthusiasm to directives from designates of society about management practices.

What if soil health indicators, such as soil organic matter, could be measured cost effectively, rapidly and representatively on each field, and in fact within each management zone and with the accuracy of current measurements from very specific soil cores? If, after more research in precision agriculture, we could confidently assess soil organic matter levels as noted above, every five years, and adjust for soil types, then it might be sensible to incentivize farmers. The incentives could include variable land tax rates or variable crop insurance premiums, according to the outcome of actual soil organic matter levels. Each farmer could then attenuate practices according to this outcome and their decisions based on other specific farm, field and management zone characteristics.

Farmers rightly exercise management choices in order to make a decent living and care for their land. It is in everyone's interest for them to do so now and in the future. Healthy soil, as the basis for healthy food in sufficient amounts, is an inclusive goal, warranting societal support.

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