Development of a Soil Health Index

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My good friends, thank you for inviting me to share with you my thoughts and philosophies for a better healthier world - a world where people of all nations have regular access to more nutritious food at less cost and to the well-being of our planet. A world where the quality of the environment is not sacrificed, where all living things are given the respect to which they are entitled - a world where our children and all who follow will benefit from the work we have begun together. A world of healthy people.

Many may think these lofty ideals are impractical, impossible to attain. They may scoff at such idealism. But revolutions are almost always led by idealists, a rare few who see the world from a different vantage point, a select few who dare to dream, who are not afraid to think big thoughts. I'm talking about the men and women who think not only decades ahead, but centuries ahead.

Three of those people, I believe, were J.I. Rodale (founder of Rodale Press), Robert Rodale (his son and late President of Rodale Press), and Mokichi Okada (founder of Sekai Kyusei Kyo). Back in 1942, J.I. Rodale made a simple, but profound prediction of an impending revolution. A gentle revolution to be sure. But one that would shake the very roots and foundations of our agricultural research and education system. One that would tie farmers and farming directly into our health care system.

What he foresaw was a soil-care revolution. A time when our agriculture leaders, scientists, farmers, and yes even consumers and policymakers would finally wake up to the fact that for far too long we've been treating our soils like din. A time when agricultural research would rivet in on a new baseline - soil quality - in balance with the priority now given to production and higher yields.

J.I. Rodale was right. The change in thinking and emphasis away from production at all costs is already underway. In a paper given this past March at an Agriculture Research Institute symposium entitled "The U.S. Agriculture Research System Under Challenge," Robert Weaver of Pennsylvania State University said this, "demands for agriculture research expanded from those for enhancement of farm productivity and profitability to improving the external impacts of agriculture and food system production and marketing activities." The external effects he was referring to were: water and air quality, food quality and safety, nutritional quality and variety, and waste from food production activities.

In my estimation, the consumer is probably having the most to do with this changed direction. Consumers are beginning to think about the connection between agriculture and food quality. Especially the food safety angle as it pertains to pesticides. They are beginning to accept fruits, for example, with some blemishes. Knowing full well that produce grown with less pesticides and herbicides will probably be safer. They're not quite sure how it will affect their health. But they know its better. That's their perception and perception becomes reality.

But J.I. Rodale knew back in the late forties and Bob Rodale confirmed during his tenure at Rodale Press, that prevention of disease and enhanced personal health just didn't mean eating food with less or no pesticide residues. What the Rodales saw over the horizon was a willingness of the. agriculture community to go even one step further, i.e., to recognize that the health of the people and the health of the soil were closely intertwined. From the moment people first scratched the earth and sowed seeds, they've had the power to improve their food, and by extension, their health, by what they did or did not do to the soil.

But unfortunately, in my estimation, the soil-care revolution is still in the starting blocks. Granted, we are taking small, but significant steps toward finally recognizing that the health of the soil is just as important as the health of our air and water. Building soil fertility and recognizing the need to monitor the health of the world's soils over time is now on the agendas of various private and public institutions.

Much credit for this must go to USDA's Agricultural Research Service (ARS), the Rodale Institute, the World Sustainable Agriculture Association and other non-governmental organizations (NGO's), USDA's National Soil Tilth Laboratory, some land grant universities, and a few forward-thinking private foundations. All have come to the same conclusion: we truly have no idea what kind of shape the world's soils are in. We've been driving along in a car without a fuel gauge for far too many years now. We may have three-quarters of a tank left, or we may well be running on empty. We simply have no idea.

Sustainable agriculture recognizes clearly that the soil has been the neglected child of the modern agricultural age. There is a growing consensus that the economic well being of the USA and other countries depends on the health of the soil.

A worldwide study, conducted by the World Resources Institute (WRI), in association with the United Nations Environment Programme (UNEP) and the International Soil Reference and Information Center (ISRIC) in the Netherlands, found that 10.5 percent of the planet's most productive soils have been seriously damaged by human activities since World War II. The study claims that 22 million acres have been irreparably destroyed by overgrazing, deforestation and unsustainable agriculture practices. And another billion acres are considered as severely degraded, but could probably be reclaimed and restored through immediate remedial actions.

During the last century, the world has lost arable land more quickly than at any other time in history. And this has happened when the world population expanded exponentially to figures almost beyond imagination. So at a time when the demand for food is greater than ever, and continues to grow by the hour, we are destroying the food base more quickly than ever. This is a short formula for disaster of unequal scale. We must stop the loss of soil at once. Today! Now!

In less than 5 years, I predict we will have a Soil Health Index, a report card documenting the gains and losses in soil quality worldwide. Such an index will help target more focused agricultural research well into the 2lst century.

Through the implementation of a worldwide soil monitoring system, scientists and researchers will be able to pinpoint those land areas of the globe that are most in jeopardy - an early warning system, if you will. Armed with such knowledge, governments and policy leaders can take the steps necessary to ameliorate soil degradation before damages become permanent. Precious funding can be spent more wisely on targeted areas with more positive, immediate results. In the end, we can help depressed or impoverished areas of the world stave off starvation, even turn it around.

I truly believe this is possible. The earth has proven itself forgiving time and time again. Even seriously degraded land can regenerate itself. I know of fields so mishandled that little would grow on them, not even the most noxious weeds. But, once abandoned by the farmer and turned over to nature, these fields have returned to health, they have regenerated, proof of soil's ability to bounce back, to become fertile and productive once again. What we want to do is stop the decline before it becomes entrenched, to give nature a helping hand, so that she doesn't have to work so hard to rectify mankind's mistakes.

Another point that I must stress today is this: There are areas of the world where soil is improving. Organic and nature farming are having a positive impact in the USA, Europe, and in parts of Asia. These positive changes need to be documented so that the areas of improvement may become models, examples of farming in harmony with nature, examples of positive farming. A workable soil index will go a long way toward accomplishing that goal.

We're not the first to recognize the utility of a soil health index. The earliest version of such an index goes back to the 1700's - basically used in order to tax farmland based on its potential productivity.

More recently beginning in 1989, the University of Wisconsin has been assembling a soil health report card for farmers. And the USDA-Agricultural Research Service's National Soil Tilth Laboratory in Ames, Iowa, has been developing a soil tilth index. Some very creative thinking and work to develop a soil quality index is being done by USDA-ARS scientists Dr. Robert Papendick and Dr. Jeffrey Smith at Washington State University in Pullman, Washington.

However, there has been relatively little work to date that attempts to link together these studies of various soil properties, especially on how soil health affects food quality and human health. In July 1991 the Rodale Institute in cooperation with USDA-ARS convened a workshop entitled: "Assessment and Monitoring of Soil Quality." About 30 participants from the USA, Canada, Europe, and the former USSR discussed the feasibility of developing a soil quality index. By the end of the workshop, it was the consensus of the group, even the skeptics, that creating a soil quality index is a feasible and worthwhile activity to pursue. It was also decided that soil health should not be limited to measures of soil productivity, but should also encompass the areas of environmental quality, human and animal health, and food safety and quality.

I remember Bob Papendick sitting in my living room discussing the next day's activities and saying, "John, we really missed the boat on something." "My God," I said, "where did we go wrong." Bob kind of sheepishly said "One of the parameters of soil health has to be human nutrition." I breathed a sigh of relief. What Bob was talking about was the relationship between soil health and human health, something that J.I. Rodale and Bob Rodale talked about over the 30 plus years that I've been with the Rodale organization. According to Bob Papendick, "More attention needs to be given to soil biological properties because of their obvious importance, but not-so-well understood relationships, to plant health and food quality."

So in developing the soil health index, special attention must be given to a previously over-looked indicator of soil health-animal and human nutrition. To me, the real reason we should all be concerned about the deteriorating health of the world's soils and measuring their health over time is directly related to the health care cost crisis staring us in the face today. Fifty years ago, J.I. Rodale predicted such a crisis and said that we could head it off by preventing diseases rather than treating them. His prevention solution: improve the quality of foods people eat by improving the health of the soils in which they are grown. Healthy soils produce healthy food which in turn produces healthy people!

Actually in the early 1930's, the USDA came close to reaching that same conclusion. Close, but not close enough in terms of linking soil health and human health. USDA established a new research laboratory designated as the U.S. Plant, Soil and Nutrition Laboratory at Cornell University in Ithaca, New York. It's mission was to investigate the nutritional linkages between soils, plants, and animals. Unfortunately not much has been heard from that laboratory since then - at least not in terms of the soil-human health connection. One person who has done much to research the connection between nutrient content and storage of food from conventionally- and organically farmed soils is ARS researcher Dr. Sharon Hornick. She is certainly a visionary in this area and much credit must go to her forward thinking and pioneering spirit.

However, I think the farmers will, over the next few years, take over where the Cornell laboratory left off. To them, sustainable agriculture means more than just maintaining nutrient levels. In the words of North Dakota farmer and sustainable agriculture leader Fred Kirschenmann, "from a sustainable perspective, the condition of the soil is at least as important as its fertility. This means being concerned not just with what is missing from the soil, but also what is wrong with it, and what can be done to correct it." That's why we need a soil health index.

What Bob Rodale said about farmers many years ago is becoming evident today, i.e., that farmers worldwide are the ultimate source of the food which all people need to survive and, hopefully, to thrive. Increasingly, people in both developed and developing countries are insisting that the food grown by farmers be safe and of good quality, and provide the essential nutrition and dietary requirements (e.g., vitamins, minerals, growth factors, and essential amino acids) to ensure a high level of human health and longevity. Thus, what farmers do on their lands affects the health and quality of life for all of us.

We at the Rodale Institute believe that the time has come to mount a concerted effort to elucidate the relationships and interactions between soil health, plant health and human health. By working cooperatively with the USDA, land-grant universities, non-governmental organizations, and international agriculture research agencies, the Rodale Institute can provide the leadership to

strengthen the case that healthy food grown in healthy soils will be beneficial to the health and well being of this and future generations. We are firmly committed to this goal.
But for now, we need to give farmers a new measuring tool, a soil health index, for example, that will help them gauge their management techniques so that both soil health and food production will be their top priorities. Granted there are many links on the “seeds to supper” chain which could impact on the nutritional quality of food. But we need to start at the farm gate - and the starting point has to be quality soil.