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ENVIRONMENTALLY SOUND FARMING PRACTICES

Tom Frantzen

President, Practical Farmers of Iowa

I was asked to give my perspective on environmentally sound farming practices. If the natural resources in our nation were under sound, long term management, this topic would be irrelevant. Any society that expects to last must manage its resources in ecological harmony. How else could the production of food and fiber be assured for future generations? Yet, our country continues to this day to care for precious natural resources in a sordid fashion. Why does this continue? How long can it last? These troubling questions expose our nations failing in developing good stewardship.

The sustainable agriculture movement, by its very nature, understands the importance of environmentally sound farming practices. I have been involved in this movement since 1983.

If we improve our understanding of the forces that shape our natural world, we can better understand what types of agricultural practices can be labeled sound. What are the forces? According to Allan Savory in *Holistic Resource Management* (1988 Island Press), our ecosystem has evolved through the effects of water cycle, mineral cycle, energy flow from the sun, and a community development process known as succession. These forces are not difficult to understand. An effective water cycle makes maximum use of rainfall. Runoff is held to a minimum, causing no erosion, and is clear of sediment. A 4" rain with 3" of runoff provides just 1" of effective

soil penetrating precipitation. Soil cover and soil condition are the key elements in making rainfall effective.

The mineral cycle is another fundamental force developing our world of natural resources. A good mineral cycle thrives in a biologically active soil. A diversity of plant rooting systems, animals, and microorganisms work in harmony to constantly cycle and recycle minerals. The mineral cycle provides the long term elements necessary to sustain life. Soil erosion and agricultural cropping systems that require increasing amounts of outside inputs are examples of poor mineral cycles. Consolidation of livestock farms often result in constant livestock numbers, yet their manure waste usually becomes an environmental liability. Soil that could utilize manure has none while other fields are overlooked. This practice, widespread today, is in violation of good mineral cycling.

The world of nature evolved with using solar power as its energy source. We must always remember that fossil fuels, although they are really solar energy stored by plants, are inedible and not a renewable source of energy. As we eventually exhaust our supplies of these fuels, our agricultural practices will be drastically altered. Agriculture must learn to harvest the sun's energy. It cannot continue to be a mining operation powered by fossil fuel reserves.

The successional process is really what happens to living beings of all forms in the presence of water and minerals, with the assistance of energy from the sun. Communities of species develop (evolve) with incredibly complex interrelationships within each other. Everything is related to everything else. Nothing lives in a vacuum. Succession can be viewed as a natural process, moving communities toward a state of complexity and stability. We can view these relationships in a prairie or a forest. There is much activity, but a condition of stability and complexity is the direction of the living community.

As we develop our understanding of these forces, a better view of environmentally sound farming practices come into focus. We can now test agricultural practices as to their effect on the natural world. For example, what is the effect of plowing grasslands and planting endless rows of monocrops? The plowing destroys soil cover exposing the land to wind and water erosion. The monocropping system further damages the land by upsetting the mineral cycle and reducing plant and animal species diversity. Could we abate this destructiveness by using no-till, and rely on chemical pesticides to control weeds and insects? No-till does leave the soil surface covered and does reduce wind and water erosion. But, it fails to deal with the true cause of the problem. Any monocropping system upsets complex balances and reduces the effectiveness of the water and mineral cycles. The reliance upon petrochemicals to control pests and provide nutrients further upsets these balances by destroying soil microorganisms and inhibiting processes such as the conversion of nitrogen from the air to a form that plants need. No-till has the potential of harming rural communities by allowing farmers to expand the acres they farm, driving other farmers off the land. Most of the conversion from grassland to row crop production has already taken place in this country. Can we farm with techniques that would not endanger the cycles and processes mentioned earlier?

I am currently president of the Practical Farmers of Iowa. This private, not for profit organization exists to research the issue of sustainable agriculture and educate the public on our discoveries. We are learning to judge the merit of our practices, at least in part, by their ability to coincide with good water and mineral cycling, efficient use of the sun's energy, and the existence of stable and complex communities of plants, animals, microorganisms, and, yes, people!

One of the founders of our organization, Dick Thompson, has received national recognition for his development of ridge tillage row crop farming without herbicides. Ridge tillage leaves the soil covered to prevent erosion, improves water infiltration (Dr. D. Karlan, 1992, National Soil Tilth Laboratory). This system utilizes livestock manure easily and allows for diversity of crop species. Dick Thompson has done extensive work on incorporating cover crops with ridge till. This work has been very successful. (Thompson Annual Report, 1991). Ridge till without herbicides and with the use of cover crops appears to benefit the water and mineral cycles. It helps harvest the sun's energy in an efficient manner. The community process of living organisms should move to a high level under this type of management.

In cooperation with researchers from Iowa State University, our organization pioneered the concept of strip intercropping. This cropping system, often done with ridge tillage, captures sunlight in a manner that boosts corn and small grain yields (Dr. R. Cruse, 1990, Leopold Proceedings). The water and mineral cycles are also benefited (Dr. R. Cruse, 1992, personal communication). Plant and animal diversity is also increased (Heidi Stallman, animal ecology grad student, 1992, personal communication). Practical Farmers of Iowa have 12 farmer cooperators experimenting with this new farming concept since 1989. Our results in 1992 are the best we have ever observed, (P. Mugge, cooperator, 1992, personal communication). Strip intercropping, judged by the ecological cycles and processes detailed earlier, promises to be an important development in our search for a sustainable agriculture.

Practical Farmers of Iowa is actively promoting a concept of intensive grazing management known as planned grazing. The pioneering work here was done by Andre Voisin in France, in the 1950's. The development and implementation of this tool has largely been done by Allan Savory and his associates

at the Center for Holistic Resource Management, Albuquerque, New Mexico.

Planned grazing is a natural tool. When properly used, it enhances the water and mineral cycles, captures sunlight energy and aids the advancement of succession of plant, animal, and micro life communities. Our farmer cooperators are learning to use this tool to farm in an environmentally sound fashion and to make a profit, too. Planned grazing in conjunction with grass based seasonal dairy production could provide economic prosperity in many rural communities. The Practical Farmers of Iowa demonstrate many farming techniques. None of them have the potential to stabilize agriculture that planned grazing has.

Environmentally sound farming practices require a skilled and educated farm population. As we improve our understanding of the forces that shape our natural world, we must develop the skills to adopt our farming techniques to harmonize with those forces. Sustaining and educating our rural population lies at the center of this transition.