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Soil and Oil

Americans are perhaps tired of being reminded that annual oil imports have risen to 400 million metric tons per year, equivalent to 16 quads of energy, and costing \$36 billion. They do not hear as much about a counterflow of agricultural products, mostly grains and soybeans, that has increased to 100 million metric tons per year, valued at \$23 billion. These farm products represent a relatively small investment of 0.5 quad of fossil energy for machines, fuel, and fertilizers.

Thus, in large measure, the bounty of our farms supports and extends the profligacy of our energy consumption. At first sight, this trade-off between solar energy trapped in plants and the energy in nonrenewable petroleum resources may appear to be a profitable long-term arrangement.

But can the current levels of productivity in the corn, wheat, and soybean heartlands be sustained? In 1971, it was estimated that in the North Central United States, 67 percent of all cropland needed conservation treatment. Since then, highly erosive and sloping soils have been placed in production of export crops, replacing forage crops.

The seriousness of the erosion problem is further indicated by a more recent analysis showing that unrestricted land use would result in a national soil loss figure of 20 metric tons per hectare per year, twice as high as the maximum tolerable rate, according to expert opinion. This could imply that for each ton of grain going to Europe or Japan, we export several tons of topsoil to the Gulf of Mexico!

Soil is a crucial element in the farm production equation. How shall we live, if both soil and oil are depleted? Perhaps we need a negative severance tax on sediment—that is, payments for keeping soil in place. This idea was basic to the national soil conservation policy that has succeeded in breaking the back of the erosion problem, but not in reducing it to a tolerable level.* Meanwhile, the programs implementing the policy have been allowed to wither over the past two decades.

Ironically, this neglect is in part attributable to the phenomenal success of another national policy of even longer standing, namely federal-state cooperation in the use of public funds for farm production research, development, and demonstration.

Historical trends suggest that soil losses are not necessarily caused by high yields: good conservation and high productivity are compatible. But it is equally clear that some soils are being mined. The implication is that the freedom to use any land for any purpose is to be tempered with a judgment as to how the private and the common enduring interests are best served.

Who is responsible for this? Soil conservation practices often appear not to be good business over the short haul. We should not depend on ethically inspired voluntarism any more than we can in other conservation issues. The stewardship challenge is one for the nation and its institutions, to be met through a voluntary partnership based on material interests. But a mere revival of the old system and adequate funding of existing programs will not be sufficient.

Farm operations can have a significant environmental impact, and undue loss of soil is classified as a nonpoint pollution source. Granting blanket exemptions for farm operations or regimentation through permits and fines are nonsolutions. But much can be said for an amalgam of short-term risk sharing in the production and marketing of crops with long-term risk sharing in the conservation of soils, as long as participation is voluntary.

Such a policy may not be popular. But it is fair to ask whether protection against the vagaries of weather and markets should be extended without assured conservation of the soil resource. Without such a provision, our now profitable solar energy enterprise may well decline through a bad trade of soil for oil.—CORNELIUS H. M. VAN BAVEL, *Department of Soil and Crop Sciences, Texas A & M University, College Station 77843*

*See L. J. Carter, *Science*, 22 April 1977, page 409.