

Robbing the Soil of Its Future

Conservationists exchange letters

by John H. Tanton

Publisher of The Social Contract John Tanton engaged Dr. Norman Borlaug and Dr. David Pimentel in a conversation about resource depletion as follows:

April 2, 2003

Dr. Norman E. Borlaug
Distinguished Professor of International Agriculture
Soil & Crop Sciences
217 Heep Center
2474 Texas A&M University
College Station, TX 77843-2474

Dear Dr. Borlaug:

I'm a farm boy turned physician, and longtime admirer of your work. In recent years, I have been trying to school myself up on energy questions, and have noted with interest proposals that part of our future energy should come from biomass.

This conflicts with my boyhood experience on the farm of trying to add as much organic matter to the soil as possible, ... and not cart it away. We planted rye after the navy beans came off for the winter cover and a spring green manure crop. The small grains were interplanted with sweet clover or alfalfa for pasture, or a green manure crop. We put the manure from farm animals back on the fields.

As an adult gardener, I have had the same experience. I have hauled hundreds if not thousands of bags of grass clippings and leaves into my garden, thereby markedly improving the tilth, erosion resistance, and water-retaining ability of the soil. Of course, what I have also been doing is hauling in carbon to act as an

John H. Tanton, M.D., publisher of The Social Contract, is a retired ophthalmologist living in Petoskey, Michigan.

energy source for the myriad organisms necessary to soil health.

My understanding of minimum tillage practices is that they have in part the same goals: retention of organic matter, especially on the surface, in part to retard wind and water erosion.

But now we are seeing proposals for hauling off not just the corn grain to the alcohol fermentation plant, but also the cobs, husks and stalks to serve as fuel for power plants. Basically the roots are all that would be left. I'm sure that for some crops in some situations, there is

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surplus organic matter that could be harvested. I would guess that tropical soils might be even less suitable than temperate ones for a regime of hauling away "surplus" organic matter.

I enclose a paper by James Woolsey in which I have highlighted references to this practice. It shows the extent to which it is anticipated.¹

If you have an opinion of or position on this practice, and an extent to which it is healthy for the soil, I would very much like to learn it. I would encourage you, as the best-known agriculturist in the world today, to let your opinion be known.

Thank you for your consideration.

Cordially,

JOHN H. TANTON M.D.

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Dr. Borlaug Replies

August 12, 2003

Dr. John H. Tanton
445 East Mitchell St
Petoskey, MI 49770-2623

Dear Dr. Tanton:

Forgive me for the long delay in replying to your letter of April 2nd, 2003. I will briefly try to answer the questions which you posed in your letter.

The first four paragraphs of your letter, you are entirely right in the procedures which you followed as a young man growing up on a Michigan farm. Those procedures are still fundamentally correct today and the best way to reduce erosion, add organic matter to the soil and by so doing add nutrients for the next or future crops. The procedures you used for inter-planting small grains with sweet clover, alfalfa or clovers for either pasture or green manure are still valid. The use of animal manure that is available within the farm is still recommended for use. However, more and more of the Mid-western farms do not have livestock, so the manure from livestock is very often at the present not available for use in cropping systems. Of course, there has been a tremendous increase in the use of chemical fertilizers, especially nitrogen and phosphorus, which have contributed to increasing the yield of our American agriculture tremendously.

The ideas by Mr. Woolsey of trying to reduce our consumption of fossil fuel by removing all of the crop residue and converting this does not make sense in the long run. I am of the firm belief that we must continue to use fossil fuel for our transport system, for our farm power, and also for generating electricity in general. Of course, in some countries the amount of energy, especially for electric power, from atomic reactors has increased dramatically. In the long run, I think there will be a gradual tendency to capture more of the sunlight and use it for power sources. This will be slow in coming, nevertheless.

One of the new developments of the last 15 years has been zero-tillage, or minimum-tillage. This involves for the most part leaving crops residue on the surface to protect the soil against erosion either from water or wind,

but at the same time over a period of the years adds organic matter to the soil just as you are doing in your garden. The one difference is that you are bringing much grass cuttings from neighbors' lawns and gardens and wisely adding it to your garden. By the addition of these large amounts of organic matter, you are not only increasing and improving tilth and water-holding capacity, but you are also, as the organic clippings or grass clippings decompose, adding nitrogen, phosphorus, potash and other plant nutrients.

This type of organic farming is appropriate and economically viable for family gardening, or for small farms close to an organic "niche" market that will pay a premium price for organically grown food. Organic

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farming, however, can play only a minor role in producing the food for the world's huge population that continues to grow at a frightening rate. In order to give you a feel for how this demand for food has grown, I need only to cite the change during my lifetime. When I was born in 1914, world population was about 1.6 billion people. Today, we are more than 6.2 billion and having 80 million more added every year. Unfortunately, most of that growth in population at the present time is occurring in developing nations which are already deficient in food production and therefore the problem in some of those countries is worsening, rather than improving.

I have seen in my nearly 60 years of foreign experience in agriculture a tremendous increase in food production in some of the food-deficit nations such as China, India, Pakistan, Indonesia, who have become self-sufficient in basic foods. Distribution of all of that food is far from perfect and therein lies one of the great difficulties. We must not only think of producing enough food, but also how to have it distributed so that it reaches the stomachs of many hungry people who are short of

purchasing power, either because of unemployment or underemployment.

I am glad to see that you as a medical doctor continue to have interest in the land and soil fertility, food production, human nutrition and environmental issues.

Sincerely,

NORMAN E. BORLAUG

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David Pimentel Comments

June 26, 2003

Dr. John H. Tanton, MD.

The Social Contract

445 E. Mitchell Street

Petoskey, MI 49770-2623

Dear Dr. Tanton:

Many thanks for your letter concerning energy questions and the interview with Jim Woolsey. Incidentally, I just substituted for Jim Woolsey at a conference on renewable energy at the National Defense University. I note that we agree that ethanol is a loser, but I do not agree with JW concerning the use of crop residues.

Before I comment about the problems with using crop residues that you identified, I am sending you under separate cover a copy of our paper on ethanol that is due to appear in *Natural Resources Research* next month.²

Like you, I have been adding leaves to my garden and also using the leaves as mulch. I get two large (2.5 ton) truckloads of leaves dumped on my lawn each year. The Village of Cayuga Heights collects these leaves from people who place them in rows along the front of their lots. I then use them to add carbon and nutrients to my soil. After 25 years of applying leaves to my garden, my soil is a beautiful black color and can be worked with only a hoe without tillage.

It would be a disaster to remove crop residues from our agricultural land. The average soil erosion on cropland in the U.S. is about 20 t/ha/yr, which is about 10 times the soil sustainability rate. If crop residues were removed as proposed by JW, erosion rates would increase more than ten-fold. Incidentally, Dr. Troeh at Iowa State University reports that about \$20 billion in fertilizer nutrients are lost each year due to soil erosion.

Few people appreciate that it takes 500 years to replace 1 inch of soil under agricultural conditions and we

need a minimum of 6 inches to grow a crop. I personally rank soil erosion, after population growth, as the most serious environmental problem worldwide. Soil erosion rates are intensifying in most developing countries because of wood fuel shortages and the people are forced to burn crop residues in a disaster!

Again, thanks for writing about an important concern that we both have. Harvesting crop residues from our land will lead to wholesale destruction of the land and damage its productivity.

Best wishes,

DAVID PIMENTEL

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NOTES

1. "Woolsey On Alternative Fuels" by Bill Moore, EV World, March 8, 2003, www.EVWorld.com. In this paper, James Woolsey, former director of the CIA calls for turning agricultural "waste" (including manure!) into fuel (ethanol/gasohol).

2. News of Dr. Pimentel's article can be found at: http://www.news.cornell.edu/releases/Aug03/ethanol_subsidies.hrs.html.

You Can Make a Difference

Please join the Sierra Club in time for the Spring vote. In 2002 and 2003, Sierra Club members elected Board members truly concerned about rapid and endless U.S. population growth. Please help elect more strong conservationists – leaders who will redirect this vital organization toward genuine environmental stewardship, which must include U.S. population stabilization.

If you are concerned about the environment and are not a member of the Sierra Club, please join by year-end so that you can vote in the Spring, 2004 election. Your vote will make a difference.

Join the Sierra Club for \$25 online at <http://www.sierraclub.org/membership/> or print a mail-in form. Or contact membership.services@sierraclub.org

Sierra Club, 85 Second Street
San Francisco, CA 94105
415-977-5500