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Standing Senate Committee on Agriculture and Forestry
The Senate of Canada
Ottawa, Ontario
Canada, K1A 0A4

Dear Sirs/Madams:

It was a pleasure to hear Senator Rob Black share his views about the work of the committee on soil health at the recent Annual Meeting of the Canadian Society of Soil Science. Our soil resources are too often taken for granted, even by those who depend on them for their livelihood and certainly by society as a whole, so it is heartening to see them receiving attention.

Senator Black invited us to provide input to the committee, so I have been inspired to share some thoughts based on over forty years in soil science. During that time I have been privileged to apply my skills and knowledge as a farmer, a farm input supplier, an adult educator, a policy developer and in research and development, which gives me a unique perspective on soil management. My comments today will focus on two areas: the challenges facing the committee in balancing competing interests for soil management, and the challenges of maintaining future capacity in soil science.

From the beginning of agriculture, soil management has been a balancing act between short- and long-term interests. In a subsistence system, the short-term need was producing enough food to carry the family through until the next harvest. In modern systems, this has been replaced by meeting the repayment requirements of the bank loans needed to finance the acquisition of land, equipment, and inputs. In both these cases, the imperative for survival (physical or economic) can take precedence over the actions needed to maintain the medium- or long-term productivity of the soil. Add to this the stressor of erratic weather, and the difficulty of maintaining practices for soil health is compounded. The consequence of these pressures is that a prosperous agricultural sector is needed if there is going to be investment in soil health, but that policies need to be carefully crafted to promote these investments rather than succumbing to greed.

Another conflict the committee will need to balance is the financial benefit for farmers of keeping resources on the land (e.g. by reducing phosphorus runoff) relative to the cost needed to retain those resources. The benefits are most commonly presented in aggregate numbers at a provincial or national scale, which look very impressive until they are divided by the land area involved in

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agriculture. It is not a stretch to say that the benefits are often measured in dimes per hectare while the costs are measured in dollars.

A related tension is between the interests of farmers and agribusiness. A company selling fertilizer, for example, depends on the margin between wholesale and retail prices to pay their expenses; if the volume of fertilizer sold is going to be reduced, the profits of the retailer (and their ability to pay taxes) will be reduced unless the margin on each tonne of fertilizer can be increased. This is challenging in a competitive environment, but if it can be achieved it represents added expense for the farmer. I have no great wisdom to offer on how to resolve these tensions, but I hope that the committee will recognize them and weigh their effects in any recommendations that are made.

My second area of concern is the erosion of our capacity in soil science to address the issues of soil degradation and soil health. In many ways, this is a symptom of our success as soil scientists over the past decades. Crop yields have been increasing, in large part due to improvements in soil fertility, and if soil physical and biological conditions have been declining the advances in crop genetics have hidden them (i.e. the capacity of the soil to support high yields has not declined as quickly as the genetic capacity of crops to produce high yields has increased, so yields continue to increase but not as quickly as they could). We have not seen a repeat of the massive wind erosion of the "dirty thirties", or sediment runoff from excessive water erosion. Soil losses are still occurring, but they are more subtle and less apparent to both farmers and non-farmers.

These past successes make it easy to assume that our problems with soil management have all been solved, but this is far from the truth. In many parts of the country, we are one big storm away from a harsh reminder of the lack of resilience in many of our agricultural systems. Maintaining a strong pool of expertise in soil science is the best way of ensuring we can respond appropriately to these kinds of weather shocks and maintain the productivity of our soils. Unfortunately, this capacity is declining both in our ability to educate a new generation of soil scientists and to maintain an appropriate level of research in soil management.

There have been some positive signs, as soil science as a discipline is being represented on more university campuses. When I was an undergrad in the 1970s, all of the soil science faculty in Ontario were at Guelph, while today there are professors of soil science at Lakehead, Waterloo, Toronto and Trent as well as Guelph. At the same time, the number of soils faculty at Guelph has declined faster than they have been added to other universities and there is no longer the ability to provide a dedicated soil science program at the undergraduate level in Ontario. This is a loss not only to agriculture, but also to forestry and environmental science. At the same time as this decline is occurring at universities, the number of research scientists dealing with soil science at Agriculture and Agri Food Canada is shrinking as soil scientists retire and are either not replaced or replaced with a scientist in a different discipline. This creates a double jeopardy, for as the need for expertise in soil science is increasing the capacity to train these experts is declining at the same

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time as the career options seem to be disappearing. As I was writing this, Joni Mitchell's "Big Yellow Taxi" was playing on the radio and her words seemed prophetic: "You don't know what you've got 'til it's gone."

Soil has been described as existing at the intersection of the lithosphere, hydrosphere, atmosphere, and biosphere. Geologists, hydrologists, chemists, and biologists can provide valuable insights into the individual components, but the unique value of soil science is in considering the interactions among them. It is not uncommon to see debate among soil scientists as to the relative importance of each component to a particular management practice, but it is with the common understanding that each component will play a role. I am, in turn, heartened and dismayed by the current focus on the importance of soil biology. Heartened, because we have underestimated the importance and complexity of soil biology in the past, so it is good to see more effort put into this area. Dismayed, because there is a tendency to hold up biological solutions as a panacea without considering the very real interactions with soil chemistry and physics.

I wish the committee well in its deliberations, and look forward to the publication of your report on the state of soil health in Canada.

Sincerely,

D. Keith Reid

Retired