

# Basis Of All Agriculture Relies On Soil Fertility

By A.W. HUMPHREY  
All phases of agriculture depend primarily on the productivity of the soil and agricultural supports, to a very large extent, most of the other important industries of the nation. As the productivity of the soil goes, so goes industry, government and civilization itself. The first and foremost farm problem is to adopt into our farming system a soil management program which will encourage high crop yields. Prince Edward Island has the capacity to produce. This capacity rests with the soil and the men who farm it.

In any discussion regarding primary agriculture and crop production, it is necessary to assess what we have to start with. Essentially we have six to eight inches of top soil. In this column we are going to discuss P.E.I. soils. Dr. Donald MacKay, Research Scientist at the Experimental Farm describes our soil problem as follows:

"I think the first thing we have to realize is that our soil is naturally low in fertility, even though we do hear plenty of statements to the contrary. Then too it is extremely sour or acid as we normally say. On the other side of the ledger we do realize that our soil responds well to applied fertilizer and, on top of this, it is well adapted to a wide variety of crops. This is because it has a good physical nature, is generally well drained and is stone free."

The one factor which most often limits yield increase is fertility—Now how do we go about solving this particular problem? "Well fertility and fertilizers are important but before we come to the application of fertilizers, before we get the best out of those we have, we have to correct soil acidity."

All right then a double barreled question—first of all what makes our soils acid and how do we overcome this acidity? "Well our soils are acid because we are located in a region of very high rainfall. With this high rainfall we get leaching or the washing out of many of the chemical elements that prevent acidity. And then to the other part of the question to overcome this matter of soil acidity we must use agricultural lime-stone."

There are two main types of limestone, what is the one that is most often used here in P.E.I.?"

"We favour the use of dolomite because it contains Magnesium, as well as Calcium. Many of our soils are low in Magnesium and dolomite limestone contains this chemical."

plain the need for plant foods and the role of soil testing. Our soils, as we know, are low in fertility, just what does the crop need for growth? Just like you and I, plants need food to grow and mature. Certain chemical elements are the raw materials from which plants produce food. Nitrogen, phosphate and potash are considered the major plant nutrients and are the ones which are most commonly added in fertilizer. The objective in supplying fertility is, of course, to supply what the plant needs for growth throughout the growing season.

Does this mean specific rates of fertility for each specific crop? **CHEMICAL COMBINATION**  
Yes, the combination of these chemical elements and the amount to be added in the form of fertilizer depends on what crops you intend to grow—Some crops have high plant food requirements while the needs of other crops are comparatively small. In addition, the different crops show extremely varied responses to individual plant foods. Probably we could say that different crops require different diets—for example, a particular field may require 2000 lbs. of a 6-12-12 fertilizer per acre to produce a top yield of potatoes whereas its requirements for a top tobacco crop might be 1000 lbs. of a 2-12-12 fertilizer per acre.

When any of these elements are not available or are unavailable in sufficient quantity, what happens? Balanced quantities of all necessary plant foods, water and oxygen, must be available to plant roots if maximum yields are to be obtained. The absence, or low supply of any one plant food will reduce yields and quality considerably. Apart from nitrogen, phosphate and potash, what other elements are needed? The ones just mentioned (that is Nitrogen, Phosphate and Potash) are the major plant foods. Then we have the secondary nutrients of calcium and magnesium which are a bonus in dolomite limestone and sulphur. The third group are the micro-nutrients or trace elements—these are boron, manganese, copper, zinc, iron, chlorine and molybdenum. Most of these elements are present in our P.E.I. soils at satisfactory levels with the exception of molybdenum which is used as a soil treatment for cole crops and brasses which is used in fertilizer for turnips, mangels and celeriac crops.

All right then, how do we assess the amounts of lime and fertilizer that should be applied? "Soil-Testing is not foolproof, but it can be used as a basis for determining the amount of lime to apply and for estimating the type of fertilizer for each specific crop."

**LIMING ESSENTIAL**  
In my position, I compile a great deal of information on thousands of soil samples analyzed. These results indicate that our soils are strongly acid and proper liming programs are essential on many fields. For example—only 30 per cent of the samples tested were at a level where immediate liming is not indicated—the remaining 70 per cent require lime for most crops.

The plant food levels are also quite low in the majority of cases—in all the samples tested last year—81 per cent were low in nitrogen, 94 per cent were low in phosphate and 70 per cent were low in potash. These results indicate that more emphasis must be placed on the soil fertility program on each farm. What are some of the steps involved in the establishment and maintenance of a permanent soil fertility program? **SIX STEP PROGRAM**  
The success of any management program can be related to the foundation and supporting factors on which it is built. I believe there are six steps which should serve as a basis for a sound fertility program.  
1. Obtain a record of the soil's acidity (pH) and plant food (fer-

tilizer) requirements by making use of soil tests.  
2. Correct soil acidity, supply calcium and magnesium by the use of agricultural limestone.  
3. Supply nitrogen, phosphate and potash through fertilizers in

quantities sufficient to replace all losses by crop removal or otherwise at maximum production levels.  
4. Maintain a desirable level of organic matter in the soil to ensure good soil structure and maximum water holding capacity.  
5. Establish and maintain good drainage, if necessary, use supporting practices such as tiles, graded ditches, etc., to keep soil, water and plant food in place.  
6. Adopt cropping sequences that suit the specific soil conditions and that provide flexibility in the cropping program. All soils being cropped in P.E.I. need fertilization. The

question no longer is should we use fertilizer?—But rather what kind and how much? The kind and amount depends upon the state of soil fertility and the crop to be grown.  
**RESEARCHING**  
Although it may seem through these questions and answers that things are quite simple and that there is nothing left for research to do this is not the case. We are satisfied that with increased use of fertilizers and with improved soil management practices that we can go a long way in improving and increasing the production of crops from our soils but we shouldn't leave the impression that all our ques-

tions are answered by any means. A great deal of the research work that is done does indeed end up on the soil recommendation report. For example in this matter of soil testing—what we are normally trying to do is running a soil test is to determine, in a matter of a few minutes usually, the amounts of plant foods that are available to the plant in the entire growing season. This is a pretty tall order and we are continually looking for improved tests and to develop the use of these in the laboratory so that they can be used in the advisory program. The other thing about these tests is that these must be

related to field performance by carefully planned field experiments so that we can do as we indicated, that is be able to recommend the amount and the kind of fertilizer that is necessary, particularly the amount that it will pay a man to use.  
For further information on soil fertility and soil testing contact the P.E.I. Department of Agriculture, Box 2000, Charlottetown or 220 Water Street, Summerside. Soil boxes, questionnaire forms and soil probes may also be obtained from these two addresses.  
Poland protects a total of 384 species of animal, perhaps the world's longest list.

**The Guardian, Charlottetown, Fri., Nov. 18, 1966.**  
**United States Food Prices Expected High**  
By JEAN HELLER  
NEW YORK (AP)—A group of food manufacturers and retailers, aware of the growing furor over rising food prices in the United States, defended those prices Wednesday and offered housewives little hope that the price spiral would stop soon.  
George W. Koch, president of the grocery manufacturers of America, a group that speaks for the U.S. food industry said: "The farmer is not to blame. The manufacturer is not to blame. The distributor is not to blame. There's nothing that the men from the farm to the table can do about it."  
The major blame, he said, lies in the fact that the U.S. is at war.  
"...for all practical purposes we are at war in Viet Nam," he said. "Every time this nation is at war, this nation's economy is inflated."

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