



The importance of soil fertility in crop production

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Effective management of nutrients in soils is needed to feed the 7.3 billion people on the planet. Soil sampling and the use of nutrient application rates based on scientific principles and research are critical components of nutrient management. The

IMPACT

Survey results demonstrate that growers in the REACCH region consider soil fertility to be an important component of sustainable cropping systems. They not only consider fertility important but also use key best management practices to enhance nutrient management.

purpose of this study is to document (1) the farmer-perceived value of soil fertility for crop yields, (2) the use of soil sampling for nutrient diagnosis, and (3) who actually makes fertilizer recommendations on cropland in the REACCH study area.

The data in this study

were collected from a 2011 survey of 711 (53.2% response rate) growers in the REACCH study area. From the thirty three questions asked, this article will discuss the following four questions:

1. How important is soil fertility (nutrients) to your overall grain yields?
 - a. Soil fertility is responsible for less than 20% of my yield
 - b. Soil fertility is responsible for 20% to 30% of my yield
 - c. Soil fertility is responsible for 30% to 40% of my yield
 - d. Soil fertility is responsible for 40% to 50% of my yield
 - e. Soil fertility is responsible for 50% to 60% of my yield
 - f. Soil fertility is responsible for more than 60% of my yield
2. Do you take soil samples (for soil testing) to evaluate nutrient status of your soils prior to fertilization?
 - a. Yes
 - b. No
 - c. Sometimes
3. If you answered yes to the above question, who takes the soil sample?
 - a. You
 - b. Fertilizer dealer
 - c. Consultant
 - d. County extension agent
 - e. Other
4. Who makes your fertilizer recommendations?
 - a. You
 - b. Fertilizer dealer
 - c. Consultant
 - d. County extension agent
 - e. Other

Mailing addresses of 1,337 active farmers were obtained from

county extension agents in more than 20 counties in eastern WA, northern ID, and northeastern OR. The survey was distributed through the U.S. Postal Service, and the response rate exceeded 53%.

The majority of growers responding to this survey feel that soil fertility accounts for at least 50% of their crop yield (Table 1). This information is significant, because when coupled with recent research data, both researchers and growers feel that soil fertility is an important component of crop yield. The high percentage of yield attributed to soil fertility suggests that in the eye of the producer, soil fertility is at least as important to yield as crop variety selection and pest management, if not more important. Grower age, number of years farmed, and farm size do not affect the percentage of yield attributable to soil fertility; however, we observed a significant relationship between annual precipitation and yield attributed to soil fertility. In general, soil fertility is seen as an increasingly important component of yield as annual precipitation increases.

Table 1. Relative importance of soil fertility to overall yields of dryland crops, based on a 2011 nutrient management survey in the REACCH study area.

Percentage of yield attributable to soil fertility	Percentage of respondents
<20	2.0
20-30	7.4
30-40	8.5
40-50	19.6
50-60	27.7
>60	34.8

Over 68% of farmers in the REACCH study area regularly take soil samples, while 23.3% collect soil samples less often (Table 2). The respondents who take soil samples less often than once per year most likely collect them once during a crop rotation. This soil sampling likely occurs prior to planting the highest-income crop (wheat) in the rotation. Fewer than 10% of survey respondents do not have soil samples collected on their farms. The survey results indicate that more than 90% of the growers in the dryland farming areas of eastern WA, northern ID, and northeastern OR consider soil sampling important.

Even though the majority of survey respondents indicated that soil samples are regularly collected on their farms, most of the samples are not collected by the growers themselves. Fertilizer dealers, consultants, county extension agents, and other individuals take 62.8%, 4.6%, 0.6%, and 0.2% of the soil samples, respectively. Conversely, growers take 31.8% of the collected soil samples.



Photo by Brad Stokes.

Table 2. Responses to the question “Do you take soil samples (for soil testing) to evaluate nutrient status of your soils prior to fertilization?” This information was collected as part of a nutrient management survey in the REACCH study area.

Do you take a soil sample?	Percent of respondents
Yes	68.3
No	8.4
Sometimes	23.3

A majority of growers in the REACCH project area make fertilizer recommendations for their crops (Table 3). Fertilizer dealers are responsible for 36.7% of the fertilizer recommendations, while consultants (6.0%) and county extension agents (1.0%) provide fewer fertilizer recommendations. It is interesting to note that fertilizer dealers collect approximately two-thirds of the soil samples but provide only about one-third of the actual fertilizer recommendations. Farmers are willing to accept help with soil sampling but are more likely to make their own fertilizer recommendations.

The survey data show that most growers consider soil fertility a very important aspect of crop production. In addition, a majority of growers have an excellent grasp of the important nutrient management concepts involving the relationship between soil fertility and yield, soil sampling, and fertilizer recommendations. A large majority of growers place a high value on soil fertility. More than 62% of the surveyed growers attribute more than 50% of their annual crop yield to soil fertility. Conversely, fewer than 10% of the growers attribute less than 30% of their yield to fertility.

An important overall conclusion from this survey is that farmers are literate about soil fertility issues. It would be nice to attribute a significant part of this high literacy to successful soil fertility extension programs offered by the three land-grant universities in the region—Oregon State University, Washington State University, and the University of Idaho. However, factors other than extension education are probably part of this improved literacy. For example, economics likely plays a big role. Since 1981, the cost of nitrogen fertilizer has increased by more than 122%. This cost increase has resulted in nutrient management becoming a larger overall cost of cereal production. This cost has made growers take notice and be on top of all aspects of nutrient management in their crops. This development alone has probably resulted in better soil sampling and nutrient diagnostics, and consequently in improved fertilizer recommendations.

Table 3. Responses to the question “Who makes your fertilizer recommendations?” This information was collected as part of a 2011 nutrient management survey in the REACCH study area.

Who makes your fertilizer recommendations?	Percent of respondents
You	54.6
Fertilizer dealer	36.7
Consultant	6.0
County Extension agent	1.0
Other	1.7