Teagasc Soil Fertility Report 2021

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The information in this publication is based on soil analysis carried out by Teagasc for its clients.

Further Information available at
http://www.teagasc.ie/soil/analysis/results.asp

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Teagasc ICT staff

Introduction

Teagasc research staff at Johnstown Castle have been reporting soil analysis results since the 1950's. During that period Teagasc has been central to research and development of soil testing and nutrient advice for Irish soils. Teagasc delivers a soil testing service part of its fertiliser planning (NMP Online) service for its clients to advise on the efficient use of nutrients for crop production. Over the last number of years there has been an increased focus on the role of soil testing and fertiliser planning to improve the efficiency of all applied nutrients and especially nitrogen. Improving farm N efficiency will help reduce nutrient losses from both organic and chemical N sources to help meet both air and water quality targets over the next decade. In the last year with increasing pressure to halt climate change and control fertiliser costs soil testing will be a key low cost technology to ensure the efficient use of applied nutrients. Getting the soil basics right such as optimising soil pH and applying P and K in a balanced programme is a key part of sustainable production systems. The drive to maximise grazed grass production during the growing season and the production of sufficient grass to ensile for the winter period is now key goal for livestock farmers.

In 2021, lime use increased by ~ 50% compared to the average lime applied in Ireland over the last 10 years. The application of lime during the year can be heavily influenced by the weather as there is a tradition to apply lime in the final quarter of the year. Optimising and maintaining soil pH is the first step in improving the efficiency of applied N. This will help accelerate the improvement in soil pH on these farms. Over the last decade the use of applied P and K fertilisers has increased due farmers acting on soil test results. The increased use of P and K's has resulted in a steady improvement in soil fertility between 2016 to 2019. In the last 2 years soil fertility has started to decline especially on grassland farms and in 2021 a similar trend is now evident for tillage soil samples. This may be due to the start of a new soil sampling cycle on farms as many farms that were participating in the Glas scheme will require new soil samples. The challenge now and in the next number of years will be to halt this new emerging soil fertility trend. Controlling fertiliser costs will critical to farm profitability but it should not be at the expense of mining valuable soil fertility levels, which have been built up over the last number of years. Maintaining good soil fertility will especially be central to improving the utilisation of N and reducing N losses.

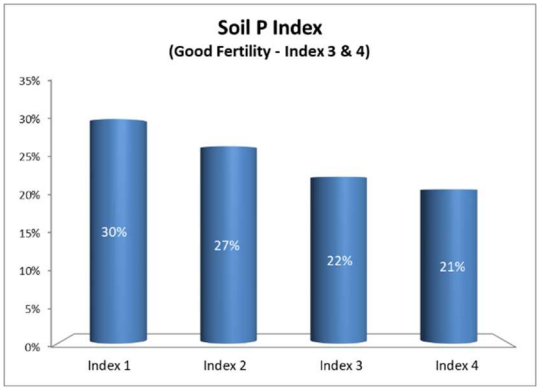
Teagasc maintain a database of soil test results analysed annually for their clients. This provides data to monitor soil fertility trends over time for the major soil nutrients (pH, P & K). The soil samples are not matched for each farm from year to year but due to the large number it provides a very solid insight as to how soil fertility trends are changing over a 4 to 5 year period which reflects the soil sampling interval on these farms. In addition the soil database is quite large with 30,000 to 65,000 soil samples analysed annually. Some care should be taken in interpretation of data as the reasons for soil sampling can vary from year to year, for example, a significant requirement for sampling in relation to agri-environment schemes can impact on trends.

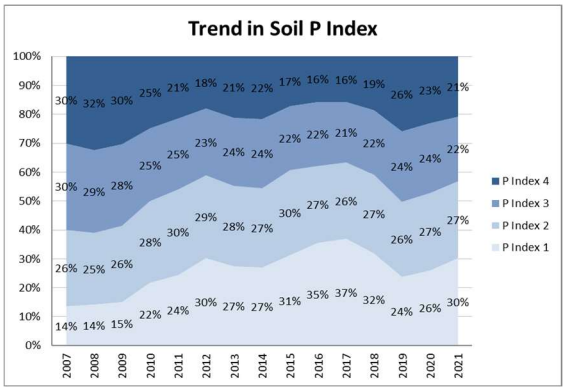
Soil fertility trends are graphically presented on a national and county by county basis and provide an insight into soil fertility status and changes over time for each county. This information tends to be quite reflective of the county soil types and farming enterprises practiced. This is very useful for farmers, advisors and policy makers on guiding lime and

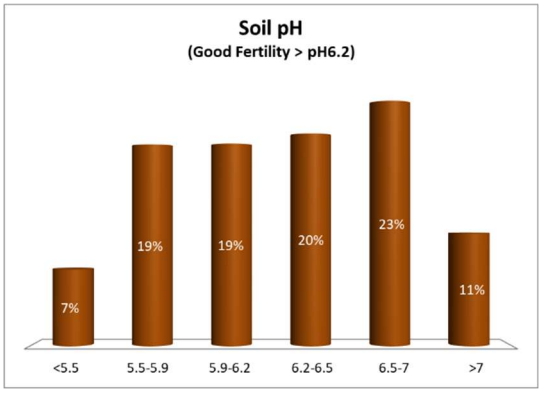
fertiliser advice for systems of production to meet requirements. It maybe also useful to guide more targeted national policy changes to meet future water and air quality targets in the future.

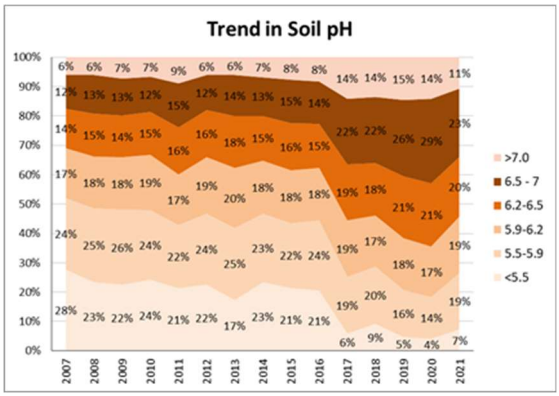
The publication consists of a number of graphs showing all soil samples since 2007 and further broken down on an enterprise basis for example dairy, drystock and tillage. The information is presented on a county by county basis for each enterprise. Each report contains four pieces of information. The current percentage of soils at each of the 4 indexes for P and K and soil fertility trends since 2007 to 2020 (see examples below). Soil pH trends are presented in a similar format with five pH categories. The final graphic shows the percentage of soils with optimum soil pH, P & K.

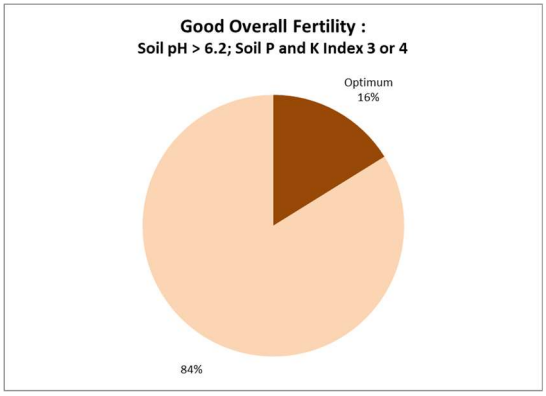
Examples of Soil Fertility Data

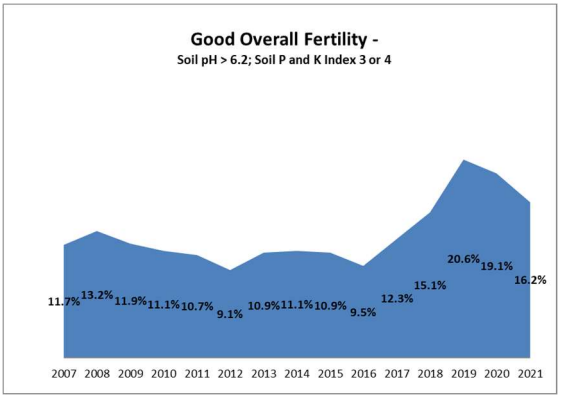












National Soil Fertility Trends

In 2021 Teagasc analysed a total 33,876 soil samples comprising of dairy, drystock and tillage enterprises. There was 30,082 grassland soil samples. For dairy farms - 21,049 soil samples, on drystock farms 8,458 soil samples, overall soil samples take increased by 11% and 8% respectively compared to 2020 for dairy and drystock. On tillage farms 3,794 soil samples, which represents ~ 17% increase in soil samples in 2020. In 2021 soil sample numbers increased by ~ 13 which was primarily driven by the significant increase in the cost of N, P and K fertilisers projected in mid-2021. The following is a summary of the main changes for soil pH, phosphorus (P) and potassium (K) in 2021.

National Highlights (All Soil Samples)

- All farm enterprises took more soil samples in 2021 (+13%)
- Overall decline in soils with optimum soil fertility to 16% (-3%)
- Soil pH declined to 54% of soils with a >pH 6.2 (-8%)
- Soil P levels at Index 1 & 2 increased (+4%) while soils at Index 3 & 4 decreased (-4%)
- Soil K levels remain simialr with a slight decrease in soils at K index 4 (-4%)

Enterprise Highlights

Dairy

- 16% of soils have optimum pH, P & K (3 % decrease)
- 53% of soils with a soil pH >6.2 (10% decrease)
- 55%of soils at P index 1 & 2 (4% Increase)
- 48% of soils at K Index 1 & 2 (no change)

Drystock

- 13% of soils have optimum pH, P & K (2 % decrease)
- 47% of soils with a soil pH >6.2 (10% decrease)
- 61%of soils at P index 1 & 2 (11% Increase)
- 50% of soils at K Index 1 & 2 (3% Increase)

Tillage

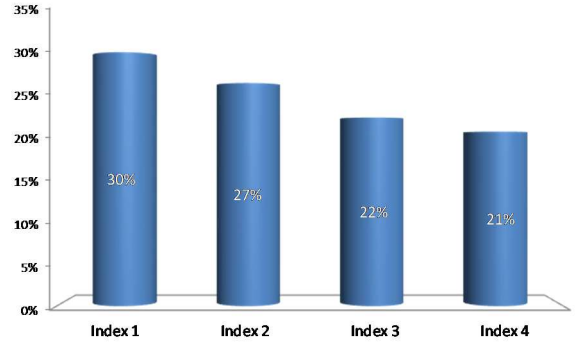
- 18% of soils have optimum pH, P & K (6 % Decrease)
- 61% of soils with a soil pH >6.5 (13% Decrease)
- 57%of soils at P index 1 & 2 (7% Increase)
- 32% of soils at K Index 1 & 2 (2% Decrease)

In 2021 optimum soil fertility levels have decreased in the range of 3 to 6 % for dairy, beef and tillage farms compared to 2020. On these farms, soil at P Index 1 and 2 have increased by 4 to 11%, while soil K levels have decreased slightly on drystock farms, no change on dairy farms to slight improvements (+2%) on tillage farms. Soils with optimum soil pH levels have decreased by 10 to 13% across all three-farm enterprises. National lime applications increased by 50% in 2021 (1.33 million tonnes) compared to the average application of ground limestone in the previous 10 years. This will help halt the decline in soil pH levels as reported in 2021.

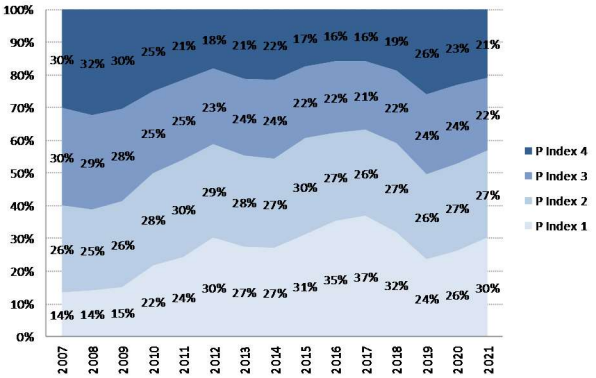
Soil Analysis Status and Trends

County	All Counties
Year	2021
Enterprise	All Farms
Number of Samples	33,876

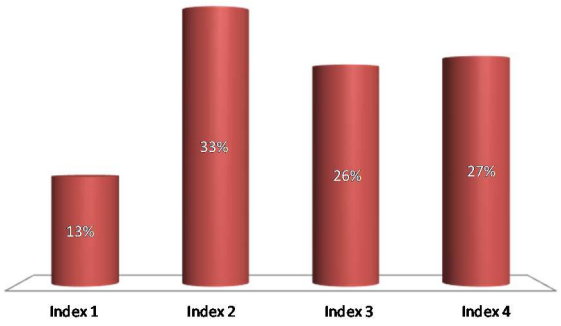
Soil P Index
(Good Fertility - Index 3 & 4)



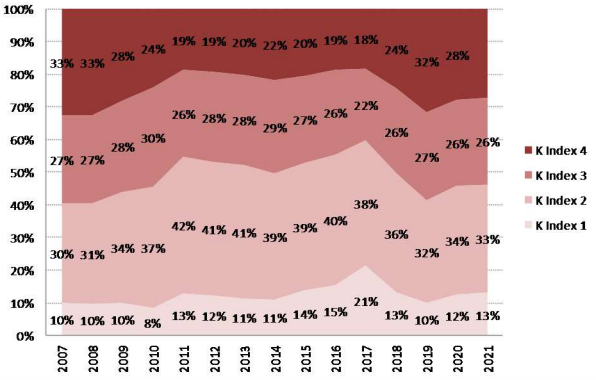
Trend in Soil P Index



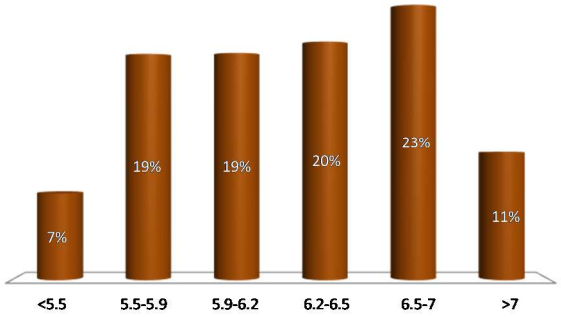
Soil K Index
(Good Fertility - Index 3 & 4)



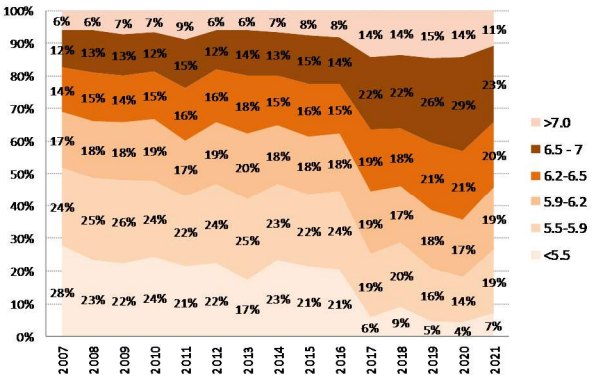
Trend in Soil K Index



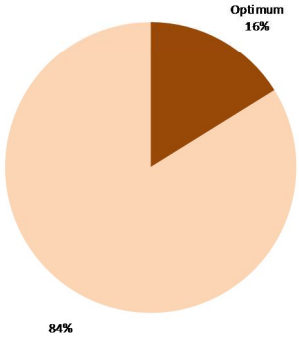
Soil pH
(Good Fertility > pH6.2)



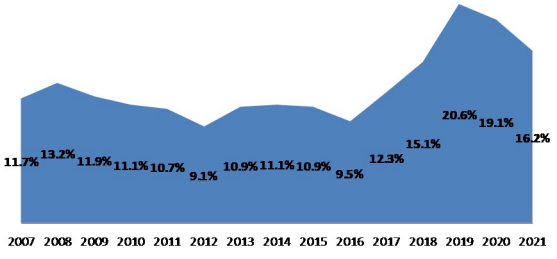
Trend in Soil pH



Good Overall Fertility :
Soil pH > 6.2; Soil P and K Index 3 or 4



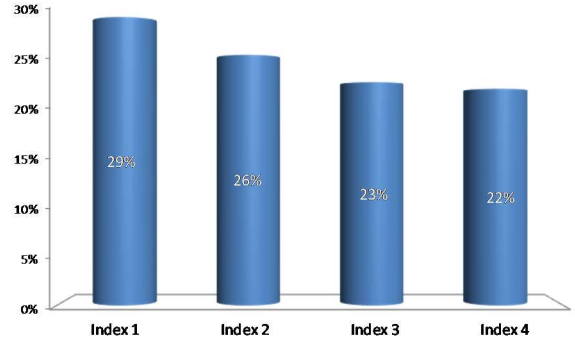
Good Overall Fertility -
Soil pH > 6.2; Soil P and K Index 3 or 4



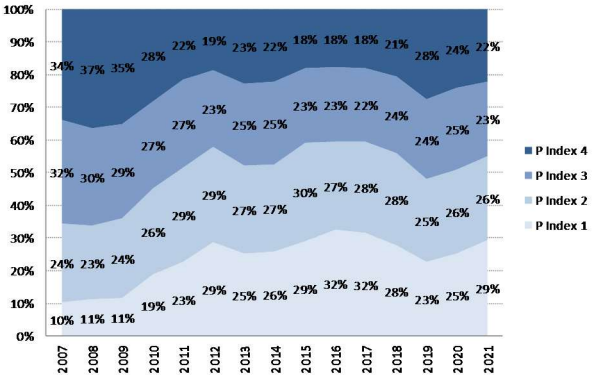
Soil Analysis Status and Trends

County	All Counties
Year	2021
Enterprise	Dairy
Number of Samples	21,049

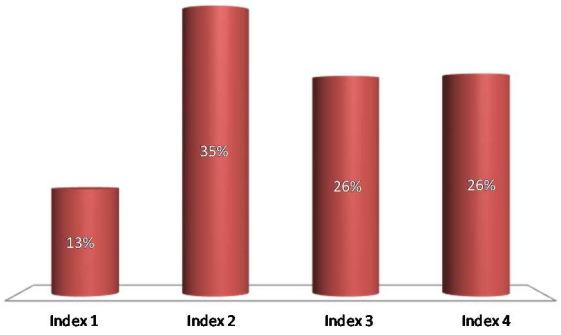
Soil P Index
(Good Fertility - Index 3 & 4)



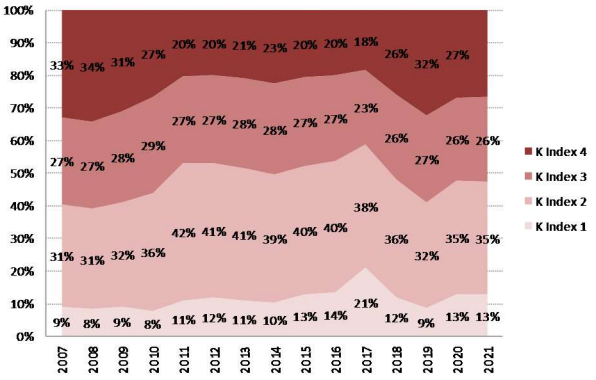
Trend in Soil P Index



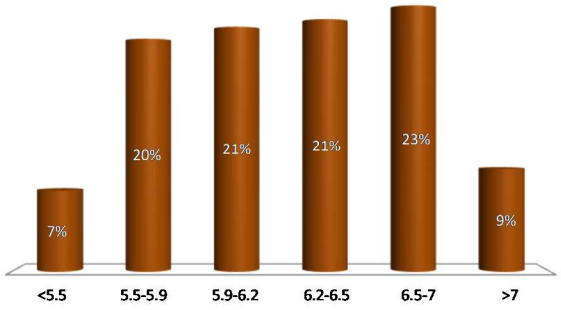
Soil K Index
(Good Fertility - Index 3 & 4)



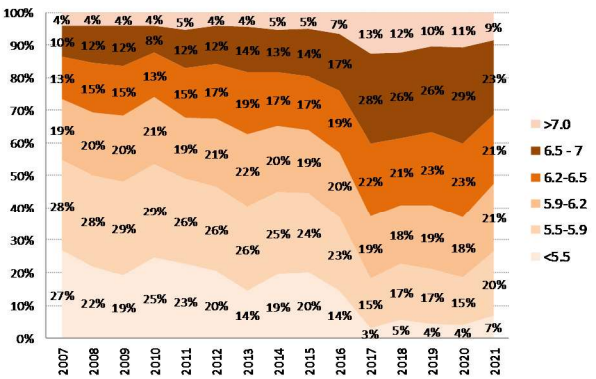
Trend in Soil K Index



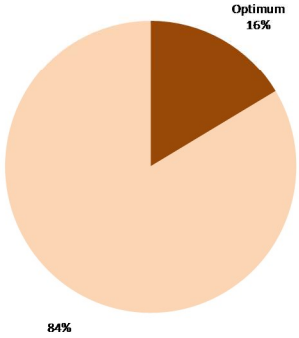
Soil pH
(Good Fertility > pH6.2)



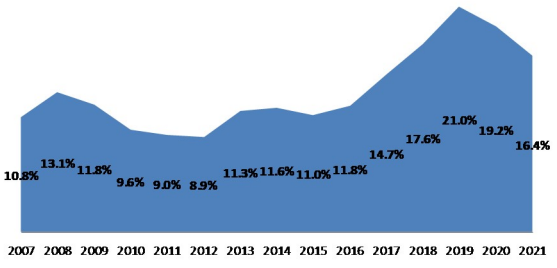
Trend in Soil pH



Good Overall Fertility :
Soil pH > 6.2; Soil P and K Index 3 or 4



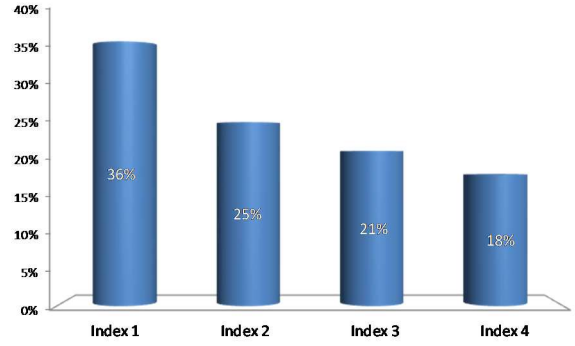
Good Overall Fertility -
Soil pH > 6.2; Soil P and K Index 3 or 4



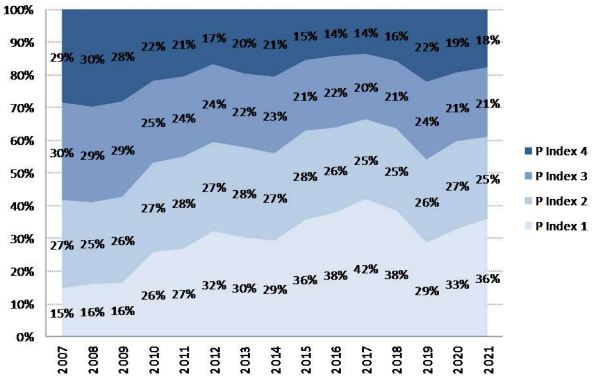
Soil Analysis Status and Trends

County	All Counties
Year	2021
Enterprise	Drystock
Number of Samples	8,458

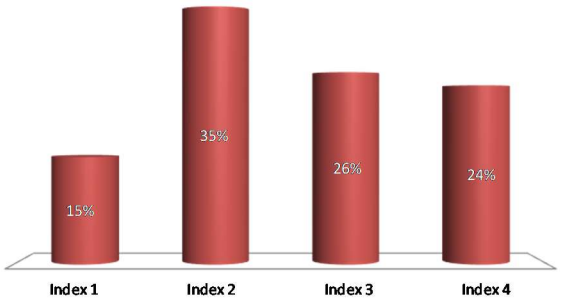
Soil P Index
(Good Fertility - Index 3 & 4)



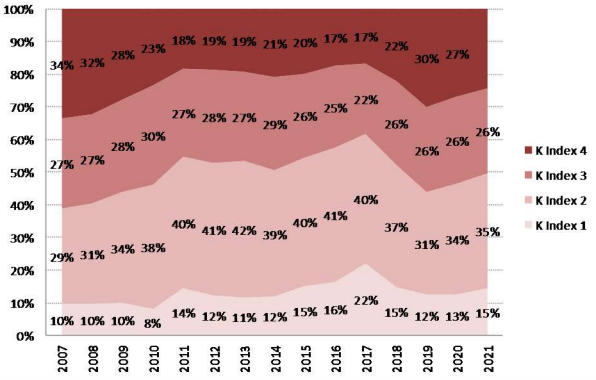
Trend in Soil P Index



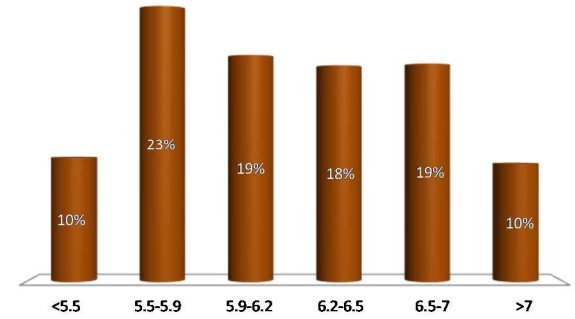
Soil K Index
(Good Fertility - Index 3 & 4)



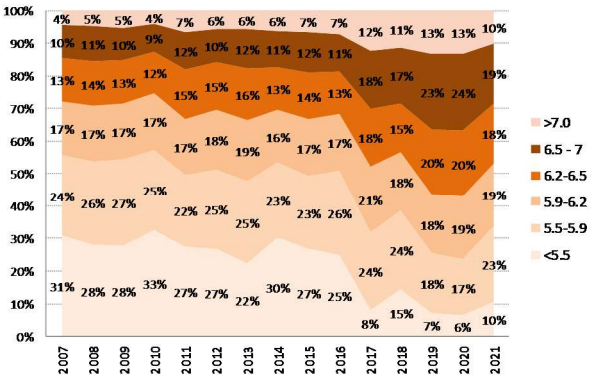
Trend in Soil K Index



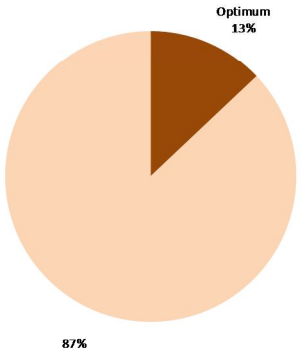
Soil pH
(Good Fertility > pH6.2)



Trend in Soil pH



Good Overall Fertility :
Soil pH > 6.2; Soil P and K Index 3 or 4



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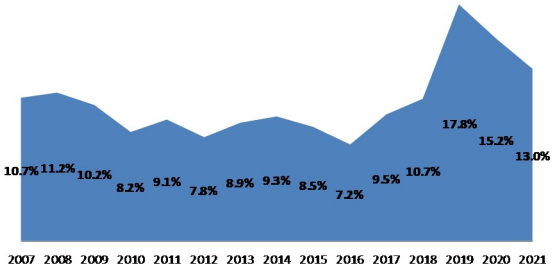
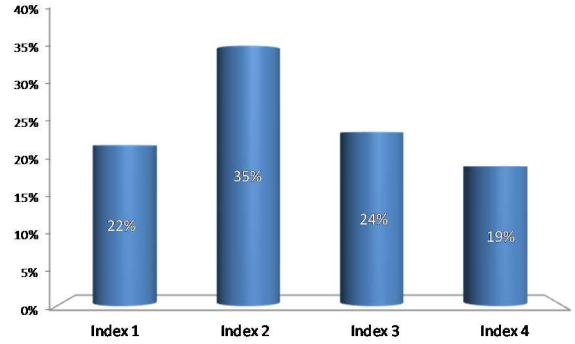


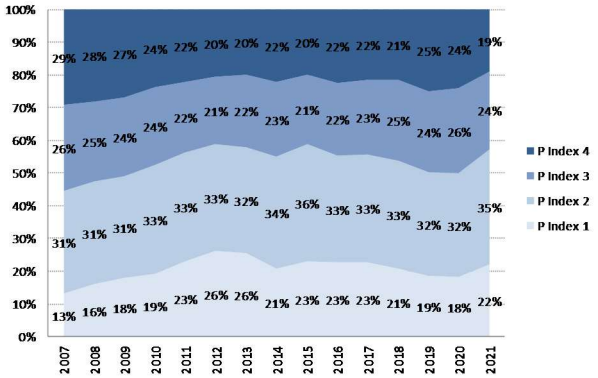
Soil Analysis Status and Trends

County	All Counties
Year	2021
Enterprise	Tillage
Number of Samples	3,794

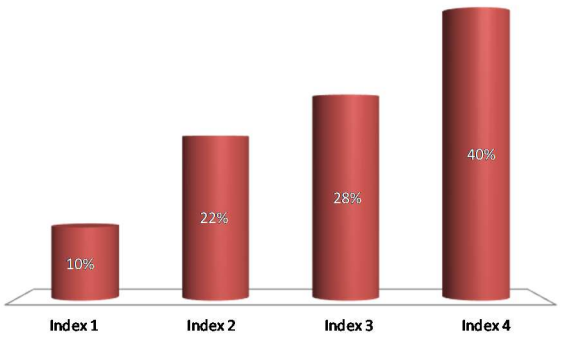
Soil P Index
(Good Fertility - Index 3 & 4)



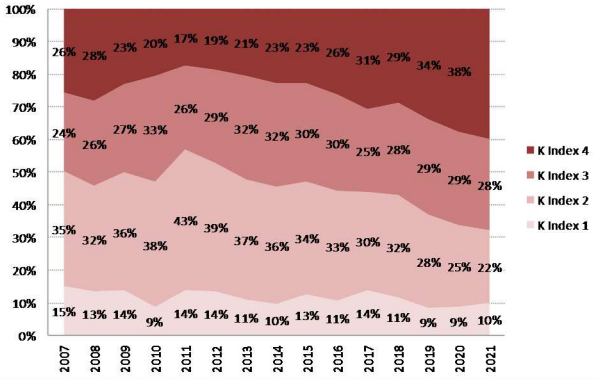
Trend in Soil P Index



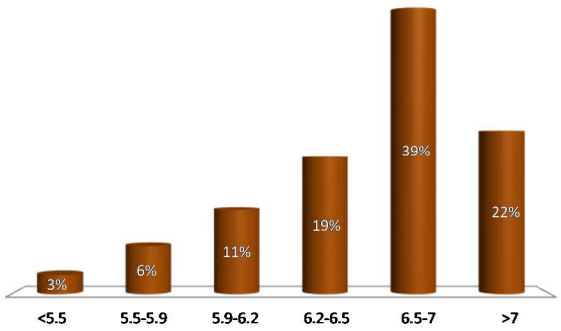
Soil K Index
(Good Fertility - Index 3 & 4)



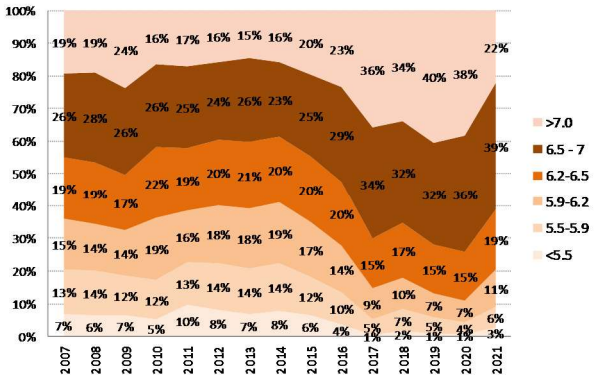
Trend in Soil K Index



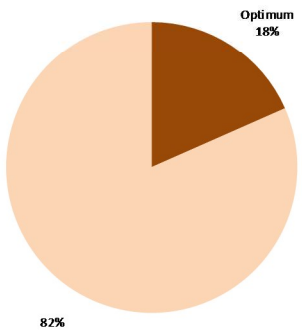
Soil pH
(Good Fertility > pH6.2)



Trend in Soil pH



Good Overall Fertility :
Soil pH > 6.2; Soil P and K Index 3 or 4



Good Overall Fertility -
Soil pH > 6.2; Soil P and K Index 3 or 4