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Soil Test Methods App: An Instant Guide to Soil Testing

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Abstract

Soil testing is central to the nutrient management planning for economically profitable and ecologically sustainable crop production. Of late, it has assumed unprecedented importance in view of the growing awareness about soil health card in Indian agriculture. Indiscriminate use of fertilisers based on their blanket recommendations or without knowing the native availability of plant nutrients in soil is of little importance in modern agriculture which not only aims at improving crop productivity but also at maintaining the fertility status of soil for sustained crop production. Further, reliability of the 'soil test based nutrient recommendations' depends largely on precision of soil testing, which necessitates proper understanding and knowledge of soil test methods for different soil parameters commonly used in preparation of soil health card and making nutrient recommendations. We developed an android based mobile application "Soil Test Methods" as an instant guide to soil testing for students, researchers and soil test personnel. It can be downloaded from Google play store for free. Operational aspect of the app has been described in this article.

Introduction

In the modern technology-driven world, mobile phones are becoming increasingly popular in all spheres of life. Used appropriately, mobile apps could be quite handy in delivering the intended message/ lessons to the target population in a rapid and effective manner. Mobile apps are being used in all walks of life including sports, music, business, education, agriculture, medicine *etc.* Recently, *Arogya Setu* app became hugely popular and useful in India which was aimed at creating awareness about COVID-19 pandemic and containing its possible spread. Use of mobile apps is becoming popular in agriculture too. A large number of such apps are presently available for the use of farming community. Kisan Yojana, Kheti-Badi, IFFCO Kisan, Soyabean Gyan, FarmBee, Kisan Suvidha, Pusa Krishi, Kisan Rath, Krishi Gyan, Crop Insurance, Agri Market, AgMobile, Spray Guide *etc.* are a few among many other important apps available to guide the farmers in various activities related to agriculture. In view of the cost involved and environmental concerns associated with indiscriminate use of fertilisers, an Android based mobile application named 'Soil Nutrient Manager' was recently developed to optimise the fertiliser application and to achieve higher crop yield and farm income in eastern India. The app developed by a team of scientists at ICAR Research Complex for Eastern Region, with an aim to provide ready recommendations on fertiliser doses and time of application for a number of crops commonly grown in Eastern India (particularly in Bihar and Jharkhand), became hugely popular (Kumar *et al.*, 2020). Keeping in view the criticality of precise soil testing in generating a reliable nutrient recommendation, we have developed yet another android based mobile application "Soil Test Methods" as an instant guide to soil testing.

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Figure 1: The logo of Soil Test Methods App

“Soil Test Methods” at Your Fingertips

Indiscriminate use of fertilisers based on their blanket recommendations, without giving due consideration to the native availability of plant nutrients in soil, is of little

use in scientific crop production which not only aims at enhancing crop yield but also at maintaining the soil fertility and environmental quality. Recommendation for a particular nutrient must therefore take into account the deficiency or sufficiency of that particular nutrient in soil as per the soil test results. Since utility of the ‘soil test based nutrient recommendations’ depends largely on precision of soil testing, it’s important to have a proper understanding and knowledge of soil test methods for different soil parameters commonly used in preparation of soil health card and making nutrient recommendations. Keeping this in view, an Android based mobile application “Soil Test Methods” has been developed as an instant guide to soil testing which can be downloaded from Google play store for free. It is intended for students, researchers and soil testing staff. While searching in Google play store, one can identify the app by seeing its logo as shown in Figure 1. Sequence of the screen appearances that a user finds while opening the app to reach a particular soil parameter is shown in Figure 2. No registration or sign up is



Figure 2: Sequence of the screen appearances showing the actions required from a user to reach the soil test method for a particular parameter

required for this easy-to-use app released on October 7, 2020.

Presently, the details of soil test methods for commonly used parameters viz. soil pH, EC, organic carbon, available nitrogen, phosphorus, potassium, sulphur, DTPA extractable micronutrients (Zn, Fe, Cu, Mn) and available boron are available in the app. For some soil parameters such as available P, extraction and estimation methods vary depending upon the soil reaction. Thus, the alternative methods for both acid and neutral to alkaline soils are given in the app to make it widely applicable. Soil test methods for biological parameters are being worked upon and are likely to be added soon.

Conclusion

As the nutrients' requirement in Indian agriculture is expected to increase to meet the growing food demand in country, and more so under the projected climate change (Kumar *et al.*, 2011a, b), importance of soil testing will further increase to optimise the fertiliser application based on soil test results. This is important to improve the farm economy as well as environmental quality. In this context, we expect our app to serve as an instant guide to soil testing for the soil test personnel, researchers and students of Soil Science.

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