

## Taking Soil Testing Laboratories to the Farmers: Building Soil Testing Infrastructure in Partnership Mode in Gujarat



*A soil testing laboratory in one of the APMCs in Vadodara district of Gujarat*

### **Background and Objectives**

Plants require 16 nutrients/elements for normal growth and for completion of their life cycle. Those used in the largest amounts- carbon, hydrogen and oxygen- are **non-mineral elements** supplied by air and water. Remaining 13 elements are taken up by plants

only in **mineral** form from the soil. Plants need relatively large amounts of nitrogen, phosphorus and potassium, known as **primary** nutrients. Three **secondary** elements - calcium, magnesium, and sulphur- are required in smaller amounts than the primary nutrients. The rest like boron, iron, zinc etc., known as **micro-nutrients**, are also important for growth, quality and productivity of crops. The big challenge for the farmer is to know the status of availability of these nutrients/elements in his field so as to enable him to apply the right kind of nutrients by means of fertilisers or manures or in other forms like bio-fertilisers etc.

The cost of essential fertilisers constitutes a large part of the input cost for the farmers. Applying less fertiliser than needed by the soil will adversely affect production both in terms of quantity and quality but applying more will, besides costing him additional expenditure, also lead to damage to the crops. It is, therefore, imperative to have the soil fertility evaluated before applying any fertiliser to the crop to economise on production costs. For evaluating/ testing soils, we need soil testing laboratories.

Most of the soil testing infrastructure in the country has been sought to be created in public sector. This has become a constraint in the expansion of soil testing infrastructure. Building this entirely in public sector requires substantial land, capital for construction and equipments, and most of all personnel to carry out tests. Government of Gujarat worked out a solution for managing these constraints and to expand soil testing infrastructure substantially in the State.

Farmers of Gujarat are very enterprising. They want their soil to be tested. They also bring their produce to agriculture produce markets. Agriculture produce markets have land and funds to construct buildings- in many cases they already have spare buildings. The Government, therefore, thought of roping in agriculture produce market committees (APMCs) in this endeavour. Government of Gujarat also thought of bringing the private sector to carry out soil tests to take care of the constraint of hiring staff in government. RKVY funds were utilised to procure equipments and other testing machines. The confluence of APMCs, RKVY funds and

private sector gave birth to the unique model of soil testing infrastructure in Gujarat. The state decided to build soil testing laboratories in the APMCs - the place where farmers are frequent visitors for buying and selling of their produce - with land and building contributed by the APMCs. Building of Soil Testing Laboratories (STLs) in APMCs was also expected to motivate farmers to appreciate the need for evaluation of their soil fertility. The STLs so built were to be operated by the private sector agencies and RKVY funds were earmarked for providing equipments and chemicals.

The state also decided to give preference for setting up STLs first to those APMCs' which had built up rooms and all other required infrastructure. Only renovation cost was allowed under the project. Soil samples were to be arranged by the district agriculture officers and operators at such laboratories were engaged on contract basis.

### **Intervention**

The state took up setting up 63 soil testing laboratories at major APMCs' with a contribution of only Rs. 660 lakhs from RKVY approved during 2008-2009. The 60 soil testing laboratories have been set up in the APMCs at the cost of Rs. 595.90 lacs only and they have become fully operational. In fact, as infrastructure was readily available with APMCs, more than 40 STLs became functional within 1 month of launching the project.



APMCs do not charge anything for the land and infrastructure provided by them as it is a service rendered to the farmers. The private sector operator is being paid service charges for testing at the rates decided by the Government of Gujarat. Glass wares, instruments and chemicals required for testing first 10,000 samples soil samples have been provided by Director of Agriculture. Kits and the cost of chemicals for testing beyond 10,000 samples is being borne by the APMCs. Expenses on staff, chemicals, electricity and stationary etc are also borne by APMCs. The entire staff for testing is kept on contract on variable rates by APMCs under public private partnership (PPP) mode which is working effectively.

A joint account of APMC and Gujarat state Agriculture Marketing Board (GSAMB) was opened to exercise proper control on funds. APMCs have also signed an MOU setting out their obligations.



Soil testing samples are collected from farmers' field by KHEDUT (farmer) MITRA/Volunteers who submit the same to the nearest STL. Farmers can also bring samples directly when they come to Mandis for sale of crops or purchase of inputs and hand over the same to the STLs. STLs test the samples in the lab for evaluation of nitrogen, phosphorus, potassium, EC and PH balance. The results are reported to the concerned farmers in the form of a soil health card with the advice to apply specific doses of nutrients.

### **Outcome**

There is spectacular increase in the soil samples tested after creation of the STL infrastructure under RKVY. The Scheme taken up in the year 2008-09 started showing excellent results. The soil samples tested in the entire state until 2008-09 used to range between 140000- 210000 annually. Soil samples tested increased to 310000 in the year 2009-10 when the work of setting up STLs was

going on. In the year 2010-11, by the time the entire additional STL infrastructure was in place, the number of samples tested rose to over 18 lakhs- 1814095 to be precise. The soil testing samples tested increased by a phenomenal 500% in one year. It is easy to imagine benefits accruing to over 18 lakh farmers in the form of precise application of nutrients in the soil as a result of these testing reports.

Correct application of nutrients as a result of recommendations contained in soil testing cards as a result of availability of soil testing laboratories, in large numbers in their vicinity and also at the convenient place which they frequented, has brought about revolutionary change in the attitude of farmers. Earlier, farmers had to be persuaded for soil testing but now they insist on it because they are fully convinced that the soil test results helped them in minimising expenditure on fertilisers and in maximising productivity.

It is well known that continuous use of high doses of chemical fertilizers leads to degradation of soil fertility. Soil tests have helped farmers to adopt corrective measures on the basis of test results. In Gujarat, though the soil testing laboratories were established and operated by the Dept. of Agriculture, public sector and state agriculture universities earlier, major impact of soil testing started showing only after launching of RKVY project in the state from 2008-09.

The STLs have not only made testing easier and faster but also ensured that there is no major liability on APMCs/Govt.