

Innovate For Agriculture

Innovative Diagnostic tools for Soil and Plant Health

Under

Social Innovation Programme for Products: Affordable and Relevant to Societal Health (SPARSH)

The Sustainable Development Goals (SDGs) adopted by the United Nations in September 2015 urge all stakeholders to take necessary actions to end hunger (Goal 1), double agricultural productivity of small-scale food producers by 2030 (Goal 2, Target 2.3) and promote policies that support entrepreneurship (Goal 8, Target 8.3).

India is an agrarian country. Indian agriculture accounts for almost 14 per cent of GDP and employs 52 per cent of the population. It is very important but underperforming sector. To meet the forthcoming demand and challenges, we need to develop and adopt new eco-friendly technologies for increasing our crop productivity. Since long, it has been recognized that crops and soils are not uniform within a given field. Over the last decade, various technical methods have been developed utilizing modern electronics to respond to field variability. This includes geographic positioning system (GPS)-based agriculture, site-specific and precision farming (precision agriculture) which includes computer-oriented technologies, agricultural decision support software, sensors and monitoring systems, GPS and mapping systems, predictive modelling technologies, and unmanned aerial surveillance (UAS) and imaging, etc.

The potential of precision farming for economic and environmental benefits could be visualized through reduced use of agricultural inputs such as water, fertilizers, herbicides and pesticides. Instead of managing an entire field based upon some hypothetical average condition, which may not exist anywhere in the field, a precision farming approach recognizes site-specific variability and requirements within fields and adjusts management actions accordingly. Precision Agriculture offers the potential to automate and simplify the collection and analysis of information. It allows management decisions to be made and quickly implemented on small areas within larger fields.

The Government of India has also launched a number of Initiatives in this direction. The Soil Health Card Scheme is one such major initiative under which soil samples of individual farmers are tested and analysed in various soil testing labs to determine nutritional status and make crop-wise recommendations of fertilisers to enable them to achieve higher productivity.

While government is doing its utmost to assist the farmers in improving farm productivity through efficient use of agricultural inputs, young entrepreneur and start-ups too can play a pivotal role in this national endeavor by developing and commercializing low cost, easy to use devices and diagnostics linked to Smartphone apps for on the spot soil and plant health assessment. Increasing productivity and sustainability of agriculture depends, to a very large extent, on engaging young people in the sector, drawing on their energy and innovations.

In order to engage, encourage and facilitate efforts of young educated minds, BIRAC announces a Call for Proposals for individuals, entrepreneurs and start-ups in the field of Soil and Plant health assessment.

Areas for support

1. *Soil Health Assessment*

- Development of efficient, low cost, easy to use sensors for estimation of pH, moisture, macro and micronutrients, organic matter, etc. for on the spot soil fertility analysis at farmers' field.
- Commercial application of crop modeling & other software, and mobile app to analyze the test results and accordingly advice the farmers to decide on suitability of crops for that particular site based on soil type and its amendments
- Use of Geographic Information Systems (GIS), Global Positioning System (GPS), and Remote Sensing (RS) techniques for capturing variability in physical properties and soil fertility in specific fields
- Big data analytics tools and techniques, IOT, etc.
- Tools/techniques for estimation and diagnostics of both pathogenic (fungi, bacteria, actinomycetes, nematodes, etc.) as well as beneficial organisms (rhizobia, mycorrhizae, etc.) in the soil

2. *Plant Health Assessment*

- Development of sensors/simple tools for assessing nutritional status/deficiencies in plants to plan proper fertilizer application and maximize yield
- Rapid, specific and low cost diagnostic kits for on-site detection of various plant diseases caused by bacteria, fungi, viruses, nematodes, etc. to minimize production losses
- Crop-specific development of pest and disease database based on various soil types and agro-ecological conditions for the forecasting of pest and disease occurrences through simulation
- Use and development of DNA probes/DNA chips/Nano sensors and other plant disease diagnostics methods
- Use of sensors in commodity handling process to ensure food safety and quality, reduce pre- and post-harvest losses, and increase shelf life
- Development of wireless access system and mobile apps for sharing data of diseased samples from fields to the specialists
- Up-scaling the already developed tools for promoting precision farming on regional (larger) scale
- Establishment of "Plant Health Clinics"
- Other related activities

Types of projects supported

What is supported?

- Projects that propose a process/product innovation with significant potential impact or commercial potential
- Projects with clear technology objectives
- Projects focused on establishing or validating proof-of-concept for a technology idea
- Projects aimed at technology de-risking i.e., reducing uncertainties in the technology
- Projects focused on generating and providing the scientific data needed to demonstrate an idea to potential licensors/investors, etc.

What is not supported?

- Basic/exploratory research projects that aim to demonstrate scientific principles/ techniques etc without technology commercialization objectives.
- Projects with no plan to convert ideas into saleable (implementable) technology/ products/services.
- Projects with no element of novelty
- Funding cannot be used to support PhD student research or any other academic research. The grant is not a research fellowship.

Operational Guidelines

Date of calls for proposals

The call would open on 26th January, 2017 and shall close on 15th March 2017.

Who can apply?

- Biotechnology Indian start-ups (*Incorporated under the Indian Companies Act and having a minimum of 51% Indian Ownership*) (Less than 3 years old as on the date of advertisement)/Indian entrepreneurs (*Indian citizen willing to form a Company as per Indian Law*)
- Limited Liability Partnership (LLP) incorporated under the Limited Liability Partnership Act, 2008 (less than three years old as on the date of advertisement) having a minimum half of the persons who subscribed their names to the LLP document as its Partners should be Indian citizens.
- Indian Academic Scientists, Researchers, PhDs, (*who must be willing to incubate in a business incubator*)
(DSIR certification is NOT required)

Duration of project

Proposed project duration can range from 12 to 18 months (No request for extension shall be entertained)

Funding

The funding support to a maximum of Rs. 50 lakhs would be in the form of grant-in-aid. The fund disbursement would be milestone based in 3 instalments as per the details below:

Installment no.	When	Amount
1	Signing of Contract	40% of project cost
2	Completion of 1st Milestone	40% of project cost
3 (Final)	Completion of project and submission of final report	20% of project cost

(Since Last instalment is released after conclusion of the project, its nature would be reimbursement)

IP rights

IP rights will belong to the applicant

Process Flow:

