

White Paper

Soil and Plant Health Campaign

Brainstorming session on:

“Soil and Plant Health : Situation, Needs and Priorities in India”

10th March 2017

Venture Center, Pune.



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On 10th March 2017 Venture Center hosted a one day Brainstorming on: “Soil and Plant Health : Situation, Needs and Priorities in India” with reference to the upcoming funding calls, as part of the Soil and Plant Health Campaign to build momentum around this theme in the Pune region. Venture Center brought together innovators and technologists, NGOs and Social organizations, industry professionals, researchers and students, entrepreneurs and startups with interest in Soil and Plant Health issues, farming technopreneurs and agri-researchers with interest in this theme area.

Soil and Plant Health Campaign

<http://www.venturecenter.co.in/campaigns/sanitation/>

Facilitating technology commercialization and entrepreneurship

Introduction:

The aim of the brainstorming session was to network all stakeholders to help initiate useful projects, start-ups etc in the space of Soil and Plant Health. This brainstorming event is part of a campaign of Venture Center to nucleate and nurture Soil and Plant Health related startups in the Pune region. The session was intentionally timed with the announcement of BIRAC-SPARSH funding call on “Soil and Plant Health” so as to help facilitate startup creation.

The intention of this brainstorming was identification and stream lining of certain key issues in this domain with reference to technology solutions for specific areas like:

- Sensors for estimation of :
 - pH, moisture, macro and micronutrients, organic matter, etc. for on-spot soil fertility analysis
 - nutritional status in plant tissue to determine nutrient deficiency and plan proper fertilizer application
- Softwares/mobile apps to analyse test results for appropriate soil amendments
- GIS/GPS/Remote Sensing techniques for capturing variability in soil fertility
- Big data analytics tools and techniques, IOT, etc.
- Tools/techniques for estimation of both pathogenic (fungi, nematodes, etc.) as well as beneficial organisms (rhizobia, mycorrhizae, etc.) in the soil
- Diagnostic kits for on-site detection of plant diseases caused by bacteria, viruses, fungi, etc. to minimize production losses

Emphasis was on defining problems and areas where technology interventions are needed, exploring user-friendly solutions for using in the community set up and identifying where technology intervention will work within a reasonable time frame and cost.

Workshop aimed to:

- Explore industry-academia/research/farming technoprenuer partnerships in technology development and advancement.
- Foster networks between industry / academic experts / agriculture and farming field practitioners / entrepreneurs
- Introduce upcoming funding opportunities like the BIRAC-SPARSH call for “Soil and Plant Health”.

Schedule		
Time	Session title	Faculty
1330-1400	Registration : 900 Foyer Area	
1400-1415	Welcome to Venture Center and Introduction to the theme of the session: Innovative Diagnostic tools for Soil and Plant Health	V Premnath
1415-1500	Session 1: Set the stage: Soil and Plant Health: Situation, Needs and Priorities in India	V S Rao
1500-1600	<p>Session 2: Brainstorming session Identification and stream lining of certain key issues in this domain with specific reference to technology solutions for specific areas like:</p> <ul style="list-style-type: none"> • Development for sensors/GIS/GPS/remote Sensing techniques for soil fertility and plant health analysis • Development of softwares/mobile apps to analyse test results for appropriate soil amendments • Big data analytics tools and techniques, IOT, etc. • Diagnostic kits for on-site detection of plant diseases 	<p>Moderator: V Premnath</p> <p>Brainstorming panel:</p> <ol style="list-style-type: none"> 1. V S Rao 2. Vidya Gupta 3. Bala Pesala 4. Shriram Deshpande <p>Rapporteur: Priya Nagaraj</p>
1600-1645	<p>Case studies of Entrepreneurship</p> <ul style="list-style-type: none"> • BioPrime AgriSolutions Pvt. Ltd. • Swasti Agro & Bioproducts Pvt Ltd • Molqbits Sensors and Data Pvt. Ltd. 	Renuka Diwan Abhay Shendye Girish Arabale
1645-1700	An overview of SPARSH funding call DBT-BIRAC focused on : Innovative Diagnostic tools for Soil and Plant Health	Sanjay Saxena
1700-1715	Summarizing the session proceedings and way ahead	Manisha Premnath
1715	Networking tea/coffee with snacks: 900 Foyer Area	

Session 1

The first session was focused on setting the backdrop for the brainstorming session. Dr. V. S. Rao, Ex-Director, Agharkar Research Institute, Pune and currently senior visiting faculty at Indian Institute of Science Education and Research, Pune set the stage by talking about different aspects of Soil and Plant Health, highlighting the needs and priorities in India.

Dr. Rao defined basic properties (chemical, physical and biological) that define soil health and highlighted key reasons for decreased crop productivity and soil fertility in India. Some of them included inappropriate cropping systems, misuse of green revolution technologies and lack of efficient technologies to monitor soil health in real time. He identified parameters that could be tested as measures of soil health and a few technologies that do on the spot soil testing for chemical parameters. He described government initiatives and schemes that are currently in place to help farmers determine and manage soil and plant health issues eg. National Project on Development and Uses of Biofertilizer Fund, National Project on Management of Soil Health and Fertility, Soil Health Card Scheme, Farmers Portal Scheme. He stressed upon the limitations in the number of parameters that current diagnostic labs can test due to lack of affordable technologies. He also stated that the future lies in better technologies and plants that use nutrients efficiently.

Session 2

The brainstorming session began with a panel discussion with the following members:

1. Dr. V.S. Rao (Ex-Director of Agharkar Research Institute, Pune. Visiting faculty, IISER, Pune)
2. Dr. Vidya Gupta (Chair and Chief Scientist, Division of Biochemical Sciences, and Head, Plant Biochemistry and Molecular Biology Group at National Chemical Laboratory, Pune)
3. Dr. Bala Pesala (Senior Scientist at CSIR-CEERI, Chennai and Assistant Professor at Academy of Scientific and Innovative Research, AcSIR)
4. Mr. Shriram Deshpande (General Manager - IT Innovation at John Deere India)
5. Dr. Premnath (Moderator) (Director, Venture Center)

Dr. Premnath set the stage for this session by outlining key issues that currently need to be addressed such as Sensing, What to measure, How to process and interpret data. He also highlighted the need for faster processes to validate new products before they were tested on the field.

Dr. Gupta stressed the importance of biotic stress in addition to abiotic stress while considering plant health, meaning, determining how plants respond to pathogens could identify biomarkers that can be used to develop diagnostics for diseases.

Mr. Deshpande spoke towards identifying potential areas where technology or innovation could benefit modern farming. He explained how one of the focus areas at John Deere is Precision Agriculture where India is still in an exploratory stage. Imaging (drone based) is predominantly used as a means to acquire data over large farm areas abroad. While multiple sensors to measure various parameters related to plant health can be used, processing and interpreting Big data in India is an issue. He also mentioned that data from such efforts can result in predictions for de-weeding, pathogen attack, pesticide use and yield.

Dr. Bala suggested the possibility of using spectroscopy with imaging technologies for more useful and better quality data from fields. However, this would require understanding spectral properties of the parameters being measured.

Dr. Gupta also pointed out the importance of early detection as current technologies and awareness allows for late sensing making treatments difficult to achieve their full potential.

The audience was interested in understanding the affordability of drone based technologies for use in smaller farms. Also, possibility for farmers to get large data analyzed from companies was discussed. The panel informed that insurance companies now insist on such kind of data and predictions and funding from them or the government was a possibility with the farmer not having to bear all of the cost. Mr. Shiram explained the process by which the team at John Deere analyzes and interprets data for farmers.

The panel discussion was followed by case studies of entrepreneurship which mainly focused on learnings and experience sharing by entrepreneurs who have already begun their journeys in the theme area of "Soil and Plant Health".

Renuka Diwan from BioPrime Agri Pvt Ltd and an incubatee at Venture Center, highlighted the do's and don'ts to keep in mind while writing grant proposals. She emphasized the key points – technology, innovation, unmet need, scale, sustainability, profitability.

Abhay Shendye from Swasti Agro Pvt Ltd and a Venture Center incubatee, discussed about what private and public funding agencies look for in startups while making funding decisions, focusing on his own technology ideas which were funded via the various funding schemes and awards that his startup has won.

Girish Arbale founder of Molqbits Pvt Ltd and incubated at Venture Center, deliberated on the technology innovations that his startup has initiated in the area of Soil Health using Raman Spectroscopy based methods. His talk gave an insight into how a high-end technology can make a dent in the soil health domain.

The brainstorming session concluded with the highlighting presentation by Dr. Sanjay Saxena, Head of Investments at BIRAC (Biotechnology Industry Research Assistance Council), New Delhi with prime responsibility of Grant Management under various funding schemes such as CRS, SBIRI, BIPP and SPARSH. Dr. Saxena shared the main features of the BIRAC-SPARSH call on "Innovative Diagnostic Tools for Soil and Plant Health", deadline being 15th March 2017, along with the eligibility criteria, the funding details, the timelines and the priority areas under consideration. He also answered questions from the audience pertaining to application process, documents to be submitted and such other details.

Dr. Manisha Premnath thanked the speakers and the participants on behalf of Venture Center with the hope that there would be several innovative applications for funding under this SPARSH call and emphasizing the mentoring, advisory support and technology connects from the Venture Center team for facilitating the application process.
