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AGRI STIMULUS

May 2020

Volume 1, Issue 3

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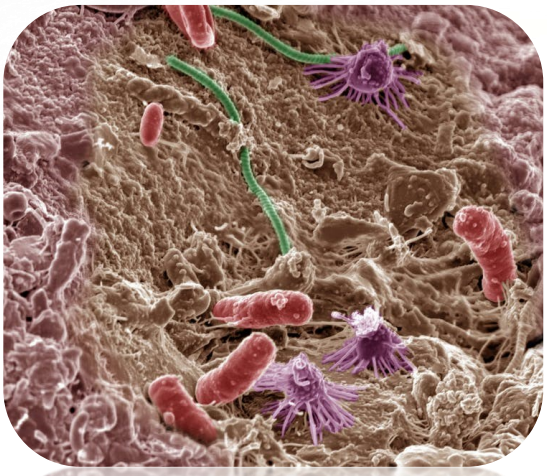
Revolutionizing Ag-Biologicals industry: Microbiome, an innovative approach



Focus in Ag-Biologicals is moving towards microbiome approaches, with novel products being increasingly commercialized. Microbiome describes the genome of all the microorganisms, symbiotic and pathogenic, living in and around plants. The industry is exploring microbes with a common strategy of developing biological formulations, validation and licensing to large seed companies for marketing. The commercialization of microbiome technologies will be impacted by the Convention on Biodiversity (CBD) in Europe and Asia Pacific regions due to stringent biodiversity laws that restrict access to microbes by private sector and the consequent limitation for grant of patents.

Recently, a study conducted by scientists at Northern Arizona University's Pathogen and Microbiome Institute (PMI) along with Purdue University researchers on "Phylogenetic farming: Can evolutionary history predict crop rotation via the soil microbiome?" indicated that while crop rotation is indeed important for yield, the effect may not extend beyond the species level. Therefore, the technological advances in microbiome science will help farmers around the world grow more food at a lower cost.

Pivot Bio (CA, USA) is using the microbiome approach to develop novel microbial nitrogen fertilizers for cereal crops like corn. The company identifies microbes that can fix nitrogen and supply to corn by mapping soil microbiome, analyzing genetics and using biotech tools to amplify the quantity of nitrogen released to the plant. Pivot Bio is using microbiome plus strain optimization approach for identification of microbes that carry the genetics for nitrogen fixation and can interact with crops – by mapping soil microbiome &analyzing the genetics.

BioConsortia, a California based company, was established in 2014 and is focusing on developing effective microbial consortia for increasing agricultural yields. Soil microbiome analysis is the claimed USP of this company. Using a machine learning based prediction system, the company identifies the best soil-based microbial consortia that can influence the phenotype of the plant and selectively increase the desired microbial phenotypes. The company has developed a proprietary high throughput phenotyping platform - Advanced Microbial Selection (AMS) process. The AMS platform is flexible and can be used for biotic and abiotic stress, which allows research into minor crops and their traits.

The investment and R&D activities are growing rapidly in microbiome products and will continue to grow over the next decade.

Increased Application of Blockchain Technology in Indian Agriculture Value Chain

Blockchain has been in the news since the past few years due to one of its implementations, Bitcoin. The market size of implementation of Blockchain innovations in 2018 was INR 425.6 Crore and is expected to grow at 47.8% CAGR. Implementation of Blockchain technologies in the agri- food sector is an upcoming and lucrative market. Blockchain technology, a Distributed Ledger Technology (DTL), is based on de-centralized management of data. To make the current centralized systems more efficient, DTL offers access, storing -storage and synchronization of data across multiple sites, geographies and organizations at consensually agreed nodes. All changes in the documents are immediately updated across all nodes. The Blockchain technology stores verified encrypted data in units called, blocks and as the transactions increase the blocks are added and a chain of the transaction records is formed using a unique cryptographic signature called the "hash" which is assigned to each block. In agriculture this technology is being used to facilitate effective quality of material and transparencies in supply chains; optimization of the food chains by optimizing prices and quantities; tracking transactions and facilitating fairer trading for farmers and micropayments thus facilitating decision making process.

Few top companies like IBM, Walmart, Unilever have already adopted this technology for effectively tracking their food supply chains. New start-ups are implementing Blockchain in supply chain management e.g. MyCrop agritech start-up tracks the movement of seeds right from the seed aggregators to the farmers, thus facilitating the tracking of the quality of the seeds entering the market and providing the transparency and reliability of the seeds; IndiaChain (beta version), a government's Blockchain initiative; Banqu Co., implementing Blockchain for farmers who do not have access to formal financial institutions by creating digital identities with credit history thus facilitating micro-loans; KHETHINEXT, a mobile application using Blockchain by ICRISAT and Eleven01 provides the farmers with clarity in financial transactions and supply chain monitoring along with advisory.

Blockchain promises transparency and reliability, hence implementing them for agricultural purposes will benefit all the stakeholders across the value chain and will also reduce costs and remove middlemen assuring quality and price to end consumers.

Although, many big companies are opting for Blockchain applications to manage their supply chains and many heavy investments are being made to promote Blockchain in agriculture resulting in the rapid growth and high CAGR, there are still some challenges remain on the regulations and standards front across the globe. We believe that it will some time before all the facets of technology are agreed upon and accepted for efficient use in any specific sector, particularly agriculture, where the users of the technology will be the most diverse group.

Artificial Intelligence Transforming Traditional Farming

Digitization is impacting all aspects of life including agriculture. In the recent years, farmers have been introduced to precision agriculture for leveraging technology for better crop yields and monitoring of crops, and are reaping the benefits of these technologies which are cost efficient, safer and also profitable to the farmers. With the growing awareness and implementation of Artificial Intelligence (AI) tools such as drones, smart sensors, and robots there has been an increase in farmer revenue and a tremendous growth in the market globally. The global agri AI market size was INR 245 crore in 2019 and is rapidly growing at a CAGR of 20.96%. Three key applications in which AI technologies have been key drivers for profitability for the Indian farmers are discussed below:

1. **Scrutinizing soil and crop health using AI:** Sensors play a critical role in remotely identifying the soil health. Using infrared rays and cameras give a clearer picture of soil health. They also help in determining the effect of use of different supplements on the health of the soil and plants. Soil imaging also helps us in determining the quantity of crop inputs required for different soil types. Similarly crop health can be monitored and weeds, pest and diseases can be effectively managed. CropIn is providing one such software which enables imaging and monitoring of the crop and soil health. The application also enables predictive modeling based on the data collected and the geographical information collected. Another example is the Testbed developed by Infosys for precision crop management which utilizes the sensor data and imaging data enabling real time management of crop health and effects of changes in external stimuli.

2. **AI powered sowing and harvesting of crops**: AI aided machineries are used for precise sowing with optimal distancing and depth to achieve almost 30% higher yields. In India, Microsoft in collaboration with ICRISAT has developed a sowing advisory application. Using the farm data provided by ICRISAT, this application provides SMS based sowing advisory based on weather forecasting models by Microsoft. The application advices the farmers on the sowing times, weather forecast for the next seven days, fertilizer application and about general plant health. AI powered machinery for harvesting of crops also aid in reducing labor costs and losses during harvesting. With an option of sorting the crops based on the pre-identified grades, the harvest time can be saved and the quality of the harvest is also very good. In India, , GRoboMac has been used in cotton harvesting. It also photographs the area of the cotton plantation and detects blooms. With the help of vacuum and using its robotic arm, it precisely picks cotton, thus avoiding contaminants. This can also be customized to do other labor demanding tasks like weeding, pruning and spraying.

3. **Predicting crop health, risk of pests and pricing using AI**: Predictive analytics has been helping farmers in predicting crop health, risk of pests and pricing too. Based on the data such as sowing time, area and the weather conditions the software can predict the volumes and enables the Governments to predict commodity prices in advance. Government of Karnataka has implemented this. Microsoft in partnership with United Phosphorous (UPL), has created a Pest Risk Prediction application that leverages AI and machine learning to indicate in advance the risk of pest attack. Testbeds of Infosys also provides predictive models for effective crop management.

These software have been revolutionizing farming and the benefits to the farmers are already visible. With the adoption of AI in agriculture, farmers can gain maximum benefits and there is huge potential and collaborations to be explored for the agri and software companies.

Recent Advancements in Agrochemical Regulations

New regulations will boost the Biostimulant industry: Today Biostimulant market in India is largely unregulated with many unorganized players selling the products. These products are currently sold without certification of their efficacy leading to farmers paying heavy price sometimes in terms of economic losses. The prominent players globally and in India include: BASF, AgriLife, Tradecorp APAC Pty. Ltd., Acadian Seaplants Ltd., Biolchim, Isagro, Koppert, Biostadt India Limited, Novozymes, Sapec Group, Valagro, Bayer, Coromandel International Limited, and Syngenta. Biostimulant products recently got regulated in US and European markets owing the benefits of these products for crop and soil health.

The Biostimulant market is currently at INR 1,500 cr and is expected to increase further with rising demands for safe food. To reduce the number of spurious products and increase the quality of Biostimulant products in the market, the need was felt for regulating the market. The government of India is soon going to announce the guidelines for its regulation. The draft guidelines through amendments in the Fertilizer Control Order, 1985 for inclusion of Biostimulant has been prepared and issued for public consultation. The amendments made in the FCO are expanded definition of fertilizer, inclusion of Biostimulant definition. As per the draft guidelines, Biostimulant will need to be registered and efficacy studies at National Agriculture Research System (SAU and ICAR) at 3 different doses for minimum one season from 3 locations must be conducted before launching the products in the market. The manufacturer/ importer shall apply Form R along with details like source of ingredients, chemical composition, physical and chemical properties of active ingredients, method of analysis, shelf life, bio-efficacy trials, toxicity details, heavy metal composition. Further, the products will also have proper labelling of the products including the manufacturer's name, ingredients and expiry date. No product will contain pesticide beyond permissible limit of 0.01 ppm.

With these regulations in place, farmers will benefit from genuine products and will help in improving the farm yields. This will further boost industry as the companies will increase their investment in R&D for development and marketing of better products benefiting both farmers and consumers.

Increasing trend of Bio-pesticides registrations: Recently, CIB&RC conducted its 415th meeting on 11th May, 2020 through video conference. A total of 15 technicals and 20 formulation products were approved for registration which includes 3 herbicides, 6 insecticides, 5 fungicides, 2 plant growth regulators and 19 bio-pesticides. Bio-pesticides accounted for nearly half of the total registrations approved in the meeting. The companies whose products got approved include Best Crop Science with 4 registrations, Grace Bio Care Pvt. Ltd. and Fishfa Biogenics with 3 registrations each. Other major companies which got approvals include Crystal Crop Protection Pvt. Ltd., Godrej Agrovet Ltd., and International Panacea Ltd. The new registrations technicals and formulations which are approved includes herbicides- Pendimethalin + Pyrazosulfuron ethyl, Pretilachlor, Metolachlor; insecticides- Alpha-cypermethrin. Apart from these other chemicals have got me-too registrations and among Bio-pesticides many have got 1st, 2nd and 3rd extensions.

Banning of pesticides to have varied effects on Indian pesticide industry: Expert committee commissioned in July 2013 to review agro-chemicals which were banned or restricted in other countries but were in use in India. Out of 66 such agro-chemicals, the government has already banned 18 pesticides in 2018, 2 in January 2020, and now have announced to ban 27 more pesticides keeping in mind the hazardous nature of these pesticides and their impact on environment. Another 6 are still under review while remaining 15 have been found to be safe for use as of now. The Crop Care Federation (CCF) of India recently claimed that Indian indigenous products match the global standards. CCF also revealed that 97.2% of pesticide samples were quality products meeting manufacturing, sale, import, transport, distribution and use of these pesticides. These chemicals are widely used by Indian farmers. These 27 pesticides account for roughly 18% of the domestic market valued at INR 22,000 crores and 10-15 percent of export market for crop protection products. Moreover, there is no clarity on whether they can be manufactured for exports. These pesticides contribute nearly 70% of the total INR 20,000 crores export market. The banned pesticides include Acephate, Atrazine, Benfuracarb, Butachlor, Captan, Carbofuran, Chlorpyriphos, 2,4-D, Deltamethrin, Dicofol, Dimethoate, Dinocap, Diuron, Malathion, Mancozeb, Methomyl, Oxyfluorfen, Pendimethalin, Quinalphos and Sulfosulfuron. The government has granted 45 days' timeframe for companies to share their views and raise objections, if any before taking final decision. We feel that the industry is set to oppose the draft order as the ban will not only limit farmer options, but will be detrimental for the "Make in India" model. These products account for 22 percent of the agrochemical industry's annual revenues in India and a complete ban of these pesticides will lead to estimated loss of INR 9,600 crores.

NEWS

Software for variety trail management launched

Agronomix Software Inc, a software company in Canada launched a new variety testing and Plant Breeding software Genovix. The software is capable of managing variety trials and support plant breeding programs.

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Proteins ensuring pollination increase in crop productivity

Successful pollination of flowering plants can lead to increase in cereal crop productivity. On these lines, University of Adelaide and Shanghai Jio Tong University researchers discovered two proteins in rice that are essential in the successful pollination of flowering plants.

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Rising premiums in the Crop Insurance Scheme result in two more states opting out of it

2-3% increase in premium for the voluntary crop insurance scheme, has resulted in farmers opting out of the scheme. As the number of farmers opting out is increasing, the premiums will also increase, along with the burden on the state governments. West Bengal, Bihar, Punjab and Andhra Pradesh have already exited and now Telangana and Jharkhand too opt out.

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NEWS

Cotton Association cuts 2019-20 cotton production estimate by 7%

The COVID-19 Pandemic has affected almost all industries, one of which is cotton. Due to this disruption the cotton consumption has gone down and Cotton Association of India has further estimated lower consumption for next year. The committee has also reduced cotton production estimated by 7% for the next year. The import of cotton into India is also estimated to reduce as domestic cotton is more economical and easily available.

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e-NAM portal gaining popularity

Online agri-market platform e-NAM has now integrated 1000 wholesale mandis in 18 states and 3 union territories. The purpose is to create 'One Nation, One Market' for agricultural commodities. Currently, 150 commodities are being traded on e-NAM which includes food grains, oilseeds, fibres, fruits and vegetables.

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Record target of food gains expected after increased Kharif sowing

An increase 35% than previous year of has been reported in Kharif sowings and government is pinning high hopes on good harvest claiming the water in major reservoirs across the country is 50% more than previous year. The government is confident on meeting the record targets set of 298.3 million tonnes for food grain production.

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Private Seed companies delivering agri-inputs to farmers

On the similar lines, private companies are thinking about last mile delivery of agri-inputs to farmers. East West seeds, a Thailand based global vegetable seed company has recently collaborated with e-retailers like Agrostar, Bighaat, Dehaat and Gramophone to supply vegetables seeds to farmers.

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First digital seed portal by IIHR

The industry trend of adopting more digital solutions by supplying agri-inputs at farmer's doorstep is picking up. First online seed portal in India by public sector in horticulture is launched by Indian Institute of Horticultural Research (IIHR). IIHR aims that this portal will help to reach farmers even in remote areas.

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Drones deployed to track locust attack

While we are fighting against the deadly COVID-19 Pandemic, another nightmare is on the horizon. The locust attack in five states of the country along the India-Pakistan border because of the longer than usual monsoon and frequent cyclones in Indian Ocean. Drones have been deployed to track their movement and Government is also considering to import satellite derived tools and sprayers to minimize the impact.

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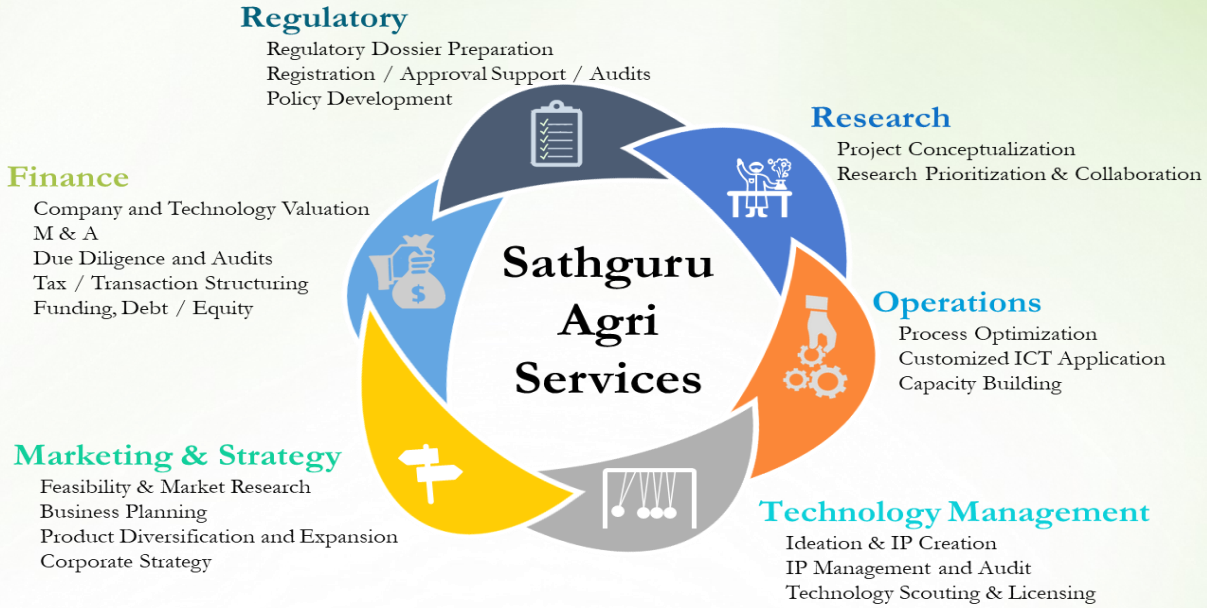
Sathguru Insights

Sathguru Services

Sathguru offers a whole spectrum of services for the Agri-input companies



Case studies

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