



Confederation of Indian Industry

125 Years: 1895-2020

## **Advanced Technology Programme in Agriculture Global Dialogue on Next-Gen Agri Technologies 17- 18 September 2020 : CII Hive**

The role of Technological innovations and their actual deployment is integral to accelerate the transformation of the agricultural sector and help attain the vision of “Aatmanirbhar Bharat”. The recent Agricultural reforms introduced by the Government will enable a market driven environment that is conducive to increase investments and exports.

To create a sustained dialogue and interaction between Technology developers, Entrepreneurs, Innovators, Academics and other stakeholders from the Agribusiness Industry and Government, and to ensure the right deployment of the global technologies in the Indian agriculture sector, CII organized the Fourth Edition of its flagship **Advanced Technology Programme in Agriculture on 17-18 September 2020.**

The two-day programme that was held in partnership with the Ministry of Agriculture and Farmer’s Welfare, Govt of India, and the Embassy of the Kingdom of Netherlands, witnessed deliberations between the sectoral experts from across the world. Speakers from India, Netherlands, Singapore, Australia, United States and Brazil shared the present status of research, development, and techno-commercial deployment of next gen AgTech solutions. In line with the annual theme of CII’s FACE, the four segments under the spotlight were – AgRobotics, Bioinnovations, Digital Ag, and AgNanotech.

During the Opening Session, **Prof Ramesh Chand** released the vision paper on ‘Digital Agriculture’. This is the 1st paper in the series and will be followed by detailed vision documents on Robotics, Nanotechnology and Biotechnology. The objective of these papers is to provide a roadmap to deploy these technologies on ground through a collaborative effort between government bodies, industry partners, and CII.

The opening session reverberated the national theme of Technology Led Resilience for a Self-Reliant Farmer, Self-Reliant Agriculture, and thus a Self-Reliant India.

**Prof Ramesh Chand** in his keynote address said that the ongoing Covid-19 crisis has changed the fundamental nature of food production and has made imperative the need for greater resilience in the farming value chains. The solutions to meet these challenges and grow more in a sustainable manner would transcend boundaries and combine elements from different technological segments. These solutions must also be practical and farmer centric and focus on judicious use of inputs, optimum usage of technology, youth involvement, along with collaborative Public-Private Partnerships.

Speaking at the opening session, **Mr Venu Rajamony**, Ambassador of India to the Netherlands mentioned that the partnership between the two countries is flourishing and through its Centers of Excellence, Dutch technologies and innovations are being transferred to Indian farmers.

**Mr. Guido Landheer**, Assistant Vice Minister for Agriculture, Nature and Food Netherlands shared that the Indian and Dutch Government are encouraging the innovation in breeding techniques, Green House, soil management under the agriculture innovation track to make agriculture more climate resilient.

The other panellists opined that while half of Indian workforce is engaged in agriculture and agriculture related activity yet the sector accounts for a comparatively small portion of the GDP. Hence there is an enormous potential for growth within the sector owing to the intensive agricultural resources that India has including the largest arable land resources in the world.

### **Robotics in Agriculture: Building Autonomous Farms of Future**

The Session on Robotics and Automation discussed on expert tech development and deployment examples from key institutions across the world. Advances in technology have also resulted in highly productive farms managed by autonomous robots. Sowing, pruning, weeding, harvesting, and several other steps of the farming cycle are carried out by robots that run on AI based algorithms. However, the solutions need an equally skilled technical human resource to be operated and deployed. Initiatives by leading Indian technology institutes help build this capacity by inviting students into local disruption workshops and creating a next generation of skilled workforce.

#### **Key takeaways**

1. With the ongoing pandemic, the need for robotics and automation in agriculture has become paramount.
2. The goal is not to replace the existing workforce but to provide them with tools that help reduce costs and increase efficiency of the farming process.
3. Capacity building of the existing and future workforce is also necessary and including robotics and automation related programs within the education system can be an important step.

### **Biological Innovations: Harnessing the Potential of Genes and Microbes for Improving Agri Efficiencies**

The Session on Bio-innovations were focussed on using genetic engineering, microbiological, and other life sciences tools such as Gene Editing, CRISPR-Cas, Genetic Modification, Biologicals for Pest Control, Abiotic-Biotic Stress Management, among several other important topics. The session emphasised on an approach that is based on sound techno-economical market research-based innovation development. Farmer focussed technology development that is addressing an important market need is suggested as the route to be taken to accelerate tech commercialization. It was also suggested that the Globally Standardized Practices, progressive regulations, and practical pricing should be the focus of the sector going forward.

#### **Key takeaways**

1. The country has a need and even technical know-how for biological innovations.
2. In combination with other digital tools, gene editing technologies can be an important factor for enabling precision farming.
3. Regulations and legislations that are synonymous with the need of the present times are required.
4. Research needs to be done with the final product in focus, the problem statement must be defined, and a business case prepared before public and private research organizations fund a large amount of capital into developing any product.

### **Nanotech Advancements in the Industry and their role in Reshaping Agriculture**

The Session on Nanotechnology was discussed on the Nanochips and sensors are being developed to be used to automate urban farm management and enable real time monitoring of pathogens by monitoring stress levels in the plant. These can also monitor nutrient uptake and light conditions and thus reduce yield loss. Nanomaterial based sensors such as the ones developed by international collaborative initiatives in Singapore are extremely sensitive and

selective, can detect changes and allow interventions in real time and that too in a non-intrusive/disruptive manner using temporal and spatial analysis of plant metabolites.

While use of nanomaterials such as metals, oxides, sulphates, sulphides, and phosphates is being looked at for agricultural purposes, the deployment of these and more advanced Nanotech innovations in the sector can be accelerated by creating benchmarks and guidelines that are universally acceptable and recognized.

### **Key takeaways**

1. Nanoparticles are already being used as agri-inputs and are providing much needed protection and nutrition to the crops.
2. Next gen nanotech products such as nano chips are being developed to be used for farm automation especially in the case of protected cultivation.
3. These digital nano innovations will help build the farms of the future and also accelerate urban farming within our cities.

### **Digital Agriculture: Data Driven Solutions for Optimizing Value Chains**

The global experts at the Session on Digital Agriculture elucidated the role each tool plays in digital agriculture such as data obtained from satellite and other remotely sensed tools, software and algorithms to process and generate insights and last mile delivery mechanisms such as instant messaging and call centres to deliver the information to the farmers. It was emphasised that a plethora of applications that are built without the farmer in focus would discourage them towards using it but rather a single holistic platform that is designed to be farmer focussed.

### **Key takeaways**

1. Segment in which majority of global innovations are based.
2. Globally organizations such as CSIRO, Yara are using different data sources, combining them with advanced analytics, and developing outputs for precision farming.
3. CSIRO's PAT is a plug and play tool that can be used to generate agronomic advisory.
4. Yara, DCM Shriram use tech for customized solutions for small holder farmers.
5. IIT Bombay is developing next gen innovations that optimize resource usage.
6. The financial aspect for deployment of these solutions is also paramount and institutions such as The World Bank (IFC) are supporting ventures with this.

### **Spotlight on Global Innovations**

At the session spotlight on Global Innovations, leading AgTech Ventures from Australia, Netherlands, and India were presented their innovations, disruptive nature of their technologies along with the commercial roadmap they undertook. The session also encapsulated the very essence of the advanced technology programme and showcased the potential that agriculture sector can reach.

The innovations surmised all the technology segments deliberated in the previous sessions. Ventures showcased the many avenues of collaboration and partnerships for co-developing and co-creating solutions.