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SmartAgri

SUMMIT 2022

SUSTAINABLE AGRICULTURE
THROUGH AGRITECH SOLUTIONS

-Report

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1. INTRODUCTION

Usage of technology in agriculture space is becoming crucial in India. The country's agriculture sector, which is worth US\$370 billion, continues to remain the main source of livelihood for over 58 percent of the population and contributes 19.9 percent (FY 2021) to the national GDP. However, despite the sector's contribution, it remains stalled in structural weaknesses that prevent growth of the sector and the population which is attached to the sector. To achieve the goal of Doubling Farmers' Income, Indian agriculture needs technology-aided modernization, backed by resilient reforms and this is where Agritech is expected to play a significant role.

The Indian agriculture sector needs dedicated reforms, policies, and technology intervention to boost productivity and efficiency. At the same time, corporates, banks, micro-financing firms and agritech start-ups also need to work in close tandem in solving the on-ground problems of farmers. India currently has over 1300 agriculture start-ups which are actively employing Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), etc. to increase efficiency and productivity in the sector.

The Bengal Chamber of Commerce and Industry (BCC&I) feels it is important to create a platform for deliberations of all stakeholders which would in turn help in formulation of concrete recommendations for designing the way forward.

1.1 Why Hyderabad?

Telangana has identified agriculture as a priority sector. The State is now focusing on developing technology-based solutions to benefit the farmers and policymakers. It has been envisioned to make Telangana a prototype State to bring a digital revolution in India's agriculture sector. The State has started using technology to a great extent for achieving digital transformation across the agrivalue chains by working with all stakeholders to realise tangible benefits for the farmers. BCC&I feels that the capital of the State, Hyderabad is the best suitable place in the country to create a platform for knowledge assimilation and dissemination in the space of Smart Agriculture.

1.2 Objectives of the Summit

The main objectives of the summit were:

- To frame strategies and policies which can act as an enabler for sustainable agriculture
- To discuss the desired structural changes in policy, technology, and investments to address the various challenges faced by the Farmers
- To understand and deliberate upon the approaches that can lead to mitigating credit risks of both financial institutions and farmers
- To discuss initiatives and role of agritech start-ups in enhancing agricultural practices and reducing wastage to ultimately benefit the farmers
- To understand the challenges faced by Farmers in acquiring input supplies and ways to overcome them
- To bring together the stakeholders who play a key role in connecting Farmer Producer Organisations (FPOs) to market directly, reducing the role of mediators in agri-marketing

This report contains the summary of the speeches of all the distinguished speakers who shared their vision and ideas in the day long summit which led to major findings and finally formation of recommendations towards the objective of the Summit – that is preparing future strategies for smart agricultural development in India.

2. INAUGURAL SESSION

The honourable speakers of this session were:

- Shri Singireddy Niranjan Reddy, Hon'ble Minister for Agriculture, Cooperation & Marketing, Telangana Govt.
- Dr. Ashok Dalwai; IAS, CEO, NRAA, Ministry of Agriculture and Farmers' Welfare, GoI & Chairman, Commission of Doubling Farmers' Income.
- Mr. Subir Chakraborty, President, BCC&I. MD & CEO, Exide Industries Ltd.
- Mr. Sachin Sharma, Vice President & Head – Channel & Dairy Operations, ITC Ltd.
- Mr. Ram Kaundinya, Director General, Federation of Seed Industry of India
- Dr. P. Chandra Shekara, Director General, National Institute of Agricultural Extension Management (MANAGE)
- Ms. Susheela Chintala, CGM, NABARD, Hyderabad
- Mr. T Narayan Reddy, President, Association of Pesticides Manufacturers (APMA)
- Mr Jayanta Chakraborty, Chairperson, Agriculture & Rural Development Committee, The Bengal Chamber & Consultant, Indofil Industries Ltd.



(L-R) Mr Jayanta Chakraborty, Chairperson, Agriculture & Rural Development Committee, The Bengal Chamber & Consultant, Indofil Industries Ltd; Mr. T Narayan Reddy, President, Association of Pesticides Manufacturers (APMA); Mr. Ram Kaundinya, Director General, Federation of Seed Industry of India; Dr. Ashok Dalwai; IAS, CEO, NRAA, Ministry of Agriculture and Farmers' Welfare, GoI & Chairman, Commission of Doubling Farmers' Income.; Shri Singireddy Niranjan Reddy, Hon'ble Minister for Agriculture, Cooperation & Marketing, Telangana Govt.; Mr. Subir Chakraborty, President, BCC&I. MD & CEO, Exide Industries Ltd; Ms. Susheela Chintala, CGM, NABARD, Hyderabad; Mr. Sachin Sharma, Vice President & Head – Channel & Dairy Operations, ITC Ltd.; Dr. P. Chandra Shekara, Director General, National Institute of Agricultural Extension Management (MANAGE)

2.1 Attaining Sustainability in Agriculture Through Policy Interventions Is Key: Jayanta Chakraborty, Chairman, Agriculture and Rural Development Committee, BCC&I

The conclave started with a Welcome Address by Mr Jayanta Chakraborty, Chairperson, Agriculture & Rural Development Committee, The Bengal Chamber & Consultant, Indofil Industries Ltd. He explained why The Bengal Chamber had chosen to organize this Summit in Telangana. Telangana is a prototype state to bring digital revolution in agriculture. Agriculture based knowledge and research centres are very much present here. To name a few - MANAGE, Indian Institute for Oilseeds Research, Agricultural Universities, KVKs and many more. Telangana is also a seed hub for India with seeds being produced and supplied to all parts of India from Hyderabad. Telangana is also host to a diversified portfolio of crops and has an excellent irrigation system along with hard-working and innovative farmers. So there is technology, research institutions, knowledge hub, governments policy support and brilliant dedicated farmers and hence the choice for Hyderabad as the Summit venue.

Attaining sustainability in agriculture through policy interventions which balances and takes into consideration the subsidies given to farmers and free rations given to consumers is key

He went on to say that earlier in agriculture, challenges were production, processing, and consumption but in recent years sustainability and climate hazards have gained prominence. For policy makers the key challenge is to ensure a balance between farmers price and consumer price. Government gives support to farmers like direct support, input support like fertilizer subsidy, insurance support etc. Similarly, government is giving tremendous support to consumers like giving free ration for the last couple of years, so there is a big correlation between farmer price and consumer price. The galaxy of leaders present here is most well suited to discuss about how policy can play a crucial role in attaining sustainability in agriculture.



Mr. Jayanta Chakraborty, Chairperson - Agriculture and Rural Development Committee, BCC&; Consultant, Indofil Industries Limited delivering the Welcome Address

2.2 Thematic Address: Mr. Subir Chakraborty, President, BCC&I and MD & CEO, Exide Industries Limited.

Mr. Subir Chakraborty, President, BCC&I. MD & CEO, Exide Industries Ltd. gave the theme address on “Attaining Sustainability in Agriculture – Policy Plays Crucial Role”. He said that The Bengal Chamber, the oldest Chamber of Commerce in India, works in more than 30+ verticals which include Agriculture. With the changing global setting, this vertical is becoming more imperative for The Chamber. He believed that the platform we have formed by envisaging this Summit would be of immense importance. It aims to create a confluence of pioneering ideas of policymakers, think tanks, practitioners and industry which may enable us to discuss the possible ways through which India can attain sustainability in agricultural space.

The Sustainable Agriculture Programme for India should first address the issue of water scarcity and dwindling groundwater reserves

Attaining sustainability in agriculture is a global task. However, to accomplish that, every country needs to design a roadmap considering the staple food habits, livelihood dependence on the farming sector and most importantly the socio-economic status of the country. The National Mission for Sustainable Agriculture (NMSA) was formulated for enhancing agricultural productivity especially in rain-fed areas focusing on integrated farming, water use efficiency, soil health management and synergising resource conservation. Needless to mention that implementation of NMSA by all the States of the country is crucial.

In India, 80% of the surface water is utilised for agriculture, putting significant pressure on groundwater resources. These resource pressures are particularly in the States with a high agricultural output of water-thirsty crops like paddy, cotton, and sugarcane. If practices continue as usual, India could soon face an unprecedented groundwater crisis, which will have a massive impact on the country's agro-economy and food security.

It was his understanding, that the Sustainable Agriculture Programme for India should first address the issue of water scarcity and dwindling groundwater reserves. However, it would not be an easy task. Because if you see the statistics of the last financial year, the combined output of summer and winter rice stand at 125 million tonnes, which was a record and very close to the highest rice producing country of the world, China. India is currently the largest rice exporter of the world. In the last fiscal, the total foreign exchange earnings from agri sector, was from paddy, 40% of the total. Hence, reducing rice production overnight is probably not an affordable solution. Drastic steps may hinder the country's food security, farmers' income, and foreign exchequer. On the other hand, the greatest environmental concern is, in India rice consumes about 4,000 – 5,000 litres of water

per kg of grain produced. On the other hand, another rich carbohydrate which is millet needs 30% lesser amount of water. However, if we so, wish we cannot shift from paddy to millet overnight.

He drew the attention of the distinguished audience to both side of the current scenarios and said that the more we discuss and share our thoughts; the more it will help us to reach a suitable solution addressing the interest of all stakeholders.

According to him. there are several schools of thoughts which we need to explore. **'More crop-per drop'** has been the mantra of current public policies around irrigation water. However, micro-irrigation processes such as sprinkler and drip system are practiced only by a few States. 69.5 million hectares of land in India has the potential for micro-irrigation. Currently, only 7.7 million hectares are under micro-irrigation. The usage of technology is widely suggested in reducing agri-inputs. I understand that several Agritech companies are here today and they are providing pathbreaking solutions by leveraging technology. But we need to remember that in our country more than 80% of farmers are small and marginal farmers. Having access to technology is a challenge for them. So, we need consolidation of farmers to be able to reap the fruits of latest technologies. Forming Farmer Producer Organizations (FPOs) is an applaudable mission of the Government. Each State should take active initiative in forming FPOs. FPO helps small and marginal farmers in many ways for enhancing their income. However, for success of the FPOs, banks and financial institutions play a key role. If there is a need to reconsider the policies to provide credit access to FPOs, then that should be considered. If we sincerely believe that agriculture needs to be transformed into a viable agri-business sector then access to credit is crucial. All these concerns demand policy level intervention.

He believed, to attain sustainability in agriculture sector, investment in research and development is equally crucial. Policy makers need to seriously consider ways and means of encouraging intensive research in this sector.



Mr. Subir Chakraborty, President, BCC&I and MD & CEO, Exide Industries Ltd. delivering the Theme Address

2.3 In the Coming Year Telangana State Will Have Irrigation Potential of Over 1 Crore Acres: Shri Singireddy Niranjan Reddy, Hon'ble Minister for Agriculture, Cooperation & Marketing, Telangana Govt.

The Hon'ble Minister said that he was happy that the Bengal Chamber of Commerce had chosen the capital city of Hyderabad as the venue for the Summit. It is a coincidence that the oldest Chamber of Commerce has organised this Summit at the youngest State of the country. He welcomed the delegates coming from different parts of the country to Hyderabad and he wished that their participation will enrich the discussions in the Summit.

Kaleshwaram lift irrigation project undertaken by Telangana govt. was completed in a record time of three years and has created irrigation potential of over 40 lakh acres.

He lauded the vision of the Hon'ble Chief Minister of Telangana which paved the way for making Telangana the best agrarian state of the country. The pro-farmers initiatives that have been taken by the Telangana government instilled a lot of confidence in the farmers. It has rooted out the misery of the farmers, rooted out the drought and famine in the state.

He lauded the work of rebuilding the water bodies that was there for more than 1000 years. Almost 46000 tanks have been reconstructed, desilted, renovated,

strengthened and enhanced resulting in supply of water and also the development of ground water. Also, the policy of supplying quality power to farmers 24/7 infused further confidence among farmers and that led to cultivation. Not even a single hectare of land is left without cultivation, bringing the total stated cultivable area under cultivation. This also adds to the national production.

He further stated that these days in Telangana you do not find persons in the rural areas who suffers for want of any work or allocation. Hardly there is any surplus labour and there is always deficit labour. That is the reason that Telangana State is depending on neighbouring states. Now not only Telangana provided employment but also people from neighbouring states are being helped.

This year the cultivation of paddy has gone up to 68 lakh acres during Kharif season which is an all-time record. Except Punjab no other states can compete with Telangana state in paddy production now. Combining both Rabi and Kharif season the acreage crosses over 1 crore acres which is a great achievement.

As per the minister, the supply of water to the farmers was the biggest challenge when they were part of composite state of Andhra Pradesh. Ever since the state of Telangana was carved out, they have overcome the water and power problem and the farmers have been brought out from the trap of debt. Twice loan waivers to farmers have been given amounting to some 20000 crores, which has completely changed the life of the farmers.

Mr. Reddy said that the State has also taken up many major irrigation projects, some completed and some ongoing. For ex the Kaleshwaram lift irrigation project was completed in a record time of three years. Water had to be lifted from sea level to 650 m above sea level. This has additionally created a potential of 40 lakh acres and now the second phase of the project will add another 15-20 lakh acres. Apart from Kaleshwaram there is the Sitamma, Palamuru Ranga Reddy, Dindi.

Currently the irrigation potential stands at 75-80 lakh acres of irrigation potential in Telangana in a year we will complete 1 crore acres of irrigation potential in the state. All these things have brought a radical change in the agricultural sector. Added to these is the innovative scheme the Rythu Bandhu - the direct input subsidy given to farmers, 10000 Rs per acre per annum given to 65 lakhs farmers amounting to 1 crore 50 lakh acres of agricultural land. Every year giving 15000 crores to farmers directly as input subsidy. Brought about tremendous change in the farming community.

The minister lauded that farmers now have a lot of self-confidence and self-respect. He is a role model to the country now. Previously farmers holding even 15-20 acres used to come and work in Hyderabad as daily wage labourers at the construction sites but now even a farmer with 1-2 acres of land is also very high.

The agricultural land value now has gone up manifold considerably now – Rs 2 lakh rupees per acre. Farmers with 2-3 acres of land have now become crorepatis.

The Telangana state expects more support from the Government of India (GoI) in the future. There are many more things in favour of agriculture in Telangana – seed hub for the country, best place for logistics, export, connectivity. Geographical location of Hyderabad is advantageous for national growth. Mr Reddy hoped that this Summit and its deliberations will throw a greater light and pave for greater things in the future.



Address by the Chief Guest – Shri Singireddy Niranjan Reddy, Hon'ble Minister for Agriculture, Cooperation & Marketing, Telangana Govt

2.4 Doubling Farmers' Income – Role of Policy: – Dr. Ashok Dalwai, IAS, CEO, NRAA, Ministry of Agriculture and Farmers' Welfare, GoI & Chairman, Commission of Doubling Farmers' Income

Dr. Dalwai was impressed by the motivational and inspiring address by the Hon'ble Minister and by his practical knowledge of agriculture and his passion for agriculture.

He lauded the fact that the two great states Telangana and West Bengal were coming together for this Summit. He said that it was very appropriate that this Summit is being held in Hyderabad, a

1 percent growth in agriculture removes more than 10% of poverty and no other economic sector can compare with agriculture in this regard.

technology hub where digital revolution is happening in partnership with Bengaluru. For agriculture, this is certainly a major hub, whether it is academics or research. Partnering this hard technology in agriculture is the digital technology as applied to agriculture also taking birth and blossoming in Hyderabad.

He was very happy about the resurgence in agriculture in Telangana state with the farmers being supported by policies. He said that "there is an effervescence in the way the agriculture is progressing and the farmers have begun to feel a new welfare for themselves. And I also agree that agriculture is no longer a primary economic activity is actually a necessary pump primer of the overall economic growth of any state, any country, any society."

He mentioned that any economic growth in agriculture bring a major benefit in the eradication of poverty. 1 percent growth in agriculture removes more than 10 % of poverty and no other economic sector can compare with agriculture in the eradication of basic poverty and with a large number of people dependent on agriculture, any economic growth in this primary sector brings about a larger ratio of equitability and therefore fulfils the basic objective of our constitution and in real terms it creates new demand because of increasing purchasing power and therefore supplies made by other economic sectors find a market. Hence agriculture is necessary to be supported and to be provided a conducive environment for its consistent and continuous growth all the time.

According to Dr. Dalwai those who normally get associated with industry and service sector have begun to talk about agriculture and dedicate their energies, finances, intellect, and organisational abilities to agriculture sector. We many a time do not recognize what is the true ratio of this sectors' contribution to the country. We are used to hearing that the contribution of agriculture to the Gross Value Added (GVA) of the country is declining. What used to be 63% in 1951 has now come down to around 16%. But in absolute terms, it is much more than this. In fact, the raw produce of agriculture is what sustains a lot many industries. The entire agro processing is supported by agriculture. If we change the parameter, our approach to measuring the contribution of agriculture to GVA we will easily find that what is 20% will go up to minimum 30%. So, we need to recognise the solid contribution that the agriculture sector makes.

Speaking on the theme of today's discussion - Smart Agriculture - and under that sustainability through agricultural technologies he emphasised that the first thing that comes to his mind is can we transition agriculture to agribusiness or agri-enterprise which means that profit is the prime purpose. Therefore, we will start looking at maximising the production, optimising the cost of production and how to fetch remunerative prices and reaching out all our agricultural produce to the market such that we are able to monetise and transfer maximum money on the

agriculture produce to the farmers. Only then can we think of profits. We should remember simultaneously that the smartness of agriculture does not mean only so much because in enterprise an entrepreneur does not consider what negative impacts his initiatives are leaving on the society and the environment. Sociologically he might be exploiting the labour force and in ecologically he might be exploiting nature and over a period both becomes unproductive. Therefore, when we talk about Smart Agriculture, we should perceive it as enterprise plus something more. Only then can it become sustainable.

So, according to him, the two prime objectives of Smart Agriculture must be to generate employment and income for the farmers since they are the entrepreneurs and to simultaneously do it in such a way that our Mother Earth is not compromised. But world over what we have seen particularly in the last 250 years since the beginning of the industrial revolution and transferring the characteristics of Industrial system of production to agriculture is large quantum of GREENHOUSE gas emission which has resulted in climate change. So, the world believes today and rightly so, that economy and ecology are hard to be put together in the same vehicle, always an apparent contradiction between ecology and economy. So, smart agriculture or any smart enterprise must look at ways to harmonise ecology and economy. That is, we achieve economic growth consistently to remove poverty and improve the lives of our people but simultaneously that our ecology is nurtured and sustained.

He said that practising the harmonised systems so that India continues to grow is the biggest challenge today in the 21st century. But then there is technology to help us. Technology, per se, is not adequate. It is a necessary condition but not a sufficient condition. We need to combine technology with business principles which are also sustainable. The themes that have been chosen are all meant to address these issues. Things like input management, output management, risk management are all very critical. The agri products which is the final output across the subsectors of agriculture; crop husbandry, horticulture, dairy, livestock and fisheries, aquaculture are all biologically nature and they need some inputs to produce them, therefore input management becomes very important.

Simultaneously, output management is very important, because we should know how to use what is the outcome of that input. To make that case very clear to you, in India, as in many other countries, we have not been able to connect our agriculture produce with the consumption centres and we have not been able to connect because we may be producing what the market does not want. So as a first principle, we should be producing what the markets wants. Second, we should know how to connect efficiently connect in time with the markets, hence the need to connect to other states and export therein. But how do we connect unless we

have efficient agri-logistics. So, we need very healthy, robust logistics that help us to transfer the surpluses locally into the far-range markets through good storage (perishables and non-perishables), transportation (normal trucks and refurb vans) and processing systems (to increase shelf life). Also, there are many other partners like pack houses, ripening chambers etc.

He further said that. in the absence of this comprehensive agri-logistics and processing facility in our country in 2015 we lost Rs 93000 crore worth of agricultural produce because it could not reach the market, it decomposed resulting in loss for the farmer, country, and the ecology. Decomposition led to emission of greenhouse gases. So, output management is as important as input management. But indiscreet input management is also irrational. Use more of water, pesticides, fertilizer, labour, power - not an efficient way of doing things. We need to use most rational ratio of inputs otherwise the cost-benefit ratio does not work out. After all, if we say that it has to be a cost plus economy as it used to be before 1991 then we cannot have people buying things. So, a cost-plus economy is a failure. We need a competitive market environment, therefore if we want our produce to be competitive in the domestic and international market, we need to cut down costs. Government may give Minimum Support Price (MSP) on some crops but not all.

The short point is that we need to be efficient in input and output management. Even if we are efficient with these two there is a third major risk, the production environment - monsoon, pests, markets. Prone to risks right from pre-sowing up to the final marketing stage. We cannot stop but only mitigate the risks through the deployment of technology and management practices. So, three basic pillars if we want to make agriculture successful are input management, output management and risk management and the approach to this is practicing Smart agriculture.

So, according to him, the first step to smart agriculture is to adopt an agricultural value chain - this enables the farmgate with the market. So, we need to build that highway consisting of roads and other infrastructure, information, management principles. So, any states which wants to practice Smart agriculture, it must support the farmers and other stakeholders to use this highway and this highway has to be superimposed by a number of layers. Anything that helps in efficiently connecting the farmgate to the market is a component of the highway.

So, how do we bring in the technology layer? He advised that, what is required is a blend of hard technology and emerging technology (digital technology). Taking in the simple case of hard technology - how to reduce the usage of water and do soil management. Use of micro irrigation will cut down the usage of water by at least 50% and simultaneously help in maintaining the soil and also aiding in higher productivity. All the researches have shown that whether it is agriculture or horticulture, use of micro irrigation brings about a yield improvement by at least 33

- 50% which is what we want. So, how do we promote micro-irrigation? For ex, - the per-capita availability of water has come down to 11-1200 cubic metres which was at 5000 at the time of Independence. So, what crops do we need to grow. If we grow paddy, we need 3000-5000 litres of water for 1 kg of paddy whereas we can grow Jowar at 300 litres/kg. So, should we grow Jowar or Rice?

Today one of the important commodities we are exporting is rice. Effectively we are exporting water to these western countries which are indirectly taking away our water. Therefore, crop planning becomes very important and Telangana has become one of the first states to have started crop colonies - agro-ecologically sound cropping plans. So, when we plan for this with respect to the usage of inputs and simultaneously keeping in mind the needs of the people.

If agriculture is mandated first to ensure food security, are we ensuring it? What I would suggest is when you talk about food security talk about nutrition security. Basically 6 nutrients (Macro 3 and micro-3) are required for good health. Sustainable Development Goal (SDG) number 3 is talking about health and well-being. You cannot have health and well-being without meeting these basic nutrients. Therefore, we need to move from carbohydrate production only to comprehensive nutrition management i.e., more of pulses which will give us proteins, more of livestock and fish which will give us animal based proteins, oilseeds which will give us fats, horticulture which will give us minerals and vitamins and amino acids. So, our crop planning must be in sync with two things, with our resources and people's health and well-being. So, water management becomes very critical.

Soil management - soils have degraded, one of the important components we have lost is soil organic carbon. There is more organic carbon in the atmosphere and therefore there is rising temperature and less in soil which should be supporting our crops. The average ratio of organic carbon has come down to .3 in rain fed areas. Without organic carbon we cannot have micro-organisms and earthworms, so any amount of addition of nitrogen, potassium, phosphate gets fixed. It is there in the soil but not available to the plants. So, technology says, why don't you test the soil and know what is there and what needs to be added.

How to apply digital technologies? From the very simple level of sharing the information with the farmers and other stakeholders to predicting new opportunities and new vistas that is available to us. At input management stage the farmers need knowledge of what to grow and that will come from upgrading agricultural value chain to agricultural value chain system (AVS). We need the farmers to grow what can be sold, and therefore market intelligence is very important. So AVS allows two-way communication of information that means produce is moving from the farmgate to the market but before that the markets

are communicating the intelligence to the farmers on what is the likely demand and price.

So, we need to predict the prices, forecast the demand, for which we need market intelligence, statistical tools, forecasting of pests, forecasting of weather, forecasting the diseases, all these requires digital technologies. So digital technology combined with statistical models will help us understand the likely problems in future and therefore take advance steps. We do not have basic data, for example, the cropping data covered. So, we need applications to have proper survey of the crop-standings so that the country knows, what is the likely production matrix and all this will depend on application of digital technology. We need technology to ensure that input-management is effective. We can have drones for example, which will be more effective in ensuring more efficient management of pests and diseases rather than going through manual operations. Then, we have, geo-spatial technologies, which can help us in a number of ways. For ex, how to survey trees outside of forests. We can use spatial technology to identify the species being grown and then to know exactly how much of canopy cover are we creating outside. So, a basket of technologies is available to us now.

He said that we can also use sensor-based technology which is more efficient than taking the soil to the lab. We must also be open to genetically modified technology. There might be many ethical issues but today new technology is emerging, which solves our ethical issues.

Everything is available, but can the farmer adapt it since it costs money and that is where we need to capacitate the farmers financially so that he can buy the technology available. This is where access to institutional credit becomes important. Also, even though he might have the money he might lack knowledge, so we need to continuously upgrade his knowledge and bring him up to speed.

He further said that, for all this, we need to encourage the support the government gives to farmers. They are in the most challenging job; they need to be supported. Their business is always controlled through inflation management. In inflation basket, 40% of the weightage is given to agriculture commodities. We do not want the prices to shoot through the rooftops. Farmers cannot dictate the prices as the manufacturer of a car can do and hence, they need to be supported. So, direct transfers to the farmers are all very progressive steps.

He congratulated the Bengal Chamber of Commerce and we should see how we can translate the concepts, ideas, basket of technologies and business management principles into operational guidelines into actionable, programmes such that it quickly spreads to people in real terms and farmers become more healthy partners in the economic and social growth of the country.



Shri Ashok Dalwai, IAS, CEO, NRAA, Ministry of Agriculture and Farmers' Welfare, GoI & Chairman, Commission of Doubling Farmers' Income delivering his address on Doubling Farmers' Income – Role of Policy

2.5 Farm to Fork – Developing a Robust Agri Value Chain: Mr. Sachin Sharma, Vice President & Head – Channel & Dairy Operations, ITC Ltd.

According to Mr. Sharma, at ITC, they practise sustainability at scale. They have been carbon positive over 17 years, water positive over 20 years and solid waste recycle positive for 15 years. ITC is present over 20 agricultural commodities and value chain, ranging from oilseeds to milk, plantation crops to FMCG etc.

The first and foremost building block in the agricultural value chain is the farmer linkages and connect. We have over the years created a robust farmer connect through 6100 e-Choupals

He mentioned that the first and foremost building block in the agricultural value chain is the farmer linkages and connect. ITC have over the years created a robust farmer connect through their 6100 e-Choupals. They have started building an FPO network with over 750 FPOs.

Reflecting on some of the challenges and opportunities the agriculture sector is facing, he said that while our agricultural production and exports have gone up, our productivity is still low vis-a-vis global standards, our share of global trade also

remains low in spite of what we produce, there are climate change risks as also the issue of food security.

On the farmers side he said that we need to connect farmers with markets, deal with their low landholding sizes, manage or mitigate post-harvest losses which are still quite high, and improve their market linkage to increase their price realization.

He revealed that there are a lot of growing opportunities as well.

- There is increasing food demand
- Strategic partnerships are happening between countries like that between India and UAE, UK etc which gives enormous potential to exports
- Government support and policies on farmer collectives,
- Digitisation and even growing consumer awareness.

One focus area for us and for everyone into agribusiness is to increase productivity and production so that farmers' income increases, and country production improves. Also, leveraging digital tools to solve problems at scale while having personalization. It is very important that what we produce is linked to the market in a sustainable way. Converting crop diversification into value addition and food processing so that you can not only serve consumer well but also support farmer in an efficient way. Last but not the least is to build agri value chains while addressing the climate challenge.

He focussed on how some of these problems can be solved and said that the building block for sustainable agriculture value chain is a robust network of farmer collectives since individual farmers with lower land holding cannot solve the problems. So we should aggregate farmers via FPOs and create strong institutions at the grassroots level. Second is use technology - possibilities like leveraging AIML, satellite imagery, image analytics and so on. Next is migrate from production led to demand led supply chains. Increase food processing and last is focus on climate smart agriculture.

He stressed the development of a phygital network - physical connect along with a digital network. They have recently launched ITC MAARS, which is a phygital ecosystem. On one side we have created a digital super App for farmers which has all the farmer needs at one place: market linkage platform for agri-input, a customised crop advisory in multiple crops, a credit linkage with tie-ups with banks all done with a layer of physical connect via e-Choupals and FPOs. Whole idea is to improve the productivity, reduce the transaction cost and have customised solutions at scale.

ITC has curated some digital technologies which have a lot of potential to solve farmer problems. Digitisation of the entire value chain brings efficiency and cuts down costs and that is what we are doing with MAARS.

ITC has come up with piloted sensor-based soil testing at scale and farmer need not take their soil to labs but instantaneously test and get a customised advisory. Image analytics gives you speed of response by way of disease diagnostic, IOT sensors, mechanisation through drone and rapid quality assaying etc. A personalised advisory for the farmers based on AIML has been developed. Farms are segmented and given advisory on crop sowing, weather forecast, nutritional level. So, these content help farmers solve its problem at the village level. There are other services of ITC MAARS like, platform for supplying inputs, an e-marketplace where he can sell his output and credit and mechanisation services through the banks.

Aspiration is (have just started 5-6 months back this new version of e-Choupals) to take it to 10 million farmers and in supporting 4 thousand FPOs. ITC is also partnering with Ministry to Agriculture and working with 750 FPOs.

Next is how to connect farmers with market. So, here the focus is inclusive value-chain development. Through their various food brands like atta, juice products, chips etc they try and link these brands with the farmers. So, this is how to connect farmers with markets. Also working with farmers in Telangana to have reduced pesticide spray, have integrated nutrient management and in making the produce food compliant and thereby getting the farmer a premium for doing so. They are able to take this produce to the export market. This is being done in case of specialty coffee in Andhra and wheat and frozen vegetables elsewhere.

Another thing is to build these value chains through crop development and certification programmes if we are to connect farmers with export. So ITC doing a lot of certification programmes and also partnering with government through various public private partnerships. Also there is a network of collaboration with various agricultural institutes to get the best practices to the farmers.

3 Case Studies were highlighted by him:

- 'Baarah Mahine Hariyali' – Over 2 lakh farmers currently connected. 30% of farmers have experienced doubling of income. Income has increased in 40-45% in Wheat and Paddy. Running in East UP and Bihar Well-thought out and can be visualised.
- Medicinal Plants in Central India and Madhya Pradesh – Wherein 7000 acres of Tulsi and Aswagandha are being grown by farmers. 25 - 35% income increase has been observed over conventional crop.
- Food safe spices being grown in AP, Telangana and Karnataka.

These projects help farmers and ITC in having the right quality of produce at the right regions.

In Millet value chain development same philosophy goes. ITC has developed sourcing strength of 5 types of millets which are connected to the markets through 5 millet brands. Focus is to build more FPOs and farmer connect in millet. ITC MAARS is also supporting millet farmers through specific inputs.

How to do the above in sustainable way. There are four focus areas

- How to develop agriculture as climate smart agriculture.
- Within agriculture how do you do it sustainably: resource conservation, soil water and sustainable cultivation practices
- Product sustainability: Can we have a certification of Indian producer which makes it export compliant for customer outside
- How to do this while increasing farmers income?

To conserve water, we have created lot of water structures, check dams, ponds wells in the rain fed areas. For soil conservation we focus a lot on zero tilling and broad-based furrow planting and we have experienced that GSD emissions come down by 47%.

Sustainability is the core in all our programmes. So, ITC promotes high yielding varieties which are also climate smart. Have tied up with Indian agricultural research institute for this.

He concluded by saying that the country must move from a reactive approach to climate change to a pro-active approach. How to be future-ready? We are doing a study on Identification of global climate hotspot in agriculture for the value chains which are important to India. Idea is to identify hotspots and start proactive measures.



Mr. Sachin Sharma, Vice President & Head – Channel & Dairy Operations, ITC Ltd. delivering his address on 'Farm to Fork' – Developing a Robust Agri Value Chain

2.6 Sustainable Agriculture – Building Blocks: Mr. Ram Kaundinya, Director General, Federation of Seed Industry of India

"Dr. Dalwai mentioned about marrying the interest of ecology and economics, I would like to add politics to it so that we can have policies for sustainable agriculture" said Mr. Kaundinya.

Today, there is just one health – bodily health and environmental health together. If we eat right, the farmer will produce right.

According to him, any form of agriculture interferes with nature since there is no cultivation in nature. So, it is important that we do our agriculture in a way such that we can conserve the natural resources and make them usable over longer period of time.

Soil, water and biodiversity are the three natural resources that we talk about. So how do we reduce acreage of water guzzling crops or how do we make them use less water through different technologies.

He pointed out three challenges going against sustainable agriculture:

- High chemical input usage
- Depletion of natural resources (Soil, water, bio-diversity)
- Climate Change (high temperatures, unseasonal rains, droughts, flooding).

This year we have seen both high temperatures in March which affected wheat yields and too much rains during monsoon times. A World Bank report which came out recently predicts job-loss and deaths due to heat beyond human survival limits in India within a very short time - if carbon emissions remain high.

Referring to the growing population and huge budget of food subsidies he said that that there is a considerable amount of population at the bottom of the pyramid who needs affordable food. We have to look at the following

- Lack of profitability of farming on one side
- Lack of sustainable practices on other side
- Consumer prices and making them available to large section of population at affordable prices
- Political situation as the fourth dimension

According to him there are three important parts of sustainable agriculture

1) Profit for the farmers - Farmers will not follow sustainable practices if they do not make money at the end of the day. This is where the challenge lies.

2) Environmental stewardship- We generally do not include environmental cost in the cost of production. If we include it in rice it will go to 150 Rs/kg - 200 Rs/kg. Today, we do not have that system. There is a need for this to be factored into. Then decide whether it is worth producing rice using 5000 litres/kg. Ploughing the field has been discarded by the world long time back. It destroys the top soil. System of zero tillage followed in many of the developed countries which preserves the top soil and preserves the soil structure. This needs policy support. Maintaining soil organic matter is another important area.

3) Social responsibility by all stakeholders concerned. Corporates have to understand that their products and their practices must protect environment. Ethical business practices and food safety need to be followed.

Public policy plays a major role in shaping our behaviour. Sustainable development goal number 12 talks about responsible production and responsible consumption. It is consumption which drives production. If consumer wants to eat things bad for his health, then that is what is produced. Today, there is just one health - bodily health and environmental health together. If we eat right, the farmer will produce right which will be good for the environment.

He further gave some policy recommendations.

- Free water and free electricity do not help. How to get a policy that serves both political purposes and sustainability purposes - answer lies in micro-

irrigation. We need to put more money into micro-irrigation rather than big projects.

- Number two is that we give subsidies on fertilizer, direct benefit to farmers, etc. Instead of using the money on subsidies can we incentivise farmers to follow sustainable practices. Maybe we create a carbon credit market in the country and tell the farmers how to access that system and is benefited by that by following sustainable practices.
- Large scale promotion of high-quality biological products is another area. Biological product research must be stepped up in the country and we have to access technologies available at the global level and bring them into country. Take farmers away from chemical uses. However, not all chemicals are bad. Safer chemicals available, need to bring that technology into the country. For ex off late, we have not developed a new pesticide in the country. All have come from outside.
- There is a serious need to reduce acreage under rice. We need to diversify the crop portfolio and incentivise farmers for that.
- Policies should support technologies that can minimise the environmental footprint of agriculture. For ex. GM technologies. Studies show that they have reduced carbon emissions in the world equivalent to removing 1 crore cars from the roads. Studies have shown that herbicide tolerant technologies have resulted in over 300 million tonnes of carbon sequestration in the soil. Reduced tillage, improved soils and weed controls result in improved yields. So, we must look at everything comprehensively rather than in isolation. So sustainable farming must be practiced, but it should not compromise yield.

Sustainable agriculture must be a part of sustainable living. Sustainable agriculture cannot be in isolation. We cannot be using fossil fuels on crores of cars and use air-conditioners and then say we want to follow sustainable agriculture. So, consumers and urban population must adopt sustainable living and dietary habits. Demand of meat is growing; every kg of meat consumes 5 kgs of agricultural produce. We need dietary habits friendlier to environment. Lancet report has predicted how dietary habits have to undergo change to make the world more sustainable. Sustainable clothing is another area. Only cotton garments get decomposed in the soil in a few months and other man-made fibres linger in the soil for longer periods.

Some of his recommendations were

- Organically produced clothes not necessarily sustainable. Wear cotton clothes instead.

- Policy imperatives - education of consumers - campaign run by the government and other stakeholders on the environmental impact of the food we are eating.
- Difficult recommendation is to have environmental tax on some of the foods that we are eating.

Overall, there is a significant opportunity but farmer education is the key. Education has limitation, financial imperatives have greater impact on behaviours.



Mr. Ram Kaundinya, Director General Federation of Seed Industry on India deliberating on Sustainable Agriculture - Building Blocks

2.7 Agripreneurship - Development for Nextgen Agriculture: Dr. P. Chandra Shekara, Director General, National Institute of Agricultural Extension Management (MANAGE)

Mr. Chandra started by sharing his views on ground soldiers required for rolling out smart agriculture. He said that his purpose in coining the word Agripreneur in 2002 was to carve out a special space for entrepreneurs in the field of agriculture. Today Agripreneurs are a force to reckon with.

MANAGE in the year 2003 started a program for input dealers. Third-party studies indicate that because of the program the confidence of the input-dealers increased. These input dealers are very critical for promoting smart agriculture.

He highlighted three important Agripreneurs who are available in the field with whom we should be working.

Large number of agricultural graduates are coming out from agricultural universities – around 80,000. Dr. Dalwai's report says that for every extension worker there are 1,162 farmers. Practically it is impossible for public extension functionaries to reach all the farmers all the time, so we must look for private extension service providers. So, here is an opportunity. Even though large number of agriculture graduates are coming out, we are unable to attract and retain them in agriculture since they are largely job-seekers. How can we transform job seekers into job producers? So, in order to realise this vision, GOI launched a program called Agri-clinic and Agribusiness centres in 2002. Around 45 days training is given, focus is on Agripreneurship development in their ecosystem. Market surveys are promoted. They prepare a DPR and it is submitted to banks. NABARD provides a subsidy, 36-44% subsidy and banks provide loan up to 20 lakhs rupees. So, in the beginning we had a lot of apprehension whether agricultural graduate is ready to go to field and start his own enterprise. Then, after 5-10 years large number of success stories surfaced. One of the third-party evaluations conducted on the study said that farmers working very closely with agripreneurs, the impact and the yield is around 17.4% for a period of 34 months. 74% of the farmers indicated that they are very happy with the quality services provided by these private agriculture doctors.

Another important outcome of this scheme is that each established agripreneur, created jobs for other 6 people in the rural areas. Today, we have trained around 82000 agricultural graduates out of which 36000 are in field and undertaking around 32 categories of different agri-ventures. 2.18 lakh rural youth are employed under these apart from creating self-employment for themselves, they brought technology to the doorstep of the farmers, they brought diversification, they reduced the cost of cultivation. They live in villages, available 24/7 to farmers and give value added extension services to the doorstep of the farmers. This is very critical for smart agriculture.

One of the challenges we faced here is getting loan and subsidy for these graduates. One of the innovative initiatives we started in Telangana was a tie-up between NABARD, SBI and MANAGE and we signed an agreement wherein they certify and in principle sanction letter were given to whoever gets the training. In the first four programmes more than 90% of the graduates got the in principle sanction letter.

The second important player is input dealer who provides seed, fertilizer, pesticides, and free information to the farmer. More than 60% of the farmers seek information from input dealers. Not all of these input dealers are from agricultural background which limits their passing quality information to farmers. MANAGE in the year 2003

started a program for input dealers - Diploma in Agricultural Extension Services for Input Dealers (DAESI), wherein they are taught basic agriculture on Sundays. They learn about soil, water, environment, pests and diseases, business ethics, post-harvest technologies etc. They get all this in a 1-year period after which they get certificate after tough examination. This has been highly successful. GOI declared it as central sector scheme and now out of Rs 20000 Rs 10000 comes from input dealers and 10000 from agribusiness companies or from GOI. We, have trained around 57000 input dealers and another 20000 input dealers are undergoing training. Third-party study indicated that because of the program the confidence of the input-dealers increased. These input dealers are very critical for promoting smart agriculture.

Third and very important set of professionals who can help smart agriculture are agri-startups. Earlier these start-ups are discouraged, but now the ecosystem is very much favourable for these agristartups thanks to Government of India policies. Raftaar is one program under which whoever comes out with new ideas are incubated with grants are given up to Rs 25 lakhs. MANAGE in touch with around 1000 start-ups. Agri start-ups play a very important role in input efficiency and maintaining sustainable parameters in the soil.

He concluded by talking about the Jai Jawan Kisan program wherein retired soldiers are attracted to agriculture. They are qualified and bring discipline to agriculture. Many more initiatives like this are being undertaken.



2.8 Credit Linkage for FPOs – Critical for Attaining Doubling of Farmers' Income: Smt. Susheela Chintala, CGM, NABARD, Hyderabad

Smt. Susheela Chintala was very happy that BCC&I has chosen Hyderabad as the venue.

*GOI and NABARD have come up with **NAB Sanrakshan** which will prove to be a game-changer in the area of credit for the FPOs.*

She said that it is a well-known fact that India is going to become the most populated country in the world which will bring problems like food security, climate change, pressure on land and natural resources, farmers with dwindling land holding and we are talking about doubling of farmers income, this is important because farmer is the foundation of our economy.

We have already highlighted that farmers should stop producing what he feels like but start catering to the demand for the produce. Then comes the challenge of access to market, improved productivity, lowering his costs, coming up with higher margin. All these things are possible only if they are aggregated to FPOs.

GOI looked at the success of the scheme rolled way back in 2012-13 pilot programme by NABARD and then rolled out these 10000FPOs scheme. Today there are 16000 FPOs supported by various stakeholders like NABARD, SFAC, private sector, various foundations. Now, we need to ensure that these FPOs are sustainable.

Challenges they are facing is that their share capital is very limited and hence they need credit to grow. Since NABARD had floated the FPO concept it also had to prove to the sector and to other bankers that FPOS are bankable. Hence, we piloted different models, we started with single digit financing, then two digit and today NABKISAN which is a subsidiary of NABARD and finances around 1600 FPOS. So here is a success story of NABKISAN and only when FPOs are given credit can they grow further which can make possible the doubling of farmers' income.

Average loan given to FPOs is Rs 20 lakhs which is just a starting amount for them. GOI and NABARD have come up with a credit guarantee fund – NAB Sanrakshan. This credit guarantee fund will prove to be a game changer for the credit requirement of the FPOs. RBI has declared FPO financing as priority sector financing i.e., up to 5 crores. A lot of capacity building programs, 16 modules developed by BIRD the training establishment of NABARD at Lucknow to take care of regional requirement of FPOs.

She further said that FPOs need to be funded right away. Out of 1600 FPOs the rate of default is only .0001%. NABKISAN and NABARD have given the rating tools to RBI

who in turn shared with IVA which came up with a circular for all banks. Bankers are also given a lot of awareness programs and capacity building programs.

State governments are also taking a lot of interest. About 370 FPOs in Telangana by NABARD out of which 151 have been financed for Rs 28 crores. TRIPOR had tied up with NABKISAN have come up with subsidies for cold storage etc. FPOs have begun diversification of crops and immersion programs with start-ups.

All roads are now leading towards agriculture along with digital revolution and it is in the best interest of all stakeholders that FPOs survive. Start-ups want to engage with the farmers through the FPOs. Today the FPOs most important requirement is both working capital and infrastructure funds. There is the agri-infrastructure fund announced by the GOI, the working capital must be provided by banking fraternity. Demand is more for working capital.

Encouraging farmgate infrastructure like sorting, grading simple processing mills and dal mills and other things for value addition needs to be encouraged.

She added that all the players have already assembled for doubling of farmers' incomes like NGOs, Government, NABARD, Startups, MANAGE and other academic institutions, it is time to start playing the game which can only happen with Credit to FPOs.



Ms. Susheela Chintala, CGM, NABARD, Hyderabad speaking on Credit Linkage for FPOs - Critical for Attaining Doubling of Farmers' Income

2.9 Agri Inputs: Capacity Building – Crucial for Attaining Sustainability in Agriculture: Mr. T Narayan Reddy, President, Association of Pesticides Manufacturers (APMA)

Mr. Reddy started by saying that Hyderabad's connectivity is unparalleled. Any remote village can be approached within 2 hours and that 90% of the villages can be covered within 2 hours. Also, younger farmers today have learnt the digital technologies and use their Smartphones freely for solving their problems by corresponding with agricultural scientists etc.

In agriculture we might not be able to reduce the labour cost so much and so we should focus on reducing the input cost and increasing the productivity per hectare.

During COVID period lot of logistic disruptions happened but as far as agri inputs was concerned it was ensured that no shortage of crop-care product is there across Telangana and the country.

Across the globe 20 crop care products are consumed widely. Out of this 20, 18 are manufactured in India. Today best of the products are available to Indian farmers at reasonable prices.

He emphasised that today we are importing around 13000 crores of raw material and finished products of the crop care products and the bright side is that we export close to 33000 crores. This means what we produce we are exporting to not only South East Asian countries but also to developed countries which proves the high quality of Indian products.

As far as his recommendations are concerned, he said that there is an indigenous production which should come under Production Linked Incentive (PLI) scheme so that domestic producers can produce more and more.

Export capabilities of the domestic manufactures can be expanded. Some incentives can be given. As Mr. Ram Kaundinya said no product is being invented. We should do a lot of research. There should be budget allocation. All this will reduce the cost of cultivation.

For any crop, 50% of the cost is labour cost which we might not be able to reduce, rest is input cost. We need to increase the productivity per hectare. Agricultural universities and private players need to chip in for that.

Talking about APMA, he said that it was established in 1996 and has 35 members. We provide quality products and services. We educate the farmers to use the right application of the product at the right time at the right price. Farmers health is our

safety. Every year we dedicate 2 days to educate the farmers on safe usage of pesticides and on destroying the containers. We cover around 5000 villages.

Policymakers should investigate storage issues which is likely to crop up when we increase production.

Also, we should refer to farmers as agri-businessman so that bankers can relate.



Mr. T Narayan Reddy, President, Association of Pesticides Manufacturers (APMA) delivering his address on Agri Inputs: Capacity Building - Crucial for Attaining Sustainability in Agriculture

3. TECHNICAL SESSION 1 ON AGRI INPUT: SUSTAINABLE FARMING – FUTURE OF FOOD SECURITY

The honourable guests for this session were:

- Session Moderator- Mr. Jayanta Chakraborty, Chairperson- Agriculture & Rural Development Committee, The Bengal Chamber and Consultant, Indofil Industries limited
- Mr. R K Goyal, Director, South East Asia, Australia & New Zealand, Verdesian Life Sciences LLP, US
- Mr. Deb A Mukherjee, Former President, BCC&I, Managing Director, Cenergist Energy Private Ltd.
- Mr. Abhisek Dhanuka, Director, Dhanuka Agritech
- Dr. Markandeya Gorantla, Chairman & Managing Director, ATGC Biotech



(L -R) Mr. Jayanta Chakraborty, Chairperson- Agriculture & Rural Development Committee, The Bengal Chamber and Consultant, Indofil Industries limited; Mr. Deb A Mukherjee, Former President, BCC&I, Managing Director, Cenergist Energy Private Ltd.; Mr. R K Goyal, Director, South East Asia, Australia & New Zealand, Verdesian Life Sciences LLP, US; Mr. Abhisek Dhanuka, Director, Dhanuka Agritech; Dr. Markandeya Gorantla, Chairman & Managing Director, ATGC Biotech

3.1 Mr. R K Goyal, Director, South East Asia, Australia & New Zealand, Verdesian Life Sciences LLP, US

Mr Goyal started by emphasising that for all the stakeholders in the agri ecosystem, the farmer is the ultimate nucleus and customer. So, if the farmer is happy the country will grow. Around 600 million people are engaged in agriculture directly or indirectly.

We need to focus on making agriculture both sustainable and safe. Excessive use of inputs is a problem both for the soil and the environment.

The Agri Input industry is around 44 billion USD. We need to focus on making agriculture both sustainable and safe. One farmer in India is using 100 kgs of seed for wheat for one acre in MP and another in Northern India using only 40 kgs of seed. Similarly, potato farmer in Western UP are using almost 5 bags of DAP against the recommended dose of 3 bags of DAP. Such excessive use of inputs is a problem also for the soil and the environment.

We need to increase the nutrition value of our crops with less pesticide so that we become healthier. Also, we should focus on how to have healthy seeds.

He further spoke about Verdesian and said that it is one of the biggest companies having nutrition efficient product. One of our customers in North India has reduced the seed rate from 40 kg to 34 kg. Also, with the trials of Agricultural University Hissar, we could prove that by the application of one of our product Seed Plus the seed rate can be reduced by 10 to 15% per acre and the yield is better.

With the help of government, we are bringing a technology to optimise urea and DAP. Every farmer currently is using urea. Urea production for the company is costing Rs 2450 per bag but sold to farmer at 266 rupees. Meaning 90% subsidy. In Indonesia or Nepal, the urea is sold at above Rs 2000 per bag. 70% of nitrogen gets evaporated or nitrified, only 30% of nitrogen is going to the plant. We have a solution for this loss and wastage - Nutrisphere - polymer technology which can prevent nitrogen from getting evaporated.

The government is promoting Nano-urea - which is good but cannot be a replacement of Urea. Can only be a supplement, an add on.

As far as DAP is concerned, we do not produce any phosphorus in India, everything is imported whether as a raw material or as a bulk fertilizer. We consume 12.3 million tonnes of DAP in India and currently there is a lot of shortage because of Russia war. A bag of DAP to government is costing 4773 Rs but available to farmers at Rs 1350 with almost 60% subsidy. In DAP 25% of phosphorus is going to the plant and balanced is fixed in the soil. We have a technology to prevent this. Verdesian specialises in stabilising your fertilizer.

He called for coming together and work in a collaborative manner to attain sustainability and make farmers happier.



Mr. R K Goyal, Director, South East Asia, Australia & New Zealand, Verdesian Life Sciences LLP, US speaking in the Technical Session 1 – Agri Input: Sustainable Farming – Future Of Food Security

3.2 Mr. Deb A Mukherjee, Former President, BCC&I, Managing Director, Cenergist Energy Private Ltd.

Mr. Mukherjee started by thanking Dr Dalwai for giving us such an excellent overview and giving us the true value-proposition, which set the tone for the day.

The two important aspects that drive sustainability is caring for the environment and responsible use of resources.

He said that sustainability is a very loaded concept and the generic aspects of sustainability needs to be contextualised and customised to suit specific applications and domains and that is how it needs to be used.

The two important aspects that drive sustainability according to him is

- Caring for the environment – which is the climate part of sustainability
- Responsible use of resources

In the context of farming, we look at primarily increased productivity in terms of the output when we talk about food security which is one of the most pressing challenges going forward.

The second most important is preservation of soil quality because that is what determines farming.

Third would be the optimised use of natural resources – specifically water. It is going to be the scarcest commodity going forward in time. Judicious, efficient use of water in farming becomes imperative. Taking care of the above would take care of our food security.

He further focussed on water and energy. Optimised use of water in precision farming and a concept – Agrivoltaics. Putting solar farms indiscriminately on land and degrading the land or not putting land to productive use is also a challenge. How can we come up with smart models, through digital technology to ensure maximised value out of the use of water.

He talked about smart irrigation and informed that the big issue in micro irrigation or precision farming is that the discharge of water at the root of the plant is not equitable and of constant flow. It will depend on the pressure flow on the terrain and the expanse of the terrain. We need an equitable discharge of flow of water even in a drip or sprinkler system so that there is uniformity and control in the output. So, use of sensor and advanced sensor technology with built in affordable intelligent algorithms to drive low-cost logic controllers to drive our water pumps and flow of water into the network needs to be used.

According to him, we need to ensure that the discharge at every outlet point is constant irrespective of the change in water pressure at the input level. So, the output level is constant. Technology to do this is available and affordable. We have pressure independent drip systems, pressure independent sprinkler system and equitable water distribution management system which can be deployed in the use of precision farming.

Second point is agrivoltaics – use of photo voltaic or solar energy in an intelligent manner depending on the crop cultivation. For example, with plants that are shade tolerant.



Mr. Deb A Mukherjee, Former President, BCC&I, Managing Director, Cenergist Energy Private Ltd. deliberating in the Technical Session 1 – Agri Input: Sustainable Farming – Future of Food Security

3.3 Mr. Abhisek Dhanuka, Director, Dhanuka Agritech

Mr. Dhanuka started by reminding us of the slogan by Shri Lal Bahadur Shastri – "Jai Jawan, Jai Kisan". Like the soldiers are protecting our borders, the farmer is contributing to the food security of the nation because of which we can sleep in peace. Even during Covid lockdown our farmers were tilling in the field.

With the Sri Lankan example ahead of us it is very clear that there is no food security without agro chemicals.

He said that today agrochemicals importance is being felt by people in the sector but the public at large look at it with negativity. But with the Sri Lankan example ahead of us it is very clear that there is no food security without agro chemicals. They ran out of foreign currency so they were finding ways and means to ban the use of chemical, fertilisers, and pesticides but now they have revoked the ban.

Today agro chemicals are rated as the No. 12 focus industry of the GOI. Pests are still causing about 15 to 20% of agri-produce loss. This is pre-harvest loss. Indian market is reported to be at 2.8 billion dollars for agro chemicals with another 25000-30000 crores of exports taking place.

While we are growing economically, we also find that the global hunger is also growing. However, production is not able to keep pace. India at global hunger index is ranked at 101 out of 116.

Coming to Indian food security, India is the second largest producer of paddy and wheat whereas the productivity is very low. Insect and disease infestation is one of the important reasons which makes the role of agrochemical more important.

When we look at the contribution of agriculture to GDP in different countries what we find is that the pesticide usage is very high in China, USA etc. The GDP contribution to agriculture in these countries is miniscule. In India GDP contribution is 17%. The consumption of pesticide in India is still so low. If we can make pesticides available to farmers, we can increase farm productivity and increase contribution to GDP.

Agrochemicals are growing to become all the more important since we are very soon going to be having 150 crore population in India.

Talking about the sustainable initiatives in agriculture he focussed on agricultural drones. With the growing education will the new generation be ready to spray pesticides. Wearing protective equipment in the Indian climate is challenging and hence pesticide spraying will not be having manually.

Already in the tea sector, they are having difficulty spraying areas on hilly terrain comprising of thousands of thousands of hectares. Indian government have already brought out a drone policy and different companies are doing trials with their products.

Then there is precision farming. With the intelligent tools in place, we will be able to predict what pests or diseases are going to come up and we can have preventive sprays.

He opined that the role of biologicals is going to increase as the shift is there from synthetic chemicals to biologicals.

Seed treatment is another area which agrochemical industry is focusing on. This reduces the load of chemical in the environment.

We are shifting towards greener technologies. The industry is moving from toxic chemicals to safer industry.

He concluded by requesting the policy-makers to reduce the GST on agrochemicals which is taxing the farmer. Currently there is huge increase in the price of fertilizer and pesticide this year from China. Cost has almost doubled in many products.



Mr. Abhisek Dhanuka, Director, Dhanuka Agritech delivering his address in the Technical Session 1 - Agri Input: Sustainable Farming - Future of Food Security

3.4 Dr. Markandeya Gorantla, Chairman & Managing Director, ATGC Biotech

Dr. Gorantla revealed that pests are now creating epidemics which conventional solutions cannot handle. So how do we modify the insect behaviour to change its exponential population explosion. So these are these molecules which will change the behaviour of the insect and control their population so that conventional tools can manage the pests.

Pests' epidemics cannot be handled by conventional solutions but using behavioural modifiers which prevents the mating of the pests.

We came up with the concept of behavioural modifiers. We use this technology to confuse males in the field which prevents their mating. This technology is a no pump no spray technology wherein with 100 gms we can manage a pest for 30 days and with 2-3 tubes (300gm) a season of 5 months, the key reason being there is no population in the field at all. Each source point created will behave as an artificial female and the male will never be able to go to its virgin female for mating. When there is no mating, an adult transforming into millions will not happen.

This space is slated to grow from 1 billion dollar to 10 billion dollar. Today pheromones and semi chemicals are used for monitoring and mass tapping. These

products service specialty crops such as apples and grapes. There are people trying to deliver them for more crops like sugarcane, cotton, and rice. ATGC is one of the players.

He pointed out that today one million hectares under mating disruption will translate to 100 million hectares which means growth will be more than 10 billion dollars.

We have developed more than 75 such products. Now we are using oils to produce these pheromones which will be very low cost and technology will be at par with many conventional solutions. Also, we have tables which can be used under water. For rice etc helpful.

Talking about SmartAgri he informed that they have developed sensors which can detect the number of females in the field so that the Integrated Pest Management (IPM) practices can be very effectively managed. This is all by way of affordable technology.

He further informed that they handle insect epidemics across the world. We spray gels in areas of more than 2 lakh acres. This is sustainability. 10 metric tonnes of pheromones to cover 2 lakh acres otherwise it could be several million litres of water which would have been used.

For pests which live inside the plant there is no conventional solution. We need to manage it very early.

He revealed that these tools bring back the young population to farming.



Dr. Markandeya Gorantla, Chairman & Managing Director, ATGC Biotech speaking in the Technical Session 1 – Agri Input: Sustainable Farming – Future of Food Security

4. TECHNICAL SESSION II & IV AGRI FINANCE & INSURANCE – A KEY TO ENHANCING AGRI VALUE CHAIN & AGRI OUTPUT – CONNECTING FPOs TO MARKET

The respected speakers of the session were:

- Chair: – Mr. R Inigo Arul Selvan, General Manager, NABARD, Hyderabad
- Co – Chair: – Mr. Azhar Pathan, Consultant, ITC
- Mr. S. Sivakumar, Specialist Manager, High Value Agri Business, State Bank of India
- Mr. Sai Prasad Somayajula, Head- Strategy, Innovation and Exponential Business Growth Channels, Samunnati
- Mr. Shailendra Jadhav, Business Manager, Fresh, ITC Ltd.
- Mr. Adinarayana Raju, VP, Samunnati



(L-R) Mr. Shailendra Jadhav, Business Manager, Fresh, ITC Ltd.; Mr. Adinarayana Raju, VP, Samunnati; Mr. Azhar Pathan, Consultant, ITC; Mr. R Inigo Arul Selvan, General Manager, NABARD, Hyderabad; Mr. S. Sivakumar, Specialist Manager, High Value Agri Business, State Bank of India; Mr. Sai Prasad Somayajula, Head- Strategy, Innovation and Exponential Business Growth Channels, Samunnati.

4.1 Mr. R Inigo Arul Selvan, General Manager, NABARD, Hyderabad

Mr Selvan referred to Gandhi and said that nature has enough for man's need but not for his greed. The theme of this summit encapsulates this mantra. Also, as told by Dr. Dalwai, for all our SmartAgri endeavour all stakeholders should keep the farmer in focus because unless the raw material is produced, we will not have a living in terms of livelihood.

For all our SmartAgri endeavour, all stakeholders should keep the farmer in focus because unless the raw material is produced, we will not have a living in terms of livelihood.

The priority sector guidelines of RBI nudge the bankers to lend at least 18% to agriculture and again 10% of it to small and marginal farmers. There are 137 reporting entities in the RBI website close to having 1.53 lakh outlets of which around 86000 are rural outlets and the gross credit as on 30th September by almost 40 commercial banks is 129 lakh crore of which agriculture credit is around 15.9 lakh crore and this has been growing despite small systemic issues such as classification issues. There are many small industries which are relying on agriculture, the credit to the industries is not classified as credit to agriculture.

As, Dr. Dalwai pointed out, in the GVA component 18% will go to 30% or more.

According to him, there are a lot of capital support schemes which are being operated by both central and state governments. One scheme which has gained attraction recently is the agri infrastructure fund scheme. A lot of industries can access low-cost credit because of it which helps in value chain building.

Also, there are specialised funds of the GOI which can be called as the rural infrastructure development fund, dairy infrastructure development fund etc to create the necessary infrastructure so that it can catalyse the private sector credit flow also.

Most of us fail to notice that export credit also does not get classified as agriculture although it is for agriculture produce.

Talking about the FPO ecosystem he said that there is capacity building which is required. Unlike other capacity building program here we are transforming a farmer board of director into a shareholder of a business entity who must think in a different fashion and direct the CEO who again has to be trained so that all decisions are shareholder centric decision which should help the FPO. This is a very big challenge. The rural youth in this sector is expected to drive the economy.

A lot of traction is happened in this sector but still the question remains of the availability of man power to drive these business entities so that they take appropriate decisions along the value chains.

There are certain concessions in banking to the FPOs. According to the RBI circular - any lending to an FPO who is going to play a part in the value chain and which is having a share holder of more than 75% Small Farmers and Marginal Farmers (SF and MF) will be classified as the bank's target to SF/MF lending. When bank is lending to SF/MF FPO the cost of transaction to the bank for that portfolio comes down. So, there is an in-interest rate advantage to the FPO also, that the FPO should be able to negotiate with the banker.

He further requested all in the FPO sector to know the area in which you are operating. Never try to operate across the entire value chain. An FPO which is good in production, quality building may not be good at bargaining, negotiation and marketing, there you will have to leverage with the federation. So, one needs to identify your niche and play an effective part in it so that you translate your business into shareholder value for the farmers.

Regarding the credit guarantee scheme there is a separate credit guarantee trust which has been established by NABARD called as NAB Sanrakshan which provides credit guarantee for FPOs. In Telangana we have supported around 36 FPOs.

There are two agri business incubation centres supported by NABARD in Hyderabad. One is Agi-Hub and other is NAM wherein start-ups are supported. We are getting start-ups mostly in the second part of the value chain which is market based and we would like more start-ups in the production space.

Agri value chain partners should share the production risks on themselves especially regarding adverse climate, this will be good for the entire system.

Already there is an established training system through NABARDs BIRD - especially for skill building of CEOs and Board of Director. Should be utilised by all and all stakeholders should try partnering with us.



Introduction to Agri Finance & Insurance - A Key to Enhance Agri Value Chain by Mr. R Inigo Arul Selvan, General Manager, NABARD, Hyderabad

4.2 Mr. Azhar Pathan (Consultant, ITC)

Mr Pathan explained that connecting FPOs to market is a real challenge since farmer might not be able to decide his price when he wants to sell his produce and, he does not know where to sell. Therefore, when we talk about increasing productivity, we also

We should focus on increasing the quality of the produce and minimizing wastage rather than harping on increasing the productivity.

need to consider losses. As one of the speakers earlier pointed out, during pre-harvest there is a 10-15% loss and then post-harvest loss of 30% combined is 45%.

So why not improve the quality rather than harp on increasing productivity. There is a scope for export and there is scope for getting better price in the country itself since domestic consumption has increased significantly. People want quality food in Tier-1, Tier-2 cities.

When we are talking about doubling farmers' incomes, it can happen only through producing what is demanded and through quality produce.

Educated population is going to service sector and the uneducated to the farming sector. So we have to address that.

Over production is always there. We must support the processing industries.

He further informed that now, Lychee is going from Bihar to Mumbai and Kino coming from Punjab to Bengaluru. Such progress is there but we need to increase the speed of progress. We can do that by improving logistics. We need robust facility to move perishable produce from South to North and vice-versa. Post-harvest system is poor. All the effort of the farmers goes to waste in a short time. We need to better that.

GOI has come up with a very good initiative some 4-5 years back - crop cluster formation. One district, one crop which is really helping exporters - to harvest a crop from one cluster having a sufficient volume. They can also invest their time and money in pre harvest training. For ex. in banana, we do fruit correctivity three months before the harvest. This needs to be done in sufficient acreage. Happening in Anantapur, Cuddapah etc. So, we can aim at doubling export which can help us in doubling farmers income.

Also, there should be very specific advisory. Banana in Vijayawada and Banana in Anantapur is totally different since one is produced in coastal region. So, disease and pests will be different. We need to have global thinking and act locally.

To see the success of the FPOs there is a model FPO - having turnover over of over 800 crores - Sahyadri Farms Nashik. They are open to visits.



Introduction by Mr. Azhar Pathan (Consultant, ITC)

4.3 Mr. S. Sivakumar, Specialist Manager, High Value Agri Business, State Bank of India

Mr. Sivakumar started by making an interesting comment that State Bank of India is now turning into Smart Bank of India. Agriculture lending is a priority sector as per RBI norms otherwise penalty is incurred. Each 10-15 km SBI is having branches and they can connect all farmers. Lot of digital initiatives taken by SBI which helps farmers for example SAFAL (Simple and Fast Agri Loan)

GOI has come up with a national portal - the Jan Samarth portal where we all the applications for various loans are integrated and entrepreneurs can easily apply for loans online.

There are a lot of agricultural institutes in Hyderabad and we have signed MOUs with them making them our knowledge partners which help both our branches and the farmers. This has led to tremendous success.

With our MOUs we are targeting for specific purposes. for example, under graduates who want to become agricultural entrepreneurs.

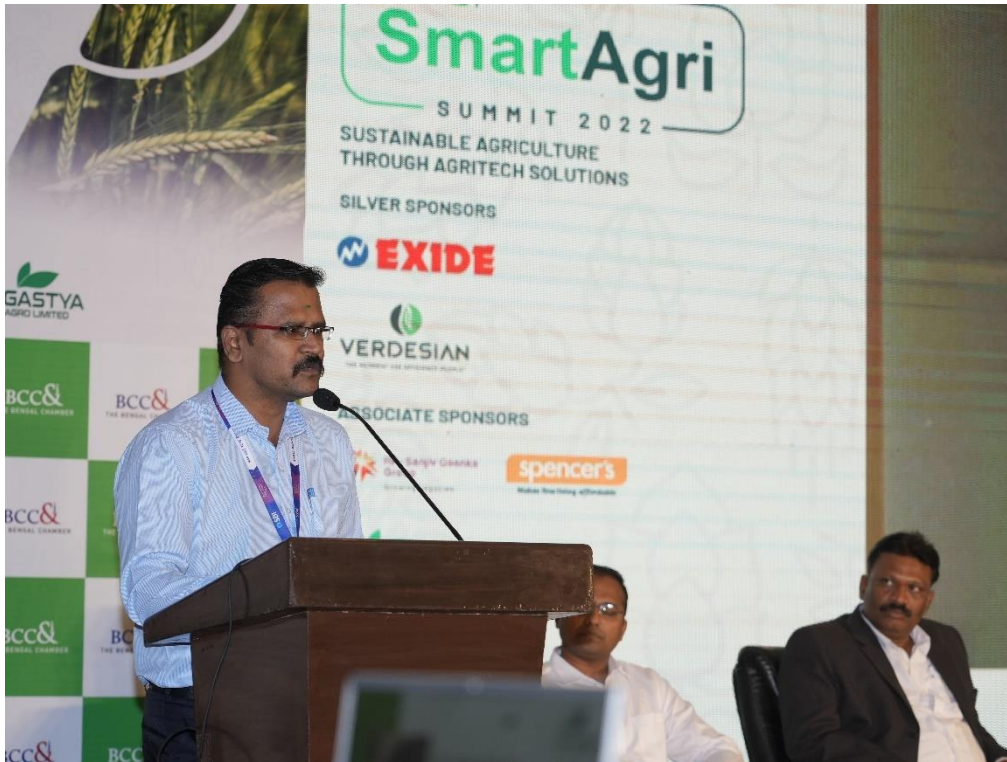
GOI has come with up many schemes under Atma Nirbhar Bharat. The specialty of these schemes is that credit guarantee is given and paid by GOI. Many schemes are giving 30-40% subsidy. Now there is a convergence of schemes which is a beautiful thing.

He informed the audience that the GOI has come up with a national portal - Jan Samarth portal -where we can see all the applications for various loans, with integration with Income Tax department. The entrepreneurs can easily apply for loans online with all the details visible. No need to go to the branch except for physical verification.

Earlier there were different portals for different schemes. Government has Model DPRs in the portals which help the entrepreneur.

We are also conducting farmers meet to upgrade their knowledge, through Krishi Vigyan Kendras, Regional Resource Station, ICAR institutes.

We are conducting Sandhya Shivirs every month in villages. All top executives sit with farmers and inform them of all the support schemes.



Mr. S. Sivakumar, Specialist Manager, High Value Agri Business, State Bank of India speaking on Agri Finance & Insurance – A Key to Enhance Agri Value Chain

4.4 Mr. Sai Prasad Somayajula, Head- Strategy, Innovation and Exponential Business Growth Channels, Samunnati

Mr. Somayajula started by saying that he is amazed at the API stack that GOI has developed which any start-up can pick and choose and start building a portal.

Next five years there will be a lot of convergence in NBFCs, traditional lenders and start-ups not just in lending but in providing market linkages and other agri allied services.

Start-ups are doing amazing work in the agritech space. Weather management solutions, crop yield management solutions, solving working capital issues.

Another important and positive development is a good convergence between banks and NBFCs and start-ups. For ex the RBI guideline on core lending is a right step in the direction wherein a bank and NBFC are converging (SBI and Samunnati). This unlocks significant amount of risk capital from the system into agri sector and increases the capital flow to agri sector. But the demand for agri finance has been outweighing the supply available.

He further talked about how to increase further flow of credit? In housing finance and MFI there are a certain category of NBFC. We must look at credit flow from traditional lending institutions to these agri NBFCs and for this to be categorised as priority sector so that these NBFCs which have the digital footprint and partnership

models to access the villages and deliver the credit to the end beneficiaries who are the small holder farmers.

Last 3-5 years technology has been the forerunner. Next five years there will be a lot of convergence in NBFCS, traditional lenders and start-ups not just in lending but in providing market linkages and other agri allied services.



Mr. Sai Prasad Somayajula, Head – Strategy, Innovation and Exponential Business Growth Channels, Samunnati deliberating on Agri Finance & Insurance – A Key to Enhance Agri Value Chain

4.5 Mr. Shailendra Jadhav, Business Manager, Fresh, ITC Ltd.

Mr. Jadhav informed that it has been almost 19 years that FPO word started existing in the ecosystem that we are operating in. In 2003 the amendment happened in Company Act and the development started. Today there are more than 16000 FPOs.

Sharing knowledge and technology and giving assurance of buying the output is not enough. It is important that the FPOs manage their working capital.

We have registered more than 500 FPOs in grains, pulses and vegetables.

Some of the challenges that FPOs are facing are.

- Decentralised formation – many FPOs are formed with objectives other than to do business. They have not yet connected to the retailers or market.

- Retail Network – Many FPOs do not have access to retail chain, or exports or correct buyers who can pay them or guide them on the commercial aspects.
- Consistency in quality – For buyers outside India, they look for consistent supplies which does not really happen.
- Knowledge – Knowledge of new technologies
- Company Management – Different stakeholder need to be managed.

ITC is trying to solve the challenges faced by farmers in four ways:

- By forming FPOs by anchor crops. We identify anchor crops by geography and with that anchor crop we form the FPO so that vision is given to the FPO.
- By having value chain partnerships. We are ensuring the output purchases for all crops.
- Training and hand-holding. To get uniform products we provide training since all seasons are not same.
- Advisory – We give advisory as per the location and crop-specific advisory.
- Working Capital – Sharing knowledge and technology and giving assurance of buying the output is not enough. If FPOs not in position in managing working capital then also there is a problem that the FPO might not be scalable further.

Since the last 20 years there has been the e-Choupal success story in the space of Indian agriculture. It Started with grains and then we are moving towards different sectors like spices, fresh fruits and vegetables.

Now they have come up with the fourth version of e-Choupal – ITC MAARS. This is a ecosystem where we not only help the FPOs but build them to be ready for next tech and next generation in terms of future-readiness captive cluster of crops. Before flowering the discussion starts and the planning happens for the volumes projected from that area as well as for the respective markets so that the product can be ready for export as well as the domestic premium market.

This digital technology helps to communicate faster right with a mobile click and not with telephonic calls or physical visit. We call it phygital, some part is physical in terms of demonstration, field visits and on-ground training. Digital is communication, rate broadcasting, quantity broadcasting and lectures and webinars for farmers.



Mr. Shailendra Jadhav, Business Manager, Fresh, ITC Ltd. delivering his address on Agri Output - Connecting FPOs to Market

4.6 Mr. Adinarayana Raju, VP, Samunnati

Talking about Samunnati, Mr Raju said that they started their journey in 2014 as a VC model funding to the rural farmers and then realizing the power of collectiveness started supporting FPOs. As of now they have connected with around 2500 FPOs across 22 states in India.

Once produce is ready, market linkage is required to convert farmers' produce into money. We have started another platform Samunnati Agro Solutions private limited which is connecting the agri-entrepreneurs and to the FPOs and farmers. So, the farmer produces, aggregator aggregates and sells, then processor will send to their markets.

He emphasised that, the entire value chain can be speeded up if finance moves fast. So, We have adapted an AMLA (Aggregation, Market Linkage and Advisory) approach through which we are supporting the value-chain players to act at high equilibrium. To have them express their fullest potential by providing the necessary finance.

He emphasised that, the entire value chain can be speeded up if finance moves fast. So, We have adapted an AMLA (Aggregation, Market Linkage and Advisory) approach through which we are supporting the value-chain players to act at high equilibrium.

After forming of the FPO we are lending Rs 5 lakhs to each FPO. Then the FPO aggregates the demand of the inputs and gets a price reduction by purchasing in bulk. After that all the produce can be aggregated in one place and we can start supplying to the agri-entrepreneurs where the farmers produce is the raw material for the agri-entrepreneurs.

Samunnati have supported almost 3000 agri-entrepreneurs where the raw material of the agri-entrepreneurs is the produce of the output of the farmer. Providing finance to agri- entrepreneurs to purchase farmers' output.

He concluded by saying that Samunnati is creating a digital platform for the entire ecosystem and to speed up the value chain.

This was followed by a short Question-Answer Session.

Q1: From Audience: There are so many schemes, even in villages the farmers are not aware of what these schemes mean. Is there any methodology to disseminate these messages to as many farmers as possible so that they can utilise these good initiatives of the Government.

Ans: Mr. Sivakumar -We are regularly training our managers. We are more oriented with activity. Farmers tells us their purpose and activity and then we talk about the scheme.

Ans: Mr. Arul Selvan - A lot of awareness programs conducted by agricultural universities such as agriculture melas where the banks and government department participate and disseminate these schemes. Also, dissemination is done through All India Radio. NABARD is also doing capacity building of CEOs of FPOs. So that they in turn can take it forward to the shareholders and the entrepreneurs in the villages. Also, websites have the information.

Finally, FPOs themselves create awareness since their CEO is a graduate who takes this information to the stakeholders. They need to continuously transact with all the shareholders.



Mr. Adinarayana Raju, VP, Samunnati delivering his address on 'Agri Output - Connecting FPOs to Market'

5. TECHNICAL SESSION III- AGRI STARTUPS - KEY PLAYERS IN INNOVATIVE SMART FARMING

The honourable guests for this session were:

- Session Moderator- Mr. Subhadeep Sanyal, Partner, Omnivore
- Mr. Vivek Sehgal, Chief Business Officer, Kalgudi AgriTech
- Mr. Trivikram Kumar, Founder & CEO, X-Machines
- Mr. Atul Chhura, Chief Business Officer, AgriBazaar
- Mr. Prem Kumar Vislawath, Founder & Chief Innovator, Marut Drones



(L-R) Mr Subhadeep Sanyal, Partner, Omnivore; Mr. Vivek Sehgal, Chief Business Officer, Kalgudi AgriTech; Mr. Atul Chhura, Chief Business Officer, AgriBazaar; Mr. Trivikram Kumar, Founder & CEO, X-Machines; Mr. Prem Kumar Vislawath, Founder & Chief Innovator, Marut Drones

5.1 Mr. Subhadeep Sanyal, Partner, Omnivore

Mr. Sanyal informed that Omnivore is a venture capital fund which invests in early stage agritech companies. Their journey started in 2011 when agritech was not even a word. Have made around 45 odd investments over the past decade. They continue to be bullish on the space and we are going to roll out a 200 million \$ fund.

Omnivore continues to be bullish on the Agritech space.



Technical Session III - Agri Start-Ups – Key Players in Innovative Smart Farming being moderated by Mr Subhadeep Sanyal, Partner, Omnivore

5.2 Mr. Vivek Sehgal, Chief Business Officer, Kalgudi Agritech

Mr Sehgal started by saying that Kalgudi is a digital agriculture platform. The agriculture ecosystem that we operate in is very large and fragmented ecosystem with a lot of small and marginal farmers. This is exactly the kind of ecosystem where digital technologies play a great role at very economical costs to be able to give the best results. It is important to understand that digital is not a panacea not a solution in itself but a final enabler.

The key both at the farmer and collective level to be known digitally. The more you can be seen helps credit organisations, market players, output organisations who wish to work with you.

Kalgudi platform was launched in 2019.

As an ecosystem it is important to bring on board the small and marginal farmers. Smart phone penetration has improved but small and marginal farmers are very difficult to interact with directly. He informed that their whole mechanism is divided into two steps,

1) We first build a digital community. That is the way small and marginal farmers come on board using a digital platform and for doing that we cannot go directly to S&MF so we work with sponsor or impact organisations like state governments, donors, NGOs etc and they run their interventions in the space using a digital platform which we provide at a very economical and easy to use format. That is how we build a digital community of S&MF. Within this it is not easy to directly interact with small and marginal farmers so the best route that everybody recognises is to utilise the collectives and obviously FPOs today are the buzz word for collectives but there is a wide variety of collectives across the ecosystem.

Impact organisation are focusing more of their activities through collective to have impact with small and marginal farmers. We follow the same channels.

2) Once we build our marketplaces (for inputs, for bulk outputs and consumer output). We build those and then have an engagement so that this whole loop is covered and regroups itself and builds one upon the other as a self-sustaining activity.

He said that they have couple of cornerstones of how they operate - we do not become a player or trader or do any of the activities ourselves. We bring in digital efficiency to the activities.

Our districts are so large that advisory needs to be micro-targeted to the last mandal.

The last-mile at the farmer level is a challenge so we teamed up and created village level entrepreneurs (VLEs) known as KUBERs (Kalgudi UBERs). Digitising the ecosystem is the key part of the starting building block. We provide the nine yards of what a collective require.

One of the oldest cooperative in Telangana is the Mulkanoor Society which has a larger turnover than Sahyadri and their entire activity happens on Kalgudi.

He believed that the key is that it is important that both at the farmer and collective level to be known digitally. The more you can be seen helps credit organisations, market players, output organisations who wish to work with you. You do not have to be relying on the annual balance sheet figures etc to know what the collective is all about. Digitisation for FPOs is like creating their own LinkedIn profile. Talk about who they are and be visible to the world at large.

Transactions are all in the input marketplace. There is a bulk output marketplace which is a typical mandi.

He revealed that they are now putting QR codes in mangoes with exact traceability back to the farmgate on what type of advisory was received by the farm. The digital SKU is the key factor in building the traceability. All these Digital SKU can be interconnected and provide traceability. We use that a lot because we want to see the FPOs the collectives along with the other state organisation that are helping them on the consumer level connects through the rural-livelihood missions working at the last-mile and creating consumer packs.



Mr. Vivek Sehgal, Chief Business Officer Kalgudi AgriTech deliberating on Agri Start-Ups – Key Players in Innovative Smart Farming

5.3 Mr. Atul Chhura, Chief Business Officer, Agribazaar

Mr. Chhura informed the audience that Agribazaar is primarily a digital trade enabling platform. We enable the trade of agri commodities which has two sections.

Agribazaar is a smart platform, any entity can come on the platform and list their trade to sell or buy a commodity.

- 1) Primary trade where farmer sells to the first buyer in the sector
- 2) Secondary trade where most of the trade happens where a small trader will aggregate sales to a large trader and then finally it will go to a processor.

He further said that Agribazaar is into commodity trading since 2006, they have also been into logistics and last-mile connectivity of agri commodities. They started this platform to enable the trade between two non-related unknown parties on the platform. Traditionally commodity business happens on trust on a very known network and that is why the outreach of any buyer or seller is very limited based on experience.

Because any commodity trade has four kinds of risks

- Assurance of the supply
- Quality
- Quantity which has to be supplied
- Price

Traditionally trade happens on trust basis, there will be a broker or trader who will buy from the farmer, he will make a fair average quality, give to any supplier he trust, some payment conditions, taking all the risks.

He further said that Agribazaar is a smart platform, any entity can come on the platform and list their trade to sell or buy a commodity. Lot of nuances. There is a smart contract which allows a trader to define its own contract and is digitally done.

Scope of Agribazaar is not to give this platform only, this platform is a tool. Where he is succeeding is that there is a huge army of people on the ground who are in the business of mitigating the risk for both buyers and sellers. We have standardized quality testing procedures, we have partners on our platform who offer finance, warehousing, logistics services, testing solutions and with this we have created an ecosystem wherein all the parties can come and do trade and there can be de-risking of trade that happens on the Agribazaar platform.

They are also the only ones who have established our own near-to-farms centres for procurement of agri commodities. We have taken licenses from state

governments to operate what we called e-mandis where we are helping buyers to buy directly from the farmers at our warehouses and the platform underwrites all the risks on quantity, quality and payment for the buyer and the seller. As on date we do about 1.2-1.3 lakh tonnes of commodity on a monthly basis worth about 1000-1200 crores. We connect about 30000 trading entities, 400 FPOs and more than 300000 farmers across India.

They are also into an enabling ecosystem for farmers where we have a marketplace for input, have technologies for helping them grow better and give advisory, and there also we have a lot of collaborations with people who are giving their technologies and building up into our platform, with input companies.



Mr. Atul Chhura, Chief Business Officer, AgriBazar speaking in the TECHNICAL SESSION III - Agri Start-Ups - Key Players in Innovative Smart Farming

5.4 Mr. Trivikram Kumar, Founder & CEO, X-Machines

X-Machines intend to enter the market with the help of rural micro-entrepreneurs who would rent this product in their neighbourhood and farmers

According to Mr. Kumar X-Machines was founded to bridge the technology gap that exist in the Indian agri ecosystem. Farmers told about rising labour costs and labour shortage. This is pushing farmers using more and more chemicals unnecessarily which is contaminating both the soil and the food. *would pay a fraction of cost than what they are currently playing.*

One way to resolve this is through usage of robotic technologies. X-Machine X 100 - is an autonomous robot, a micro tractor which can perform various agri operations such as precision plantation, seed sowing, weed control, pesticide application as well as fertilizer micro dosing activities fully autonomously with the help of different smart attachments. We are trying to enter the market is through a rental model. We intend to place this product within the hands of rural micro-entrepreneurs with the help of a bank loan who would rent this product in their neighbourhood and farmers would pay a fraction of cost than what they are currently playing.



Mr. Trivikram Kumar, Founder & CEO, X-Machines delivering his address in the Technical Session III - Agri Start-Ups - Key Players in Innovative Smart Farming

5.5 Mr. Prem Kumar Vislawath, Founder & Chief Innovator, Marut Drones

Mr Vislawath informed that most popular activity in the agriculture is the spray whether for nutrient, pesticide, or herbicide. Spraying 100s of litres in an acre manually.

Drone technology can reduce spraying activity taking 2-3 hours per acre to less than 10 minutes along with 80-85% reduction of water.

Same activity can be done using the drone technology - chilli crop - spraying only 8-10 litres per acre and earlier taking 2-3 hours per acre now in less than 10 minutes. So, 80-85% reduction of water, time and efficiency is there.

They are coming up with aerial tractors - drones. We have automated 7 different applications. For crop like paddy, drones can do transplantation (wet seeding), spraying, fertilizers, pollinations, crop-monitoring to identify the pests and the diseases, and you can harvest. One entire crop of paddy can be attained.

Few of the applications - eradication of malaria dengue in the city of Hyderabad managing 150 lakes. Transportation of blood vaccines from one district to another for 45 kms. Afforestation - seed balls planted via drones.

This was followed by the moderator, Mr Sanyal asking each of the panellists to spend two minute each in highlighting the operational challenge that each of them has faced.

- Mr. Vislawath, (Marut Drones) - In agriculture bringing in technology is not the problem, the problem is that any technology or hardware that you are bringing must go through a scientific trial. We were fortunate to have the collaboration with the academia and the government. Because drone is a subject that is highly regulated. Because when we started in 2018 nobody understood who is allowed to give the permission to fly a drone.

Since small and marginal land-holding where people depend on finance from banking or subsidy. So farmers wait for loan subsidy for buying drones etc.

Third is awareness. A startup itself cannot create the awareness regarding the benefit of the available technology.

- Trivikram Kumar (X-Machines) - One biggest problem is the price point, the affordability of the technology in the market. Farmers can only buy when the cost is low and for the cost to go low there needs to be more farmers buying the product. So, there could be some subsidy or rental model.

- Atul Chhura (Agribazaar)- We face challenges with three stakeholders.

Starting with the government - input and output market for commodities is highly regulated at a state level regulation. There is no policy for an online trading license for input commodities. Biggest challenge is that every state has a different look at the rules, policies, regulations, and framework.

Second, the private entity - the trader or buyer. The perception of directly dealing with a farmer has some resistance. So, people will look to deal with the middlemen because of the convenience since they are as per their terms and conditions. That change of mind, transition from traditional route to digital route is met with resistance even by private entities.

Third, any start-up works towards scalability and sustainability, but even now for any tech to create awareness or reach a product to the farmer the cost of last-mile delivery or cost of farmer acquisition is very high. That is why we work towards collaboration because any company alone cannot get into all technologies.

- Vivek Sehgal (Kalgudi) - Two points. The last mile challenge is best addressed by local level village entrepreneurs. The challenge we faced is that there is already a large ecosystem of banking correspondents who are well equipped to do this. Resistance by lead banks to open them up.

State level entities like the gram-sahayaks can also be opened. This can add a source of income to them.

FPO digitisation, as mandatory to be digitised as it is to give their annual balance sheet to the ROC.



Mr. Prem Kumar Vislawath, Founder & Chief Innovator, Marut Drones presenting in the TECHNICAL SESSION III - Agri Start-Ups - Key Players in Innovative Smart Farming

6. RECOMMENDATIONS

- Any sustainable agriculture programme for India should first address the issue of water scarcity and dwindling groundwater reserves. For example, we can look at increasing the acreage of crops requiring less water and reduce the acreage of water guzzling crops.
- For sustainable agriculture, we need to transition agriculture to agri-enterprise which will help us to start looking at maximising the production, optimising the cost of production and how to fetch remunerative prices since farmers will not shift to sustainable practices if they do not make money at the end of the day. At the same time, we need to ensure that Mother Earth is not compromised while carrying out this agri-enterprise.
- We need very healthy, robust logistics that help us to transfer the surpluses locally into the far-range markets through good storage (perishables and non-perishables), transportation (normal trucks and refurb vans) and processing systems (to increase shelf life).
- Use of micro irrigation will cut down the usage of water substantially and simultaneously help in maintaining the soil and aiding in higher productivity.
- When we talk about food security, we should also talk about nutrition security. We cannot have health and well-being without meeting basic nutrient requirement.
- Use of digital technology in agriculture combined with statistical models will help us understand the likely problems in future (forecasting of pests, forecasting of weather, forecasting the diseases) and therefore take advance steps. We can look at AIML, satellite imagery, image analytics and so on.
- Going forward, drones will be more effective in ensuring more efficient management of pests and diseases rather than going through manual operations. The new generation might find drone operations more suitable than manual operations.
- Instant sensor-based technology for soil testing is more efficient than taking the soil to the lab.

- We must be open to genetically modified technology. There might be many ethical issues but today new technology is emerging, which solves our ethical issues.
- We should create avenues for certification of Indian producer which will make its produce export compliant for customers outside the country.
- Access to institutional credit and continuous upgradation of farmers knowledge are both required.
- For strengthening institutional credit banks and NBFCs may work in synergy.
- Zero tilling which helps in conservation of the soil is the way forward.
- We need to include environmental cost in the cost of production. Today, we do not have that system. There is a need for this to be factored into.
- Corporates have to understand that their products and their practices must protect environment. Ethical business practices and food safety need to be followed.
- If consumer wants to eat things bad for his health, then that is what is produced. Today, there is just one health - bodily health and environmental health together. If we eat right, the farmer will produce right which will be good for the environment.
- We can look at creating a carbon credit market in the country and tell the farmers how to access that system and be benefited by that by following sustainable practices.
- Sustainable agriculture must be a part of sustainable living. Sustainable agriculture cannot be in isolation.
- We can look at having environmental tax on some of the foods that we are eating - that does not promote sustainability.
- Practically it is impossible for public extension functionaries to reach all the farmers all the time, so we have to look for private extension service providers.

- For any crop , we might not be able to reduce the labour cost but we can reduce the input cost. We need to increase the productivity per hectare. Agricultural universities and private players need to chip in for that.
- We can look at reducing the GST on agrochemicals which is taxing the farmers.
- The concept of behavioural modifiers in handling pest epidemics needs to be taken note of.
- We can look at improving the quality of the produce and minimizing the wastage rather than harping on increasing productivity.
- Specific advisory is key in agriculture. We need to think globally and act locally.
- It is important that both at the farmer and collective level to be known digitally. The more one can be seen helps credit organisations, market players, output organisations who wish to work with you. One need not be relying on the annual balance sheet figures etc to know what the collective is all about. Digitisation for FPOs is like creating their own LinkedIn profile.
- Digital platforms can promote sustainable trade between unknown parties and thus increase market linkages.
- Robotic technologies can help us reduce the labour costs and help prevent contamination of the soil. The government can look at giving subsidy to such technologies to make it more affordable.