NSFI Global Agri CONNECT 2015 Conference cum Exhibition

GLOBAL AGRI CONNECT 2015

TECHNOLOGIES & INNOVATIONS IN AGRICULTURE: PUSHING THE FRONTIERS

POLICY RECOMMENDATIONS

NATIONAL SKILLS FOUNDATION OF INDIA

NSFI Global Agri Connect 2015
Technologies & Innovations in Agriculture: Pushing the Frontiers
Policy Recommendations

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Foxview Media
BA, 12F, Second Floor, DDA - MIG
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Tel: 011-65001407, Mob: 9911938844
info@foxviewmedia.com
www.foxviewmemedia.com

FOREWORD

MR. SANJEEV ASTHANA
CHAIRMAN, NSFI

Agriculture in India is truly at a crossroads today. While we do know that multiple factors affect agriculture, they have been changing over the years. There is so much dynamism in the sector that we wanted to understand and capture how the government and the private sectors are taking cognisance of this and also at the same time find out how the dynamism is affecting day-to-day decisions at the ground level. Interestingly, over the past few years, numerous outstanding businesses built on innovative business models and technologies have been emerging. The ability of the agricultural sector to sustain itself and grow beyond 4% has been a big challenge and it keeps getting reflected in the short-term very often by way of shortage of pulses, edible oil etc, in turn affecting inflation, even as the non-cereal part of the Indian economy continues to grow. While our economy is surplus when it comes to agricultural exports, the structural challenges will continue to impact the sector in the longer term.

Agriculture in India is today facing a cycle of problems—be it farmers' suicide, failed monsoons, water shortages or even technology adoption. The only thing that can make a big difference to agriculture, besides policy changes, is technology. Our belief is that technology can make a huge difference both in the welfare of the farmers as well as the state of agriculture and also resolve a lot of structural issues plaguing the country. Many countries such as Israel, The Netherlands and nations in South America have proven that technology is a big driver in agriculture transformation there. The adoption of technology will eventually change the way agriculture will take shape in the country.

Multiple government schemes such as Digital India, Skill India, Jan Dhan Yojana will have a very defining and far reaching change provided if the following takes place: a) policy response to the ground level situation b) adoption of technology in terms of what is available and what can be replicated and c) how we catalyse the process of micro or medium enterprises to become harbingers of change in terms of adopting technology and institutionalising the change. It would need a lot of effort from the government, the private sector and the large number of entrepreneurs in the country. The prosperity of India will really depend on the way we deal with agriculture and the people who work in the sector.

> "The prosperity of India will really depend on the way we deal with agriculture and the people who work in the sector

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INTRODUCTION

The State of Indian Agriculture

India has the second largest agricultural land in the world at 157.35 million hectares. Hence, it is no surprise that agriculture, with its allied sectors, is the principal means of livelihood for 58% of rural households[1]. Even after we faced large-scale food scarcity problems after Independence, the rapid strides in agriculture ensured that we became self-sufficient in food despite the huge growth in population. Though agriculture's share in the Gross Domestic Product (GDP) has come down from over half at Independence to less than one-fifth, it is still one of the largest contributors to GDP along with forestry and fisheries. According to the Central Statistics Office (CSO), its share of the Gross Value Added (GVA) in 2015-16 was 15.35%.[2]

The contribution of agriculture in the Indian economy is much higher than the world's average (6.1%) in 2014. CSO estimates suggest that the sector has recorded a growth of 8.3% in FY15 at $259.23 billion compared to $132.71 billion in FY14. India is the second largest fruit producer in the world and as per the World Trade Organisation India is the seventh largest exporter of agricultural products with revenue being pegged at $43 billion in 2014.

The importance of agriculture in the Indian economy cannot be underscored. The Economic Survey 2016-17 mentioned that India's growth potential is still around 8-10% and to achieve that "India cannot afford to neglect its agriculture". While the growth target for agriculture and its allied industries for the period 2012-17 has ben pegged at 4%, the growth registered inthe first year was 1.2%, 3.7% in 2013-14 and 1.1% in 2014-15. For an industry that is employing half the population in India, the rate of growth is pretty abysmal.

In a way, Indian agriculture is a victim of its own successes in the past. As we grew cereals in large quantities, we also encouraged the intensive use of input resources such as land, water, fertiliser and power. Thanks to the weak monsoons, poor harvest and falling global food prices, rural incomes are hitting new lows. Changing dietary patterns, rapid industrialisation, climate change are all reasons why India needs to focus on increasing productivity and "do more with less".

The rise in farmers' income will not only be beneficial to them, but have a lasting impact on the Indian economy as their purchasing power increases. Increased agricultural productivity and rapid industrial growth in the recent yearshave contributed to a significant reduction in poverty levels, from 55% in 1973 to26% in 1998[3]. The increase in productivity on the ground level also needs to be met with good policy framework, relook at the subsidies and active private-public partnerships. Besides this, the huge exodus of manpower from agriculture, low profitability and marketing risks are further exacerbating the situation.

According to the Planning Commission, "Future increases in the production of cereals and non-cereal agricultural commodities will have to be essentially achieved through increases in productivity, asthe possibilities of expansion of area and livestock population are minimal. To meet the projected demand in the year 2020, the country must attain a per hectare yield of 2.7 tonnes for rice, 3.1 tonnes for wheat, 2.1 tonnes for maize, 1.3 tonnes for coarse cereals, 2.4 tonnes forcereal, 1.3 tonnes for pulses, 22.3 tonnes for potato, 25.7 tonnes for vegetables, and 24.1 tonnes for fruits. The production of livestock and poultry products must be improved 61% for milk,76% for meat, 91% for fish, and 169% for eggs by the year 2020 over the base year TE1999. Average yields of most crops in India are still rather low."

In this backdrop, technologies and innovations can play a catalysing role in overcoming the challenges that affect the farm sector, ensure the food security of the country and enhance the lives of a large number of people dependant on agriculture.

> India is the seventh largest exporter of agricultural products with revenue being pegged at $43 billion in 2014

1 *India in Business, Ministry of External Affairs, Government of India, Investment and Technology Promotion Division http://indiainbusiness.nic.in/newdesign/index.php?param=advantage/165*

2 *India Brand Equity Foundation http://www.ibef.org/industry/agriculture-india.aspx#sthash.XADs9NUf.dpuf*

3 *http://www.planningcommission.nic.in/reports/genrep/bkpap2020/24_bg2020.pdf*

Global Agri Connect 2015

The fourth edition of the Global Agri Connect 2015 was held at Le Meridian Hotel in New Delhi on November 2nd and 3rd, 2015. The theme of the 2015 Conference was *'Technologies and Innovations in Agriculture: Pushing the Frontiers".* Global Agri Connect is the flagship programme of the National Skills Foundation of India (NSFI), which is being organised since 2011. The earlier themes were: *Transformational Changes in Indian Agriculture: The Next Decade (2011), Hi-Value Agriculture: A Gateway to Farm Prosperity (2012), Evolving Skill Dimensions: The Lever to Agricultural Growth (2013).* Every year, NSFI brings various stakeholders in agriculture such as government bodies, corporate bodies, departments of agriculture at the state and central levels, experts and scientists to discuss and deliberate on various perspectives of agriculture that can protect the country from the trends of declining production & productivity of small farms. In addition to the discussion and deliberations, GAC 2015 also saw the release of a report on 'Innovations in Indian Agriculture: Select Case Studies' in association with YES Bank. The report is a snapshot of today's technologies that offer incremental farm incomes (directly or indirectly) or market efficiencies for the benefit of the sector and the economy.

Who's Who at GAC 2015

The fourth edition of the Global Agri Connect 2015 saw the presence of who's who of the industry. Representatives of various research organisations, government officials, private companies and entrepreneurs made it an engaging conference with their views and visions. The inaugural session on the first day saw the eclectic presence of **Dr. Ashok Gulati,** Infosys Chair for Agriculture, Indian Council for Research on International Economic Relations (ICRIER); **Dr. Ashok Vishandass,** Chairman, Commission for Agricultural Costs and Prices (CACP); **Mr. Shyam Khadka,** Country Representative, Food and Agriculture Organisation, India.

There were five sessions on Day 1. The topics of the sessions varied from agri business, to post harvest management, mechanisation and precision farming to inputs for enhanced productivity and crop care. The last session of the day focused on ICT and agricultural extension.

DR. ASHOK GULATI
Infosys Chair for Agriculture, Indian Council for Research on International Economic Relations (ICRIER)

DR. ASHOK VISHANDASS
Chairman, Commission for Agricultural Costs and Prices (CACP)

MR. SHYAM KHADKA
Country Representative at the Food and Agriculture Organisation, India

Policy Background

Agriculture is a concurrent subject, which means both the Centre and the state are equally responsible for the sector. The Agriculture Policy, which is designed by the government for raising production, productivity, income levels and the standard of living of farmers, is formulated for all-round development of the agriculture sector. The renaming of the seven decade-old Agriculture Ministry as 'Agriculture and Farmers' Welfare Ministry' with a view to take care of the farming community's needs as well as the personal problems faced by them is astep in the right direction.

On July 28, 2000, India launched its first ever National Agriculture Policy, envisaging a 4% annual growth through efficient use of resources and technology and increased private investment while emphasising on price protection to farmers in the WTO regime. The most important objectives of India's agriculture policy[4] are:

- Increasing input productivity
- Raising Value-Added per hectare
- Protecting the interest of poor farmers
- Modernising agriculture sector
- Checking environmental degradation
- Agricultural research and training
- Removing bureaucratic obstacles
- Removing Improper and inefficient uses of nature resources
- Removing predominance of low-value agriculture
- Removing poor cost-benefit ratios of sectoral activities
- Insignificant process of cooperative farming and other self-help institutions

In March 2015, the Union Minister of State for Agriculture Mohan ji Kalyan ji Bhai Kundriya announced that in the next few months a new agriculture policy will be released, which will have a provision for compensating farmers for losses due to natural calamities. However, Indian agriculture is still in need of a clear decisive technological policy to improve crops and yields.

The Central government has launched many schemes in agriculture for the benefit of the farmers. Though not an exhaustive list, here are some:

a) Pradhan Mantri Krishi Sinchai Yojana: With an outlay of Rs 50,000 crore for five years, the scheme envisages providing assured irrigation cover to every farm (Har khet ko pani) and maximising water use efficiency through drip irrigation. However, it appears that the limited rural electrification, high capital costs of diesel or solar pumps & drip irrigation means that the average small farmer is far from benefitting from it.

b) Pradhan Mantri Fasal Bima Yojana: It envisages a crop insurance scheme under which farmers' premium has been kept at a maximum of 2% for foodgrains and oilseeds and up to 5% for horticulture/cotton crops.It has approved farmers' premium between 1.5-2% for foodgrains & oilseeds crops, and up to 5% for horticultural and cotton crops. However, returns from the awaited scheme to be rolled out from the kharif 2016-17 are long-term & the extent of benefits to farmers is to be seen.

c) Electronic National Agriculture Market (e-NAM): The pan-India electronic trading portal with network ofexisting APMC mandis (21 mandis from eight states) is expected to offer a single window service for all APMC related information and services. This includes commodity arrivals & prices, buy & sell trade offers, provision to respond to trade offers, among other services. While material flow (agriculture produce) continue to happen through mandis, an online market reduces transaction costs & information asymmetry. The Centre aims to eventually bring 585 mandis across India on to the platform by March 2018.

d) Paramparagat Krishi Vikas Yojana: The scheme offers to support and promote organic farming and thereby improve soil health. With a budgetary outlay of Rs 300 crore the scheme aims to develop 10,000 organic clusters over 500,000 acres countrywide. The premium for organic foodsis expected to boost farm incomes.

> Indian agriculture is still in need of a clear decisive technological policy to improve crops and yields

4 *http://www.yourarticlelibrary.com/agriculture/agricultural-policy-of-india-explained/62860/*

Current Scenario & Bottlenecks

The rapid changes in the global economy are posing new challenges to India's agricultural economy. The advancement of technologies and the integration of various value chain systems to bring the produce from the farm to the table signal the need for a radical overhaul of the current systems in place.

Since the nature of agricultural production is changing, conventional methods of increasing productivity such as increased use of land, water and fertilisers also needs to change. The agriculture policy in India today encourages the unabated use of power, water and fertilisers thanks to the huge subsidies from the government. Further, risk averseness of Indian farmers for new crops and technologies can be ascribed to low farm incomes, as it was noted in the deliberations at the Global Agri Connect 2015. The highly fragmented nature of the land use in India demands a myriad of frugal and relevant solutions.

> The agriculture policy in India today encourages the unabated use of power, water and fertilisers thanks to the huge subsidies from the government

While the government would like the farmers to take up alternative employment in order to increase their contribution to the exchequer, the agriculture policy does not articulate how this can be achieved. Traditionally, in India, farming practices and knowledge have been passed down from generation to generation. While various institutions do focus on capacity building of the farmers, the sheer number of farmers in the country leaves huge gaps in the demand and supply of farmers' skill development in the era of modern agriculture. Natural resources management in the country leaves a lot to be desired. The focus of the agricultural strategy has to now move towards developing new technologies, agricultural practices and crop varieties that consume less resources and are environment-friendly, if India has to survive the resource constraints, changes in global agriculture economies to meet its food security and double its farmers' income by 2022.

A government panel was set up in April 2016 to suggest ways to double farm income and prepare a blueprint to transition farm policies being production oriented to incomes or value addition oriented. It will identify particular segments for growth and the areas that require investments, diversify the risks in farming and find ways on how integrated farming can help boost incomes. Needless to say, the task is herculean. Dr. Ashok Gulati, agriculture chair professor at the Delhi-based Indian Council for Research in International Economic Relations (ICRIER), said in an interview to Mint, said, "To begin with, the government needs to decide whether they are talking about real or nominal incomes. If the goal is to double nominal incomes the (previous) United Progressive Alliance government did it in five years between 2009-10 and 2013-14. Doubling real incomes by 2022 will require the farm sector to grow at an annual rate of 10%, compared to a growth rate of less than 0.5% in the last two years."

Two back-to-back droughts, the collapse of international prices for major agricultural commodities since late 2014, the slow response of the governments and insufficient financial allocation to the agriculture sector are all contributing to the agriculture distress that the country is facing today. While 13 states in the country have declared drought, the respective state governments have not adequately used the funds allocated to them by the Centre for drinking water projects, according to data from the Centre's Rural Development Ministry. The Marathwada region, which is facing its worst drought in decades, had Rs 322 crore of unspent central funds for drinking water. The lack of Centre-state cohesiveness is also a major cause for worry.

A sustainable agricultural policy must support and protect farmers from the vagaries of the monsoon and market forcesand also create an enabling institutional framework. The neglect of agricultural universities, extension services and cooperative institutions has led to a collapse of the enabling institutional architecture critical to development of sustainable agriculture which supports small and marginal farmers.

The next couple of chapters will feature the important highlights from the discussions and deliberations at GAC 2015, where entrepreneurs, government officials and researchers talked about the challenges and possible solutions to problems in Indian agriculture.

5 *http://www.livemint.com/Politics/ibdSw1oYBh27Towb1X3qjN/Govt-sets-up-panel-to-lay-out-plan-for-doubling-farm-incomes.html*

6 *http://www.livemint.com/Opinion/RxfHRPfI6frit62U8qXv8M/Rebooting-Indias-agricultural-policy.html*

GAC 2015 - INAUGURAL SESSION

The panel showcase the NSFI-YES Bank Report, a compilation of 30 case studies of various agri innovations from around the country

The inaugural session of the two-day Conference was kicked off by NSFI Chairman Sanjeev Asthana. The keynote address was delivered by Dr. Ashok Gulati, Infosys Chair for Agriculture, ICRIER. The other members of the inaugural session panel were: Dr. Ashok Vishandass, Chairman, Commission for Agricultural Costs and Prices (CACP); Mr. Shyam Khadka, Country Representative at the Food and Agriculture Organisation (FAO), India; and Mr. Sai Krishna, COO, NSFI. The session also saw the launch of the NSFI-YES Bank report, which is a compilation of 30 case studies of various agriculture technologies and innovations from around the country. NSFI Chairman Mr. Sanjeev Asthana felicitated Dr. Ashok Gulati with the citation of honour for Outstanding Contribution to the field of Agriculture and Public Affairs.

Major Highlights from Inaugural Session

Underemployment of the farming sector: While the sector provides jobs to above 50% of the labour force in the country, it contributes only 16.1% of the total GDP. The agriculture policy is silent on how to induct farmers into the labour force.

Controlling post-harvest losses: India's crop yield per hectare is much lower compared to the global average, according to FAO. Massive strain on resources has necessitated the need to revive and reuse indigenous methods of making the soil fertile and irrigating the land. There is a need to control post-harvest losses as our farmers are ill-equipped to handle that.

Need formal training: Only 2.3% of farmers in India receive some form of formal training. Traditionally, farming knowledge is passed from father to son. Hence, farmers need training in farming techniques and also training in social, entrepreneurial and financial skills.

Focus on technology & innovation: The Agriculture Policy needs to focus more on technology as much as seeds, land, irrigation and the likes. Currently, the policy favours overproduction of cereals and huge import of pulses & oilseeds. Any innovation must be comparative, inclusive, sustainable and scalable. It should not just be in technology, but also in processes and products.

DR. ASHOK VISHANDASS
Chairman, CACP

MR. SHYAM KHADKA
Country Representative, FAO

> It is time to move the farmers to more durable occupations and hence there is an urgent need for skill development programs for farmers

While it has been known for many years that the farmers are suffering, no one has been able to come up with a durable solution to mitigate this alarming problem. Even though the prices of agri commodities like pulses rise, the farmer gets only an incremental value of the price rise. This is a huge paradox we are grappling with. Three things need our attention: Diagnosis of the problem, sustainable and long-term solutions and developing environmental-friendly agriculture systems. As the GDP figures show, there is underutilisation of farmers in agriculture, but there is no visible strategy on how to include them into the labour force. It is time to move the farmers to more durable occupations and hence there is an urgent need for skill development programs for farmers. Policy induced biases can wreck havoc and have a devastating cascading effect on the sector. For example, we produce excessive quantities of rice and wheat, but we import massive quantities of pulses and oilseeds. The government of India has allocated Rs 70,000 crore for fertiliser subsidy for 2016-17. The subsidy induces more consumption of water and power and hence is not environment friendly. Agriculture in India cannot take off unless the farmer is ensured that he will get his due.

It is known that underemployment and low productivity plague the agriculture sector. However, a bigger problem lies in how agriculture skills are passed in India. Traditionally, such skills are passed from father to son and there is no scope of transfer for new knowledge and scientific training. According to the NSSO 66th round data, only 2.3% of farmers in India receive some kind of formal training when compared to UK (68%), Germany (75%), USA (52%), Japan (80%) and South Korea (96%). Indian farmers are ill-equipped to control post harvest lossesand value addition in the agro-processing sector, which can lead to increased exports.

While India is a big exporter of agri commodities, there is a need to educate the farmers on export regulations and supply chain. Farmers need more than just technical skills: They should also be taught social skills, financial management skills and entrepreneurship development skills. Climate change is in vogue these days and the farmer will need new skills and knowledge to tackle it. There is also a need to revive and relearn the indigenous methods of keeping the soil fertile and the land irrigated. Another major problem is that most agricultural programmes of the government target men and not women, who are increasingly taking up the professions in the villages as the men leave to work in the cities. There is a pressing need to focus on women in agriculture both in skill development and developing technologies relevant to women.

DR. ASHOK GULATI
Infosys Chair, ICRIER

There is no doubt that innovation can unleash a huge gain for the betterment of the society. There is a need to take care of four basic thumb rules for innovation:

1. Comparativeness: All types of innovation need to be assessed for their impact on agriculture. Countries specialise in areas where they have comparative advantage or they develop comparative advantage according to their needs and then trade across the world. Hence, without looking at the comparative economics, it is not enough to say that we need to be self-sufficient.

2. Inclusiveness: Are the innovations being captured by the top 5% of the farmers or inclusive of the entire masses in the sector? When the government thinks of a new programme, they dole out huge subsidies. But, the minute the subsidies are withdrawn, the programmes fail.

3. Sustainability: Judge the sustainability of the innovation, financially and environmentally. In 1966, India was facing a massive food shortage as two successive droughts had crippled the agriculture sector. At least 30 million people died of starvation then. It was then India imported 18,000 tonnes seeds of high yielding variety—Sonara 64 and Lerma Rojo 64A, which heralded in the Green Revolution. Soon, we moved from using high-yielding varieties to hybrids and eventually to Bt yields. Thanks to the use of Bt technology in cotton, production has more than doubled to 36-38 million bales today.

4. Scalability: Innovation must work towards scalability; only then, it can have the desired impact. Innovation in products and processes are essential too. For example, while soya is a great source of protein, it is mostly used for extracting oil in India. If soya is mixed wheat or other dals, it could save India thousands of tonnes of pulses in imports. The ability of the agricultural sector to sustain itself and grow beyond 4% has been a big challenge and it keeps getting reflected in the short-term very often by way of shortage of pulses, edible oil etc, in turn affecting inflation. This is happening even as the non-cereal production continues to grow.

> Without looking at the comparative economics, it is not enough to say that we need to be self-sufficient

Dr. Ashok Gulati felicitated with citation of honour for Outstanding Contribution to the field of Agriculture and Public Affairs by NSFI Chairman Sanjeev Asthana. Dr. Gulati is a Member of Prime Minister's Economic Advisory Council, a Padma Shri Awardee and the former Chairman of the Commission of Agricultural Costs and Prices.

SESSION 1
AGRI BUSINESS

THE BREATHER FOR AGRICULTURE DEVELOPMENT IN INDIA

HIGHLIGHTS

- **Need for transaction banking:** According to RBI, if banks and other financial institutions increase their transaction banking services to farmers and the poor in the country, then the GDP will grow by 1-1.5%. Unfortunately, the focus has been credit driven rather than transaction banking driven.
- **More investment in food processing:** According to a research by Rabobank, it was estimated that Rs 1 crore of investment in the food processing sector will lead to higher employment than Rs 1 crore in the IT sector. Unfortunately, the investment in food processing in India is very low.
- **Franchisee model a game changer:** The food processing industry in the country is at a nascent stage. The franchisee model could prove to be a game-changer.
- **Economic crop jobs:** There is a need to switch to economic crop jobs for long-term growth and also stop knee-jerk reactions to fall in fruit and vegetable supply. Concerted action is required.
- **Banking services:** Farmer development centres and Krishi Samridhi Kendras assess the needs of the farmers and accordingly provide banking services to them

MR. ARINDOM DATTA
Executive Director,
Rabo Bank

If we have to bring technologies and if we have to do innovations at our grassroot level in the upstream part of the value chain, we cannot expect every farmer to innovate. While Dr. Ashok Gulati's CISS framework – Comparativeness, Inclusiveness, Sustainability and Scalability - to judge innovations is an excellent tool to assess the contribution of an innovation or a technology, such innovations may also be brought to the farmers through a vibrant Small and Medium Enterprises or Small Business operating in Food and Agri Business Sector.

Focus in the country has so far has been on financing the farmer under priority sector lending. There is also a need to look at what is the key role played by SMEs in promoting agri business. SMEs played an important role in the growth of agriculture in various successful cases of Netherlands, Switzerland, USA etc,. These SMEs are not only sustainable from financial perspective but also they act as aggregators for resources, knowledge which is eventually passed on to the farmers. Agriculture development requires huge investments at the farmer's level to increase productivity and to get into sustainable cropping systems to address the issues of soil and water. In this context it is very essential to have sustainable small businesses / SME sector who are directly dealing with farmers in food and agri business.

SPEAKERS

Mr. Arindom Datta
Executive Director,
Rabo Bank

Mr. Nitin Puri
Senior President &
CountryHead - Food &
Agri Strategic Advisory &
Research, YES Bank

Mr. Hemant Gaur
MD, Sri Siddhi Vinayaka
Agro Processing Pvt. Ltd.

Mr. A. K. Das
Dy. General Manager, PC&FI
Wing, Canara Bank

Mr. Pradipta Kumar Sahoo
Business Head, SAFAL,
Mother Dairy Fruit &
Vegetable Ltd.

MR. NITIN PURI
Senior President & Country Head - Food & Agri Strategic Advisory & Research, YES Bank

The bank implemented a payment solution for speedy delivery of dues to farmers and a warehousing facility that not only mitigated the risks for farmers, especially small-ticket holders, but also guaranteed to buy the produce if the farmer found no takers during distress sales. The bank has implemented a payment solution for the dairy sector, where the farmer gets paid within 15 minutes of delivering milk to the cooperatives. Earlier, the farmer had to wait for more than 10 days for payment and even then he was not guaranteed full payment. So far, this system has been implemented in Andhra, Karnataka, Rajasthan, Madhya Pradesh. Once they got familiarised with the system, the bank opened the dialogue on financial inclusion in terms of increasing their savings. Now, a farmer will not have to resort to distress sales. A farmer can deposit his stock at a warehouse, equipped and managed by a collateral management agency, which has a certain margin system to ensure that the price volatility is taken care of. There is an anchor partner/organisation which guarantees the purchase of the produce if the farmer finds no takers. He can keep 50% of his stock in the warehouse and sell it six months down the line.

> The bank has implemented a payment solution for the dairy sector, where the farmer gets paid within 15 minutes of delivering milk to the cooperatives

MR. HEMANT GAUR

MD, Sri Siddhi Vinayaka Agro Processing Pvt. Ltd.

The food processing industry in India is at a very nascent stage. Siddhi Vinayaka has 125 franchisees across the country, through which the farmers are taught basic skills like how to make a transaction, or a bill or what needs to be done to take a licence etc. Siddhi Vinayaka has tied up with AgriCo, the world's largest potato seed company, to bring in the best varieties of potatoes to the country. All inputs are supplied to the farmer through the franchisee channel. The model also addresses the disconnect in the supply chain by ensuring that the person running the franchisee is responsible for both buying and selling. He will ensure that he will not get a bad quality yield and he will not overprice it because he has to buy it. The franchisees also get linkage to agro chemical companies, organic fertilisers, various cold storages and handling and financial institutions. Siddhi Vinayaka provides various engineering solutions to keep the produce fresh such as consulting (provide expertise on how to run a factory/machines), water solutions (provided a solution where water used to wash potatoes was made reusable again), equipment that can process potato and different kinds of storage solutions.

> Siddhi Vinayaka provides various engineering solutions to keep the produce fresh

MR. A. K. DAS

Dy. General Manager, PC&FI Wing, Canara Bank

One of the oldest banks in the country, Canara Bank has disbursed Rs 63,561 crore in rural credit so far and has marked its presence with more than 3,000 branches in rural areas. The bank has set up 66 farmer learning centres and 67 training institutes in the country that impart training in the field of agriculturebesides setting up Agricultural Knowledge Dissemination Centres that educate the farmer on technical advancements and government policies. Farmers' Development Centre (FDC), which was opened in Hyderabad,providesservices in domains of sales, imparting skills and capacity development. Krishi Samridhi Kendras of the bank directly approach the farmers to assess their needs and provide banking services to them. The bank is also financing several innovative business models viz., organic dairy farm in Karnataka, 1,000 vermicompost units, biodiesel plantation & processing units, agri business centres and green energy products. The agriculture innovation centre at the head office and two other centres in Karnal, Haryana and Lucknow, Uttar Pradesh are playing a pivotal role in promoting innovations in agriculture domain.

MR. PRADIPTA KUMAR SAHOO

Business Head, SAFAL, Mother Dairy Fruit & Vegetable Ltd.

The contribution of the fruits and vegetables basket in inflation is 25%. Hence, a mere disruption of supply can have a massive ripple effect on the economy. Though fruits and vegetables comprise the biggest segment among major crops, there is a high degree of price volatility and uncertainty leading to a reactionary response rather than a thought out concerted response to the situation. Interventions in end-to-end supply chain processes, with the right mix of technology and innovations, can have a significant impact on the availability of fruits and vegetables. It is time to switch to economic crop jobs. Supply management is the key to the success of any integrated value chain approach. In the short term, there is a need to create central and state institutions to deal with supply-demand mismatch and quickly deal with aberrations of weather i.e. Price Stabilisation Force. This force will engage in checking price rise at domestic level and be involved in imports and exports. For the long term, it is necessary to create Special Crop Zones—production clusters on a regional and national level with FPOs, map production areas season-wise and with comparative advantages and estimate demand-supply gap region-wise, state-wise and aggregate for the country month-wise.

> It is time to switch to economic crop jobs. Supply management is the key to the success of any integrated value chain approach

Speakers on the dais - (From L to R) Mr. Nitin Puri, Mr. A. K. Das, Mr. Arindom Datta, Mr. Pradipta Kumar Sahoo, Mr. Hemant Gaur

SESSION 2

POST HARVEST MANAGEMENT

WIN-WIN FOR THE FARMER AND THE ENTERPRISES

HIGHLIGHTS

- **Creating win-win:** Capability, willingness to do the job in a cost-effective manner and determination—These three principles are needed to create the system, the processes and the technologies that can enable the win-win for both farmers and the entrepreneur.
- **Value for all stakeholders:** Value delivery to the ground level stakeholders is the primary constraint affecting the entire agri value chain.
- **Institutional Research:** There is a big need to supplement farmers knowledge with institutional research.
- **SPV for Agri Extension Services:** It should provide training & certification and act as a central repository of extension services offered by the government and the private sector.
- **Farmer Producer Organisations:** The emergence of FPOs will soon gain traction as they have been successful in linking small farmers with markets.

DR. HARSEV SINGH

CEO, Reliance Dairy Foods Ltd.

There is a need for win win situation for both the farmers and entrepreneurs. Both these stakeholders in a way are on either side of the same spectrum while the farmers need higher price for their produce, the entrepreneurs are expected to maximise their profits based on their investments. In order to bring down the cost of operations and processing for the benefit of both these stakeholders, there is a need for collective effort by researchers, innovators and entrepreneurs. While farmers, given an opportunity, can excel in their businesses.

Technologies and innovations are the principle means of aiding better price realisation for the farmers and reduction of the costs across the value chain. This is the principle means of ensuring that a decent portion of the consumer rupee is passed on to the farmer.

SPEAKERS

Dr. Harsev Singh
CEO, Reliance Dairy Foods Ltd.

Mr. Krishna Kumar
CEO, CropIn Technology Solutions Pvt. Ltd.

Mr. Tushar Pandey
Senior President, Public and Social Policies Management (PSPM) Group, YES BANK

Mr. Avinash Kant Kumar
Executive Vice President - Supply Chain, Jubilant FoodWorks Ltd.

Mr. Chandra Pratap Singh
CEO, Vindhyachal Agro Farms Private Limited

MR. KRISHNA KUMAR

CEO, CropIn Technology Solutions Pvt. Ltd.

While there is a lot of data on agriculture, the absence of real-time knowledge of the challenges is very disconcerting to the farmers. CropIn wanted to create a technology that could bridge the gap between the farmer and the whole ecosystem that includes the buyer, agri companies and the banks.

The company provides agronomy support to farmers through data from apps where in a staff member connects with at least 50 farmers, find out their needs and requirements and get their inputs on the ground level situation. This information is then loaded to the Cloud through the application which allows sharing of real-time information such as the number of farmers in the state, the weather conditions, crops that are being sown, different crop varieties etc. The farmers can plan their crop with adequate information on smart crop planning, compare yields, analyse practices, inputs, season climate and its impact on yield, compare seed performance, get market analytics and trends, get instant advice on pest and diseases and personalised advice on crop. CropIn currently is being used in 14 states and covering more than 50 crops.

> While there is a lot of data on agriculture, the absence of real-time knowledge of the challenges is very disconcerting to the farmers

MR. TUSHAR PANDEY

Senior President, Public and Social Policies Management (PSPM) Group, YES BANK

> Owing to the structural complexities in the agri sector, it is essential to pay special emphasis on education & awareness

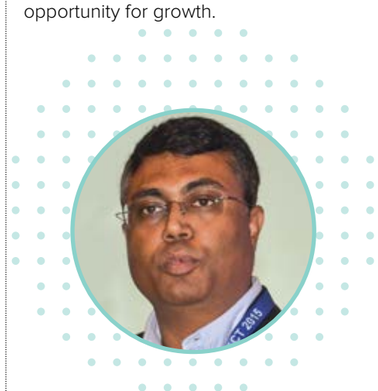
Technology development and innovation should be all about empowering communities. Value delivery to the ground level stakeholders is the primary constraint affecting the entire agri value chain. In the Indian context, the large number of small and medium farmers make it essential to ensure cohesive collaboration at the grassroots to achieve market scale. Recent policy mechanisms have seen the focus on shifting the value chain processes closer to the production area. The approach benefits the smallholder in two ways: Increase in revenue generation as more economic activities take place closer to the farm and timely process enhancements that will minimise the physical presence in the value chain.

The area of institutional research leaves much to be desired and it is important that one takes care of it. There is a need for a Special Purpose Vehicle for Agri Extension Services. India has about 750 extension workers per million farmers compared to 2,500-3,500 in China and Vietnam. Owing to the structural complexities in the agri sector, it is essential to pay special emphasis on education and awareness. Ideally, the SPV should provide training and certification to business correspondents, extension workers, NGOs; provide training and certification to farmers that would make them eligible to secure additional benefits; act as a central repository of extension services offered by the government and the private sector. With transport costs a major overhead in the agri value chain, the concept of Community Food System is picking up momentum.

MR. AVINASH KANT KUMAR

Executive Vice President - Supply Chain, Jubilant FoodWorks Ltd.

India has grown to become the second largest market after the US for Domino's. From importing every ingredient, the company has shifted to creating and sourcing everything locally. Today, it is the largest end-user of all agri commodities. The quality, quantity and the food safety of the agri products is of prime importance for Domino's. Since the shelf life of the products is only four to five days, Domino's is working with dedicated local farms, who are cultivating vegetables such as brocoli, zucchini and lettuce. As freshness and traceability (healthy and pesticide free) are the main focus, the firm has created a highly automated supply chain across the country. Once the vegetables reach the centres, they are transported to restaurants within two hours through the multi-temp trucks. These trucks are fitted with GPS/Geo fencing and temp sensors and their transport route and capacity optimisation is automated. The consumer in India today wants different things than in the past: They seek food that is fresh, want to co-create new dishes or do it themselves and want healthy food offerings that are free of pesticides. The total industry size of the fast food sector is Rs 560,000 crore. Only 4,000 restaurants out of 15,000 are organised. It is a huge opportunity for growth.



MR. CHANDRA PRATAP SINGH

Chief Operating Officer, Vindhyachal Agro Farms Private Limited

> A social enterprise can enter the market either by addressing needs & resources or tackling inefficiencies or promoting innovations

Social enterprises such as Vindhyachal Agro are those organisations that use a business approach to pursue social objectives. A social enterprise can enter the market either by addressing needs & resources or tackling inefficiencies or promoting innovations. For example, 'The Mango Tree'promotes sustainable community based bee-keeping where as 'Krishi Star' has a network of farmer-owned units for canned tomato and works with farmers cooperatives in Gujarat and Maharashtra. There needs to be a convergence of the entrepreneur and the farmer. 'eKutir Social Business' shows the seamless coordination between the two where the entrepreneur connects the farmer to the value chain system. This enables the farmer to apply new technologies and methods to increase yield & income and lower risk & costs. The value chain will get the benefit through increased efficiencies, knowledge and profits.

The integration of the small farmer with agri value chains can lead to poverty alleviation, matching market demand, increased farmer productivity & yield and developing collaborative last-mile solutions. Vindhyachal Agro Farms is in the process of setting up a unique farmer entrepreneurship model and a Centre of Excellence for hi-tech farming in Eastern UP.

Speakers on the dais - (From L to R) Mr. Tushar Pandey, Mr. Krishna Kumar, Dr. Harsev Singh, Mr. Chandra Pratap Singh, Mr. Avinash Kant Kumar

SESSION 3

MECHANISATION AND PRECISION FARMING

PRINCIPLE MEANS TO OVERCOME RESOURCE CONSTRAINTS

HIGHLIGHTS

- **Value change:** There is a need to create value for all stakeholders end-to-end and that can happen only if we ensure quality production.
- **Plasticulture:** One of the very effective ways of farming, is a perfect combination of man, method and mechanisation.
- **Private-Public Partnership:** There is a need to combine the resourcefulness of private companies with the policy makers and government bodies to ensure seamless transfer of knowledge and equipment to the farmer.
- **International tie-ups:** Indian and Dutch governments are collaborating on various fronts in the field of horticulture and have established International Horticulture Innovation Technology Centre (IHITC).
- **Indigenous technologies:** Make In India initiatives such as Hydroponics will contribute immensely in the field of animal husbandry in India.

MR. MUKUL VARSHNEY

Director, Corporate Affairs, John Deere India

The Green and White Revolutions have led to a manifold increase in the production of milk and wheat. However, this success could not be replicated in other agricultural commodities because it has not been possible to co-create value for all stakeholders at every single stage. The farmer works in a very volatile environment, with fluctuations in price, input costs and weather affecting the total output. Today, there is a huge amount of innovation in process and equipment every day and there is a need to bring the high-end technology to the door of the farmer. While production has not been an issue, quality production has been an issue in India. Take for example cotton. Women and children are the primary pickers of cotton. But, there are many countries in the world that have banned cotton that is picked by children. Hence, even if the quality of the cotton is good, it does not get many takers. Despite large acreage of cotton in India, the productivity was less. Hence, on an experimental basis after consulting various experts, John Deere sowed new seeds and used better agronomy practices and equipment. Production increased from 200kg to 750 kg. As it was child labour free, the marketability of the cotton also improved. Punjab and Andhra replicated this model.

SPEAKERS

Mr. Mukul Varshney
Director - Corporate Affairs, John Deere India

Mr. Krish Iyengar
Executive Director, National Committee on Plasticulture Applications in Horticulture (NCPAH)

Mr. Anup Kalra
Chief Executive Officer, Ayurvet

Mr. Anand Krishnan
Deputy Agriculture Counsellor, Royal Netherlands Embassy

MR. KRISH IYENGAR

Executive Director, NCPAH

Over the past many generations, people have been leaving agriculture as it is an unpredictable occupation and not economically viable. Per capita holding of land in the country is less. There is no sense of pride in the occupation. The farming community is ageing. However, these challenges can be overcome through plasticulture.

Plasticulture is an application that takes care of all the four basic innovation principles: Competitiveness, scalability, financial viability and sustainability. All kinds of water, including saline water, can be used for this type of agriculture. Since it is practised in a controlled environment, it is not affected by variable weather. Capital expenses can be recovered within two years. Land is also not an issue as a greenhouse can be built on a fraction of the land used for farming. Today, most of the farmers who practice plasticulture are below the age of 35 and they use their mobiles and gadgets to help them with farming.

Plasticulture offers better crop management techniques for crop production; provides micro climate for crop development; production of high value crops in adverse climatic conditions; reduction in inputs; undertaking crop production throughout the year; provides moisture retention thereby reducing irrigation; cleaner crop with better quality; increases productivity; reduction in pre- and post- harvest losses; water, fertiliser & labour savings, maintains soil health; conversion of deserts/waste lands.

> “Plasticulture is an application that takes care of all the four basic innovation principles: Competitiveness, scalability, financial viability and sustainability

MR. ANAND KRISHNAN
Deputy Agriculture Counsellor, RNE

Agriculture is one of pillars of the economy of The Netherlands where it contributes two-thirds of the net revenue of the Dutch government. Large investment in R&D of Agriculture, innovation and creating a sustainable value chain has been a factor of its success. One of the major successes of the Dutch lies in crop management. Greenhouse locations are further apart from each other and farmers are usually not on site all the time to monitor the day-to-day crops. The Dutch technology will not only help in doubling the food production to feed the increasing population in India, but it will also suggest effective ways of using the natural resources.

The International Horticulture Innovation Technology Centreis the first public-private partnership in the space of horticulture and is an international centre collaboration between the state government of Rajasthan and the government of Netherlands. Farmers from India and the world come to the institute for training and the curriculum has been provided by the Dutch government. Soon, there will be another collaboration in horticulture on skill development, post harvest, supply chain meeting etc. Centers of Excellence have been set up in seven states and they act a knowledge dissemination centres for the farmers.

MR. ANUP KALRA
Chief Executive Officer, Ayurvet

One of the biggest problems in India is that Make In India technologies don't get as much attention as something from the West or unless it is vetted by foreign experts. We should develop technologies in India and market them both in India and abroad. The limitation of technology has never been the problem. The challenge is how to get the tech to the doorstep of the farmer.

Water has always been a big problem area for farmers be it for agriculture or livestock. In 2008, Ayurvet created Ayurvet Progreen Hydroponics, through which one could get better green yield for livestock throughout the year. The machine was indigenously designed and developed to produce nutritious green fodder from maize, oats and barley and the seed to feed conversion takes just seven days compared to 25 days in the conventional nursery. Its advantages include saving water, land and getting better quality of produce. Besides, it has been approved and certified by the Ministry of Agriculture, Government of India. The cost of Hydroponics is Rs 1200-1300 per acre and conventionally it is higher at Rs 2,000 or more. The range of productivity is from 100kg per day to 2000 kg per day. One machine that produces 1000 kg of green feed is in 800 sq. ft. saves almost 15 million litres of water per annum. The company is working with several state governments and the Indian Army. The technology has been adopted by villages in Punjab, Haryana and Gujarat.

Speakers on the dais - (From L to R) Mr. Anup Kalra, Mr. Krish Iyengar, Mr. Mukul Varshney, Mr. Anand Krishnan

SESSION 4
AGRICULTURE SUSTAINABILITY

INPUTS FOR ENHANCED PRODUCTIVITY AND CROP CARE

HIGHLIGHTS

- **Nutrient-rich food:** It is not just essential to produce adequate food but also food that is rich in nutrients.
- **Water-efficiency:** In India, water-efficiency is only at 40-50%. There is tremendous scope to increase water efficiency through drip irrigation and micro irrigation.
- **Conservation agriculture:** For agriculture to be sustainable for smallholders, it is necessary for farming to be done along the lines of conservation agriculture in a participatory mode with private bodies.
- **Gender Inclusion:** There is a need to include the female farmer in the entire value chain as an individual. They face various socio-economic problems, which can only be overcome by recognising their role in Agriculture.

SPEAKERS

Dr. HS Gupta
Director General, Borlaug Institute of South Asia

Dr. Kuhu Chatterjee
Regional Manager, South Asia, ACIAR

Dr. Neelam Patel
Senior Scientist, Indian Agriculture Research Institut

Shri Kanwal Singh Chauhan
Farmer & Entrepreneur

DR. HS GUPTA
Director General, Borlaug Institute of South Asia

There is a need to give the farmers' occupation respect and dignity. Today, given the option, many farmers would like to give up the occupation. Unless we change this attitude, we won't be able to address their issues properly. Small and marginal farmers need to be brought to the mainstream, especially those in Eastern India, where there is tremendous scope for improvement in terms of crop productivity.

Even though India is the second largest producer of wheat and rice, 40% of school-going children are malnourished. Recent surveys have shown that 70% of Indians are protein malnourished. If children grow up to be malnourished adults, it will do more harm to the economy than we are foreseeing right now. This is a wake up call. We should ensure that along with adequate food, adequate nutrients are also available.

If a farmer does not add value to his produce, his profitability does not increase. In order to add value to processing, it is necessary to skill people in processing. The Indian farmer can be prosperous if he is able to access the technologies and innovations along with manpower. In India, water efficiency is only at 40-50%. There is a tremendous scope to increase this from 50% to 90% through drip irrigation and micro irrigation and this requires funds, research and infrastructure.

DR. KUHU CHATTERJEE
Regional Manager, South Asia, ACIAR

The transformation of our food systems will require rapid innovation driven by targeted research, new approaches to technical cooperation between governments, businesses and agricultural organisations. There is a growing regional character, which reflects India's expertise and its ability to help its neighbours. The entire program of ACIAR is now focused on East India, which has the highest concentration of the world's poor.

Sustainable and Resilient Farming Systems Intensification (SRSFI) Project is based on the Eastern Gangetic Plains of Bangladesh, India and Nepal and funded by the Australian government under the sustainable development investment portfolio for South Asia. It operates in eight districts across the three countries in association with 20 partners— 2 districts in West Bengal (Malda, Cooch Behar), 2 in Bihar (Purnia and Madhubani) 2 in Nepal (Dhanusa, Sunsri), 2 in Bangladesh (Rampur, Rajshahi). The project develops solutions for the smallholder farmer through the principles of conservation agriculture in a participatory mode. The project has an ambitious target of reaching 35,000 farmers in the next four years and 200,000 farmers 10 years from now and is seeking to address the technology requirements of the smallholders, women farmers and institutions.

DR. NEELAM PATEL
Senior Scientist, Indian Agriculture Research Institute

The reduced amount of water for irrigation and agriculture is a major concern. In 1997, 83% of total water was used for agriculture. This came down to 78% in 2010 and is likely to reduce to 72% by 2025 and 68% by 2050. Water consumption in agriculture is declining because it is being diverted for domestic use, power and other industries. Nearly, 45% land in India is irrigated, while the rest is rain fed. The overall irrigation efficiency is 30-40%. The Krishna, Godavari, Mahanadi river system has 27% efficiency and the Indus River Valley system has 43-47%. In 1950-51, 22.6 million hectares was irrigated; this has risen to 100 million hectares. The target is to have 160 million hectares irrigated. Even if the irrigation efficiency rises by 10%, it would benefit an additional 4 million hectares.

The government has launched a scheme - 'Har Khet Mein Pani'. In order to make the scheme a reality, the country will have to increase area under irrigation, bridge the gap between irrigation potential & utilisation, creating & strengthen water distribution network & enhance water efficiencies. A major part of fields in India are irrigated with water from the canals, where at least 60% of water is lost. If PVC pipes are used, then water losses can be cut by at least 20%.

FIRST PERSON ACCOUNT

SHRI KANWAL SINGH CHAUHAN
Farmer Entrepreneur

I was 15 when I started farming. Though we had land, we were the poorest family in the village. In 1980, I started with Basmati rice, but then soon I discovered I was not able to get much profit out of my crop. I was in debt and worried. I found out soon that we could farm baby corn. Someone from ICAR said the seed was available with them and it would give me good yield. For the first time, I got the best yield in the village. I struggled to sell it through the vegetable mandis and soon I managed to get it to a agro processing unit. Over the years, I started cultivating sweet corn, mushroom, tomato and baby corn.

We faced many issues and I will try to highlight the most problematic ones.

1) A lot of what we make goes to the government through tax. In the case of tomato puree, the excise duty on the cans has been hiked from 4% to 12.5% affecting us direly.

2) Banks hesitate to give out loans with agricultural property as collateral. If any person wants to start farming, say for example mushroom, he will need at least Rs 1 crore. but, banks are not willing to give farmers loans. Then, how can one move forward? There is a huge demand for mushroom in the Indian market and since it is a labour intensive crop, we will be able to employ more people in the farms if we get the loan.

3) There was a government guideline that the mushroom yield is measured per hectare. That is a big problem. Mushroom is grown in controlled conditions in small areas and not hectares. I tried to bring attention to this anomaly to the authorities by writing to the Ministry of Agriculture, but nothing came of it.

Speakers on the dais - (From L to R) Dr. Kuhu Chatterjee, Dr. HS Gupta, Dr. Neelam Patel, Shri Kanwal Singh Chauhan

SESSION 5

ICT AND AGRICULTURAL EXTENSION

INNOVATIONS UNLIMITED

HIGHLIGHTS

Information Overload: There is a plethora of information available to the farmer. There is a need to deliver the right information in a compact manner.

E-National Agriculture Market: One country, one licence to trade in agri commodities.

Lack of extension workers: Currently, there are 9,000 extension workers; however, 30,000 posts are lying vacant in various state departments.

Tech for farmers: Voice-based and text-based messages with agriculture related information are sent to farmers, while Kisan Call Centre address grievances and Farmers Club collects feedback.

Weather forecast: Short-range and predictable weather forecasts are what farmers look for, not long-range forecasts that are more speculative in nature.

MR. ATANU PURKAYASTHA

Secretary, Central Information Commission

With increasing population, there is a need to increase productivity. One of the ways to do that would be to make sure innovations reach the farmer through the process of extension. During the earlier days of subsistence farming, knowledge was transferred over generations from grandfather to father to son. When there was a shift from subsistence to profitable farming, one should move beyond the conventional communication channels. Now, the Internet has taken over that role. If information can be provided to the farmer in a faster and more compact manner, it would be of great service. Farmers are also now using mobile-based technologies. States like Maharashtra, Andhra and Madhya Pradesh have pushed modern ICTs and innovations in agriculture.

MR. RAJESH URKUDE

Head m-KRISHI, Planning & Operations

It is very difficult to implement digital farming technology on the field. m-KRISHI is working very closely with the Indian Institute of Soil Sciences. By mapping the transpiration rate of each village through satellite, the company is able to tell the farmer if he needs to resort to drip irrigation or micro irrigation. Once the farmer puts various inputs, he can design a crop protocol—figure out crop protocol, soil, fertiliser, irrigation support system and package of practices. Since farming is a complex phenomenon, very localised crop practices were evolved and crop protocols created depending on the farmers' risk taking abilities. The company has worked with certain multinational companies in Brazil and the European Union. Now, m-KRISHI not only engages with the farmers, but also with the labourers. Facebook and WhatsApp have made a great difference in the way the farmer thinks. But, there is information overload and this is confusing the farmers. So, the external agencies need to filter the information before providing it to the farmers.

> Once the farmer puts various inputs, he can design a crop protocol—figure out crop protocol, soil, fertiliser, irrigation support system and package of practices

SPEAKERS

Mr. Atanu Purkayastha
Secretary, Central Information Commission

Mr. Rajesh Urkude
Head m-KRISHI, Planning & Operations

Mr. Rajesh Sinha
CEO, NCDEX e-Markets Ltd.

Dr. J. P. Sharma
Joint Director-Extension, IARI

Mr. Sandeep Malhotra
CEO, IFFCO Kisan Sanchar Limited

Mr. Sonu Agrawal
MD, Weather Risk Management Service Pvt. Ltd.

MR. RAJESH SINHA
CEO, NCDEX e-Markets Ltd.

The three things that an efficient marketplace should offer is inventory, asset and regulatory requirements of the organisations. The evolved marketplace also looks at risk management, where risk of every market participant is actually taken care of. The farmer today buys at retail rates and sells at wholesale rates. The government established the Electronic-National Agriculture Market on three basis tenets: Transparency, technological efficiency and information dissemination. There are about 2,500 market yards and 8,000 sub-market yards. In order to create an efficient system, there is a need to do the following: Join all the sub-market yards into the market yards where trading is transparent, in real time and reconcilable; the quality is visible, scalable and measurable and payment is made directly to the accounts and there is complete accountability. One country, one market, one licence: In order to take licence in any state, it is not necessary to have a permanent establishment in that state if you are a citizen of India. This is the second change that we would like to see in the country. Objective quality-based verification: On the platform one can check how many people are bidding and for how much, is the produce quality certified. If the produce is objectively certified, the farmer gets 10-15% more income for the produce.

DR. J. P. SHARMA
Joint Director-Extension, IARI

Today, a single extension worker is catering to the needs of 5,000 families as opposed to 1,000 earlier. Currently, there are 9,000 extension workers; however, 30,000 posts are lying vacant in various state departments. Moreover, the extension workers are given additional responsibilities. Rapid technological strides is also making it difficult for the extension worker. Earlier, one variety existed for 20 years. Now, there are hundreds of research institutions and seven agricultural universities and with the generation of rapid number of innovations, which makes un uphill task for the extension worker to handle and disseminate.

IARI lends the technology to 28 NGOs who then take the technology to the farmer. Each NGO maintains contact with 100 farmers & each farmer is in touch with 10 other farmers & hence IARI is working with nearly 8000 farmers through this mechanism. Though the postal services employ 6.5 lakh workers, there are not enough workers to man 1.5 lakh post offices. Hence, IARI identified certain places where farmers performed the role of branch postmasters on a contract basis. Once the model became successful in UP, it was established in 9 other states. Farmers were trained at the institute & were sent seeds through the scheme of 'Book Now, Pay Later'. Now, the scheme will be implemented across 100 districts in the country.

MR. SANDEEP MALHOTRA
CEO, IFFCO Kisan Sanchar Limited

While there are 120-150 million farmers, the extension activities do not reach to more than a few lakhs. Even the awareness level among farmers is pretty low. Three initiatives undertaken are to overcome these challenges include: Voice-based and text messages, Kisan Call Centre and Farmers club. On a monthly basis, the company provides 10,000 unique messages in 11 languages, four times a day. Two of the messages are related to agriculture, horticulture, climatic conditions and the rest on government schemes, health and education. The idea behind the project is to create a prosperous farmer through better information availability. The information services gap is huge in this country.

The Kisan Call Centre receives about 30,000-40,000 calls a day. It is the largest and the most successful initiative of the government in the ICT space in the country. However, we are able to address only 60% of them. The company recently started the Farmers Club to get feedback from the farmers on the ground situation. Unless there are people on the ground backed up with accessible technology, we won't be able to improve the lives of the farmers. We need to have better practices, economies of scale, viability of the farmer if we are to see development in agriculture.

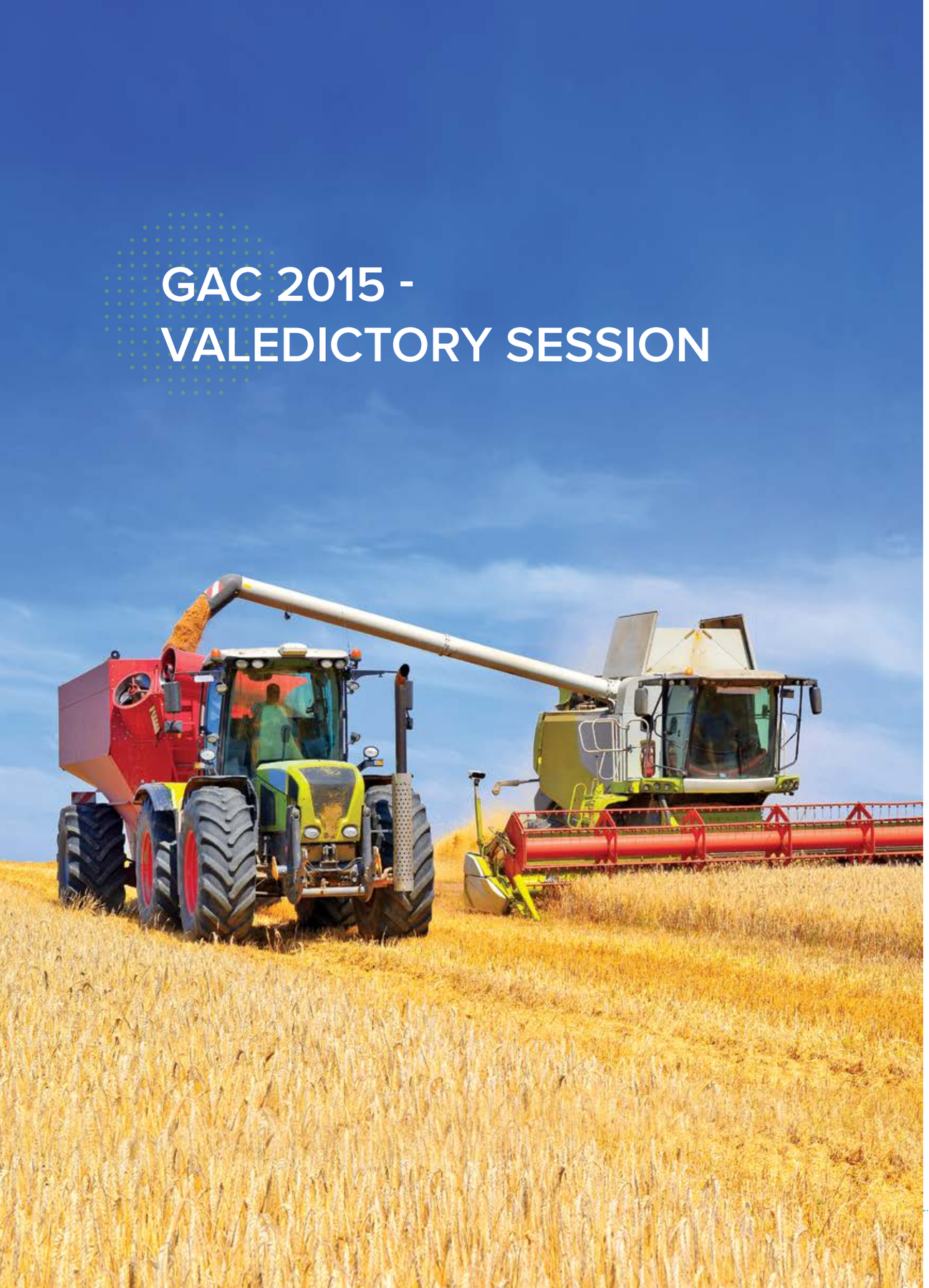
MR. SONU AGRAWAL
MD, Weather Risk Management Services Pvt. Ltd.

Ten years ago, only a government agency could have predicted the weather. Today, it is much easier as you can obtain a lot of data from the public domain and Indian Meteorological Department (IMD). The company has set up 1,000 weather stations and have been able to generate data for 4,000 locations across the country. A programme called the GFS-Global Forecasting System provides ready-to-use data. The firm has created 10,000 reference points in the country—they could be farmers with smartphone applications or institutes who use the forecasts and provide feedback, which is very critical. As the average farmer would not pay for the weather forecast, the company started making it as part of their farm application called MyFarm. Such forecasts are useful to the farmer only in a certain context. It cannot be speculative. Today, long-range forecast is still speculative in nature. A short-range forecast has a very high degree of prediction power. If the forecaster advise farmers on frost management or small showers in a short-range forecast, then it becomes quite useful for them. Through WhatsApp, any farmer can get weather forecast, disease prediction and advice management.

> A short-range forecast has a very high degree of prediction power. If the forecaster advise farmers on frost management or small showers in a short-range forecast, then it becomes quite useful for them

Speakers on the dais - (From L to R) Mr. Rajesh Sinha, Mr. Rajesh Urkude, Mr. Atanu Purkayastha, Dr. J. P. Sharma, Mr. Sandeep Malhotra, Mr. Sonu Agrawal

GAC 2015 - VALEDICTORY SESSION



DR. TRILOCHAN MAHAPATRA
Director, IARI

While all models and schemes are in place, there are problems as well. It was suggested that farmers move away from agriculture. However, it is not easy to implement. Unless there are industries and occupations that can gainfully and sufficiently engage these vast majority of farmers, who may not have the right kind of skills, it won't be possible to engage them meaningfully. This is where we need policy intervention. We should look at skilling those farmers who are willing to move away from agriculture.

It is said that over 80% of the farmers are small and marginal. Hence, the country needs a framework to operate in the villages so that the small farmers are also engaged in farming as we still need to feed 125 crore people. Information alone will not work because for farmers seeing is believing. Most of the information that is being provided will be lost. One will have to go to the farms and demonstrate it to them. Can corporates replicate the success stories of farmer entrepreneurs who have started with Rs 500 and now make Rs 5 crore? There is a dire necessity to link farmers directly to the market. It is necessary to create good value so that everyone from the farmer to the government benefits.

DR. S. K. MALHOTRA
Horticulture Commissioner,
Ministry of Agriculture, GoI

The government of India has started the National Food Security Mission. The focus is on productivity led growth, not expansion led growth. It is equally important to focus on post-harvest growth because there is a huge change needed in the entire process. Under the Mission for Integrated Development for Horticulture, post-harvest management is being promoted. Horticulture has a budget outlay of Rs 2,000 crore. States have been instructed to utilise 30% of the funds on post-harvest management and 25% on hi-tech productivity led growth. New government interventions such as 'Apna Bazar, Apni Mandi — E-mandi are taking place. Farmers face a major problem in marketing in many states. Hence, the government is coming up with Farmer Trust Groups and Farmers Producer Organisations. Once a farmer becomes a member of such FPOs, they will automatically get many benefits.

> Farmers face a major problem in marketing in many states. Hence, the government is coming up with Farmer Trust Groups and Farmers Producer Organisations

SPEAKERS

Dr. Trilochan Mahapatra
Director, IARI

Dr. S. K. Malhotra
Horticulture Commissioner, Ministry of Agriculture, GoI

Mr. Sonu Agrawal
MD, Weather Risk Management Services Pvt. Ltd.

Mr. Sanjeev Asthana
Chairman, NSFI

Mr. Sai Krishna
COO, NSFI

MR. SONU AGRAWAL
MD, Weather Risk Management Services Pvt. Ltd.

Meteorological data has been predominantly in public sector domain for several years. However, with open source applications and information retrieval mechanisms emerging, advisory on meteorological data is no more restricted to the domain of government agencies. With partnerships and collaborative efforts with various agencies across the geographies it is feasible to compile the data and offer relevant and appropriate crop advisory services to farmers based on meteorological data. With the onset of cloud computing, different resolution forecasts can be taken up easily for the benefit of various stakeholders without large investments that were required few decades ago. However, this requires collaboration among various stakeholders to gain higher precision and scale up.

In collaboration with few farmers with smart phone accessibility, research institutes, about 1000 reference points have been created across the country through offering them free forecast advisory, but collecting real time feedback from them to refine the forecasting models. With the use of technology, today, forecasts are being made available for all the villages in the country which is also available on the website www.weather-risk.com. The forecast advisories are made available through mobile applications as well to ensure reach out to the farmers. The long range forecasts in India are still based on predictions, while the short term forecasts could achieve precision. In situations of short term forecasts tools like whatsapp are used to reach out to the farmers on their spraying advises and frost management advises.

> The long range forecasts in India are still based on predictions, while the short term forecasts could achieve precision

MR. SANJEEV ASTHANA
Chairman, NSFI

The presentations during the conference and the discussion with the participating delegates has clearly brought out the importance of the theme for the contemporary agriculture scenario. While the need for discussion on various themes has clearly emerged during the conference, necessity to discuss and deliberate on the ecosystem for technology development by not only government and private sector entities but also budding entrepreneurs, also has been highlighted.

Some of the speakers have highlighted the need for collaboration among different stakeholders to evolve frugal and relevant technologies and innovations. Farmers are not the lone torch bearers of responsibility to come out with solutions to the challenges of transforming agriculture. Various small businesses and entrepreneurs are already bring out affordable solutions to the impending challenges of the farmers and various other stakeholders across the agriculture value chains.

It is humbling to receive extremely good and positive response on the conference theme and we are sure that the deliberations would further evolve in the coming events for the benefit of meaningful and evidence based policy advocacy.

MR. SAI KRISHNA
COO, NSFI

I would like to put on record the continuous improvements in the quality of deliberations and participation in Global Agri Connect year after year. While several of the stakeholders who are associated with the conference for all the past years do look forward to discuss and deliberate in every upcoming conference of Global Agri Connect, the current theme of the conference received a wider and stronger response from known and unknown quarters. Indian Agriculture Research Institute (IARI) and Yes Bank have been partners in our journey of bring together meaningful and relevant deliberations on the emerging themes of agriculture. This is to thank all the partner of Global Agri Connect 2015 and several other individuals and institutions that have been contributing to the success of the conference.

We look forward to bring together more engaging discussion on the technologies and innovations in agriculture and also on the ecosystems that is enabling the development of such technologies, in Global Agri Connect 2016.

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Speakers on the dais - (From L to R) Mr. Sanjeev Asthana, Mr. Sai Krishna, Dr. S. K. Malhotra, Dr. Trilochan Mahapatra

EPILOGUE

Deliberations of the conference clearly bring out the fact that technologies in Indian Agriculture are not just playing a critical role in the achieving higher productivity and production, but also in various other segments of the agriculture value chain. Various innovations attempted by corporate sector and other forms of organisations in the form of Farmer Producer Organisations and various other entrepreneurial initiatives of the start ups are playing a significant and substantial role in the development of Indian agriculture. These technologies not only are facilitating technology experimentation and adoption by the farmers but also aiding in the making the markets more efficient thus contributing to the incremental income of the farmers.

> Scaling up the successful technologies & innovations to bring out their benefits for the vast manpower depending on agriculture is the key to agriculture growth

As emerged in the conference deliberations, at a time when Indian agriculture is reeling under stagnant growth in spite of large number of manpower depending on the same, several individuals and organisational forms are already making yeomen service to the farmers and to the agriculture value chains through integrating small and marginal farms to national network of markets. However, these attempts are still in the form of islands of success.

With the second largest agriculture land being cultivated in the country, while Indian agriculture holds the largest opportunity to feed the world and contribute to the country's economy, the resource constraints and changing climatic conditions plagued with challenges of fragmented land holding, are posing the severe challenges in the path of potential realisation. Stagnant agriculture in the last 1.5 decades is witness to this precarious situation of Indian Agriculture. However, the emerging technologies and innovations in various segments of agriculture value chain; innovations in the way agriculture businesses are carried out and the fast emerging entrepreneurial initiatives appears to be holding the right answers to the challenges plaguing Indian agriculture.

However, all is not rosy. Scaling up the successful technologies and innovations to bring out their benefits for the vast manpower depending on agriculture is the key to agriculture growth. Assessment of the technologies on the parameters of their comparativeness, inclusiveness, sustainability and scalability is the only means of taking forward the 'technology-innovation' agenda forward to realize their potential they hold for agriculture growth and especially for their positive externality on the farm incomes. Deliberation is no more on whether a technology / innovation is useful for Indian Agriculture or a Farmers or an Agripreneur', but it should be on a) which technologies are more relevant and frugal for easy adoption, b) what are the challenges faced by the persons / institutions behind these technologies / innovations in developing them, promoting / marketing them and making them useful, c) What are agriculture policy and fiscal policy frameworks that enable or challenges the development and use of such technologies affecting the agriculture development quotient and growth.

Similarly, there is pressing need to recognize that the nature of technology use in Indian agriculture is evolving from being 'production technology' during green revolution to technologies and innovations used in 'resource use efficiencies viz., precision agriculture, mechanisation', 'extension / technology transfer viz., ICT & Telecom'. Further, technologies/ innovations are not just restricted to the domain of the farmers but also on various segments of 'farm to fork' such as supply chain efficiencies.

In this context, Global Agri Connect looks forward to bring these dimensions of Agriculture Technologies and Innovations for further discussion in the upcoming events.

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National Skills Foundation of India
K-59, South City - 1, Gurgaon - 122018, Haryana, India
Tel: 0124-4058848-49, Fax: 0124-4058840; info@nsfindia.org