# AP AgTech Summit 2017

**Progressive Farmer, Smart Farming.**

15th - 17th Nov, 2017, Vizag


# Summary Document
# November 2017

HOSTED BY PARTNERS

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# Contents

# 1 Context

## 1.1. Agricultural Growth in Andhra Pradesh

Andhra Pradesh has been at the forefront of agricultural transformation to improve the lives of small and marginal farmers in the state through agricultural innovation. Agriculture and allied activities are a vital source of the state's income. The sector contributes ~30% to the state's Gross Value Added (GVA)and has grown steadily since 2014[1] . In 2016-17, the sector grew at a rate of ~14% at constant (2011-12) prices[2].

Andhra Pradesh is one of the major producers of a number of crops in India. It is one of the leading producers of food grains and oilseeds.The state is also the top producer for mango, chillies and turmeric within horticultural crops. There is also a significant push by the Hon'ble Chief Minister, Sri N. Chandrababu Naiduto increase the share of horticulture and aquaculture activities in the economy to augment agricultural incomes.As a result, Horticulture grew at 16.8% and Fishing and Aquaculture at 30.1% in 2016-17[3] .

The Government of Andhra Pradesh has set ambitious agricultural sector targets for 2029. The state is on course to sustain double-digit economic growth to become one amongst the three best states in India by 2022 and the best state by 2029. As part of achieving this vision, the Government of Andhra Pradesh has set ambitious targets to be the best in the country in food grain production and best in coarse cereals, pulses and maize productivity among BRICS nations by 2029.

The Government of Andhra Pradesh has been a pioneer in using technology to revolutionize how agricultural activities are carried out across the agricultural value chain in the state. For seeds and equipment supply, there are initiatives such as e-Seed Distribution, an Android application for the distribution of subsidized seeds through biometric system using Aadhaar, Webland and Ration card databases.For monitoring soil and plant health, the Soil Health Card System enables tracking soil nutrient status of macro and secondary nutrients and soil physical parameters, accompanied by advisory on the corrective measures for improved soil health and better yield. For advisory services, m-Sedyam is a mobile application in the local language that provides technical knowledge (package of practices of major crops, other technical information, guidelines of schemes of the department etc.) to farmers. As an example of farming governance interface, the AGRISNET portal displays latest information, data, notifications, scheme information, cultivation practices, etc. directly to farmers. Also, initiatives targeted at a broader e-governance mandate include the CM Dashboard, a real-time dashboard for the Hon'ble Chief Minister to monitor key performance indicators, crop coverage reports, grievance redressal status, natural calamity reliefs, input subsidy payments, etc.

Looking forward, the Government of Andhra Pradesh is actively looking to increase the role played by technology to achieve its agricultural sector targets, with a specific focus toward benefitting the lives of small and marginal farmers across the state.

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*1. Socio-economic Survey 2016-17, Planning Department, Government of Andhra Pradesh, 2017*
*2. Socio-economic Survey 2016-17, Planning Department, Government of Andhra Pradesh, 2017*
*3. Socio-economic Survey 2016-17, Planning Department, Government of Andhra Pradesh, 2017*

## 1.2. Rise of Agricultural Technology in India

Agriculture technology is a sunrise sector in India and has witnessed rapid growth in the past few years. There are an estimated ~180 – 350 AgTech companies operating in India across the agriculture value chain. These organizations have raised over USD 300 Million since 2016, placing India 2nd globally in the number of AgTech deals completed. Overall, there are six prominent models of AgTech companies in India:

1. Farming as a Service (FaaS) Models for Equipment: On-farm equipment, tools and services on a pay-per-use basis
2. Market Linkage: Technology-enabled market linkage to connect farmers to input companies and output markets
3. Customized Rural Advisory Services: Advisory, diagnostics, predictive analytics and farm management based on satellite, drone and mobile imagery and soil, weather, remote equipment data
4. Hardware and Systems: Implements, tools, irrigation solutions, and farming systems
5. Post-production Supply Chain Infrastructure: Storage, transport, post-harvest processing, and distribution solutions
6. Credit and Risk Management:Access to finance and insurance, either as a separate solution or integrated with the primary offering

The figure below provides a summary of these models with the names of a few companies operating in that space [4].


**Figure 1: There are six prominent models of AgTech companies in India**

*4. Companies can fall under multiple categories and this classification should be considered illustrative only.*

## 1.3. Fostering AgTech in Andhra Pradesh

With Andhra Pradesh as a pioneering technology adopter, as well as the increasing activity in the AgTech sector nation-wide, the time is ripe for the Government of Andhra Pradesh to identify, nurture and deploy cutting-edge AgTech solutions across the agricultural value chain. The Government of Andhra Pradesh, in partnership with the Bill & Melinda Gates Foundation, CII and Dalberg Advisors, decided to host an event with about 100 participants, and a pitch competition to identify the best AgTech solutions relevant to the challenges faced by small and marginal farmers in the state.

# 2 Story of the Summit

## 2.1.Genesis of the Summit

The Summit was initially envisioned to be a small event, catering to a niche audience of 100 agriculture experts. However, the Hon'ble Chief Minister, Sri N.Chandrababu Naidu believed that this was a unique moment in the growth of agriculture in the state, and saw the opportunity to make this a catalytic event that could identify ideas that transform the lives of small and marginal farmers. Inspired by the scale and success of the Partnership Summit 2016, he pushed the organizing team to think big and bold. Under his guidance and leadership, it was decided to make the AP AgTech Summit 2017 a mega event, which would invite panelists and delegates from around the world to brainstorm on innovative ideas to leverage technology and improve the lives of small and marginal farmers in the state. In addition, the Summit would include a Pitch Competition, which would invite global innovators to showcase their solutions for solving the challenges faced by small and marginal farmers in the state, through the use of cutting-edge technologies. Also, the Summit would have a large exhibition arena where innovators from around the state and the world would demonstrate their disruptive technologies across the entire agricultural value chain.

In the spirit of making the end beneficiaries, small and marginal farmers, the central figure of the Summit, the Hon'ble Chief Ministerlay special emphasis on inviting progressive farmers, students, and representatives from agricultural universities to the Summit. Along with them, agricultural technology experts from around the world were invited to share their ideas with the varied, and vibrant delegates.

To bring the Hon'ble Chief Minister's vision to life, the organization team, under the leadership of Sri B. Rajsekhar, Principal Secretary to Government of Andhra Pradesh, Department of Agriculture, Marketing & Cooperation, along with other partners – the Department of Agriculture and local administration, Bill & Melinda Gates Foundation, CII, and Dalberg Advisors– put their expertise together and worked exhaustively for four weeks, with the aim to make the event a success. The Andhra Pradesh Industrial Infrastructure Corporation (APIIC) grounds were chosen as the appropriate venue to deliver an event of this scale. CII, with their wealth of experience, delivered beyond the expectation of the organizing team, and was successful in putting together a mega structure that could do justice to the prestige of the event. The images below highlight the effort put in by the entire CII team.

Figure 2: Before: Images of the venue merely three weeks before the event date

Figure 3: During: The venue in the works


Figure 4: After: The AP AgTech Summit 2017 in session – (from top left to bottom right) Chief Minister's meeting room, the Plenary Hall, and the exterior

In a span of merely three weeks, the CII Team transformed the venue, laying roads and erecting halls. The three halls they put up contained office spaces for the partner organizations and the Chief Minister, a plenary hall and break-out rooms, faculty rooms for invited guests, meeting rooms for the Chief Minister, private dining halls for invited guests as well as the Summit delegates, as well as exhibition halls to host the 50 exhibitors who attended the summit. These halls were also completely equipped with electricity, water supply, and state of the art IT infrastructure.

## 2.2.About the Summit

As stated earlier, Andhra Pradesh is at the forefront of technology-driven transformation for small and marginal farmers, and has set ambitious agricultural goals in the Sunrise Andhra Pradesh Vision 2029. To build on this momentum, the Summit was a historic platform that brought together global leaders including business heads, start-up founders, leading policymakers and technology experts to discuss innovative ideas for agricultural transformation in the state and beyond.

The Summit was a global event held in the FinTech capital and Smart City, Visakhapatnam, on November 15 – 17, 2017 and was personally led by the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu. The three-day Summit provided an immersive experience through:

- 10 panel discussions, featuring 50+ experts in the AgTech field, covering a wide variety of topics such as global best practices, the role of businesses in promoting farmer prosperity, the evolution of rural advisory services, etc.
- The #SmartFarming4AP AgTech Pitch Competition, that saw inspiring innovators, selected from a global pool of 250+ applicants, battle it out for an opportunity to roll out their technology-based agricultural solutions in Andhra Pradesh.
- The AgTech Exhibitions track, which showcased pathbreaking AgTech solutions that can lead to an unprecedented leap in agricultural development in India and around the world.

In the following sections, we share further details about each of the above.

# 3 Programme Grid

## Day 1: November 15, 2017

| TIME | ACTIVITIES | |
|---|---|---|
| 10 am - 1 pm | Inauguration of AP AgTech Summit 2017 By **Shri. Muppavarapu Venkaiah Naidu** (Hon'ble Vice Presidentof India) In the august presence of Sri. **N.Chandrababu Naidu** (Hon'ble Chief Minister of Andhra Pradesh) | AgTech Exhibitions Showcase |
| 1pm - 2pm | **Networking Lunch** | |
| 2pm- 3:15 pm | **Panel Discussion 1** Role of Technology in Horticulture | |
| 3:30pm - 4:45 pm | **Panel Discussion 2** Role of Technology in Aquaculture | |
| 5pm- 6:15 pm | **Panel Discussion 3** Role of Technology in Animal Husbandry | |

## Day 2: November 16, 2017

| TIME | ACTIVITIES | | |
|---|---|---|---|
| 9:30 am - 11:30 am | **Pitch Competition 1:** Lightening Talks by AgTechpreneurs Inaugural by **Shri Gajendra Singh Shekhawat** (Hon'ble Union Minister of State for Agriculture and Farmers Welfare)<br><br>Talks and Q&A on:<br>• Tech-enabled Rural Advisory Services v2.0<br>• Tech-enabled Market Linkages | | AgTech Exhibitions Showcase |
| 11:30am - 12noon | Tea | | |
| 12- 1:30pm | **Panel Discussion 4** Global AgTech Solving Local Challenges | | |
| 1 pm- 2 pm | **Networking Lunch** | | |
| 2:30pm - 4 pm | **Interactive Session with Progressive Farmers** | | |
| | **Break-out 1** Harnessing Big Data for Small Farmers | **Break-out 2** Soil Information Systems | |
| 4:15pm - 6:30 pm | **Pitch Competition 2:** Lightening Talks by AgTechpreneurs<br><br>Talks and Q&A on:<br>• Digital Financial Services for Agriculture<br>• Data Mining for Agriculture | | |

## Day 3: November 17, 2017

| TIME | ACTIVITIES | | |
|---|---|---|---|
| 9:30 am - 11 am | **Panel Discussion 5** Businesses Working for Small Farmer Welfare | **Break-out 3** Next Frontier of Rural Advisory Services | AgTech Exhibitions Showcase |
| 11am - 11.30am | Tea | | |
| 11:30am - 1:pm | **Panel Discussion 6** Enablers for Effective AgTech Transformation | | |
| 1pm - 2 pm | **Networking Lunch** | | |
| 2 pm- 3:15 pm | **Panel Discussion 7** Farm to Fork – Creating Market Linkages | | |
| 3:45 pm - 5:15 pm | **Valedictory Session of the AP AgTech Summit 2017**<br><br>Chief Guest: Mr. Bill Gates, co-Chair and Trustee, BMGF | | |
| 5:15 pm- 6 pm | **Networking** | | |

| | |
|---|---|
| Dinner hosted by the Hon'ble Chief Minister (by invitation only) | Dinner hosted by the Hon'ble Minister for Agriculture, Horticulture, Sericulture and Agri-Processing (by invitation only) |

# 4 Learnings from Panel Discussions

## 4.1.Day 1

### Inauguration of AP AgTech Summit

Description

The AP AgTech Summit 2017 was officially inaugurated by the ceremonial Lighting of the Lamp by the Hon'ble Vice-President of India, Sri MuppavarapuVenkaiah Naidu, the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu, the Hon'ble Minister for Agriculture, Government of Andhra Pradesh, Sri Chandramohan Reddy, and other dignitaries.


Figure 5: Lighting of the Ceremonial Lamp

This was followed by a Welcome Address by the Principal Secretary to the Government of Andhra Pradesh, Department of Agriculture, Marketing & Co-operation, Sri. B. Rajsekhar, IAS, and brief opening remarks by senior leadership of the Bill & Melinda Gates Foundation, CII, and the Hon'ble Minister for Agriculture, Government of Andhra Pradesh. The Hon'ble Chief Minister of Andhra Pradesh delivered the Inaugural Address along with a detailed presentation, followed by the Keynote Speech by the Hon'ble Vice-President of India.

The Government of Andhra Pradesh also launched the BMGF Program on Digital Platform for Agriculture, in partnership with and the Bill and Melinda Gates Foundation and Digital Green, to expand the use of various technologies to boost the yield and income from agriculture for small farmers. The Bill & Melinda Gates Foundation will also partner with the Government of Andhra Pradesh for digital soil mapping across the state.

Figure 6: Executive Director of Digital Green, Rikin Gandhi, exchanging the MoU with Sri B Rajsekhar IAS, Principal Secretary to Government of Andhra Pradesh, Department of Agriculture, Marketing & Co-operation

## Key Points Discussed

– Sri N.Chandrababu Naidu, Hon'ble Chief Minister of Andhra Pradesh

1. He presented the impressive track record of Andhra Pradesh in Agriculture and Allied Sectors and reiterated his commitment towards the Sunrise Andhra Pradesh Vision 2029, as well as towards the small and marginal farmers, who hold 86% of land in Andhra Pradesh.
2. The government of Andhra Pradesh has made great progress in improving the inputs farmers receive. The agreement with Iowa State University to set up a Mega Seed Park in Kurnool to strengthen the supply of quality seeds, and the setting up of Custom Hiring Centers (CHCs) where farmers can rent farm machinery and equipment are two examples of the state's commitment towards the same.
3. Value Addition tasks and post-harvest infrastructure require a focused effort in the state of Andhra Pradesh. The organization of farmers into Farmer Producer Organizations (FPOs) is a step in the direction of turning traditional agriculture into agribusinesses, and enabling farmers leverage scale to link better to markets.
4. Through Zero Budget Natural Farming (ZBNF), the state is focused on organic farming – this has already been implemented in 131 clusters, and 160 new clusters have been identified.
5. Diversification is very important to farmer wellbeing – the growth in Agriculture and Allied Sectors has been spurred by the growth in Horticulture and Aquaculture, and it is important that farmers diversify into these sectors. The State of Andhra Pradesh is on its way to becoming the hub of Horticulture and Aquaculture in India.

6. The Summit is the first of its kind (in India and the rest of the world) platform to promote inclusive growth and small farmer happiness by bringing expertise and technologies together from all over the world – this convention is for the Government to understand how technology can be integrated further, and what the missing links are in deploying AgTech in the state.

## Key Points Discussed

### – Sri M Venkaiah Naidu, Hon'ble Vice President of India

1. He highlighted the importance of agriculture to both Andhra Pradesh and India, and stressed on the judicious adoption of latest technology (especially IT) as essential to doubling farmer incomes by 2021.
2. He devoted specific focus to post harvest facilities (marketing, cold storage, etc.) and argued that it was the strengthening of such facilities that would enable the farmer avoid exploitation of the middlemen, and receive fairer prices for his produce.
3. With banks now flush with funds, it should be made easier for farmers to access institutional credit, and lending for agriculture should happen at lower rates of interest.
4. It is also important to pay attention to enablers that sustain agriculture – in particular, continuous power supply, and road infrastructure are key to unlocking the potential of agriculture technology and of the agriculture sector as a whole.
5. eNAM, the pan India electronic trading portal which aims to create a unified national market for agriculture commodities is an important step toward enabling farmers sell their produce to different markets across the country.
6. The linking of rivers, similar to the linking of Krishna and Godavari in the Pattiseema project undertaken by the Government of Andhra Pradesh, is crucial to providing irrigation to farmers.

### Other Points Discussed during the Inaugural

1. A number of programs undertaken by the Government of Andhra Pradesh, including the supply of micronutrients to farmers at 100% subsidy, the Hon'ble Chief Minister's effort in introducing a separate Budget for Agriculture, and the allocation of INR 11 crores for Drip and Sprinkler implements were presented by Sri S. Chandramohan Reddy, Hon'ble Minister for Agriculture.

2. Sri B Rajsekhar outlined Andhra Pradesh's progress in adopting agricultural technology innovation through examples of the state's pioneering AgTech initiatives such as e-seed distribution, Meeseva – farm mechanization, Soil Health Card systems, and the Plantix app. In support of Andhra Pradesh's continuing ambition to identify and support the most promising and cutting-edge innovations on agricultural transformation, he mentioned that the AP AgTech Summit 2017 includes a pitch competition which received over 250 applications and is probably the largest AgTech platform focused on small and marginal farmers anywhere in the world.Sri B Rajsekhar stated that agriculture initiatives undertaken by the Government of Andhra Pradesh have truly transformative potential particularly for the welfare of small and marginal farmers in the state.

3. Dr. Purvi Mehta, Head, Agriculture for Asia, Bill and Melinda Gates Foundation, applauded the transformative thinking in agriculture by the Government of Andhra Pradesh.
4. Smt. ShobanaKamineni, President, CII, welcomed the efforts of Hon'ble Chief Minister of Andhra Pradesh in safeguarding the small and marginal farmers and explained various initiatives taken by CII in India and Andhra Pradesh for the welfare of the farmers.

## Panel Discussion 1 : The Role of Technology in Horticulture

Description

Panelists discussed technologies that are disrupting the horticulture sector in India and around the worldand also ideated on what the future holds for horticulture in the State, and how technology can be better integrated.

Panelists

**Dr. H P Singh**
**(Chair)**
(Retd.)
Deputy Director
General, ICAR

**Sri Chiranjiv Choudhary, IFS**
Commissioner &
Secretary (EO) for
Horticulture &
Sericulture,
Government of
Andhra Pradesh

**Dr.Jiftah Ben-Asher**
Emeritus Professor,
Ben Gurion University,
Israel

**Dr.Mohinder Singh Kadian**
Regional Research Scientist,
International
Potato Center (CIP)

**Devendra Gupta**
CEO,
Ecozen Solutions Pvt. Ltd.

### Key Points Discussed

1. Availability of quality plant material is one of the biggest challenges in horticulture. Further, the seed distribution system in the potato value chain is very centralized, making it difficult and expensive to access these seeds.
2. Farmers incur high production costs as there exists low labor availability and high labor costs. On the other hand, mechanization is often not sustainable for the small farmer. However, the uberization of farm equipment[5] through Custom Hiring Centers (CHCs) to reduce mechanization costs, a cause championed by the Government of Andhra Pradesh, is a step in the right direction.
3. The existence of a huge gap in post-harvest and processing infrastructure should especially be taken note of in the value chain of perishables like fruits and vegetables. The produce, without this infrastructure is often lacking in quality.
4. Smartphones are an easily accessible and reliable way to encourage farmers to use technology. Images on the field can be captured and sent to servers that analyze them for deficiencies.
5. Decentralized cooling chambers near farms can be used to precool produce to ensure freshness. Farmers would be able to leverage this technology to sell their produce in time when they are likely to receive higher incomes.

*5. Uberization of farm equipment refers to pay per use models for farm machinery*

## Panel Discussion 2: The Role of Technology in Aquaculture

Description

Panelists discussed technologies that are disrupting the aquaculture sector, identified the current use of technology in aquaculture, addressed how technology can be better integrated in the current practices, and ideated on what the future holds for aquaculture.

Panelists

**Dr. M. Vijay Gupta (Chair)**
World Fisheries Expert and World Food Prize Winner

**Sri Rama Sankar Naik, IAS**
Ex-Officio Commissioner of Fisheries and Managing Director, AP State Fishermen Cooperative Societies Federation Ltd. (AFCOF)

**Karthik Ramesh**
Manager - Projects (Lead of Fisheries Initiative), Tata Trusts

**Dr. Raghu Prakash. R**
Principal Scientist & Scientist-in-Charge, Central Institute of Fisheries Technology (CIFT)

**Dr. K. Phani Prakash**
Deputy Director of Fisheries, Government of Andhra Pradesh

**Dr. Shubhadeep Ghosh**
Senior Scientist & Scientist-in-charge, Visakhapatnam RC, Central Marine Fisheries Research Institute (CMFRI)

**Dr. P. Ram Mohan Rao**
Consultant, AP Fisheries Department

**Sreeram Raavi**
Founder and MD, Eruvaka

**G S Shiv Kumar**
Executive Director, Sprint Exports Pvt. Ltd.

**Dr. Akshaya Panigrahi**
Principal Scientist, Central Institute for Brackishwater Aquaculture

### Key Points Discussed

1. While in the case of agriculture and livestock, the ability to ascertain quality or deficiencies through sights and smells exists, there is low visibility in aquaculture – the power to know at the right time is crucial for aquaculture farmers.
2. Quality of seed is most important in culture fisheries. Given that it is a high value product with great demand, it is essential to be able to establish a network of quality, pathogen-free hatcheries. For shrimp, this could be by means of having sufficient seed testing facilities. This way, farmers will be able to tell the quality of seed right at the time of purchase, thereby improving the quality and operations of hatcheries. For fish, establishment of milt banks and brood banks could help meet the huge demand of seed.

3. Pond/water body management is essential for a good crop. There are various aspects to this. Cooperation between scientific institutions and civil society requires strengthening to ensure dissemination and uptake of best practices. Pond automation through technology such as the Internet of Things (IoT) to remotely keep track of critical parameters (DO, pH, temperature, etc.), and provision of knowledge services via digital channels (voice, SMS, mKrishi), analytics to assess feed consumption, etc. are all expected to help avoid crop losses.

4. Production techniques such as semi biofloc, India-specific Recirculating Aquaculture Systems, affordable cage culture, as well as culture of new products/species such as sea weed/seabass etc. could be experimented in suitable areas, with appropriate market linkages established. Experimenting on alternate feed/better feed utilization (single cell protein, insects, and agriculture waste-based feeds) is expected to improve profitability.

5. Infrastructure support in terms of appropriate testing facilities (seed, water, feed, other inputs, drone based soil mapping, satellite and soil quality based productive zone identification), supply chain support systems such as block chain technology, and transport infrastructure (modified atmospheric transport, cold chains) is expected to unlock greater value for the sector.

**Recommendation to the Government:**
Replicate eSagu[6] in Aquaculture to bridge knowledge gaps that currently exist, and take information on best practices to farmers.

## Panel Discussion 3: The Role of Technology in Animal Husbandry

Description

Panelists discussed major challenges in the management of livestock in the state, and how transformative technologies could address these challenges. Panelists also identified use cases of promising technologies in the animal husbandry sector, and ideated on what the future holds for the sector.

Panelists

**Dr S.Rajeshwaran (Chair)**
IIM Bangalore

**Dr. G. Somasekharam Director,**
Animal Husbandry Department, Govt. Of Andhra Pradesh

**Dr. Polavarapu Giri President and CEO,**
Genomix Biotech Inc.

**Dr. Y. Hari Babu Vice Chancellor,**
SVVU
(Sri Venkateswara Veterinary University)

**Dr. S. Ramalinga Raju (Retd.) Director of**
Animal Husbandry, Government of AndhraPradesh

**Dr. Shyam Zawar**
CEO, JK Trust

6. *eSagu is a web-based agro Advisory System in Telugu for farmers in agriculture*

### Key Points Discussed

1. The need of the hour in Animal Husbandry is animal-specific information available on call 24 x 7 with reference points for comparison. The absence of both leads to an incomplete learning feedback. This results in improper feeding, management, and breeding by the farmer and a loss in potential income and profit. This is exhibited as low productivity.
2. Farmers are facing difficulty in disposing male calves due to the ban on sale and slaughter. To reduce this problem, it is envisaged that obtaining a higher percentage of female calves by using sexed semen technology and assisted reproductive technology will be useful to the farmer. However, these technological interventions need to be carried out under the guidance of a professional veterinarian, and they have tobe documented.
3. Preventive health care for animals begins with monitoring and regularly vaccinating against specific communicable diseases, especially those of zoonotic importance. Towards this, an opportunity area for the Government of Andhra Pradesh is to have its own vaccine production unit using latest technologies to produce safe, quality vaccines in large quantities.
4. Feed conversion efficiency is an important area of focus as there is limited fodder and this limited quantity needs to be utilized in a more efficient manner. Towards this, DNA sequencing and metagenomics[7] could be used.
5. Disease-free status certification of individual animals using simple diagnostics (home kits) and classifying them to Class A and B in terms of growth and production will help farmers realize a higher price for these animals in the market. This will also encourage the flow of credit and insurance for animals into the livestock sector.

**Recommendation to the Government**

Use blockchain technology to establish a farmer-centric animal information system that will empower the individual farmer across the state and enhance profitability, resulting in double digit growth in production of milk and meat.

*7. Metagenomics (also referred to as environmental and community genomics) is the genomic analysis of microorganisms by direct extraction and cloning of DNA from an assemblage of microorganisms. Source: Handelsman J. Metagenomics: Application of Genomics to Uncultured Microorganisms. Microbiology and Molecular Biology Reviews, 2004.*

4.2.Day 2

## Panel Discussion 4: Global AgTech Solving Local Challenges

Description

Panelists discussed the most transformative global AgTech innovations, identified key challenges faced by small and marginal farmers in Andhra Pradesh, and ideated on how these challenges can be solved through the use of cutting-edge technologies. Panelists also identified what can be done to ensure these technologies are adequately promoted in the future.

Panelists

**Sri B Rajsekhar IAS (Chair)**
Principal Secretary to Government of Andhra Pradesh, Department of Agriculture, Marketing & Co-operation

**Dr. Benjamin Kwasi Addom**
Programme Coordinator, ICT, Technical Centre for Agricultural and Rural Cooperation, Netherlands

**Rajendranath Goswami**
**Global AgTech**
Business Unit Lead, Bosch

**Dr. Dileepkumar Guntuku**
**Global Programme Leader,**
Iowa State University, USA

**Ram Kaundinya**
**Board Member,**
Advanta Limited

**Dr. Nick Austin**
**Global Director - Agriculture,**
Bill & Melinda Gates Foundation, USA

### Key Points Discussed

1. There is a need to recognize the unique characteristics of small and marginal farmers while trying to take technology to them – landholdings are dispersed, literacy is low, farmers are resource poor, and the small and marginal farmers live in remote areas. These circumstances create the need for government-led AgTech transformation.
2. The technology use cases around the world in the agriculture space were identified as the following:
   - Value chain optimization
   - Soil information
   - Improvement in predictability of weather and natural disasters
   - Precision agriculture
   - Yield measurement/ forecasting using predictive models
   - Post-harvest management
   - Agri-finance
3. Globally, technologies that are currently being used include:
   - Smart phones to provide processed data to farmers
   - Sensors, drones, and satellites that can provide soil information oOpen data platforms and big data analytics (in nascent stages)

- Mobile money and credit rating tools
- Virtual reality (being developed)
- Agriculture robotics

4. There are diverse challenges with deploying AgTech at scale:
   - Simplifying the technology and getting farmers to adopt the technology, and spreading awareness on the benefits of technology
   - Lack of sustainable business models with existing AgTech solutions
   - Low reliability of open data platforms
5. Technology and innovations alone are not enough; capacity building, education, an enabling ecosystem for start-ups (e.g. floating an INR 100 crore fund), etc. are all equally important.

## Interactive Session with Progressive Farmers

Description

Progressive farmers from Prakasam, Ananthapur, Kurnool, Chittoor, Guntur, Vizainagaram, and East and West Godavari districts of Andhra Pradesh discussed farming practices and technology that enabled them to improve yields/incomes. Farmers also discussed the best practices they had followed and technology used, as well as shared their plans for the future. This interactive session was personally led by the Hon'ble Chief Minister.

### Key Points Discussed

1. During this session, farmers championed the cause of natural farming – they had seen results from the method, and were willing to share their knowledge and experiences about the same:

   a. Meka Radhakrishna Murthy (Mantripalem in Nagaram mandal, Guntur district) narrated that the traditional paddy cultivation process reduces labor cost. He mentioned that the use of pesticide could be eliminated by using hay and other materials and generating yellow smoke. He suggested farming in one acre raising bunds and taking up horticulture and aqua culture to multiply the income.

   b. Nara Parthasaradhi (Dharmavaram mandal) had returned to farming after working for 11 years in the software field. He formed a ZBNF farmers' network. Working with the Agriculture Department, he has been able to reduce wastage and introduce grading and sorting. The produce is being marketed among communities in Bangalore.

   c. A. Gangabhavani(Chintadapalli, near Tadepalligudem)has successfully taken up natural farming in one and a half acres after returning from the U.S. He has seen a yield of 25 bags of produce.

   d. Ramakrishna (Anantapuram district) has successfully taken up integrated organic farming in 108 acres, and offered to train others in the best practices.

2. Farmers also highlighted that natural farming and technology were compatible and complementary to one another:

a. Gullepalli Sujatha (Pedarakatla in Konakanamitlamandal, Prakasam district) spoke about how natural farming and modern technology were combined to achieve the best results in 32 acres – farm ponds, raising bunds, mulching, trenches, and inter-cropping help increase nutrition and moisture. Using sensors helps in reducing the use of water through Drip and Sprinkler irrigation. She also announced plans to explore precision farming.


Figure 7: Hon'ble Chief Minister felicitating progressive farmers after the session[8]

Panelists

**Dr.Parmesh Shah (Chair)**
Global Lead for
Rural Livelihoods and
Agricultural Jobs,
World Bank, USA

**Frederic Pivetta**
Co-founder and
Managing Partner,
Dalberg Data Insights,
Belgium

**RavishankarMantha**
CEO,
Agrisk Data Analytics

**Kunal Prasad**
Co-Founder and COO,
CropIn Technology
Solutions Pvt. Ltd.

**Prateep Basu**
COO, Sat
Sure Analytics India Pvt. Ltd.

## Breakout Session 1: Harnessing Big Data for Small Farmers

Description

Panelists discussed how big data can be used to benefit the small and marginal farmer, and presented case studies of such applications for different stakeholders – government, farmers, and other intermediaries. Panelists aimed to identify the right building blocks for capturing, analyzing, and using data and how different actors can be brought together to leverage this data.

### Key Points Discussed

1. Huge amounts of data are being generated in the agricultural sector, as in other sectors, and therefore, Big Data analytics is essential in the agriculture sector.
2. Reliable data is very important to draw proper conclusions from data, but reliable data is often unavailable as data is collected through archaic methods. The states of Andhra Pradesh, Gujarat, and Maharashtra are exceptions, but there is always room for improvement in quality data collection using modern technology.
3. There is a need to sensitize the official machinery about the importance of agricultural data – this is especially true since data may not be very meaningful to farmers, but can be used by the official machinery for various purposes (to provide advisory, settle claims, etc.).
4. Data use cases go beyond advisory and precision agriculture – a particularly interesting use case is that of insurance settlements. High insurance premiums can be brought down by making use of Big Data analytics, which is useful in assessing crop losses in the event of natural calamities.
5. It is important to build an integrated data platform which will have data from all the offices – water, soil testing, weather, crop, etc. All this has to be seen in a single funnel rather than in isolation.

## Breakout Session 2: Soil Information Systems

Description

Panelists discussed how organizations are using modern technologies to better collect and use soil data. Panelists also ideated on the potential applications for soil data and how it can be used by a variety of players (financial institutions, government, AgTech providers, etc.), to provide innovative products and services to small and marginal farmers.

Panelists

**Michael Tsan (Chair)**
Partner,
Dalberg Advisors, USA

**Dr. Balwinder Singh**
Cropping System Scientist,
International
Maize and Wheat Improvement
Center(CIMMYT)

**Laxmi Prasad Putta**
Founder, Vassar Labs

**Dr. Ch Srinivasa Rao**
Director, ,
ICAR-National Academy of
Agricultural Research
Management (NAARM)

**Dr. William Salas**
President and Chief Scientist,
Applied Geosolutions, USA

**Harsh Dahiya**
Director,
Plantris Ventures
(OPC) Pvt. Ltd., UK

### Key Points Discussed

1. In Andhra Pradesh, farmers use less fertilizer in comparison to farmers in North India. The incentive for farmers to pay for soil heath testing is lower here, because the incentives are not aligned with excessive fertilizer use.
2. The soil health card scheme is an incredible initiative, with Andhra Pradesh at the lead. However, it also continues to be an area for improvement – there is just enough money for a percentage of farmers to get the soil health card, and there needs to be a business model for follow-up.
3. There are a number of interesting opportunities arising from developments in the technology and data space for the soil health ecosystem broadly in India and in AP in particular, such as:
   - Significant improvement in efficiency and decline in cost of soil testing equipment
   - Continued evolution of technology, with the innovative use of satellites as supplementary or alternative data sources for remotely monitoring soil health. Costs of remote sensing have been dropping significantly by a factor of 3-5x
   - Innovation around data platforms that incorporate soil heath data and create tools for policy makers, extension agencies, agri-businesses and farmers.
4. There are challenges in getting technology integrated into the soil health space: a lot of technology/data is still nascent, but more importantly, the use cases are nascent. While it is clear that digital soil maps are the foundation for the soils ecosystem in India and Andhra Pradesh, there are still unanswered questions around the business model.

5. The most interesting use cases of technology for soil information systems include reducing costs for soil testing, improving the quality of soil planning intelligence more broadly, financial inclusion by using soil data for insurance and credit scoring information, and tailored advice to farmers.

6. There is a need to take a more comprehensive look at how to integrate technology into the soil health ecosystem, and a need for sustainable business models, along with bringing in the private sector. Particularly, INR 500 crores has been invested in the federal soil health card scheme, and there is a need for engaging the private sector to invest the next INR 5,000 - 10,000 crores for sustainability.

## 4.3.Day 3

### Panel Discussion 5: Businesses working for Small Farmer Welfare

Description

Panelists discussed the efforts and initiatives of businesses to promote farmer welfare, the current integration of technology by businesses in their farmer programs, and the role that businesses can play for the welfare of small and marginal farmers going forward.

Panelists

**Dr. JP Mishra (Chair)**
Adviser (Agri), Niti Aayog

**DatlaTirupathi Raju**
Executive Chairman,
Vijayanagar
Group of Industries

**Rajashekhar Reddy Seelam**
**CEO,**
Sresta Natural Bio Products

**RG Chandramogan**
Managing Director,
HatsunAgro Products

**Dr Srinivasu Pappula**
Global Head of Digital
Farming Initiatives Group,
Tata Consultancy Services

#### Key Points Discussed

1. For businesses to benefit small farmers, they have to be able to reach scale. To reach scale:
   - Businesses should infuse technology to reduce costs
   - Government policies have to be supportive of integrating with global markets.
2. Businesses have, through large scale and direct procurement of produce from farmers, offered fair prices to small and marginal farmers. As an example, Vijaynagar Industries offers INR 13 per coconut as against INR 5 offered by middlemen in the traditional value chain.

3. For dairy farmers, the lack of electricity is a significant challenge, as they need it to maintain milk chilling units in their area. In addition to this, they incur high costs of labor as they do not use milking machines.
4. There is also a need to concentrate on other by-products in the value chain of the farmer so the farmers can receive more remunerative prices.
5. Rural service providers with technical expertise on soil, storage, marketing, finance, and insurance should be developed in villages so that they can link farmers to markets and guide them in times of financial need to approach institutional sources of credit.
6. Organic farming would enable farmers to leverage consumer trends and realize higher prices, but farmer produce needs to be certified for this to work.

## Breakout Session 3: Next Frontier of Rural Advisory Services (RAS)

Description

Panelists discussed innovations in advisory services, which are transforming the way small and marginal farmers receive information. Panelists also identified the current use of RAS by small and marginal farmers, the challenges faced by organizations, and what can be done to overcome these challenges.

Panelists

**Sandeep Malhotra (Chair)**
CEO, IFFCO Kisan Sanchar Ltd.

**Deepak Pareek**
Co-founder and CEO, MyCrop Asia

**Madhur Jain**
Country Director, India, Precision Agriculture for Development

**Rajiv Tevtiya**
Co-founder and CEO, RML AgTech Pvt. Ltd.

**Rikin Gandhi**
CEO, Digital Green

**Shyam Vembar**
Executive Vice President, Mahindra Agri Solutions Ltd.

### Key Points Discussed

1. The ability to reach out to millions of farmers physically is impossible. This is especially true given that farmers are heavily dependent on traditional show and tell models, and such show and tell creates a barrier to scale. Technology will therefore play a key role in scaling extension services. At the same time, there are significant challenges to this:
   - There is only 3% penetration of smart phones among small farmers in India
   - There is a lack of awareness – less than 5% of farmers are aware of Kisan Call Centers.

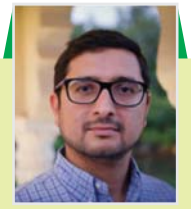
2. The initial disruption of using SMS to deliver advisory services was an excellent platform, however, it is inadequate and unidirectional – as more technology becomes available and there is a demand to tailor information for the farm and the farmer, farmers need to be able to give information innovators need, and there is a need for two-way information systems.
3. A huge challenge for extension to overcome is the lack of openness towards advisory received through technology in farmers.
4. Understanding what helps farmers adopt is important. Training a village champion to use a tablet and then collect information is one way to improve adoption. However, hiring and training village champions is a challenge to scale.
5. Another way to improve adoption is to mobilize people into large scale groups. This establishes trust, as well as creates role models within the community who have aspirational value.

## Panel Discussion 6: Enablers for Effective AgTech Transformation

Description

Panelists dissected the cross-cutting themes discussed during the summit, with a focus on identifying the "key enablers" for making AgTech work for small and marginal farmers. Panelists also identified what different types of organizations on the panel can do to promote AgTech in the state.

Panelists



**Varad Pande (Chair)**
Partner, Dalberg Advisors

**Dr. David Bergvinson**
Director General,
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

**Prof Solomon Darwin**
Executive Director,
Garwood Centre for Corporate Innovation,
UC Berkeley, USA

**Vijay Kumar Thallam**
Advisor to the Government of Andhra Pradesh, Agriculture

### Key Points Discussed

1. A crucial enabler for effective AgTech transformation is an integration of agriculture and allied departments – the departments working together rather than in silos is critical to make the entire ecosystem work for the small farmer.
2. Collecting quality data and enabling farmers to leverage this data will strengthen the system for the farmers, give them information across the value chain (weather forecasts, water management, market prices, etc.), as well as act as a source of information based on which products and services (for example, loans/insurance) can be provided for the farmer.

3. Zero budget natural farming (ZBNF) will be important if we are to meet the food security and livelihoods challenges of the world. ZBNF provides a lower cost, more climate proof and resilient model of agriculture, which is showing great results in Andhra Pradesh. The ambition is to cover the entire state under the ZBNF method of cultivation in the next 5-7 years. A comprehensive community-based model of propagation and scaling up is being deployed to enable this.
4. There is a need to prioritize good working models (as brought out by the Pitch Competition) for small and marginal farmers that are ready for testing and prototyping.
5. Initial stages of innovations have to be supported and spurred on by actors that are not the government (banks, investors, and other private players), that can take more risk. Governments can enter at a later stage, when innovations have passed the proof of concept stage. Public private partnerships and philanthropic collaborations can be explored.

**Recommendation for the Government**

Develop an 'AP-AgriStack' modeled on 'IndiaStack', that will bring together different datasets relevant to improving farmer livelihoods: farmer data, farm & crop data, and weather & climate data, to create a fully open source platform with open Application Programme Interfaces (APIs) that can be used by innovators to build applications and use cases for the benefit of the small farmer with double digit growth in production of milk and meat.

## Panel Discussion 7: Farm to Fork – Creating Market Linkages

Description

Panelists discussed emerging trends in market linkage models, which are transforming the way small and marginal farmers are connected to input sellers and output buyers. Panelists also identified the current use of linkages by small and marginal farmers, identified challenges and ideated on what can be done to overcome these challenges.

Panelists

**Ravindra Shevade (Chair)**
COO NCDEX e Markets Ltd.

**Ashwin Mahavadi**
Founder and CEO, Krishiyog

**Rajesh Sawhney**
Founder, GSF Accelerator

**Dr. Richard Hawkins**
Director, International Centre for Development-oriented Research in Agriculture (ICRA), Netherlands

**Varun Khurana**
Co-founder and CEO, Crofarm

### Key Points Discussed

1. The traditional structure where farm produce is sold at the local market through middlemen hides the whole picture from the farmer, and disables the farmer from realizing the full price. Technology can eliminate this through connecting farmers directly to markets, or providing them real-time data about the markets. From this, market solutions must move towards price realization from price discovery.
2. For online trading platforms to be successful, the government should take an active role in standardizing the quality parameters for various crops and educating farmers about these parameters.
3. Technology can also plug the missing link in the post-harvest portion of the value chain, ensuring quality control, grading, sorting, and processing (value addition tasks).
4. A lack of cold storage (and other post-harvest) facilities and organized markets inhibit farmers from being able to realize profits. As a result, farmers are also unable to pump money back into improving productivity.
5. Farmer Producer Organizations (FPOs) play an important role in reaching scale and creating linkages. Consisting of 1000 farmers, FPOs integrate activities and collect all information about farmers, and hence can be a source of data, as well as market linkage through the power of aggregation. Awareness of FPOs should be increased so that farmers can involve themselves in the processing and marketing of their final product.

## Valedictory Session of the AP AgTech Summit 2017

Description

The official Valedictory Session of theAP AgTech Summit 2017 commenced with the felicitation of Sri Bill Gates, the Co-Chair and Trustee of the Bill and Melinda Gates Foundation by Sri NaraChandrababu Naidu, the Hon'ble Chief Minister of Andhra Pradesh.

This was followed by an Address by Sri N.Chandrababu Naidu,Hon'ble Chief Minister of Andhra Pradesh, and the Keynote Speech by Sri Bill Gates, the Co-Chair and trustee of the Bill and Melinda Gates Foundation. The #SmartFarming4AP Pitch Competition winners were announced after this, and the winners and finalists were felicitated by them. The Session concluded with a formal Vote of Thanks delivered by Sri B Rajsekhar, IAS, Principal Secretary to Government of Andhra Pradesh, Department of Agriculture, Marketing & Co-operation.

### Key Points Discussed

– Sri Nara Chandrababu Naidu, Hon'ble Chief Minister of Andhra Pradesh

1. The Hon'ble Chief Minister began by reminiscing about the first time he met Bill Gates in Delhi, where a 10-minute meeting extended to 40 minutes, and he made a presentation on a laptop to Bill Gates (the only Indian tech savvy politician at the time).

2. He presented the headwayAndhra Pradesh had made in Agriculture and Allied Sectors, and went on to reiterate the targets set for the Sunrise Andhra Pradesh Vision 2029.
3. He solicited the partnership of the Bill and Melinda Gates Foundation in the areas of agriculture, nutrition and health, and sanitation.
4. To make Andhra Pradesh a leader in innovation in India, he announced a special committee that will identify and bring the best innovations to Andhra Pradesh, and requested Sri Bill Gates, the Co-Chair and Trustee of the Bill and Melinda Gates Foundation, to serve as an Honorary Chair of this committee.


**Figure 8: Hon'ble Chief Minister welcoming Mr. Bill Gates during the Valedictory Session**

## Key Points Discussed

– Sri Bill Gates, Co-Chair and Trustee, Bill and Melinda Gates Foundation

1. An agricultural transformation should occur with the aim of ensuring that agriculture runs like a business – it should profitable and efficiently meet the needs of both producers and consumers.
2. It is important to take a comprehensive approach while planning to assist smallholders – providing quality seeds, effective farm tools, farm management practice, reliable information, and market linkages are all important pieces of the plan.
3. The state of Andhra Pradesh is already making great strides in taking AgTech to small farmers – from inaugurating the Mega Seed Park to developing applications for various purposes (D Krishi for seeds, M Sedhyam for advisory, etc.), to investing in micro irrigation and digital soil

mapping, Andhra Pradesh is a frontrunner in innovating to make farming more sustainable for farmers.

4. Farmer Producer Organizations (FPOs) can enable farmers leverage scale, and this setup is beneficial especially for women – The World Bank Programme, JEEViKA, brought 4000 women maize farmers in Bihar together into a Producer Organization, and they sold over 3/4th of their produce through these groups.

5. There is yet work to be done, and Bill and Melinda Gates Foundation is committed to working with the government:

   - Andhra Pradesh contributes only a portion towards milk productivity in India and the Foundation will be joining hands with the government to introduce sexed semen technology to improve milk productivity

   - The Foundation will join hands with the government to conduct digital soil mapping using drones and satellite data

6. Effective political leadership coupled with the right initiative can empower Andhra Pradesh's 14 million small farmers harvest their agricultural transformation, and this transformation will serve as a model for India and the rest of the world

# 5 #Smart Farming 4 AP Pitch Competition


**Figure 9: The Hon'ble Chief Minister and the Hon'ble Union Minister of State for Agriculture and Farmer Welfare at the #SmartFarming4AP Pitch Competition Grand Final**

## 5.1.Description

The Dalberg team proposed that as part of the AP AgTech Summit 2017, a pitch competition should be conducted to invite organizations from around the world with innovative AgTech solutions to solve some of the most pressing agricultural challenges faced by small and marginal farmers in the state. This would accelerate inclusive agricultural transformation for the benefit of small and marginal farmers in Andhra Pradesh by identifying and partnering with cutting-edge innovators in the field of agriculture technology.

A pitch competition format was chosen in order to:

- Enable start-ups/companies to present pitches addressing clear and well-defined problem statements
- Provide an objective, open-source way of selecting best-fit companies, that can work with the Government of Andhra Pradesh to scale innovations
- Give innovators a definitive way of engaging with the Government of Andhra Pradesh, and a clear value proposition though MoUs and visibility

## 5.2.Objectives

There were two key objectives of the Pitch competition:

1. To identify technology-enabled, and contextually relevant solutions that address the key issues facing small and marginal farmers in Andhra Pradesh
2. To provide a pathway to impact through large-scale pilots in the state

## 5.3.Themes

The Pitch competition focused on the following four themes based on the challenges identified during field research conducted by Dalberg, expert consultations, and subsequent discussions with the Steering Committee (consisting of representatives of the Government of Andhra Pradesh and the Bill & Melinda Gates Foundation):

- Technology-enabled Rural Advisory Services (RAS) v2.0
- Technology-enabled market linkages
- Digital Financial Services for agriculture
- Data mining for agriculture

**Note :** Solutions with a specific focus on horticulture and livestock sectors, or on leaseholder/landless farmers were to be given priority. All solutions were meant to be focused on transforming farming livelihoods of small and marginal farmers. Descriptions of each of the themes used to solicit applications are provided below:

### Theme 1: Technology-enabled Rural Advisory Services (RAS) v2.0

Solutions that deliver on-time, tailored and actionable information to farmers enabling them to adopt better farming practices.

Small and marginal farmers in Andhra Pradesh often have limited access to timely, hyperlocal information, and rely on sources that provide generic advisory. Often, the information is dated or based on old heuristics (old editions of books, practices followed by their friends and family, etc.). Consequently, farmers may adopt ill-informed farming practices that can be detrimental to the farm, and adversely affect their incomes.

Increasingly, Rural Advisory Services (RAS) are going beyond just disseminating knowledge about best practices. As the extent and granularity of data increases, advisory services can be increasingly customized to a farmer's specific needs. Some of the services that fall under RAS 2.0 are image analysis for plant health diagnostics, combining satellite imagery and soil sensors to relay information on sowing periods, appropriate fertilizer use, etc.

The Government of Andhra Pradesh is looking for technology solutions that transform the current advisory delivery landscape and enable farmers to access accurate and timely information that is tailored to their individual needs at various critical decision points in the farming cycle.

### Theme 2 : Technology-enabled market linkages

Solutions that connect farmers to a wide range of input sellers, and/or buyers of agricultural produce, providing farmers an increased array of options.

Small and marginal farmers in Andhra Pradesh often have limited options to procure inputs, and/or engage with different output markets. As a result, they can sometimes make sub-optimal decisions that increase the costs of acquiring inputs, and/or reduce the price that they can realize from the sale of their produce.

Increasingly, digital platforms are reducing the traditional dependence on middlemen by linking farmers to input companies, and/or output buyers and providing new avenues for farmers to access complementary services such as transportation and quality control.

The Government of Andhra Pradesh is looking for technology solutions that disrupt the traditional agriculture value chain and enable farmers to reduce the cost of acquiring inputs and/or realize a fair price for their produce by linking them to input/output markets.

### Theme 3 : Digital Financial Services for agriculture

Solutions that provide low-cost, tailored financial products to s. Small and marginal farmers often require working and growth capital at different points during the cropping cycle, and often have a small window to access it. During these moments, challenges such as complicated procedures, lengthy loan processes, need for collateral, etc. often dissuade farmers from adopting institutional sources of finance. Consequently, they often take loans from informal sources which charge a much higher rate of interest. On the other hand, banks and insurance providers lack adequate information about small and marginal farmers to create products that suit these farmers' needs. These challenges especially affect the landless, who cultivate on land they do not own.

To overcome these challenges, organizations are using alternate data and creative data collection methods, such as purchase patterns of pesticide and fertilizers, receipt of government benefits, use of advisory services etc., to provide farmers access to on-tap credit solutions and insurance products.

The Government of Andhra Pradesh is looking for technology solutions that revamp traditional financial products and provide, or enable the provision of, low-cost, tailored products that meet the unique needs of small and marginal farmers.

### Theme 4 : Data mining for agriculture

Solutions that collect and use granular farm and farmer data to develop B2B and B2G agriculture products and services.

The Government of Andhra Pradesh has led the monumental task of collecting farm and farmer data, which is powering the agricultural revolution in the state. There is an opportunity to further enhance the collection and use of data with the objective of developing solutions for other agri-

businesses (B2B) and government services (B2G) with the aim of increasing farmer welfare.

For example, the use of remote sensing technology and large-scale methods of data collection such as satellites and drones, combined with on-ground data collection efforts have enabled the creation of massive datasets that are providing the building blocks for the development of innovative products for both farmers and other players in the ecosystem.

The Government of Andhra Pradesh is looking for B2B and B2G technology solutions that use data to reimagine the practice of agriculture and provision of allied services, by enabling farmers, policy-makers, and other players to make proactive farming-related decisions.

## 5.4.Value Proposition for AgTech Entrepreneurs

The AP AgTech Summit 2017 attracted a variety of eminent stakeholders from around the world including senior government officials, AgTech investors, entrepreneurs and start-ups, global incumbents, and leading academicians. Innovators had the unique opportunity to:

1. Showcase their solution at a global event:The finalists pitched their ideas to an eminent jury consisting of investors, AgTech experts, industry leaders, and government official, and received valuable feedback. In addition, they engaged with the global AgTech community at the Summit
2. Receive recognition by pioneering leaders from the Government and Technology space. The winners and finalists were felicitated by the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu, and the co-chair and trustee of the Gates Foundation, Mr. Bill Gates.
3. Implement their ideas at scale: The winners had the opportunity to sign an MoU with the Government of Andhra Pradesh to roll-out their solutions. The Government of Andhra Pradesh will work closely with the innovators, and help them deploy their solution in the state.

## 5.5.Eligibility Criteria

Applications were accepted based on the following eligibility criteria:

1. The solution should be technology-enabled
2. The solution should have a primary focus on small and marginal farmers
3. The solution provider should not have an ongoing engagement with the Government of Andhra Pradesh[8]
4. The solution should have been in operation for over 6 months; have at the minimum a proof-of-concept in place; and be ready to be deployed as a pilot in AP.

*8. Each application was assessed to verify if the applicant had an existing MoU with the Government of Andhra Pradesh*

## 5.6.Assessment Criteria

Applications were assessed by the Selection Committee and Grand Jury based on the following criteria:

1. Potential for Impact
   - Has the problem addressed been clearly defined including vision and real user need?
   - What impact does the solution have on the users? Is the impact proven?
   - If the solution relies on other stakeholders to achieve impact, has the role of different stakeholders been clearly explained?
2. Sustainability of business model
   - Is the unit economics of the business model sustainable?
   - What are the risks to the business model? Has the team taken adequate measures to mitigate the risks?
3. Need and readiness to collaborate with the Government of Andhra Pradesh
   - What kind of support from the government is desired by the solution provider? Has it been clearly articulated?
4. Design of the proposed pilot program and the ability to scale effectively and quickly
   - Has the solution provider clearly articulated their proposed pilot design?
   - Does the solution provider have the technical and financial capability to initiate a pilot in AP by week 1, Dec 2017, should they win the competition and sign an MoU with the Government of Andhra Pradesh?

## 5.7.Selection Process

A rigorous and objective process was followed to arrive at the ten finalists, which consisted of the following steps:

1. Call for applications: Launch of the Pitch Competition and request for applications through the website
2. Stage 0. Screening for eligibility: Screening of applications to remove incomplete/ineligible organizations
3. Stage 1. Evaluation by Selection Committee: First round of review by Selection Committee members to select the finalists
4. Stage 2. Final selection by Grand Jury: Final selection by the Grand Jury to identify the winners of the Pitch Competition

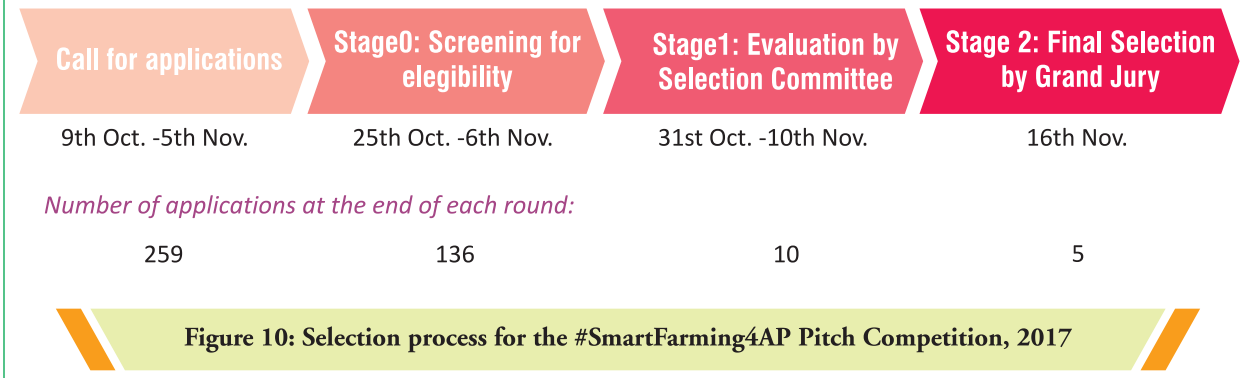
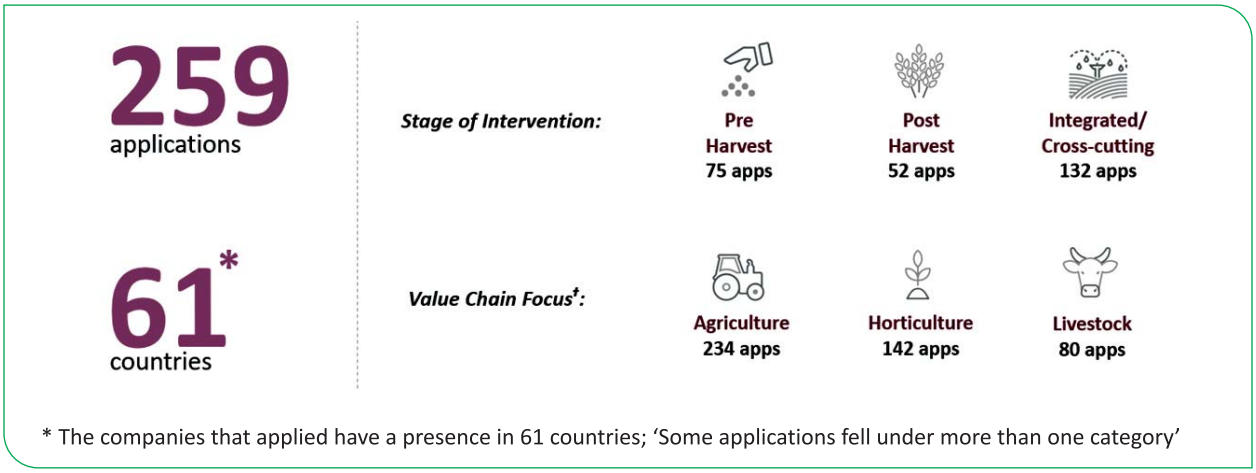



**Figure 10: Selection process for the #SmartFarming4AP Pitch Competition, 2017**

## Call for applications

Dalberg Advisors developedthe application form and the launched the #SmartFarming4AP Pitch Competition website to publicize the Pitch Competition and accept applications.

The deadline for the Pitch Competition was extended from October 31 to November 5, 2017. The Dalberg team received 259 applications, making this pitch competition one of the largest AgTech platforms focused on small farmers in the world. A breakup of the applications received is provided below:




* The companies that applied have a presence in 61 countries; 'Some applications fell under more than one category'

**Figure 11: Snapshot of applications received by Dalberg Advisors**

### Stage 0: Screening for eligibility

The Dalberg team performed preliminary screening to remove duplicate and non-serious applications based on the pre-defined eligibility criteria. Each application was reviewed by at least two reviewers. Conflicts were discussed and applications were accepted or rejected based on a consensus of the reviewers. At the end of this stage, 136 applications had qualified for assessment by the Selection Committee.

## Stage 1: Evaluation by Selection Committee

Eligible applications were reviewed in detail against pre-defined assessment criteria by an eminent Selection Committee, consisting of senior experts from the industry, such as:

**Saswati Bora**
Project Lead, Food Security and Agriculture Initiatives, World Economic Forum

**Luis Diaz-Albertini**
Strategy Team Project Manager, The Rockefeller Foundation

**Anuradha Lohia**
Vice Chancellor, Presidency University

**Hemendra Mathur**
Venture Partner, Bharat Innovation Fund

**Christian Merz**
Senior Programme Officer Digital Solutions, Bill & Melinda Gates Foundation

**Gopal Naik**
Dean, Faculty, IIM Bangalore

**Ajay Parida**
Director, Institute of Life Sciences

**Professor Kandukuri Raman**
Adjunct Professor and Associate Director (Special Projects) – Cornell University

**J Satyanarayana**
IAS (Retd.), Advisor to Government of Andhra Pradesh, e-Governance

**Alok Sinha**
Director General, Indian Council for Food and Agriculture

**Dr. Kevin Tiessen**
Senior Program Specialist, Asia Regional Office, International Development Research Centre

The Dalberg team ensured that each application was scored by at least two members of the Selection Committee. In any instance where there was a connection between a Selection Committee member and the application being reviewed, the score of that Selection Committee member was disregarded and another Selection Committee member was assigned to review the application.

Scored evaluation sheets were collected from each Selection Committee member, and the scores were normalized[9]. Based on the highest normalized scores, the top ten finalists were identified. These finalists were discussed during a calibration call attended by all Selection Committee members. Top five reserve candidates were also identified by the Selection Committee members through an exhaustive voting process during the calibration call.

Based on the scores received from the Selection Committee, the top ten finalists were (in alphabetic order):

*9. Scores were normalized for the number of Selection Committee members that reviewed the application.*

### BharatRohan Airborne Innovations Pvt. Ltd.

BharatRohan is involved in empowering farmers by reducing their losses through the prediction of pest attacks and disease outbreaks using Drone/UAV based HyperspectralRemote Sensing, Data analytics, and machine learning technologies.

### BigHaatAgro Pvt. Ltd.

BigHaat.com is an agricultural inputs digital platform for farmers to procure a wide choice of branded and quality inputs that range from seeds to agri implements. It is a disruptivesupply chain technology platform benefiting stakeholders across the agri ecosystem.Quality of inputs is vital to crop quality and yield, therefore availability and accessibility ofright inputs to farmers is key to farmer empowerment. By providing right and relevantadvisory, BigHaat empowers farmers to take the right decisions at the right time.

### eKutir

eKutir identifies and trains existing community agents'/farmer cooperatives, armed withmobile devices, to interface between farmers and our powerful digital platform. Theagents gather valuable farmer data reliably and consistently on the mobile platform –"FarmChalo", allowing previously disconnected small and marginal farmers' access tosustainable inputs and markets. The platform generates farmer-specific, unique andintelligent solutions. FarmChalo records farmer data, interactions, and transactions and isused to map and assesses a farmer's risk, interpret them, and deliver actionableinformation to mitigate their risk and improve their productivity and increase income,through data-driven recommendations and exchange of products.

### EM3 AgriServices Pvt. Ltd.

EM3 AgriServices Pvt. Ltd. is India's first and leading venture that provides farmmechanization services to the small and medium farmers of India on a pay-for-use basis,across the entire cultivation cycle. Services are digitally provisioned and provided underthe brand "Samadhan" from fulfillment centres known as "SamadhanKendras". These aremanned by agro-business professionals, managed technologically and equipped withcompany owned and third party equipment, which are operated by company trained andcertified operators. The company has successfully served farmers on over 70,000 acresand currently serves over 1,000 additional acres every day.

### Infinium Solutionz Pvt. Ltd.

Infinium[10] primarily provides solutions using Geographical Information System (GIS), Remote Sensing, Light Detection and Ranging (LiDAR), Drone, RadioFrequency Identification (RFID), Global Positioning System (GPS) and High- Precision GroundSurveying (DGPS, Total Station, GPS) Technology. Their solutions are Web Based, RealTime, Informative, and provide analytical data for various sectors such as Agriculture,Smart Cities, Urban Planning, Mining, Infrastructure, Governance, Land Administration,Logistics, Oil and Gas, Public Transportation, Health Care and Port Management.

### Kisan Network

Kisan Network[11] is an online tradingplatform for Indian agriculture. It enables small and marginal farmers to sell their freshproduce directly to businesses across the country, using their smartphone. KisanNetwork provides a pan-India supply chain, from the farm directly to thebuyer's doorstep.

### Krishi Star

Krishi Star is a farm to fork business that is ending poverty among small and marginal farmer farmers inrural India by increasing farmer ownership of the value chain and connecting farmers tohigher margin markets. Krishi Star is building a network of farmer-owned food processingunits, and selling products through their Krishi Star brand.

### Manuring It!

Manuring it! envisions creating a hyper local market for the smallest of small farmers, bybringing indigenous farm inputs (real time credit and farm technology) on a digitalplatform: accessible through one mobile missed call for accessing credit and rentingmodern farm equipment in real time, using data and primary distribution coral networks.

### National Agro Foundation

National Agro Foundation (NAF) a Public Charitable Trust founded in 2000 by CSubramaniam, (Architect of India's Green Revolution) and nurtured by Dr. A P J AbdulKalam, Former President of India, is working towards Comprehensive RuralDevelopment initiatives with focus on agrarian community. With its significantexperience of 17 years, NAF has reached out to 642 villages spread over 5 Indian Statesbenefitting about 51,000 rural families, through programs and projects in SustainableAgricultural Development and AgriBusiness, Watershed and Natural ResourceManagement, Community Development including FPOs, SHGs, etc. and Training andCapacity Building of the Stakeholders.

*10.Scores were normalized for the number of Selection Committee members that reviewed the application.*
*11. Kisan Network is backed by Y-Combinator and a Thiel Fellowship recipient.*

SatSure Analytics India Pvt. Ltd.

SatSure Analytics India aims to increase the effectiveness of the entire agriculture valuechain by enabling financial inclusion of farmers through data driven insights, improvingthe efficiency of marketplace and the supply-chain for agri input producers, traders, andpolicymakers, by creating unique risk management solutions that make use ofmulti-sensor data such as satellites, IoT, and drones, and artificial intelligence algorithmsto derive actionable intelligence.

## Stage 2: Final selection by Grand Jury

Each finalist was coached by the Dalberg team through phone or video conferencing to refine their pitches. The Dalberg team also conducted mock pitches with the finalists to further refine their pitches before they were presented to the Grand Jury.

On the day prior to the finale, the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu, conducted a two-hour interaction with the finalists, where each finalist team presented their solution, and answered questions asked by the Hon'ble Chief Minster.

**Figure 12: The Hon'ble Chief Minister interacting with the Grand Finalists of the #SmartFarming4AP Pitch Competition**

The finale of the Pitch Competition was judged by an eminent Grand Jury, consisting of:

**Sri B Rajsekhar, IAS**
Principal Secretary to Government of Andhra Pradesh, Department of Agriculture, Marketing & Co-operation

**David Bergvinson**
Director General, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

**Hemendra Mathur**
Venture Partner, Bharat Innovation Fund

**Parmesh Shah**
Global Lead for Rural Livelihoods and Agricultural Jobs, World Bank

**Dr. Purvi Mehta**
Head of Asia, Agriculture, Bill & Melinda Gates Foundation

**Suresh Rayudu Chitturi**
Vice-Chairman and Managing Director, Srinivasa Hatcheries Ltd.

**Varad Pande***
Partner, Dalberg Advisors

**N. Balasubramanyam IPS***
Commissioner Transport, CEO e-Pragati

**Vijay Kumar Thallam•**
Advisor to the Government of Andhra Pradesh, Agriculture

Prior to the finale, each Jury member received a Briefing Pack consisting of an Executive Summary presentation with key details of each of the finalists, the assessment matrix and the scoring sheet. The detailed application forms (and attachments, if provided) of the ten finalists were also available on request.

All finalists delivered their pitches in front of the Grand Jury and a large audience of delegates over two sessions on November 16, 2017. The Hon'ble Union Minister of State for Agriculture, Sri Radha Mohan Singh, and the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu, were in attendance during the first session of the Pitch Competition. In both sessions, each pitch was followed by approximately 10 minutes of questions, with about 1-3 questions from the Grand Jury and one question from the audience.

After all the finalists' pitches were delivered, the scoring sheets of the Grand Jury were collected, and tabulated. The scores received for each finalist were normalized[12].

Available members of the Grand Jury reconvened at the end of the second session, for a brief calibration meeting, where the decision was taken to select the winner and the runners-up on the basis of the highest normalized scores.

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** Present for the first session of the Pitch Competition*
** Present for both sessions of the Pitch Competition*
** Present for the second session of the Pitch Competition*

*12. Scores were normalized for the number of Grand Jury members present for the pitches: For finalists pitching during the first session, all 8 Jury members were present. For finalists pitching during the afternoon session, 6 Jury members were present.*
** Additionally, in any instances where there was a connection between a Jury member and the organization being scored, the score of that Jury member was disregarded and scores were normalized accordingly.*


**Figure 13: A finalist making his pitch at the Grand Final of the #SmartFarming4AP Pitch Competition**

Based on the normalized scores, the top five finalists were:

- Winner: Kisan Network
- 1st runner-up: Infinium Solutionz Pvt. Ltd.
- 2nd runner-up: SatSure Analytics India Pvt. Ltd.
- 3rd runner-up: Krishi Star
- 4th runner-up: BigHaatAgro Pvt. Ltd.

The results of the Pitch Competition were announced during the Valedictory session on November 17, 2017, and the winners were felicitated by the Hon'ble Chief Minister of Andhra Pradesh, Sri N. Chandrababu Naidu, and the co-chair and trustee of the Bill & Melinda Gates Foundation, Mr. Bill Gates.The top 5 finalists have begun discussions with the Government of Andhra Pradesh to develop their pilot plans to roll out their solution in the state.

# 6 Overview of Exhibitions

As part of the Summit, the Department of Agriculture, Government of Andhra Pradesh, under the able leadership of Mr. Hari Jawaharlal, Special Commissioner for Agriculture, organized an international level exhibition that showcased agricultural innovation across the agricultural value chain. There were ~50 organizations that were selected out of a vast pool of 100+ organizations. These organizations comprised of various departments of the Government of Andhra Pradesh, research institutions, private start-ups, as well as international organizations.

**Figure 14: Hon'ble Vice President of India and Mr. Bill Gates visiting the Exhibition Stalls along with the Hon'ble Chief Minister**

The table below provides an overview of the exhibitors at the Summit.

| S. No. | Name of Organization | Theme |
|---|---|---|
| 1. | Threshold Software | Farmer One Stop Shops –RythuSevaKendram (RaitheMundhu) |
| 2. | Acharya N. G. Ranga Agricultural University (ANGRAU) | Cutting edge technologies for enhanced farm incomes utilizing location specific synergies |
| 3. | Indian Council of Agricultural Research (ICAR) –Indian Institute of Millets Research (IIMR) | Value addition in millets for health and wellness |
| 4. | Department of Agriculture | Showcase of the innovative Mega Seed Park |
| 5. | Department of Agriculture Marketing | IT initiatives in Agricultural Marketing, and real-time operation of e-NAM Markets in AP |
| 6. | International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) | Integrated technology driven scaling up approach for agriculture research and development |
| 7. | International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) – Digital agriculture | Digitizing agriculture with advanced technologies like drones, mobile-based applications, real-time monitoring dashboards, and crop and weather advisories |
| 8. | Indian Council of Agricultural Research (ICAR) – Indian Institute of Rice Research (IIRR) | Latest advancements of management technologies in rice to increase production, and imparting knowledge through rice portal |
| 9. | Department of Animal Husbandry | Doubling farmers income in the Animal Husbandry sector through improvement and preservation of genetic stock, fodder management and security, etc. |
| 10. | Andhra Pradesh Dairy Development Cooperative Federation Ltd. (APDDCF) – AP Dairy | IT initiatives in the dairy sector |

| S. No. | Name of Organization | Theme |
|---|---|---|
| 11. | Department of Fisheries | The use of IoT in the fisheries sector |
| 12. | Department of Sericulture | Doubling the income of silk farmers in Andhra Pradesh through disruptive technologies. |
| 13. | Indian Council of Agricultural Research (ICAR) – Indian Institute of Horticultural Research (IIHR) | Latest advances in horticulture research |
| 14 | Horticulture Department and YSR Horticulture University | Research, development, and transfer of technology in horticulture crops |
| 15. | Digital Green | Human-mediated extension system – a digital empowerment process through community videos |
| 16. | Vassar Labs | Innovative use of IoT sensors, satellite data, large scale hydrological models and cloud based technologies |
| 17. | View360 Technologies | Digitization and intelligent automation of aquaculture farms |
| 18. | Future Farms | Hydroponics – Hitech Soil Less Farming |
| 19. | Netafim India | Smart micro irrigation technology in crops |
| 20. | Vinfinet Technologies (Kisan Raja) | Smart irrigation technology such as smart mobile irrigation pump controller solutions |
| 21. | Tech Mahindra Ltd. | Farm Guru – Precision agricultural IoT solution |
| 22. | Berkley Andhra Smart Village Project | IT initiatives in agriculture and allied sectors |
| 23. | Oxygen UAS | Drone technology for precision agriculture |
| 24. | S3M Technologies | Use of drone technology in agriculture |
| 25. | Global Tech | Use of low-cost agricultural drones for spraying pesticides |
| 26. | SatSure Analytics India Pvt. Ltd. | Remote sensing technology in agriculture for credit-worthiness rating of farmers, crop insurance settlements, and smart sampling of crop cutting experiments |

| S. No. | Name of Organization | Theme |
|---|---|---|
| 27. | Confederation of Indian Industry (CII) | Showcase of the projects led by CII |
| 28. | John Deere India Pvt. Ltd. | Ease in Farm Mechanization |
| 29. | VST Tillers Tractors Limited | Ease in Farm Mechanization |
| 30. | Tirth Agro Technology Pvt. Ltd. (SHAKTIMAN) | Mechanization technology to help farmers save money and time with more output |
| 31. | VARI | Digital platform for agri-marketing |
| 32. | AP Innovation Society (APIS) | Agri-aqua technologies incubated by APIS and XLr8AP |
| 33. | Source Trace | Mobile-based solution for agriculture |
| 34. | E-Bee Global Solutions Pvt. Ltd. | E-commerce B2B, B2C, and G2B solutions |
| 35. | Suma Agro India Pvt. Ltd. | Manufacture of Humic acid in the form of potassium humate |
| 36. | Reliance Foundation Information Services | Information services in agriculture |
| 37. | Jeeth Technical Interventions and Products Pvt. Ltd. | Intelligent root irrigation system with IoT or smart irrigation |
| 38. | Nagarjuna Fertilizers and Chemicals Ltd. (NFCL) | Seed-to-harvest crop management program |
| 39. | KHETHINEXT | Digital agriculture transformation through smart farming |
| 40. | Leowin Solutions Pvt. Ltd. | Increasing milk production using MozziQuit device in cow sheds |
| 41. | Parna Technologies and S4S Technologies | Solar Conduction Dryer to reduce moisture content in agro-marketing produce |
| 42. | Ecozen Solutions | Ecofrost technology – solar powered micro cold room |
| 43. | Navaneetha Evergreens | Mango Ice Fruit Technology |
| 44. | JK Trust | Advances in Animal Husbandry sector |

| S. No. | Name of Organization | Theme |
|---|---|---|
| 45. | NA PANTA | Mobile-based information solutions for crop protection techniques, real-time suggestions for a crop, access to right agri-equipment, and effective market linkage |
| 46. | Konam Foundation | Risk prediction tool for farmers |
| 47. | SadonAgro Products Pvt. Ltd. (NamasteKisan) | E-commerce market portal for farm products and processed food |
| 48. | Wifibee Technologies Pvt. Ltd. (Kisan Kart) | Integrated platform for farmers, traders, retailers and farm workers for access to agri products, assets and farm workers |
| 49. | Krishi Trade | Mobile application based e-commerce solution for supply chain services to farmers |

# 7 Ratings on Kaizala

The Government of Andhra Pradesh is an active user of Microsoft Kaizala, a mobile chat based application that enables citizens to directly reach out to the Hon'ble Chief Minister to share problems related to harvests, climate, pension, ration, water, etc. For the AP AgTech Summit 2017, Kaizala was used to collect live feedback from delegates throughout the event, through a simple voting mechanism. The application revealed outstanding feedback for the event, with over 96% of the delegates rating their experience as "Satisfied" or higher, and 80% of the delegates rating their experience as "Excellent" or "Good". The figure below provides an overview of the feedback received through the application.

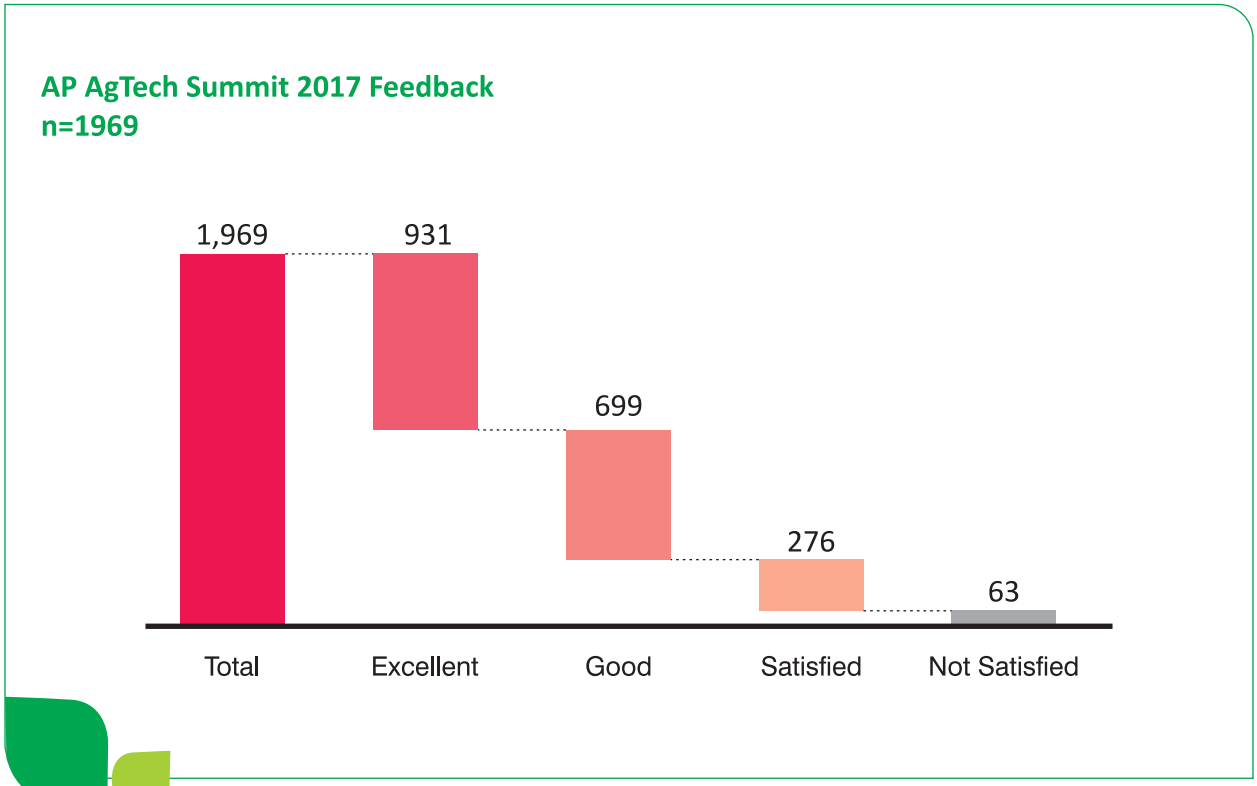


**Figure 15: Summit feedback through the Microsoft Kaizalaapplication**

# 8 Photo Gallery



AP AgTech
Valedictory Session


AP AgTech
Summit 20


ICRISAT
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# 9 Partners

## Bill & Melinda Gates Foundation

India is investing significantly in the health and social development of its people, working to enable millions of people to participate in the country's growth and economic progress. The Bill & Melinda Gates Foundation works in alignment with India's objectives - partnering with India's central and state governments, community groups, non-profit organizations, academic institutions, development organizations and the private sector, to achieve shared goals. With a focus on helping all people lead healthy and productive lives, the foundation develops innovative solutions to improve the quality and coverage of key services, primarily across four sectors: Health, Sanitation, Agricultural Development, and Financial Services for the Poor.

## Confederation of Indian Industry (CII)

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes. With 67 offices, including 9 Centres of Excellence, in India, and 11 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Iran, Singapore, South Africa, UK, and USA, as well as institutional partnerships with 344 counterpart organizations in 129 countries, CII serves as a reference point for Indian industry and the international business community. CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,500 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 250 national and regional sectoral industry bodies. CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues. Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few

## Dalberg Advisors

Dalberg Advisors is a strategy advisory firm dedicated to social and economic development of the global poor, with the mission of bringing the best of private sector strategy to address global development challenges. Dalberg Advisors have 17 offices across the globe and clients spanning the public, private and philanthropic sectors.

In the agriculture sector, Dalberg Advisors have worked on over 150 projects advocating, understanding, and helping solve problems facing agriculture actors at the international and local level. The firm has helped leading organizations identify, design and implement solutions that benefit agricultural market participants and increase food security.


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