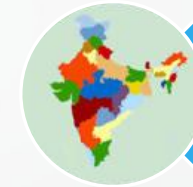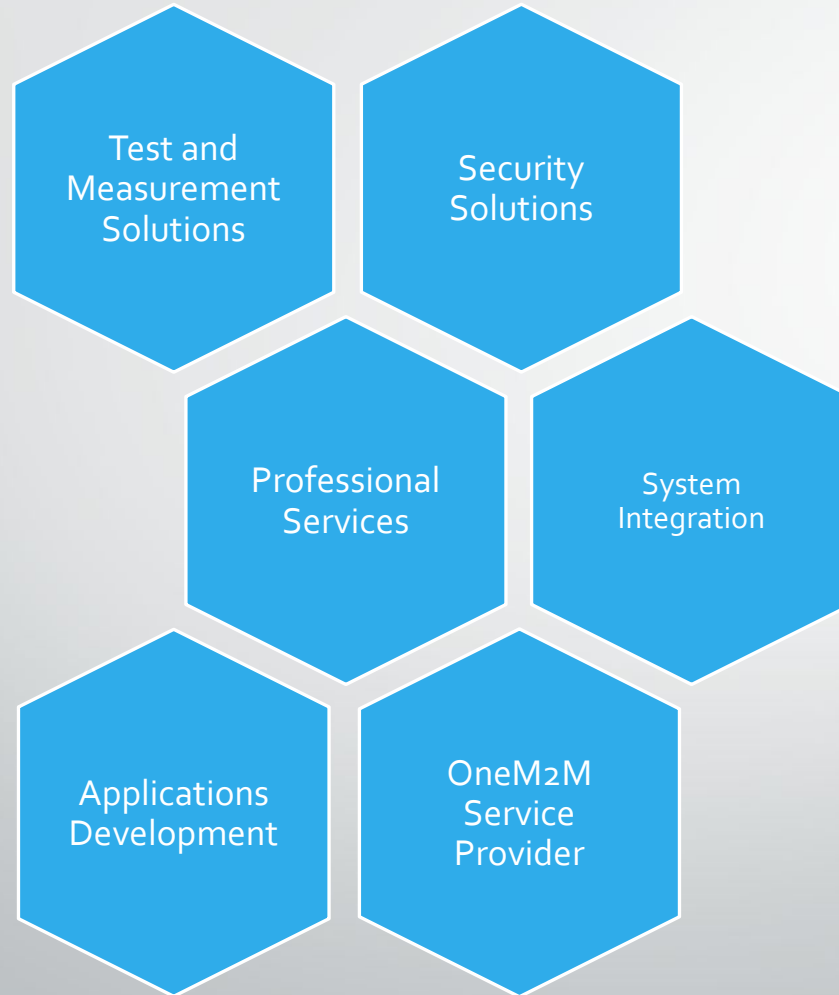# Agenda

- About INVAS Technologies
- Challenges in Agriculture
- Technologies and its Uses
- Smart Agriculture Proposed model
- Application Model
- Use of oneM2M
- Road-map
- Benefits to End Users
- Way Forward

INVAS Technologies

Test and Measurement Solutions

Security Solutions

Professional Services

System Integration

Applications Development

OneM2M Service Provider

PAN India Presence

Dedicated Calibration Facility

Quality Certification

Challenges in Agriculture

- India has a very diverse agriculture land and requires categorical and structured way to manage farming.

- Besides number of schemes and facilities there are various challenges in agriculture sector like flood, drought, soil health, unexpected weather changes that trouble farmers

- Challenges come with huge losses and has adverse effect on various domains.

- Now days its necessary to synchronize verticals in agriculture and communications to help each other

Flood

Drought

**Frost**

Soil Nutrient Imbalance

Technologies and its Uses

- Developments in Industrial Automation and agriculture sector also need to be integrated.

- Various sectors changing their way of doing business with evolving communication infrastructure.

- Agriculture sector can be modernized by use of AI/ML prediction and Alert.

- Making inter communication between different verticals need to be made easy and convenient.

- 5G and Next-G coming with huge data band and low latency can be utilized for critical applications as well.

- Much needed objective in agriculture domain is to make things automated and predictive, that will help farmers, govt and cooperative agencies to facilitate and empower end user.

Smart खेत

Smart Agriculture Proposed model
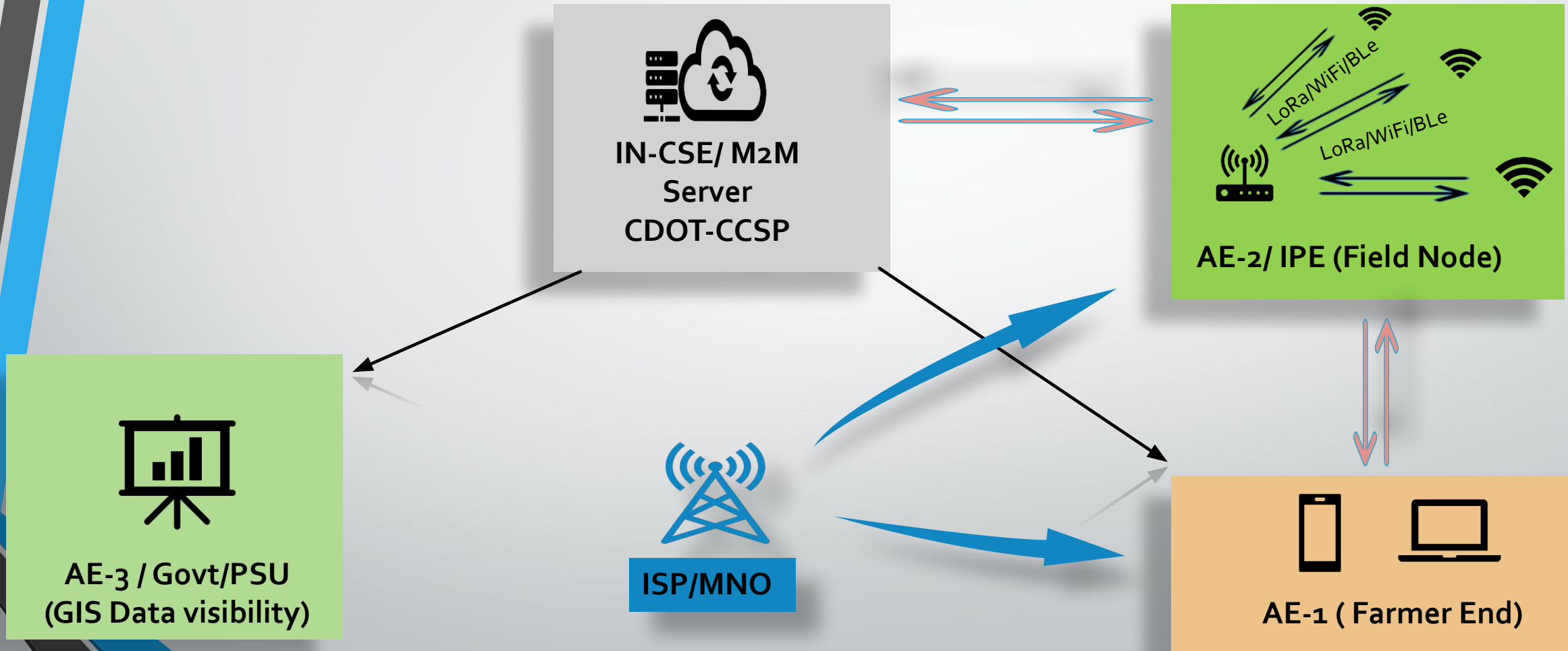
Nodes and their working

- **AE-1/ Farmer End :-** This node will setup and deploy/monitor the sensor devices and port enabler to operate appliances, having **UEs like mobile and laptop etc.**

- **AE-3/ Govt/PSU End (GIS Data visibility) :-** This node will have the web access to different organizations **GIS Data** visibility and also have the rights to send pre alert and notification in defined geographical area.
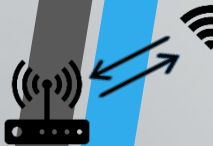
- **AE2/IPE Field Node :-** This node have the field sensor and actuator devices which are directly controlled and monitor by end user, having **IPE, Sensors, remote relays etc.**

- **IN-CSE/ M2M Server :-** This node will have the common services functionalities that will be available through our **MN-CSE** like Registration, Subscription, Security, Discovery, Device management, Location, Group management etc.

- **ISP/ MNO : -** This node is independent, ie this can be any network service provider over any interface like RF, Optical, Satellite etc.

Sensors and Actuators

IN-CSE/ M2M Server CDOT-CCSP

AE-2/ IPE (Field Node)

AE-1 (Farmer End)

LoRa Air Interface

AE-2/ IPE (Field Node) DATA Logger with Connectivity options Wifi, Bluetooth, LoRa And Network SIM card module.

AE-1 (farmer End) have the Mobile application as well web interface that visualize the current scenario of the deployed sensor on field and can operate actuators from this node.

Wireless Humidity, Temp, Water Level Sensors

Wireless Solenoid Actuators to control flow of water in Farm

Wireless Pump Actuators to switch ON/OFF Pump in Farm
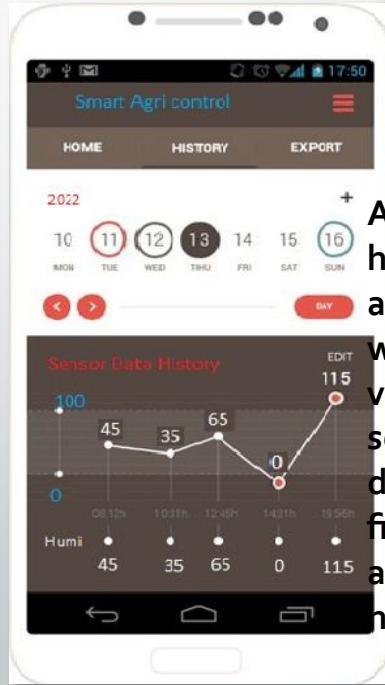
Application Model

☐ INVAS would be the first node where all sensor data receive directly for CCSP.

☐ Received data will process and store on local server for further utilization like prediction, suggestion and actuator enablement.

☐ The whole purpose of processing data, to make available end users in very efficient way. As we received only raw data from CCSP.

☐ User will get notification on every platform like mobile app and messages.

OneM2M and INVAS

- oneM2M is a / will be de-facto standard of interoperability between different verticals that facilitate different types of services like Industry automation, smart city, smart infrastructures, smart hospitals etc.

- INVAS has got license of oneM2M Service Provider and we aim to use it by developing applications for benefit of society at large, with focus on lowest level of user.

- For making this possible we intend to utilize common service functionality of CSE developed by CDOT.

- We are in initial stage of development and shall get to prototype stage very soon for field testing.

- OneM2M standards provide us with interoperability and functionality to manage our product and services in very secure and managed way.
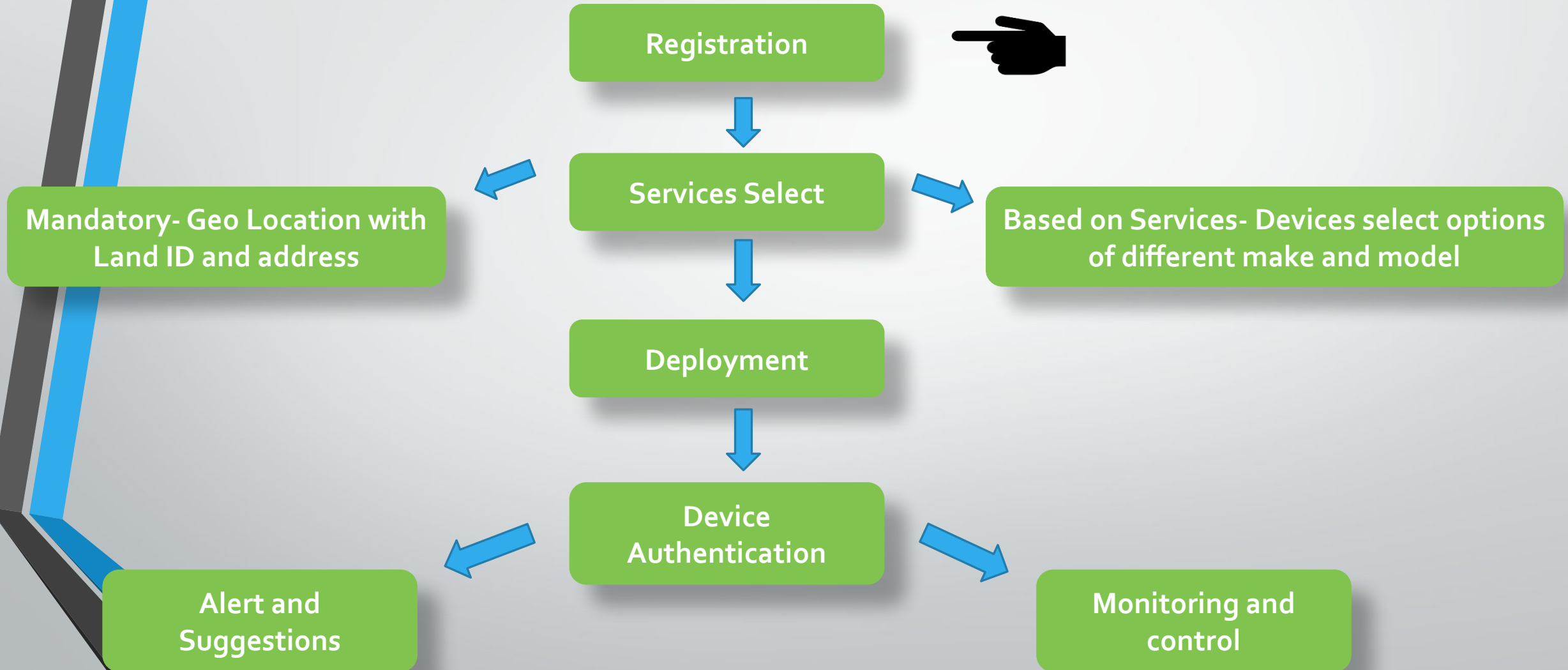
  We shall also develop parallelly more such application benefiting the lowest strata of our society.
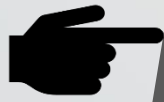
Road-Map

- The target to build a robust infrastructure that has end to end solution from crop planning to market reach.

- The motive of our solution is to target and benefit end user like farmers. They can use facility to monitor crop remotely, appliances enablement, get statistical data, pre monsoon alert, best farming techniques, soil health etc.

- Further the solution template can be utilized in different domain like smart city, smart village and smart infrastructure.

- The field data can be extended to district level, state level, and country level for government and value added service provider.

- The field data can be utilized to estimate actual losses in field, pre alert farmers and suggest remedies.

- Our model can be utilized by government authorities. Authorization and credentials can be customized.
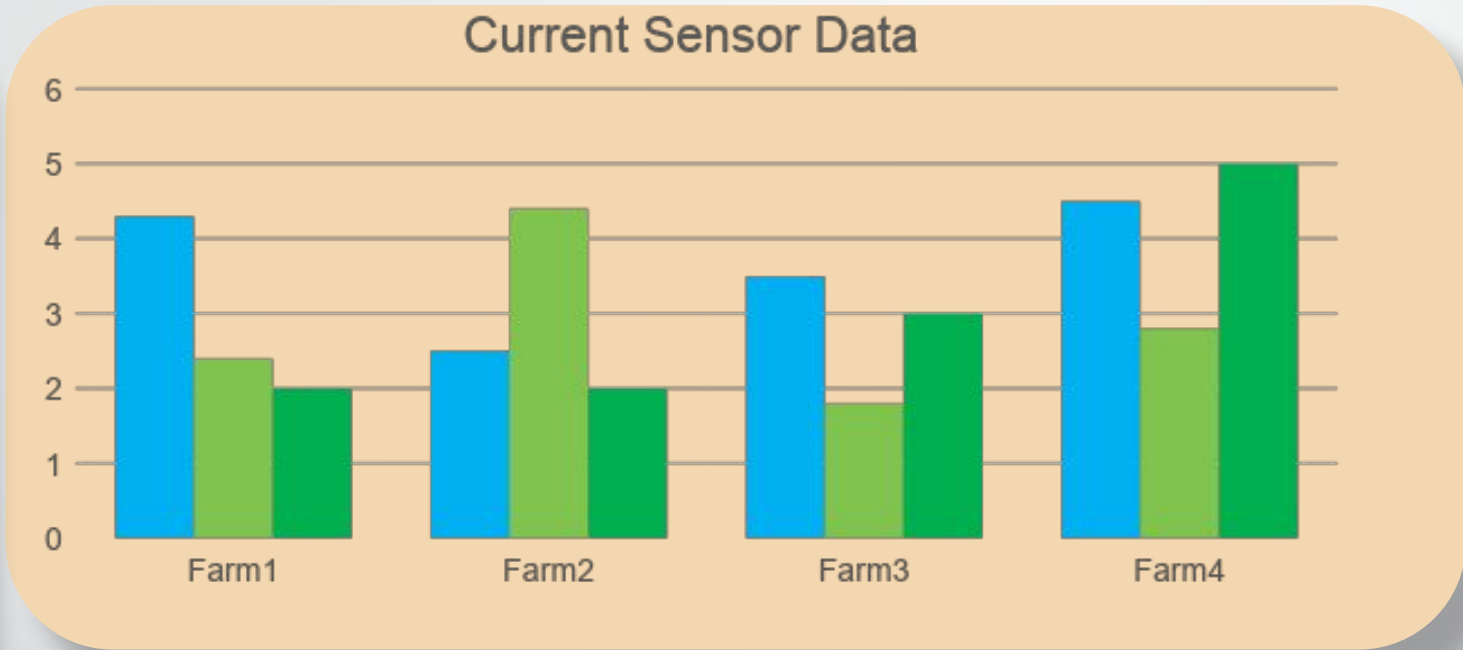
AE-1/ Farmer End – Utilization

Registration

Services Select

Mandatory- Geo Location with Land ID and address

Based on Services- Devices select options of different make and model

Deployment

Device Authentication

Alert and Suggestions

Monitoring and control

AE-1/ Farmer End – Utilization-contd..

>- **User Profile**
>- **User Adhaar**
>- **Bank-details**
>- **Land Record** >-
Auth-Devices
>- **Device-Status**
>- **VA-Services**

Current Sensor Data

>- **Alert**
>- **Notification**
>- **Sugg-crops**
>- **Insurance**
>-
Loss-Estimatio n

Crop Profile and their progress

| Crop-1 | Crop-2 | Crop-3 | Crop-4 |

AE-3/ Govt/PSU End (GIS Data Visibility)
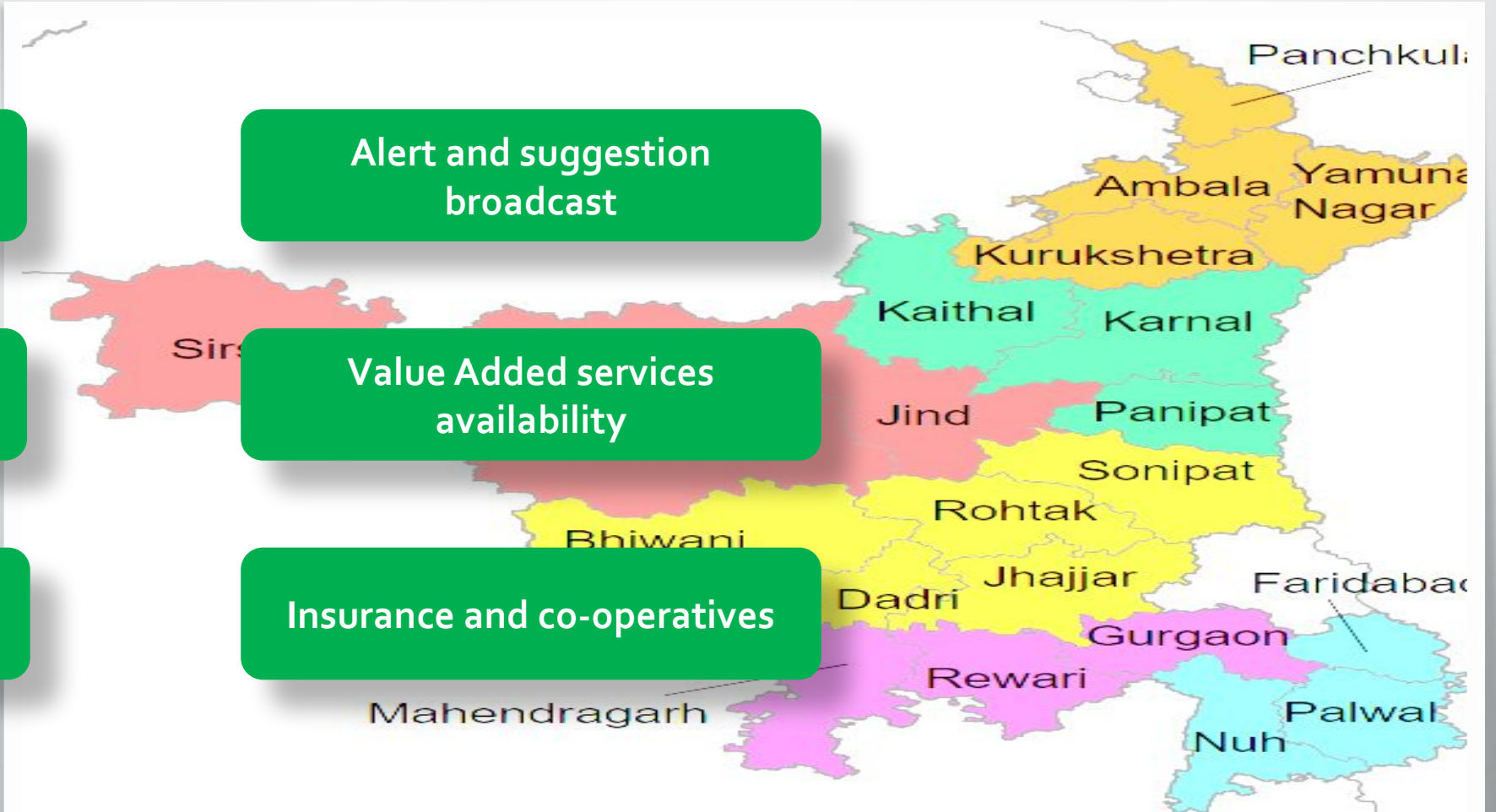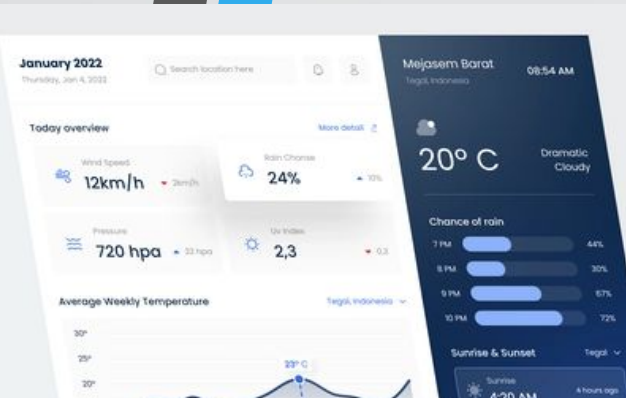
Dynamic Data Available on GIS Map

Alert and suggestion broadcast

Future Forecast and past data trends

Value Added services availability

Natural Disaster and loss Estimation

Insurance and co-operatives

Way Forward...

- Standardization and interoperability has been an issue in maximising the benefits of applications. oneM2M standard can be utilized to fill the gap.

- Needs a very strong collaboration between various entities, where all aspects of different verticals talk to each other and get sufficient data for accurate AI/ML predictions.

- oneM2M is the best bet to standardise things and ensure interoperability between different silos. INVAS as the industry connect has already pledged to play its role in a proactive way.

- Smart Agriculture is need of hour for India and world community at large. INVAS as a OneM2M service provider is developing applications around this which will benefit the farmer and enable Govt to monitor and optimise resources for benefit of farmers under various schemes like Antyodaya Yojana.

धन्यवाद

We welcome your suggestions and advice

Team INVAS

INVAS Sales and Service Network
Gurugram, Delhi, Mumbai, Bengaluru, Chennai, Kolkata, Hyderabad, J&K, Patna, Ahmedabad, Nepal, Bangladesh