Smart Farming Solution
for
Current and Future Farmers

Indian economy to reach $5 trillion by 2025 with the contribution of $1 by agriculture
- PM Narendra Modi at World Economic Forum 2018 in Davos

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Kisan Mitra

- Technochrist
- Design & Development of Smart Irrigation & Soil Health Monitoring System
- Date of presentation* 26/09/2018
- 1-sentence summary of your business*
  - Developing IoT Centric Advanced Technologies to make Farming Sustainable & Profitable
- How much money are you seeking for:
- Phase1: 37 Lakh, Phase2: 60 Lakh, Phase3: 73 Lakh, Phase4” 1.1 Crore
Current Situation

- While India ranks 2nd in the number of workforce and 7th in the geographic size, farm productivity is much lower than some of the countries which are smaller in geographic or workforce size.
- Agriculture is one of the key sectors of Indian economy. It accounts for around more than 17% of nation’s GDP.
- Area used for sowing increased by about 10% between 1951 and 2015. In the same period, population increased by about 350%.
- 1951 Total Population - 361.1 M, 2015 Total Population - 1.28 B.
- Agricultural land use in India.

Prototype Reve Sensor

Using the prototype sensor we designed, number of field trials has been taken. We found the huge potential and it demands efforts and investment.

- **Smart Agriculture Market**: Cloud Based Automated Precision Farming
  - Optimise the use of water & fertilisers, maximise crop yield
  - Automation of irrigation pumps, collect & provide real-time data on vital parameters such as soil humidity, soil fertility etc.
- **Smart Agriculture Global Market**: To be worth USD 13.50 Billion by 2023 (source: *Smart Agriculture Market by Agriculture Type (Precision Farming, Livestock Monitoring, Fish Farming, Smart Greenhouse), Hardware (GPS, Drones, Sensors, RFID, LED Grow Lights), Software, Services; Application, and Geography - Global Forecast to 2023*).
Challenges in Farming (Current Problems)

- Increased demand for food as the population increases
- Reduction in total cultivated land and average land holding by individual farmers
- Labor shortage due to migration from rural to urban, suburban areas
- Climate change causing reduction in water availability
- Inefficient irrigation system, Selection of type and quantity of Fertilizer
- Decrease in quality of soil due to chemical fertilizers and pesticides
- Increase in the cost of cultivation
- Decrease in productivity & profitability of farmers
- Reliable and Instant Analysis of Soil (Presently, this process takes a long time and the facility is in the cities only)
- Crop Selection based on Soil’s Present Situation
- Crop Selection based on “Future Market Demand"

**Source: Govt. Of India, Department of Agriculture Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare**
How to Accomplish the Vision

- Use of Internet of Things (IoT) technologies to
  - Build eco friendly and sustainable farming solutions
  - Increase productivity and profitability for farmers
  - Increase quantity and quality of farm produce
  - Educate and equip farmers with tools which provides necessary information on
    - Soil conditions
    - Environmental information
    - Weather forecast
    - Water usage across field
    - what to sow
    - when, where and how much to apply the amount of fertilizer and pesticide
  - Remote monitoring and control of irrigations systems
  - Alert notifications on crop maturity, soil conditions, changes in the weather etc.
Smart Farming Solution

**Data Analytics**
- Resource utilization
- Process and cost optimization
- Inform farmers about what to sow based on soil conditions
- When, where and how much to apply the amount of fertilizer and pesticide
- Help create fertilizer profile based on soil chemistry

**Sensors and Gateways**
- Soil quality
- Air quality
- Environmental Conditions
- Crop maturity
- Efficient irrigation control
- Alert notifications

**Feedback Loop**
- Notify Govt. agencies and producers of seeds, fertilizers, pesticides etc. of the usage and conditions of farms

**Real Time Monitoring and Control**
- Energy management
- Water management

**SFS**
Data shared throughout the farms from all sensors available
Through gateway data is securely communicated to cloud based analytics platform
Actionable information accessible through web interface, mobile app or API
Notifications through email, text based on the threshold configured
# Hardware & Software – Phase wise Implementation

<table>
<thead>
<tr>
<th>Air monitoring</th>
<th>Water Monitoring</th>
<th>Soil Monitoring</th>
<th>Crop Monitoring</th>
<th>Security System</th>
<th>Controlling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality Index (AQI)</td>
<td>Water Temperature</td>
<td>Soil Moisture</td>
<td>Temperature</td>
<td>Alert Generation of Unauthorized Transaction</td>
<td>Water Level</td>
</tr>
<tr>
<td>Dust Particles in PPM</td>
<td>Water PH</td>
<td>Rain Gain Measurement</td>
<td>Disease Identification (Fungus etc)</td>
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<td>Water Flow</td>
</tr>
<tr>
<td>Air Sensor</td>
<td>Conductivity</td>
<td>Amount of NPK Measurement</td>
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<td>Surveillance using Camera</td>
<td>Pumps</td>
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<td>Turbidity</td>
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<td>Solenoid Valve</td>
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<tr>
<td>Wind Sensor</td>
<td>Gas Sensors (CO, CO2, O3)</td>
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**GATEWAY**

(RF, Wi-Fi, Bluetooth, LoRa, ZigBee, GSM, GPS)
Market Analysis

- The smart agriculture market is estimated to be worth USD 7.53 billion in 2018 and is projected to reach USD 13.50 billion by 2023, at a CAGR of 12.39% during the forecast period.\(^1\)

- The global smart agriculture/farming market is anticipated to reach USD 18.21 billion by 2025.\(^2\)

- The global smart agriculture market was valued at around USD 5,098 million in the year 2016 and is expected to reach approximately USD 15,344 million by the end of 2025.\(^3\)

- 6.4B connected things will be in use in 2016, up 30% from 2015 and will reach 20.8 billion by 2020.\(^4\)

- By 2020 annual revenues could exceed $470B for IoT vendors selling hardware, software and comprehensive solutions.\(^5\)

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1 - MarketsandMarket, 2 - Grand View Research, 3 - Globe NewsWire, 4 - Gartner, 5 - Bain
Competitive Advantage

- Hardware components to hold a major share of the smart agriculture market during 2018–2023\(^1\)
- Currently major players in Smart Agriculture / Farming are US or Europe based. No major player in India providing such solution
- Imported solutions expensive and non-economical to Indian farmers
- Also there could be high risk of failure as imported products not specifically designed for soil or weather conditions of India

Our solution

- Design, development and manufacturing in India
- Affordable
- Supports local economy
- Contributes towards Make in India initiative
- Will continue to evolve with new technologies and input from end users

\(^1\) MarketsandMarket
Rollout of Products / Services

Market Strategy

Strategic Partnerships
- Agricultural University
- Government Body Agricultural Dept.
- Seed, Fertilizer, Fertilizer Producers
- Greenhouse Manufacturers

Marketing
- Sample Live Demo

Customer Retention
- Upgrades, Addition of new Features
- Live Help Desk
- Annual Analysis Report

Selected Farms

Greenhouse
## Business Model – Stage wise

<table>
<thead>
<tr>
<th>Parameter /Model</th>
<th>AIR</th>
<th>WATER</th>
<th>SOIL</th>
<th>Security Alert</th>
<th>Crop Monitoring</th>
<th>Controlling</th>
<th>Gateway</th>
<th>Application</th>
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<tr>
<td>Dust Particles Measurement</td>
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<tr>
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Business Projections

**Projections based on Model A**

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**Projections based on Model A**
## Capital Requirements

<table>
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<th>Model</th>
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<th>Prototype</th>
<th>Product</th>
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</table>

- Model A provides basic set of required features for Smart Farming Solution. It requires lowest capital compared to other models and thus would be preferred model to start with.
- Other Models can be developed based on specific requirements.
Timeline

Current Status

POC

4-6 Weeks

Prototype

2-3 Months

Product Launch

Pilot Program
5-10 Farms
3-6 Months

Mass Production
## Our Team

### Team Member
- Madhukant Patel
- Harshad Pansuriya
- Nikunj padshad
- Shubham mistrr

### Advisory Board
- Mahender patodiya (Former ISRO Scientist)
- Isheet Patel (M.D. Reve Automation LLP.)
- Jagruti Kheni (M.D. Technocrist Technology LLP.)

### Employment (bachelor of engineering)
- Electronics engineering-3
- Mechanical engineering-2
- Computer engineering -2
- ITI-5

### Future Need
- Marketing Consultant
- Government Tie Up Consultant