ARTIFICIAL INTELLIGENCE, BIG DATA AND BLOCKCHAIN EMERGING TECHNOLOGIES AND BUSINESS MODELS ACTING AS POINT OF INFLECTION FOR SMALLHOLDER FARMERS

CHANGING THE WORLD, ONE FARMER AT A TIME
Today Human Civilization is at the cross roads Plagued by three major challenges

Food Security Agrarian Distress Climate Change
We can tackle these challenges by producing more food with less land, limited water, and fewer resources hence making farming profitable for smallholder farmers.
2.5 Billion Small Holder Farmers are Key to Food Security as Largest cultivators of food crop, they manage 500 Million Farms

But Small Holder Farmers are in enormous distress Because of

Insight Vacuum
Increasing Cost of Cultivation
High Risk & Limited Access to Finance
Low Realization from sales
Current agriculture problems in developing economies...

- Access to resources
- Relevant customized information
- Actionable insights to assist decision making
- Intelligent insights from complex data
- Farming automation & mechanization
- Meaningful information dissemination
- Last mile access to farmers
- Real-time data of farmer activities
- Profit enhancement & risk mitigation tools
- Real-time intervention & support
- Ecosystem players (lack of..)
- Farmers (lack of..)

Say in there own future
new agricultural technology and Business Models Are needed...
We Need a truly Sustainable Agrifood System

Data Driven
Insightful
Scalable
Holistic
Distributed
Self-Learning
Transparent
Real-Time
Collaborative
Profitable
A Solution in which every Agriculture Stakeholders Must Trust & Value
Data Driven Decisions

facilitate farmers and stakeholders in taking most optimum decisions. Farm Plan, customized for each farmer based on Weather, Soil, Pest, Crop data on real-time basis. Trust driven actionable insights customized for each Stakeholder.

Distributed ledgers (BlockChain)
Big Data

Internet of things & Cloud Computing

Intelligent Algorithms
Artificial Intelligence

Machine Learning Assisted Decision Making

Crop Monitoring
- Crop health monitoring using Deep Learning Algorithms based on real-time data from sensors, satellite/drone images, on ground farming practices and ground truthing techniques.

Pest & Soil Defect Detection
- Artificial neural networks (ANN) to identify potential defects both in soil and plants. Image processing algorithms along with historic/current local pest, soil, weather and activity data is used for training ANN.

Farm Automation
- Machine learning techniques are used to care for plants by deploying UAVs & UAGs including automated application of pesticides and plant nutrients, elimination of weeds, irrigation.

Predictive Analytics
- Algorithms are used for prediction of yield, crop quality, input side demands, output aggregation needs leading to optimization of supply chain (input & output), Policy intervention etc.

Recommendation Engine
- Farming activity recommendations including Crop/ Variety Selection, Crop Nutrient/ Protection and Sowing/ Irrigation/ Harvest Timing based on Demographic, Agriculture and Market Profiles.
Public Data Sources

- Weather & Climate
  - Satellite
  - Predictions
  - Historic Database
- Soil Database
- Crop Models
- Markets Info.
- Agro Input Datasheets
- Best Practices Inventories
  - Global
  - National
  - Regional
- Farmer Info.
  - Demographics
  - Yield & Production
- Other Info.

Decision Models, Evaluators & Algorithms

- Integrated Farm Models
- Crop Growth Models
- Water Balance Models
- Soil Nutrition Models
- Precision Agriculture Algorithms
- Best Practice Evaluators
- Farm Optimization Models
- Shortest Supply Chain Analytics
- Risk Assessment Models

Proprietary Data and Sensors

- Local Sensors
  - Soil
  - Weather
  - Crop
- Crop Variety Yield Database
- Private Inventories
- Geospatial Data
- Remote Sensing Images
  - Satellite
  - Drones
- Input Prices
- Yield Maps
Blockchain
transparent and incorruptible information to create Trust

**Agri-Input E-Commerce**
- Optimized economical delivery of relevant agriculture inputs at fair price.

**Farm Credit**
- Empowering farmers by making low cost finance reach in most optimal manner in environment of trust.

**Profitable Realization**
- Transparent output sales ensure farmers get what they deserve.

**Food Safety**
- Ensuring the food to plate is grown sustainably.
A Futuristic Platform for Farmers

**PAST**
- 1980s: The Plough
- ~2008: Machinery & GPS Tracking
- GMO

**PRESENT**
- Confused Farmer (Overwhelmed by data)

**FUTURE**
- Connected Ag Weather Stations
- Doppler Weather Forecast
- Plant Sensors (e.g. sap flow)
- UAV with Sensor Payload

**INCREMENTAL BENEFIT OVER PREVIOUS GENERATION**

**NEW GROWTH POTENTIAL FOR FARMERS**
Farmer Profitability Increase
Doubling farmer income in 5 Years

Reduction in Cost
Increase in Productivity
Enhanced Realisation
Increased Income

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Reduction in Cost
Increase in Productivity
Enhanced Realisation
Increased Income

1st Year
2nd Year
3rd Year
4th Year
5th Year

Reduction in Cost
Increase in Productivity
Enhanced Realisation
Increased Income
Thank You!

Deepak Pareek, CEO & Founder
+91 98982 69489
deepak@mycrop.tech
www.mycrop.tech