The TCS PRIDE™ Model – Empowering Farmers!

Using Digital Five Forces to Revolutionize Agriculture:
- Better Prices
- Cost Reduction
- Mitigate Risk
- Improve Supply Chain efficiency
- Increase Yield

Srinivasu Pappula, Ph.D., CISSP.  
Global Head – Digital Farming Initiatives, TCS
### Impact on Farmers – To Date

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Reduction</th>
<th>Average Increase</th>
<th>Average Increase</th>
<th>Average Increase</th>
<th>Average Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticides</td>
<td>- 15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer</td>
<td>- 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield</td>
<td></td>
<td>48%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td></td>
<td></td>
<td>45%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to best practices</td>
<td></td>
<td></td>
<td></td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>PRIDE™ Members</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Access to grants – Rs. 5K/acre</td>
</tr>
</tbody>
</table>
TCS Digital Farming Initiative - Mission

Improve farmer livelihoods through technology and partnerships

“Smart Villages”

“Climate Smart” & “Market Smart”

Leverage collective power of partners and farmers to create sustainable ecosystems – PRIDE™s

Confluence of Digital Five Forces, GIS & Proprietary Agri Knowledge Base

Digital Transformation Powered by the TCS Digital Farming Platform
TCS Digital Farming Initiative - Objectives

Objective 1: Improve crop production, efficiency
through cyclic optimization process

Objective 2: Establishing ‘linkages’ across partnership ecosystems
Forward & Backward linkages
Access to support groups

Data Collection
Management/Planning
Analysis & Evaluation
On field operations

Government
Industry / standards bodies
Agri input companies
Markets
The 3Ss

- Scalability
- Suitability
- Sustainability
Integra Precision Agriculture Solutions

CONNECTED EDGE
Devices & equipment capturing sensor data, taking action

Compute Intelligence at the EDGE
- Download Disease Prediction Models and other Agri related Models from the Cloud
- Enable Real-time Data Processing & Analytics

TURN DATA INTO INSIGHT
Process, store data, Cloud analytics, Manage devices, Precise networks

PRECISION AGRICULTURE
Actionable Information, Automate Operations

TATA CONSULTANCY SERVICES
Experience certainty.
Towards Smart Farming

TCS Digital Farming Data Analytics Centre

RuPS

Drones

Satellite Images

Crop Data

Farmer Data

Soil Data

Weather Data

Market Data

Sensors

Analyzed Data sent to various Agri stakeholders - DaaS

Agri-Input Companies

Credit Co. / Banks

Insurance Companies

Farmers

Domestic & Export Markets

Government

Research Institutes
Phase 1: Crop Planning

- **Goals**
  - Reduce Cost
  - Get more Yield
  - Get more profit

**Crop Plan Options**

<table>
<thead>
<tr>
<th>Option</th>
<th>Cost</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>X</td>
<td>X + 50</td>
</tr>
<tr>
<td>Option 2</td>
<td>Y</td>
<td>Y + 100</td>
</tr>
</tbody>
</table>

Question? Which Crop to sow?

Farmer's Financial & Risk Profile

Irrigation

Farmer

Livestock

Land & Soil data

Cash in Hand

Agro Climate Info dB

CROPS™

AgriKnoB™

Market Trends & Demand Forecast
Phase 2: Aggregation & Ordering

Crop Plan Options

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>X</td>
<td>X + 50</td>
</tr>
</tbody>
</table>
| Option 2 | Y    | Y + 100?

 Consolidated Agro Input
 Demand for Seeds, Fertilizer, Pesticide, Irrigation, Labor, etc.

PRIDE™

AgriComms™

Agri-Input Companies

Credit Co. / Banks

Insurance Companies

Markets
Phase 3: Crop cycle management

- **Disease Prediction System**
  - Farmer (Participatory Sensor)
  - Actual Weather
  - Sensor
  - Farm

- **mKRISHI® Data Center**
  - AgriComms™
  - AgriKnoB™
  - Export Market Compliance

- **CROPS™**
  - Crop Protocol
  - Farmer
  - Agro Expert

- **TCUP**
  - AWS
  - Disease Models
  - Drone
  - Weather Forecast
  - Satellite

- **Agro Expert Advice**
  - Crop Protocol Prediction
  - Disease Prediction System

- **Yield Monitoring, Impact Monitoring**
  - Farm Traceability & Certification
Phase 4: Harvest Planning

Crop Protocol

CROPSTM

AgriComms™

Local (PRIDE / Village) Storage

Processing Center

P1

P2

P3

P3a

P3b

P3c

P4

Logistics Manager
What is a PRIDE™?

Progressive Rural Integrated Digital Enterprise

• Intersection of Technology, Agriculture and Business Management
• Self-sustaining, economically viable entity
  • Made possible through technology intervention
    • Standardized processes
    • Improved data visibility
    • Enabling data analytics
    • Demand-driven production
Objectives of PRIDE™s

Leverage ICT to **transform** the 19th Century Agricultural practices into 21st Century by **connecting farmers with partners and experts** of agriculture eco system and promoting **scientific farming**.

Leverage ICT to achieve **economies of scale** through aggregation of land-holdings, supply of market produce and demand for agri-inputs.

Provide personalized, farmer specific bouquet of services like Agro Advisory, Best Practices, Crop Rotation and Planning, Alert Services, Procurement etc. on mobile in local language for Value Creation.
Finally...

mKRISHI® is a Business solution involving
- Numerous Technologies
- Consortium Ecosystem, and
- a sustainable Business Model

Characteristics:
- On Mobile,
- Farmer Specific and
- in Local language.

- *Qualcomm's Wireless Reach Initiative Award (2007)
- *Golden Peacock Award for Innovation (2008)
- NASSCOM Top 50 Innovation Recognition (2009)
- India Innovation Initiative (i3) Award (2009)
- NASSCOM Social Innovation Honors (2010)
- Aegis Graham Bell Innovation Award 2010
- eINDIA Awards 2010
- Stockholm Challenge 2010 (Eco Dev) Honorable mentions
- Business World Infocomm 2012
- Best CIO 2012 IT for Social Cause Award
- Highly Commended Award - Big Ticket Business in the Community, Excellence 2013

TCS’ award winning Agri-Solution Platform
Questions?

Srinivasu.p@tcs.com

Thank You
Backup
Digital Farming – Case Study
**Objective**

- Visualize risks associated in Agriculture
- Due to Pest, Disease, other factors
- Based on predefined rules

**Actions**

- Intimate farmers/producers with appropriate actions
- Trigger sales of required agri inputs based on risk level
- Trigger crop consultancy and auditing services
- Analyze the trend of risks and prediction
Project Description

Framework

- Data pull service from file server
- Rule based modelling engine
- Automated Image generation using R
- Automated uploads of images to Google Maps Engine
- Creation of smart UI elements in the front end - pulling appropriate images from Google Maps Engine - Rendering on Google Maps

Features Built

- Plot registration and Search
- Plot Visualization
  - Weather Layer with graph
  - Cloud Layer
  - Incident Layer
  - Fusion Layer
  - Risk Layer
Plot Visualization (Temperature & Weather Layer)
Plot Visualization: Weather Graphs

- Temperature (past)
  - Temperature (2014-02-01)
  - Temperature (prediction)

- Humidity (past)
  - Humidity (2014-02-01)
  - Humidity (prediction)

- Precipitation (past)
  - Precipitation (2014-02-01)
  - Precipitation (prediction)
Plot Visualization: Incident Layer & Risk Layer
Finally…

“The effective execution of a Plan is what counts and not mere planning on paper; it is not what we put on our plate or even what we eat that provides nourishment and growth, but what we digest.”


JRD Tata