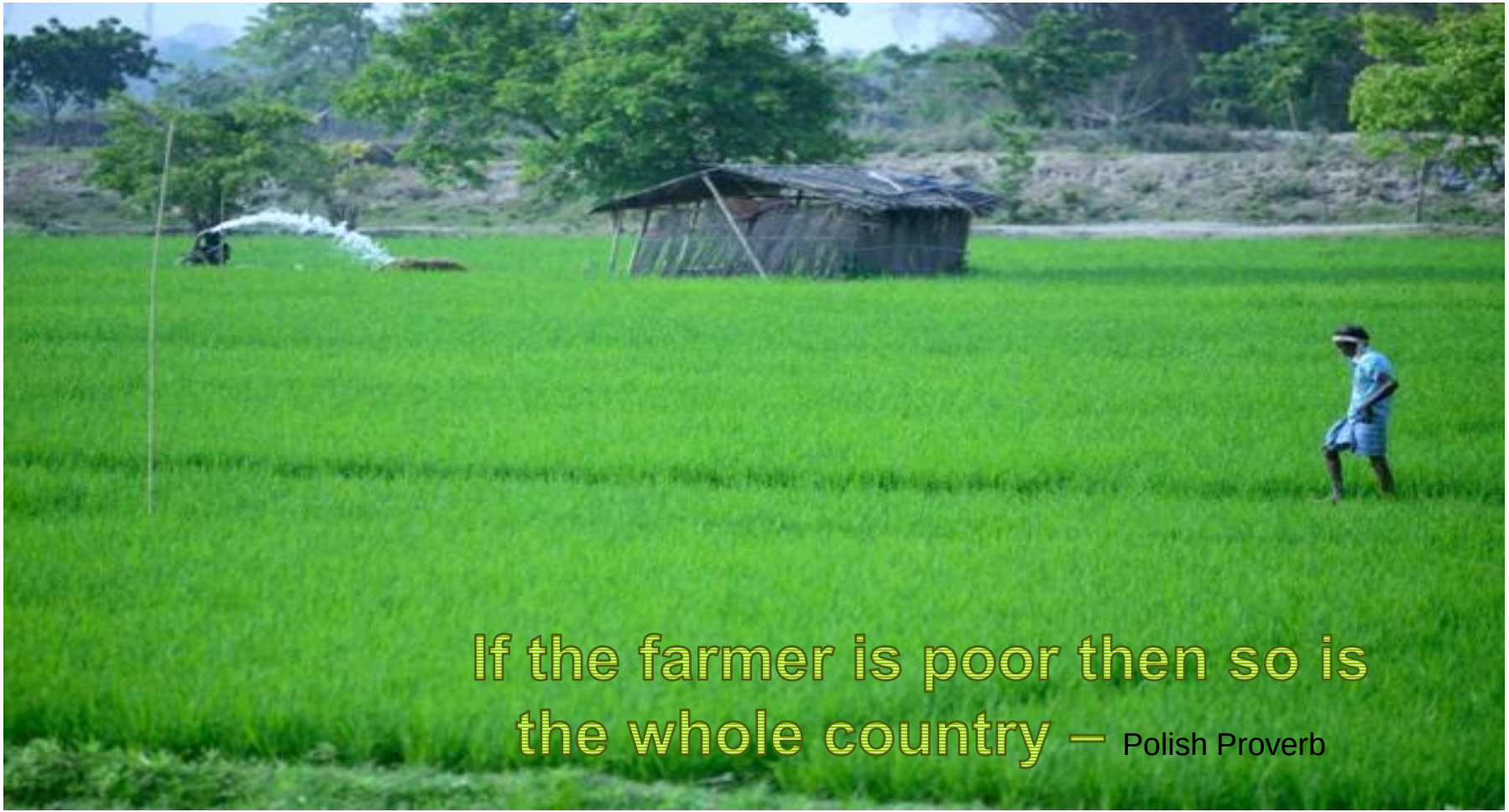
CYIENT

Integrated site specific farming solution by CYIENT

Murali Ayyagari
Srikanth Ponapala



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We are in the midst of agrarian crisis

Every 32 minutes, one farmer family is losing the head of household

- Unfavourable weather
- Water crisis
- Higher Input costs
- Debt

- Labour scarcity
- Small holdings
- Seed quality
- Per acre yield
- Low mechanization
- Over/under usage of chemicals
- Losing land to urbanization

300,00 farmer suicides were reported since 1995 in India

Indian agriculture is consuming **lower nutrient usage(106kg/ha)** below the world average leading to malnutrition of the fields

Lower literacy rates in farmer community is hindering in gaining the fruits from technology advancements

Lower yield levels compared to the other major agriculture producing countries

Limited **access to the retail** markets

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Climate is getting better for agriculture

There is a greater demand for food in coming 30 years

- New irrigation projects
- Technology driven solutions
- Positive policy changes
- Crop insurance

- Digitization
- Increasing collective farming
- Organic farming
- Corporate investment
- Advanced mechanization availability
- Drones
- Soil health cards

Governments **covering the input costs**
Ease of securing the **bank loans** and credits
Free or **subsidized electricity**
Construction of roads helping to **connect the last mile**
Integrated schemes for **agriculture marketing**
Start-ups getting into many areas of Agri-business bringing innovation on to the table

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Who we are

CYIENT founded in 1991, provides engineering, manufacturing, geospatial, network, and operations management services to global industry leaders.

Cyient's technical expertise, domain knowledge, and service offerings differentiate us as a Design, Build, Operate & Maintain Partner who can fulfill greater needs and solve more problems. We leverage the power of digital technology to offer complete solutions across our clients' value chains.

KEY SERVICES	Product Engineering, Process Engineering, Networks & Operations, Design Led Manufacturing, Geospatial (Digital)		
INDUSTRIES SERVED	Aerospace & Defense, Communications, Energy, Geospatial, Industrial, Medtech & Healthcare, Mining, Rail, Semi-conductor, Utilities		
FACTS & FIGURES	$538 M Revenue*	$72 M Operating Profit*	~ 14,000 Employees
MARKET PRESENCE	North America	Europe, Middle East, Africa	Asia-Pacific

Aerospace & Defense	Boeing | Diehl Aerospace | ELTA Systems | Honeywell | Pratt & Whitney | Rafael | UTC Aerospace Systems
Communications	Airtel | AT&T | BT | Cox | Swisscom | Telenet | Telstra | Verizon | VolkerWessels | Windstream
Energy & Mining	IHS | Rio Tinto | Siemens | SMEC | Transocean | Westinghouse
Geospatial	Ordnance Survey | Rural Payments Agency | TomTom | U.S. Department of Transportation
Industrial	Caterpillar | ESCO | John Deere | Joy Global | Komatsu | Terex
Medtech & Healthcare	GE Healthcare | Medtronic | Ortho Clinical | Philips | Siemens | Thermo Fisher Scientific | Vios Medical
Rail Transportation	Alstom | Bombardier | PTA (Western Australia) | Siemens | Thales
Semiconductor	AMD | Bosch | Broadcom | GlobalFoundries | MediaTek | NVIDIA | Qualcomm | Xilinx
Utilities	AusNet | Xcel Energy | Pacific Gas and Electric Company | Singapore Power | Southern California Edison

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Integrated solution for site specific farming

CYIENT in collaboration with a major AgChem company working on development of an “Integrated Site-Specific Farming Solution using the Precision Agriculture methodology” for farmers and other key stakeholders involved in the agriculture industry to leverage the benefits of technological advancements for early detection of crop health, possible yield restrictions, minimizing under/over-application of chemicals, sensible yield predictions and optimizing the resources.

Execution of the real world Proof Of Concept is in progress to evaluate the technical feasibility and economic viability of the such an integrated solution.

The outcome of the POC shall help to understand the key benefits to the farmers, business opportunities, implementation limitations, needed investments, market worthiness, scalability and potential risks for architecting the organizational strategy.

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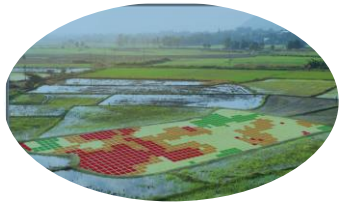
Solution model



Digital Prescription

Prepare the site grid/fishnet, generate the zonal statistics and cerate the digital prescriptions

Data processing

Stich the imagery data in to 2D orthomosaic images and generate DTM, DSM and NDVI

Field Scouting

Inspect and compare the crop health from the digital prescription and recommend actions

Data acquisition

Areal imagery data collected thru RGB and multispectral cameras using drones. Also satellite imagery will be used wherever feasible

Variable Rate Deployment

Integrate the farm specific prescriptions for variable rate deployment using drones, backpack sprayers and other spraying mechanism

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Farmer Centric

Major challenges faced by farmers	Approach to solve by the solution
Scarcity of water resulting in to reduction in food production	Provide the knowledge of field topography, texture, moisture, weather and crop growth for selective watering. More crop for drop..
Shortage of labor during peak seasons due to migration in to other high paying trades, moving to towns/cities etc.	Increasing efficiency thru variable rate application, drone based chemical spraying, effective weed controlling are some of the areas addressed
Over/under usage of nutrients and crop protection agents	Farmer specific prescriptions to accurately deploy the chemicals
Not taking educated decisions basing on weather conditions, rain fall and crop suitability	Local, trusted advisor support thru field agents and agronomists

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Key findings to help the farmer

Soil Fertility Map

Supply the PH value, salinity, slope and nutrient status information which helps in customizing the application of nutrients and target spraying

Terrain Info

DTM and DSM datasets will help making the decisions on land leveling and irrigation layout planning

Plant Height

Plant height calculated from terrain info help in growth assessment

Weed Patches

Vegetation index from drone imagery helps in identifying the presence of weed patches in between the inter row area helps planning for herbicide application.

Stress Areas

Stress areas related to moisture, nutrients, crop diseases etc. to help early detection .

Yield Mapping

Yield maps provide the assessment of yield vary within the field which will help making sensible management decisions

Irrigation

Provide the different rates of irrigation required for every part of the field based on water stress index taken from aerial imagery

Weather information

Meteorological information gathered from multiple sources would help developing the irrigation schedules and crop selection and sowing and harvesting decisions

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Where is the economic benefit for farmer

Benefit

Cost

Baseline
Traditional farming

Value additional crop

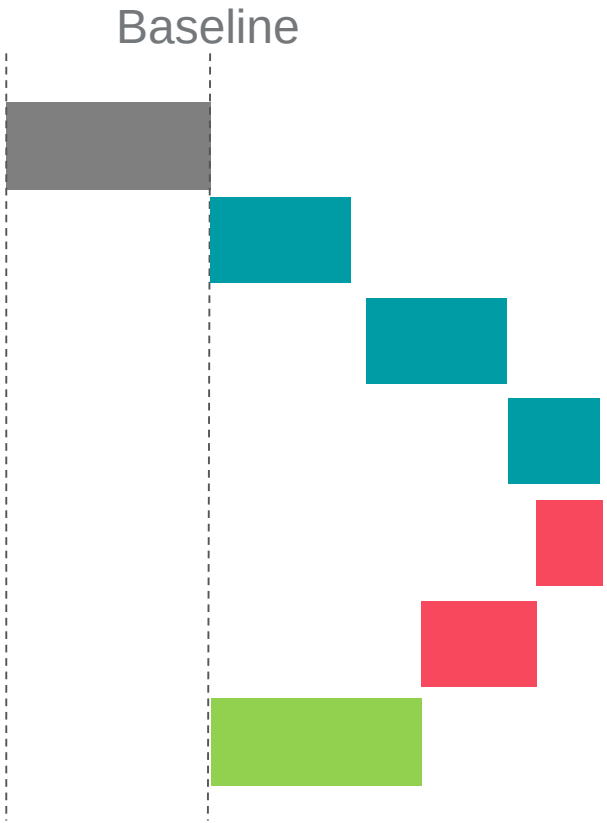
Reduced input costs.

Reduced labor costs

Cost of data acquisition

Cost of precision deployment

Net benefit farmer



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Revenue streams

Core services ← → *Adjacencies*

Phase #1

1 Subscription based PA services

- Farmer will be the key customer in this model
- Basic services in the crop lifecycle will be offered in this phase
- A mobile application and a website for visualization and communication

2 Drone services for chemical deployment

- Uniform nutrient deployment

3 Data acquisition, processing and Analysis

- Data services for financial institutions
- Government bodies
- Insurance agencies
- Retail networks
- Food storage units
- Food processing companies
- Logistic companies

4 Yield mapping, crop classification and damage assessment

- Risk assessment advisory services for insurance agencies
- Crop statistics for govt. bodies

Future releases

- Seed selection
- Yield comparison
- Profitability
- Soil sampling
- Weather monitoring
- Sensor based data collection

- Variable rate application of nutrients
- Deployment of pesticides

- On-demand data Acquisition

- Predictive models for yield mapping, pest infestation and moisture levels

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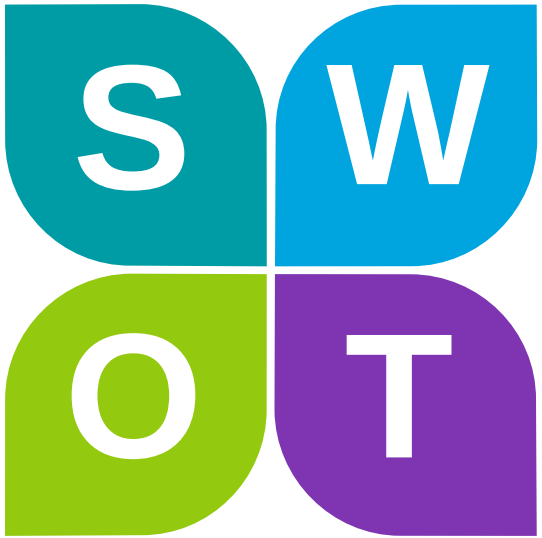
SWOT analysis

Strengths

1.Farmer reach
2.AgChem expertise
3.Geospatial experience
4.Data analytics
5.Software development
6.IoT platform
7.Drone/UAV collaboration
8.Design led manufacturing
9.Institutional support

Weaknesses

1.Limited access across pan India
2.History data unavailability
3.No/limited Influence on policy making



Opportunities

1.~390 Mn acres of land to explore
2.Huge demand for supply of produce
3.Growth in usage of secondary and micro nutrients
3.Growth in organic farming
4.Growth in drone based services

Threats

1.Farmer buy-in for subscription
2.Restrictions on UAV/Drone flying
3.Government policy changes
4.Scaling up to the larger size
5.Higher data acquisition costs per serving land
6.Availability of internet in remote areas
7.Collaboration/partnership related challenges

Short and long term benefits

Short term benefits	Short term benefits
• Site specific information improves ability to diagnose crop production problems • Yield restrictions caused by drainage, soil type, diseases, weeds can be identified & corrected • Prevention of over-application of inputs • Promotes good land stewardship	• Evaluation of Management Practices • Comparison of Yield Variations over the periods • Evaluation of Crop Inputs, New Products • Tracks Trends & Identifies Problems • Changes in crop rotation & varieties • Efficient Equipment Use • Increases Field Efficiency • Reduces overlaps & missed applications • Increased Machinery Utilization rate • Uses soil characteristics & weather to improve scheduling of operations • Reduces Risk • Reduces Variability in Net Returns

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Looking forward

The collaboration of CYIENT and its AgChem partner epitomizes our shared values of “social responsibility, growth through innovation and technology empowering the rural India” backed up by combined strengths of “AgChem and Technology” is looking forward to launch the integrated site specific farming solution to enhance the productivity, sustainable agriculture and instrumental in reducing the environmental pollution…

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Murali Krishna Ayyagari PMP

Head - Precision Agriculture @ CYIENT

Murali Ayyagari

About Murali

Over 20 years of experience in managing the delivery of global software projects/programs across diversified domains and technologies supporting fortune 500 customers.

Areas of expertise

Growing and sustaining high-performance teams | Leadership building| Partnership building| Initiate/manage cross-functional teams and multi-disciplinary projects | Program/Project Planning | Customer liasoning | Pre-sales support | P&L ownership | Vendor management | Technical Architecture | Software development & Testing | Precision Agriculture

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Srikanth Ponapala

Subject Matter Expert- Precision Agriculture @ CYIENT

Srikanth Ponapala

About Srikanth

A post graduate in agriculture with 15 years of experience in GIS & Remote sensing technologies in the agriculture and other allied areas. Currently associated with Cyient Limited as Subject Matter Expert for Agriculture and managing Agriculture relevant projects within New Business Accelerator (NBA) Program.

Areas of expertise

Agriculture | Geospatial | Field survey| Proposals | Project reports | Customer liasoning | Pre-sales support | Client presentations | Project planning and execution | Team management |

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Thank You

For further information, please contact

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