MAKING MONEY IN THE USD 5.09 BILLION PRECISION AG MARKET GROWING TO USD 9.53 BILLION, AT A CAGR OF 13.38\%
AGENDA

Historical perspective: The history and importance of precision agriculture

Precision agriculture market dynamics: market size, companies involved, and recent developments

Technology: agriculture ecosystem investments in novel technologies and companies

Confusion reigns in the precision agriculture business, some case studies
WE ARE THE WORLD’S LARGEST REVENUE IMPACT COMPANY

Largest repository of high growth niche market research focusing on over 30,000+ domains

Influencing revenue decisions of 7000+ customers globally

Over 900 Research Analysts across 10 different industry verticals

Complete Ecosystem of Platform (Syndicate Research), People (Custom Consulting) and Processes (Client Services)

Heavily focused on exploring the impact of interconnections among markets

Numerous accolades and testimonials from clients

Profiled in leading publications like Forbes

Profiled as one of the top-funded tech startups in India (Funded by FTVentures)
WE ARE THE CATALYSTS FOR MAKING MARKET RESEARCH REAL IN LEADING CORPORATIONS

AEROSPACE & DEFENCE

AGRICULTURE

AUTOMOTIVE & TRANSPORTATION

CHEMICALS & MATERIALS

ENERGY & POWER

FOOD & BEVERAGE

HEALTHCARE

SEMICONDUCTOR & ELECTRONICS

OTHERS

INFORMATION & COMMUNICATION TECHNOLOGY

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ORGANIZATIONS ARE CONSTANTLY STRUGGLING TO IDENTIFY NEW REVENUE SOURCES IN A FAST CHANGING WORLD

Today's Revenue Mix

Future Revenue Mix

New Sources

Old Revenue Sources

New Use Case
New Technology
New Ecosystem Market
New Product/Offering
New Client/Partners/Target M&A

Hot Bets Impacting new revenue sources

Extended

Our lens on hot bets

Next Hot bets

Your Client's Client

Your Client

Your Vendor

Your Vendor's Vendor

WE IDENTIFY NEW REVENUE SOURCES FOR YOU, YOUR CLIENT, YOUR CLIENTS’ CLIENT
A HOLISTIC RESEARCH ECOSYSTEM OF PLATFORM, PEOPLE AND PROCESSES CAN HELP ORGANIZATIONS BENEFIT FROM CHANGE

ACCESS TO RESEARCH VIA KNOWLEDGE STORE*

- Comprehensive access to exclusive insights/off-the-shelf research on 30,000+ high growth niche markets
- Library / Domain / Sub-domain access with free customization
- Personalized portal for each business/product line
- Competitive Leadership Mapping via Micro-quadrants
- Option to suggest report titles and pre-book reports

CUSTOM CONSULTING/ANALYST SUPPORT

- A dedicated client engagement team for round the clock support in terms of requirement gathering, query handling, and any other support activity
- Free customization of reports
- Access to Markets and Markets knowledge library via the analyst team who can quickly get back and extract the specific information you are looking for
- Backing of existing market research reports to support research activities along with access to paid databases, thus minimizing research investment at your end
- Option to buy analyst hours beforehand and utilize the same throughout the year based on your research requirements

Plus exclusive access to MnM webinars, conferences, customer summits across the year

CLIENT SERVICES

- Offer continuous support to key clients onsite
- Provide you with analysis and insights to make smart moves
- Keep a tab on events that impact your business environment
- Revenue Impact Assessments
- Deep Dives and Contextualization

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<table>
<thead>
<tr>
<th>KNOWLEDGE STORE PLATFORM - TRACKING DISRUPTIVE INNOVATIONS WITHIN EACH INDUSTRY VERTICAL &amp; IDENTIFYING GROWTH OPPORTUNITIES</th>
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<tbody>
<tr>
<td><strong>MegaTrends</strong></td>
</tr>
<tr>
<td>3D Printing, Artificial Intelligence, Big Data &amp; Analytics, Connectivity, Internet of Things, Nano technologies, Robotics, Smart Infrastructure, Wearable, Smart Manufacturing, Digitalization</td>
</tr>
<tr>
<td><strong>Aerospace &amp; Defense</strong></td>
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<td><strong>Automotive &amp; Transportation</strong></td>
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<td><strong>Chemicals &amp; Materials</strong></td>
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<tr>
<td><strong>Food &amp; Agriculture</strong></td>
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<tr>
<td>Agricultural Biologicals, Agrochemicals, Farm Equipment &amp; Irrigation, Feed &amp; Animal Nutrition, Precision Agriculture, Testing &amp; Services, Seeds &amp; Others, Convenience &amp; Frozen Food, Food Ingredients, Food Processing &amp; Equipment</td>
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<tr>
<td><strong>Energy &amp; Power</strong></td>
</tr>
<tr>
<td>Clean &amp; Renewable Energy, Drilling Equipment &amp; Services, Well Intervention, Offshore Oil &amp; Gas, High Voltage Products &amp; Systems, Pumps, Motors &amp; Control Devices, Power Generation, Transmission &amp; Distribution</td>
</tr>
<tr>
<td><strong>Healthcare</strong></td>
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<tr>
<td>Advanced Genetic Sequencing, Analytical &amp; Scientific Instrumentation, Animal Health, Bio-Production, Cardiovascular Devices, Healthcare IT, Diagnostic Imaging, Healthcare Analytics, In-vitro Diagnostics</td>
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<tr>
<td><strong>Information &amp; Communication Technology</strong></td>
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<tr>
<td>Cloud Computing, Analytics, Mobility, Network security, Endpoint security, Cyber security, Public Safety, Software Defined Anything, Data Center Networking</td>
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<tr>
<td><strong>Semiconductor &amp; Electronics</strong></td>
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Figures indicate number of reports published till May 2018
CUSTOM RESEARCH SERVICES - DELIVERING VALUE BY CUSTOMIZING RESEARCH TO SPECIFIC PAIN POINTS

INTRODUCTION
- Market Estimation
- Market Forecasting
- Opportunity Analysis

GROWTH
- Market Penetration

MATURITY
- Competitive Landscaping
- Product Benchmarking

SATURATION
- Channel Benchmarking

DECLINE
- Related Products Assessment
- New Markets Assessment

REVENUES

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OUR DRIVERS

- MEASURE REVENUE IMPACT
  Measure how our research has helped our clients achieve real revenue impact

- MAXIMIZE KS AND MNM ECOSYSTEM UTILIZATION
  Continuously monitor patterns across companies to find opportunity areas

- DRIVE IMPACTFUL DECISION MAKING
  Enable close collaboration with Research Team for customizations and additional research needs

OUR OPERATIONS

- CLIENT INTERACTIONS
  Dedicated client partner will meet with our clients once or more every two weeks

- PLAY QUARTERBACK
  Proactively enable client interaction with the broader MarketsandMarkets ecosystem

- DELIVER VALUE
  Drive Value through continuous feedback and engagements

OUR ASKS

- TIME
  Meet regularly to understand business priorities

- INTERACTION
  Ability to communicate with client team and stakeholders to help drive actionable insights

- LOGISTICS
  Access to the facility for efficiency
RESEARCH METHODOLOGY – OUR RESEARCH TAKES INPUTS FROM MULTIPLE SOURCES INTEGRATED INTO ROBUST QA AND CI PROCESSES

CLIENTS:
Consumption fueling creation
The more our clients use our research the better the validation of our process
(Powered by client services)

EVENTS:
Participants & speakers at various MnM events throughout the year
• Conferences
• Summits
• Webinars

PAID DATABASES:
Subscribed & Paid databases from different providers

PRIMARY SOURCES:
• Supply side - Suppliers, manufacturers, partners, etc.
• Demand Side - Executives, users of targeted products etc.

SECONDARY SOURCES:
• Annual Reports
• Press Releases
• Public Sources/Data
• Analyst reports

EXPERT PANELS:
• Internal (Full Time, Part Time) Experts
• External Consultants
• Industry experts
HOW CAN THIS ENGAGEMENT MODEL HELP SOLVE REAL BUSINESS PROBLEMS?

**Corporate Goal**
- Increase company’s revenues by 20% to 30% in Retail and Banking sectors

**Business Unit Goal**
- Increase market share from 20% to 30% in Retail and Banking sectors
- Enter the healthcare sector with existing analytical services & solutions
- Identify new adjacent services / solutions which can be offered within the analytics space

**Strategic Initiatives**
- USA market is saturated. Need to expand to other regions
- We need to identify potential partners in order to offer wider solutions. However, partner intelligence is difficult to find
- No real insights around existing and potential competitors
- No established customer base
- Not enough information around the factors impacting end users
- How should we approach our potential new customers?
- Which segments have the maximum potential?
- Which are the opportunities that will generate immediate revenues (12-18 months)?
- What innovations are disrupting my and customers’ business?

**Use Cases**
- Market sizing & forecast
- Regional attractiveness analysis
- Competitive landscape
- Customer identification
- Partner identification
- End user perception analysis
- Segment Attractiveness Index
- Targeting, Segmenting, Positioning & Messaging
- Influencing factor analysis
- Identifying short-term revenue generation sources
- Solution Benchmarking
- Innovation Tracking
- Pricing Strategy

**Problems / Use Cases / Pain Points**
- Validate available data
- Only basic information available. Need to go 2 level deeper
- XX
- XX
- XX
- XX
- XX
- XX
- XX
- XX

**Revenue impact**
- US$ 100 million in 2021
IDENTIFY THE LOW HANGING FRUITS IN ORDER TO HIGHLIGHT THE MINIMUM Viable PLAN (MVP)

FOR ENGAGEMENT

**Minimum Viable Plan (MVP)**

- **O1-P1**: Expanding into retail and banking sectors of other regions (EU and APAC)
- **O2-P7**: Identification and evaluation of different healthcare analytics solutions

<table>
<thead>
<tr>
<th>Problem Area</th>
<th>Implementation Priority</th>
<th>Revenue Impact</th>
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<tbody>
<tr>
<td>Market sizing &amp; forecast</td>
<td>O1-P1</td>
<td>Low ease of execution</td>
</tr>
<tr>
<td>Regional attractiveness analysis</td>
<td>O2-P6</td>
<td>Low ease of execution</td>
</tr>
<tr>
<td>Competitive landscape</td>
<td>O3-P7</td>
<td>High ease of execution</td>
</tr>
<tr>
<td>Customer identification</td>
<td>O2-P2</td>
<td>Mid ease of execution</td>
</tr>
<tr>
<td>End user perception analysis</td>
<td>O3-P3</td>
<td>Low ease of execution</td>
</tr>
<tr>
<td>Solution Benchmarking</td>
<td>O1-P2</td>
<td>Mid ease of execution</td>
</tr>
</tbody>
</table>
RESEARCH SCOPE & COVERAGE IN AGRICULTURE

4 DIMENSIONAL RESEARCH COVERAGE FOR AGRICULTURE

FOCUS AREA 1
- CROP PROTECTION CHEMICALS
- ANIMAL NUTRITION & HEALTH
- AGRICULTURAL BIOLOGICALS
- PLANT NUTRITION
- IRRIGATION & FARM EQUIPMENT
- PRECISION AGRICULTURE

FOCUS AREA 2
- CROP COVERAGE
  - CEREAL CROPS
  - FIBRE & SUGAR CROPS
  - TURF & ORNAMENTALS

FOCUS AREA 3
- INPUT & STRESS MANAGEMENT
  - PEST MANAGEMENT
  - SOIL MANAGEMENT

FOCUS AREA 4
- GEOGRAPHICAL COVERAGE
  - NORTH AMERICA
  - EUROPE
  - ASIA PACIFIC
  - MIDDLE EAST & AFRICA
  - SOUTH AMERICA

INDUSTRY COVERAGE
- SEEDS
- CROP PROTECTION CHEMICALS
- PLANT NUTRITION
- IRRIGATION & FARM EQUIPMENT
- PRECISION AGRICULTURE

CROP COVERAGE
- FRUITS & VEGETABLES
- OILSEEDS & PULSES
- PLANTATION CROPS

INPUT & STRESS MANAGEMENT
- DISEASE MANAGEMENT
- NUTRIENT MANAGEMENT
- WATER MANAGEMENT

GEOGRAPHICAL COVERAGE
- NORTH AMERICA
- EUROPE
- ASIA PACIFIC
- MIDDLE EAST & AFRICA
- SOUTH AMERICA

700+ MARKET VIEWS PROVIDED THROUGH OUR LIBRARY
- In-depth market analysis, dynamics & trends
- Value chain and ecosystem analysis
- Industry standards and regulatory frameworks
- Opportunity analysis
- Competitive landscape
- Regulatory Analysis

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### MARKETSANDMARKETS RECENT RESEARCH RELEVANT TO SMART/PRECISION AGRICULTURE

<table>
<thead>
<tr>
<th>REPORT TITLE</th>
<th>CAGR (%)</th>
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<tbody>
<tr>
<td>Autonomous Tractors</td>
<td>24.9%</td>
</tr>
<tr>
<td>Pre-harvest Equipment</td>
<td>5.7%</td>
</tr>
<tr>
<td>Planting Equipment</td>
<td>6.3%</td>
</tr>
<tr>
<td>Vertical Farming Market</td>
<td>30.7%</td>
</tr>
<tr>
<td>Variable Rate Technology (VRT)</td>
<td>9.7%</td>
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<tr>
<td>Agricultural Sprayers</td>
<td>7.1%</td>
</tr>
<tr>
<td>AI in Agriculture Market</td>
<td>22.5%</td>
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<tr>
<td>Agricultural Robots</td>
<td>20.7%</td>
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<tr>
<td>Soil Moisture Sensor</td>
<td>16.2%</td>
</tr>
<tr>
<td>Connected Agriculture</td>
<td>17.9%</td>
</tr>
<tr>
<td>Farm Management Software</td>
<td>14.1%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>REPORT TITLE</th>
<th>CAGR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Agriculture Market</td>
<td>13.3%</td>
</tr>
<tr>
<td>Precision Agriculture</td>
<td>13.5%</td>
</tr>
<tr>
<td>Precision Agriculture Software</td>
<td>14.0%</td>
</tr>
<tr>
<td>Smart Irrigation Market</td>
<td>17.2%</td>
</tr>
<tr>
<td>Agriculture Drones</td>
<td>30.2%</td>
</tr>
<tr>
<td>Yield Monitor</td>
<td>7.2%</td>
</tr>
<tr>
<td>Geographic Information System (GIS)</td>
<td>9.6%</td>
</tr>
<tr>
<td>LiDAR Drone</td>
<td>35.2%</td>
</tr>
<tr>
<td>GPS Receiver</td>
<td>16.4%</td>
</tr>
<tr>
<td>Global Telemetry</td>
<td>14.2%</td>
</tr>
<tr>
<td>Drip Irrigation</td>
<td>11.6%</td>
</tr>
</tbody>
</table>

Many more......
Historical perspective: The history and importance of precision agriculture
## Green Revolutions – Smart/Precision Agriculture Is the Next Driver

Green revolutions are the result of a sequence of scientific breakthroughs and development activities in agriculture industry that successfully helped in increasing food production.

### First Green Revolution
- Research and development of technology transfer initiatives

### Adoption of New Technologies
- New, high-yielding varieties (HYVs) with superior genetics
- Use of chemical fertilizers and pesticides
- Multiple cropping system supported by the use of modern farm machinery and proper irrigation systems

### Second Green Revolution
- Increased crop yield and nutrition

### New Technologies Focus
- Genetic engineering of new crops and foods
- Tailoring existing seeds to different environments (for instance, sequencing of the rice genome)

### Third Green Revolution
- For better decision making or more efficient exploitation operations and management
- Solutions to environmental issues, efficient use of water resources, and optimization of inputs

### New Technologies in Focus
- Management Information Systems
- Precision agriculture
- Agricultural automation and robotics
The application of modern Information and Communication Technologies (ICT) into agriculture – Precision Agriculture

**Smart & Precision Agriculture Goal:** To offer better decision making capability for the farmer and “to make more with less”

**APPLICATION OF ICT SOLUTIONS INCLUDE**

- Precise Equipment
- The Internet of Things (IoT)
- Sensors & Actuators
- Geo-positioning Systems
- Big Data
- UAVs & Drones
- Robotics

**Utility**

- Integrated Mapping
- Increased Yield
- Saves Time
- Convenience & Accuracy
- Reduced Investment On Manpower
- Return On Investment

**Information Flow**

- Data collection
- Data storage & processing
- Geo-sensing data
- Decision making
- Farm input mapping
- Tillage & seeding
- Fertilization
- Plant protection
- Yield mapping

- Growers, Suppliers and advisories
- GIS
- Soil sampling & survey, field topography, remote sensing
- Input cost, resource availability
- Map prescriptions
- Soil sensing
- Crop scouting
- Pest monitoring & mapping
- GNSS
Precision agriculture is a farming management concept based on observing, measuring, and responding to inter and intra-field variability in crops.
The Geographic Information System (GIS) was the first precision agriculture tool developed in the 1960s.

Intelligent Devices and Implement (IDI) components were developed in the 1980s, including a Yield Monitor or on-the-go nitrogen tester.

Global Positioning System (GPS) was introduced in the 1990s.

Internet of Things (IoT), Decision Support Systems, & Machine to Machine Communication are some of the advancements in the 2010 & beyond period.
TECHNOLOGY ROAD MAP: PRESENT AND UPCOMING TECHNOLOGIES IN PRECISION FARMING MARKET

Automation & Robotics

- 2010-2015
  - Auto-guidance technology with GPS and reinforced by laser/infrared sensors
  - Variable-rate applications by precise yield maps
  - Automatic machine setting optimization for harvesting and implements

- 2015-2020
  - Machine platoon

Imagery & Sensors

- 2010-2015
  - Aerial imagery (satellite/drone)

- 2015-2020
  - Basic crop condition sensors (optical)
  - Advanced crop condition sensors
  - Soil condition measurement
  - Location yield monitoring
  - On-machine soil condition sensors

- 2020-2025
  - Multifunctionality drones
  - Augmented reality

Big Data & Digitization

- 2010-2015
  - Field yield maps

- 2015-2020
  - Multilayer field maps and data analytics
  - OEM data platforms
  - Open data platforms
### KEY DEVELOPMENTS IN THE PRECISION AGRICULTURE INDUSTRY FROM 2011 TO 2018

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>DEVELOPMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 - 2013</td>
<td>• <strong>Trimble, Inc.</strong> launched a new technology Trimble xFill - technology utilizes the RTK technology delivered through satellites to provide more in-field runtime with fewer interruptions.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Raven Industries</strong> launched environmental sensors in Field Connect, Inc. (U.S.)</td>
</tr>
<tr>
<td></td>
<td>• <strong>Raven Industries</strong> launched the new Slingshot API implementation along with ZedX Inc. (U.S.) - the new product helped in transmitting data wirelessly</td>
</tr>
<tr>
<td></td>
<td>• <strong>AgJunction, Inc.</strong> launched a value-based steering terminal with a broad Global Navigation Satellite System (GNSS) versatility product called Outback STX.</td>
</tr>
<tr>
<td></td>
<td>• <strong>AgJunction, Inc.</strong> developed a series of software enhancements for its flagship terminal, Outback MAX.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Deere &amp; Company</strong> launched environmental sensors in Field Connect, Inc. (U.S.)</td>
</tr>
<tr>
<td></td>
<td>• <strong>Raven Industries</strong> collaborated with <strong>Dow AgroSciences (U.S.)</strong> to work together to develop approaches and technologies to assist farmers in the execution of site-specific applications to improve yields and manage costs.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Deere &amp; Company</strong> collaborated with <strong>Dow AgroSciences, (U.S.)</strong> to work together to develop approaches and technologies</td>
</tr>
<tr>
<td>2014 - 2016</td>
<td>• <strong>Raven Industries</strong> entered into a partnership agreement with AGCO Corporation (U.S.), integrated its precision technology and solution to the machines of AGCO Corporation.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Raven Industries</strong> and <strong>CNH Industrial</strong> (U.K.) have established a new long term agreement</td>
</tr>
<tr>
<td></td>
<td>• <strong>Deere &amp; Company</strong> entered into an agreement with The Climate Corporation (U.S.), to acquire Precision Planting, Inc. (U.S.)</td>
</tr>
</tbody>
</table>
### KEY DEVELOPMENTS IN THE PRECISION AGRICULTURE INDUSTRY FROM 2011 TO 2018

<table>
<thead>
<tr>
<th>PERIOD</th>
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</tr>
</thead>
</table>
| 2014 - 2016| • **AgJunction, Inc.** announced its merger with Novariant, Inc. (U.S.). With this merger, AgJunction, Inc. gained a prominent position in automated steering and machine control technologies, and its ability to deliver application-specific solutions to precision agriculture customers worldwide.  
  • **Deere & Company** acquired **Monosem**, the European market leader in precision planters.  
  • **AGCO Corporation** extends its Grain Storage and Seed Handling Business with the acquisition of Cimbria Holdings Ltd. (Denmark).  
  • **Trimble, Inc.** signed a global distribution agreement with Digi-Key Corporation (U.S.), to offer Trimble’s Mercury 5e Series of embedded ultra-high frequency (UHF) radio-frequency identification (RFID) modules.  
  • **Raven Industries** entered into a partnership with Kinze Manufacturing, Inc. (U.S.) to develop a standalone monitor solution for the Kinze 4900 series planter.  
  • **AgJunction, Inc.** entered into a partnership agreement with Pulse Aerospace (U.S.), a manufacturer, developer, and supplier of advanced Unmanned Aerial Systems (UAS).  
  • **Trimble, Inc.** announced the acquisition of AGRI-TREND (Canada), one of the leading service providers of agrology consulting, precision agriculture, grain marketing, and farm business among others.  
  • **MapShots, Inc. (U.S.)** and Trimble, Inc. announced a partnership that allows all users of MapShots’ signature AgStudio software platform to read as-applied maps and production data from Trimble’s connected farm solution.  
  • **Raven Industries** announced that its Applied Technology division has been named the worldwide exclusive distribution partner for AgEagle Aerial Systems (U.S.)  
  • **AgJunction, Inc.** became a strategic technology partner for TeeJet Technologies (U.S.). Under this partnership, AgJunction, Inc. became the preferred steering supplier for TeeJet’s range of precision agriculture solutions. |
## KEY DEVELOPMENTS IN THE PRECISION AGRICULTURE INDUSTRY FROM 2011 TO 2018

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>DEVELOPMENTS</th>
</tr>
</thead>
</table>
| 2014 - 2016 | • **Trimble, Inc.** acquired AXIO-NET GmbH (Germany), a recognized provider of GNSS services which would help improve technical expertise and advantage of geospatial markets.  
• **Deere & Company** announced a joint development agreement with Scherer Design Engineering, Inc. (U.S.) to develop and commercialize kernel processing solutions for self-propelled forage harvesters.  
• **Trimble, Inc.** launched a new Unmanned Aircraft System (UAS) named ZX5.  
• **AGCO Corporation** launched a new agricultural equipment guidance system.  
• **AGCO Corporation** launched Go-Task, a new mobile application.  
• **Trimble, Inc.** launched the new Trimble remote sensing suite. This new launch provides satellite images for precision agriculture applications.  
• **Deere & Company** launched a new software for operation centers and it allowed farmers or growers to reduce their reliance on desktop software such as Apex and eventually adopt one system for their farm data management needs.  
• **Deere & Company** added an 8-Row Folding Corn Head to its harvesting equipment line. Farmers operating John Deere group 6 and 7 S-Series combines now have the option of using an 8-row Folding Corn Head to harvest their crops.  
• The Outback Guidance division of **AgJunction, Inc.** announced the release of its Multi-Product ISO application control at the Farm Progress show. With Outback’s Multi-Product ISO, five separate application channels could be controlled across a maximum of 50 separate sections.  
• **Trimble, Inc.** launched a new portfolio of wireless Internet of Things (IoT) sensors for water monitoring.  
• **Deere & Company** has upgraded the 800M-Series Tracked Feller Bunchers and 800MH-Series Tracked Harvesters with engines that meet FT4 emission standards. |
<table>
<thead>
<tr>
<th>PERIOD</th>
<th>DEVELOPMENTS</th>
</tr>
</thead>
</table>
| 2017 - 2018 | • **AGCO Corporation** expanded its product offering in the automatic guidance segment. AGCO VarioGuide and Auto-Guide customers using the NovAtel SMART6-L receivers, could use TerraStar satellite correction signals for enhancing positioning performance.  
• **AGCO Corporation** and FarmFacts (Germany) launched a web-based tool through which farmers could view and easily exchange geographical information from multiple manufacturers through single machine terminal.  
• **AGCO Corporation** expanded its product offering with the introduction of wireless blockage and flow monitor from Intelligent Agricultural Solutions (U.S.).  
• Topcon’s Agricultural division introduced X35 touchscreen display with innovative functionality. X35 would allow comprehensive data management capability through the use of its cloud-based technology.  
• **Case IH** updated its precision agriculture offerings through the launch of AccuStar GPS receiver and the Case IH UAV.  
• **Case IH (U.S.),** a subsidiary of CNH Industrial N.V. entered into a collaborative agreement with four cloud-based agronomic decision-making software companies including Encirca services from DuPont Pioneer, My Farm Manager web platform from Decisive Farming, OnSite technologies from AgIntegrated, and AgStudio software from MapShots.  
• **DJI** introduced the new aerial mapping application- Ground Station Pro (GS Pro) for use by DJI aircrafts.  
• **DJI** added Agras MG-1S to its agricultural solutions portfolio. The new product is expected to bring aerial precision to farm operations.  
• **Valley Irrigation** and Trimble (U.S.), entered into a distributor agreement wherein Valley Irrigation would become the OEM (Original Equipment Manufacturers) distributor of Irrigate-IQ precision irrigation solution by Trimble (U.S.).  
• **Ag Leader Technology and New Leader,** a unit of **Highway Equipment Co. (U.S.),** introduced NL5000 G5 Crop Nutrient Applicator in North America. |
EVERYONE DIVES INTO THE PRECISION AGRICULTURE INDUSTRY

MARKET PLAYERS IN THE PRECISION AGRICULTURE ARENA

• Agri-input Companies (Fertilizers, Pesticides, Farm Equipment, and Seed) are racing to capture market share in the burgeoning “smart/precision agriculture" arena

• Companies are investing in new technology developments in the area of smart agriculture through venture capital partnerships

• Acquiring start up companies having new innovations or cutting-edge technologies in the field of smart/precision agriculture

• The companies are partnering with numerous universities, research institutes, and members of the value chain, as well as entering into public private partnerships in order to accelerate the innovations in the field of precision agriculture
## COMPANIES INVESTMENTS IN PRECISION AGRICULTURE - EXAMPLES

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>INVESTOR COMPANY</th>
<th>CATEGORY</th>
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<tbody>
<tr>
<td>Agrible</td>
<td>Archer Daniels Midland Company</td>
<td>Precision Agriculture &amp; Predictive Analytics</td>
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<tr>
<td>Blue Rive Technology</td>
<td>Monsanto Growth Ventures</td>
<td>Robotics and Drones</td>
</tr>
<tr>
<td>Resson</td>
<td>Monsanto Growth Ventures</td>
<td>Robotics and Drones</td>
</tr>
<tr>
<td>PhyTech</td>
<td>Mitsui &amp; Co., Syngenta Ventures</td>
<td>Sensors</td>
</tr>
<tr>
<td>Farmers Edge</td>
<td>Mitsui &amp; Co.</td>
<td>Sensors</td>
</tr>
<tr>
<td>DJI</td>
<td>Dow AgroSciences</td>
<td>Drones</td>
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<tr>
<td>ZedX Inc.</td>
<td>BASF SE</td>
<td>Digital Agriculture Intelligence</td>
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<tr>
<td>proPlant</td>
<td>Bayer AG</td>
<td>Plant Health Diagnostics</td>
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<tr>
<td>Iteris Inc.</td>
<td>Bayer AG</td>
<td>Digital Farming</td>
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<tr>
<td>Blossom</td>
<td>Scott’s Miracle Grow</td>
<td>Sensing &amp; IoT</td>
</tr>
<tr>
<td>Vital Fields</td>
<td>The Climate Corp. (Monsanto)</td>
<td>Sensing &amp; IoT</td>
</tr>
<tr>
<td>Hagie Manufacturing Company Inc.</td>
<td>Deere &amp; Company</td>
<td>Sensing &amp; IoT</td>
</tr>
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</table>
In 2017, Farm technology sector received major funding from the investors (which includes funding for Indigo, Plenty Inc., etc.)

Agriculture biotechnology field received highest funds
COMPANIES RECEIVED FUNDING IN PRECISION AGRICULTURE INDUSTRY – FEW EXAMPLES

Investments in Precision Agriculture

Note: Collected from Press Releases
KEY ENTRANTS IN THE PRECISION AGRICULTURE INDUSTRY

01 360 YIELD CENTER
A revolutionary on-demand nitrate testing system has brought 360 Yield Center into the spotlight.

02 FARMERS EDGE
A global leader in precision agriculture and data management solutions, Farmer’s Edge continues to lead the technological growth in precision agriculture.

03 CROPMETRICS
The Nebraska-based company produces software that helps farmers use water more efficiently and increase crop yields. The software specializes in variable rate irrigation for center pivots.

04 BLUE RIVER TECHNOLOGIES
Blue River Technology is redefining agriculture through their use of robotics. See & Spray is being put to use in cotton fields across the US; instantly recognizing plants that don’t belong in field rows as it passes by.

05 GEOVISUAL ANALYTICS
The company has developed an artificial intelligence-based computer vision technology that it is turning into profitable intelligence for fresh fruit and vegetable producers. Their software uses aerial and satellite imagery as well as crop health monitoring and analytics to predict optimal harvest times and maximum profits.

Other key entrants in the precision agriculture industry include Mavrx, Spensa Technologies, Prospera Technologies, Aglytix, and SST Software.
Precision Agriculture to hold the Largest Size of the Overall Smart Agriculture Market

The increasing adoption of new technologies and advanced devices for precision agriculture is expected to drive the growth of the precision agriculture market.
The smart agriculture market in APAC is in an early stage of adoption life cycle and is expected to grow at a double digit rate between 2017 and 2022.
The precision agriculture market is projected to grow at a CAGR of 13.4% during the period from 2018-2023.

Weather tracking and forecasting application segment is projected to witness highest CAGR growth of 17.6% during 2018-2023.
Precision agriculture market for hardware offerings have accounted for major share in precision agriculture market, 2017

Hardware segment accounted for a major share and within this, Automation Control Systems have accounted for nearly 73% market share and rest by Sensing and Monitoring Devices.

Services segment is projected to witness highest CAGR growth of 17.5% during 2018-2023
The size of the Bubble indicates the Market Size in 2021/22

Studies already covered by MnM

Market Size by 2016 (IN USD MILLIONS)

CAGR (%)
COMPANIES IN THE PRECISION AGRICULTURE INDUSTRY AND COMMON BUSINESS FRAMEWORK
Big data is
• Large
• Diverse
• Complex Longitudinal

Collection & Integration of Data & Knowledge Dissemination of information
Big Data Handling & Analytics

Flow of Information for Better Decision Making

AGRICULTURAL FARM

Variety
Volume
Velocity

AGGREGATORS
As a service

Advisory services for value creation to the farmers
Self use or Sale of data with farmers’ consent

Agri-input Companies
(Pesticides, Seed, Fertilizers, & Equipment)

Agri-output value chain stakeholders
(food processors, traders)

Service/Technology Providers, Knowledge institutes, Agriculture Industry Players Precision Ag. Companies

For R&D to develop new products and also to push its own brands

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PRIVACY & SECURITY PRINCIPLES FOR FARM DATA

• Grower organizations and industry should work to develop programs, which help to create educated customers who understand their rights and responsibilities.

• Farmers own the information generated on their farming operations.

Agriculture Technology Providers (ATP) have also certified their products are compliant with the Ag Data Transparency Evaluator along with the prescribed principles by the American Farm Bureau Federation.

• ATP’s collection, access and use of farm data should be granted only with the affirmative and explicit consent of the farmer. This will be by contract agreements, whether signed or digital.

• ATPs should explain the effects and abilities of a farmer’s decision to opt in, opt out or disable the availability of services and features offered by the ATP.

• Each ATP should provide for the removal, secure destruction and return of original farm data from the farmer’s account upon the request of the farmer or after a pre-agreed period of time.

• ATPs shall notify farmers about the purposes for which they collect and use farm data. They should provide information about how farmers can contact the ATP with any inquiries or complaints, the types of third parties to which they disclose the data and the choices the ATP offers for limiting its use and disclosure.

• Within the context of the agreement and retention policy, farmers should be able to retrieve their data for storage or use in other systems, with the exception of the data that has been made anonymous or aggregated and is no longer specifically identifiable.

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BUSINESS MODEL CASES
Farmer’s Business Network, Inc., founded in 2014, is an independent, farmer-to-farmer e-commerce network. It utilizes data science and machine learning to offer farmers, the insights and analytics about their farms. The technology platform predominantly collects data extracted from farm equipment but also aggregates farmers’ manually recorded data to provide insights on areas such as seed selection, compare productivity, and benchmark field performance over time.

**BUSINESS SEGMENTS AND ASSOCIATED SERVICES**

- **ANALYTICS**
  - Seed & Agronomics Analytics
  - Input Price Transparency
  - Farm & Team Operations
  - Data Integration & Storage
  - Mobile Apps (FBN Ops and FBN Seed Finder)

- **BUY INPUTS**
  - Buy Inputs

- **FINANCING**
  - FBN Direct Products
  - FBN Direct Marketplace
  - Specialty Crop Production Contracts

- **CROP MARKETING**
  - Data & Technology (Personalized Market Data and Dashboards)
  - Grain Marketing & Pricing Contracts
  - Specialty Crop Production Contracts (Exclusive Production Opportunities & Packages)
### FARMER’S BUSINESS NETWORK, INC. COMPETITORS (HAVING SIMILAR LINE OF PRODUCT) –

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>COMPANY BUSINESS OVERVIEW</th>
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</thead>
<tbody>
<tr>
<td>FarmersEdge Inc. (Canada)</td>
<td>Empowering growers and agricultural professionals with Precision Digital Solutions</td>
</tr>
<tr>
<td>Granular, Inc (U.S.)</td>
<td>Managing talent on the farm, risk management, managing inventories, and making profitable decisions with the data</td>
</tr>
<tr>
<td>Farmlogs</td>
<td>Farming software designed to help in executing production and crop marketing decisions</td>
</tr>
<tr>
<td>Crop Logic Ltd. (New Zealand)</td>
<td>Combination of technology and crop science with on-the-ground agronomic expertise, company technology platform helps in improving crop yield and directly addresses the issues growers face in an increasingly challenging global environment.</td>
</tr>
<tr>
<td>Cropio (Cyprus)</td>
<td>The Cropio decision-making tool aims to optimize fertilization and irrigation, and thus reduce the amount of fertilizer and water used. Cropio, combining weather information and satellite data, also makes it possible to monitor crops and yield forecasts. Price varies from $1 to $5 per hectare per annum.</td>
</tr>
<tr>
<td>Airwood (India)</td>
<td>Airwood help farmers, FPOs, aggregators, and agri-entrepreneurs realize the full potential of their farms. They provide software and handhold farmers from sowing to harvest by providing them manpower assistance, technology solutions and insights from farm analytics.</td>
</tr>
<tr>
<td>Cropin Technology Solutions Pvt Ltd (India)</td>
<td>Provides decisive decision-making tools to bring consistency, dependability, and sustainability in agri-businesses.</td>
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</tbody>
</table>
The Standard plan offered by Farmer’s Business Network, Inc., includes Ag tech services such as access to the largest seed performance database, evaluation and comparison of yield by nitrogen application, population, rainfall, hybrids, and many other services. It costs USD 600 a year and the discounts offered are directly proportional to the timespan of plans and cost associated with them.
Farmer's Business Network, Inc. is **comprised of thousand of American farmers** and have **managed over 8 million acres of farms** in just two years since inception. Expansion, acquisition, and raising funds/investments are some of the key strategies being adopted by this company to strengthen its position in Ag-tech industry.

### KEY STRATEGIES

<table>
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<tr>
<th>EXPANSION</th>
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<tr>
<td>• In 2018, Farmer's Business Network, Inc. expanded its services in Canada</td>
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<table>
<thead>
<tr>
<th>ACQUISITION</th>
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<tr>
<td>• In 2018, Farmer's Business Network, Inc. acquired Yorkton distributors in Yorkton, Saskatchewan.</td>
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<table>
<thead>
<tr>
<th>INNOVATION</th>
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<tr>
<td>• In 2018, Farmer's Business Network, Inc. raised USD 110 million led by T. Rowe Price and Temasek. In addition, the Series D round funding brought USD 200 million for this company in the same year.</td>
<td></td>
</tr>
</tbody>
</table>
Farmobile Inc., founded in 2013, offers data management services to the farmers. It utilizes pre-configured passive uplink connection (PUC) device that collects, stores, and processes data from farmers’ machines and this helps to make informed decisions about spraying, harvesting and planting.
The above mentioned plans include services such as real-time farm data, field based activities related to plant, spray, and harvest, farm data video, text notes, inputs related to seed varieties, data sharing capabilities and many more. In pro plan, additional benefits and devices are offered such as universal file transfer, precision planting data, USB cable, harnessing, 6 CAN channels for data collection and many other.
Partnership, offering clients transparency, promotional activities, and raising funds/investments are some of the key strategies being adopted by Farmobile Inc. to expand the business, to enlarge its customer base, and to strengthen its position in Ag-tech industry.

**RAISING FUND**
- In 2017, Farmobile Inc. raised USD 18 million in Series B funding round. The prime investors in this funding include Anterra Capital, AmTrust Agricultural Insurance Services.

**PROMOTION**
- In 2017, Farmobile Inc. announced harvest guarantee promotion. Under this activity farmers were paid USD 1 per acre on yield data when they purchase a subscription of Farmobile.

**PARTNERSHIP**
- In 2016, Farmobile Inc. partnered with Grower Information Services Cooperative (GiSC). This partnership expanded Farmobile’s access to numerous number of farmers as GiSC owns the membership spanning 38 states in US.

**TRANSPARENCY**
- In 2016, Farmobile Inc. initiated pro-farmer legal agreements that clearly govern the ownership and control of agronomic data. This agreement grant full data ownership to the farmer.
BUSINESS CASE – 2 : cont....

FARMOBILE, INC. COMPETITORS (HAVING SIMILAR LINE OF PRODUCT) –

<table>
<thead>
<tr>
<th>COMPANY</th>
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</thead>
<tbody>
<tr>
<td>CoolFarm</td>
<td>Flexible, integrated, intuitive, and intelligent solutions to achieve maximum efficiency, quality, and profitability in indoor farming.</td>
</tr>
<tr>
<td>FarmLogs</td>
<td>Farming software designed to help in executing production and crop marketing decisions</td>
</tr>
<tr>
<td>Climate FieldView</td>
<td>Data partner to collect, store, and visualize critical field data, monitor, and measure the impact of farmer agronomic decisions on crop performance, and manage their field variability by building customized fertility and seeding plans for fields to optimize yield and maximize profit.</td>
</tr>
<tr>
<td>Conservis Corporation</td>
<td>The Company’s cloud-based platform offers business-oriented farms service-centric software to track field activities, manage resources, and make better decisions.</td>
</tr>
<tr>
<td>FieldIn</td>
<td>FieldIn is an end-to-end pest management software solution for professional growers of specialty crops.</td>
</tr>
</tbody>
</table>
Founded in 1996, Ag-Analytics company offers digital agriculture analytics. It utilizes strategic tools such as crop insurance estimator and forecasting tools. Ag-Analytics provide real-time yield and risk-management forecasts that allow farmers to devise best possible strategy based on their fields, for different types of insurance, at any point in the season. Moreover, Ag-Analytics works in conjunction with John Deere Operations Center and Cornell University in order to provide its clients with the optimum utilization of their agriculture data.

Ag-analytics Integrating, John Deere Operations Center And Cornell University

- Aid farmers to securely use their high-resolution agriculture data in real time to extract more useful operations insights
- It is a private research university
- Securely integrates the farmer’s precision agriculture data to extract deeper intelligence
How Ag-analytics Business Model Works -

**AG-ANALYTICS**
- Offers variety of insurance and forecasting tools that aid farmers to make better strategic decisions

**CORNELL UNIVERSITY**
- Utilize the farmers data for R&D Purpose
- Provides valuable inputs to farmers derived form R&D operations
- Ensures that the ownership of the data retains with farmers

**JOHN DEERE OPERATIONS CENTER**
- Allow farmers to securely use their data in real time
- Integrates and analyze farmers data and provide useful operations information

Through Ag-Analytics.org, farmers integrate their data with the John Deere Operations Center

Valuable inputs from R&D

Farmer's agriculture data for R&D
CHALLENGES THAT REMAIN

• WHAT IS THE MOST EFFICIENT PATH TO MARKET?
• CONVINCING EVERYONE THAT QUALITY IS MORE IMPORTANT THAN QUANTITY WHEN IT COMES TO DATA?
  • AND THE COLLORARY: IS ACRES IN USE MORE IMPORTANT THAN PAID ACRES?
• WHO OWNS THE DATA AND WILL YOU PAY ME FOR IT?
• WHO WILL BE LEFT STANDING WHEN THE DUST SETTLES?
EVALUATION OF PRECISION AG BUSINESS MODELS AND ADOPTION RATES

SCOPE OF THE STUDY

- To study & evaluate the top 10 key players business models in precision agriculture
- To suggest on best suitable business model in the field of precision agriculture

PRECISION AGRICULTURE COMPANY BUSINESS MODEL

Value Proposition
Customer Segments
Customer Channels
Cost Structure

EVALUATION AND ANALYSIS OF COMPONENTS ASSOCIATED WITH THE BUSINESS MODEL

Customer Relationship
USPS
Key Partnerships
Revenue Streams

Other success factors gauged in the business model study would include:

- Strategic Focus
- People Management
- Process Operations
- Marketing Analysis
- Key Financials

Timeline: 14-15 Weeks
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