

Precision Agriculture and the OEM

The quest to produce more with less

Guelph, Ontario
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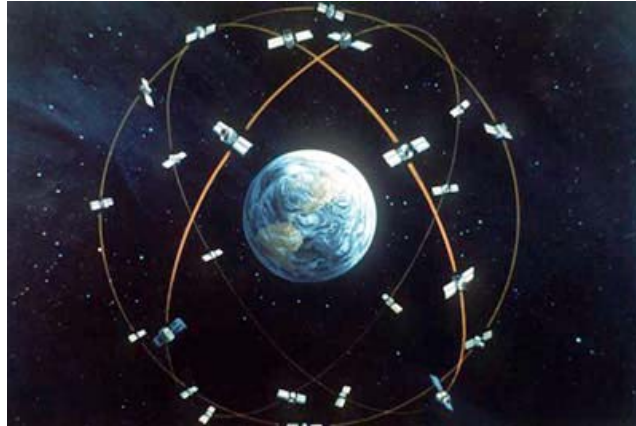
Working Together on the Issues



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What is Precision Agriculture?

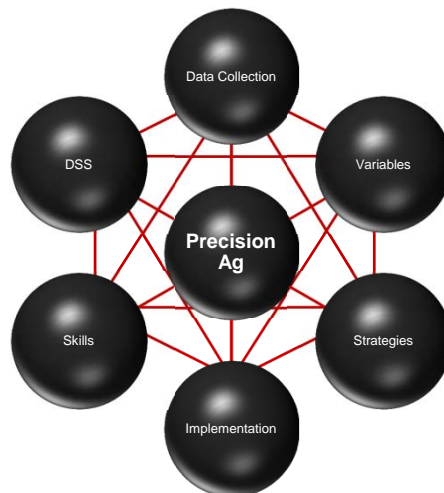


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A few of the issues that make up the process



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Why is it important?

INCREASING CROP YIELDS

90%
of all crops losses are due to weather.
Weather related crop damage could be reduced by 25% using predictive weather modeling and precision agriculture techniques.

PRECISION AGRICULTURE
IBM is using data to help farmers be more efficient in their operations and make more precise decisions about planting, growing, harvesting and transporting crops, leading to better price points and a stable supply chain.

WEATHER MODELING
YIKES!!!

DEEP THUNDER
IBM's Deep Thunder is a service that provides a hyperlocal forecast up to 36 hours in advance with 90% accuracy.

SENSORS

GROWING
70%
of fresh water worldwide is used for agriculture purposes.
If farmers know when and where it's going to rain they can better schedule their irrigation and know when they should put down fertilizer to avoid run off.

FEEDING FUTURE GENERATIONS

How weather affects agriculture and what IBM can do with precision weather forecasts to help farmers

TRANSPORTATION
50%
of food ready for harvest never reaches the consumers mouth.
By understanding the effect of weather on transportation networks, companies can make better decisions on which routes will be the fastest to transport their food.

THE IMPACT
As farmers reduce waste and increase crop yields, consumers will feel the positive economic impact at the grocery store.

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Environmental Performance and Economic Performance are driven by the same goal:

Maximize the output per unit of input

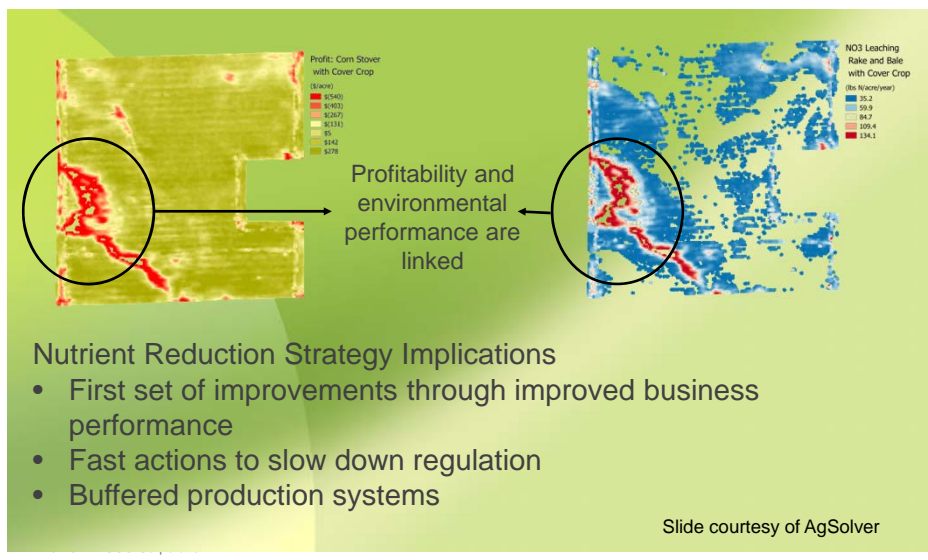
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Precision Business Planning Workflow – Opportunity Ratio Business Planning



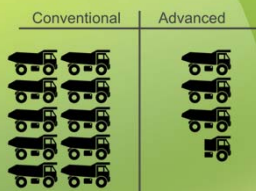
Conservation Planning: Financial and Environmental Benefits



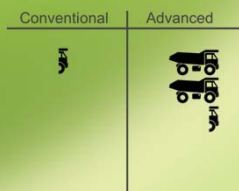
Adding Context to Environmental Performance Impacts

	Conventional Management	Advanced Management
Annual Soil Loss (tons of soil)	204	69
Annual Soil Carbon Change (lbs C)	8,137	44,341
Annual Nitrate Loss (lbs NO3)	7,779	3,442
Annual CO2 Loss (lbs CO2)	751,311	717,169

Soil Erosion



Soil Carbon

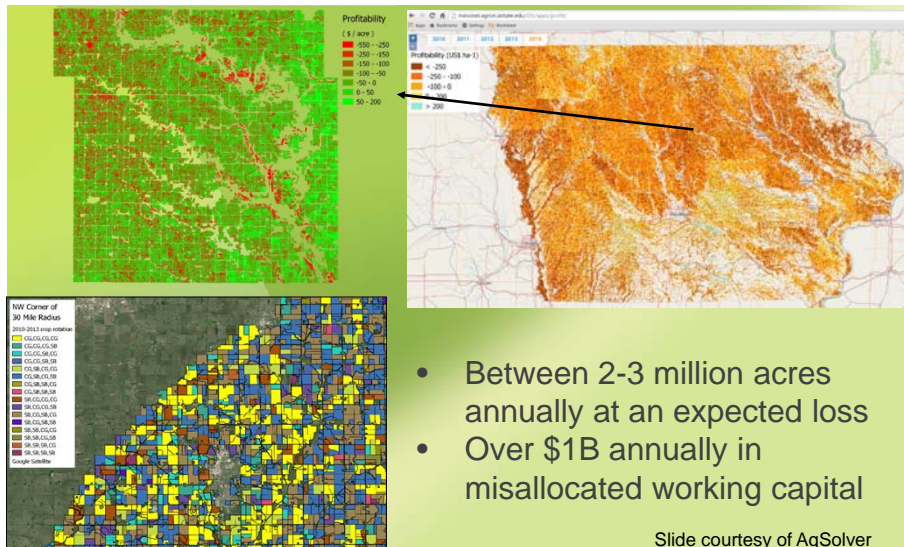


CO₂ Gas Flux



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Identifying the Opportunities

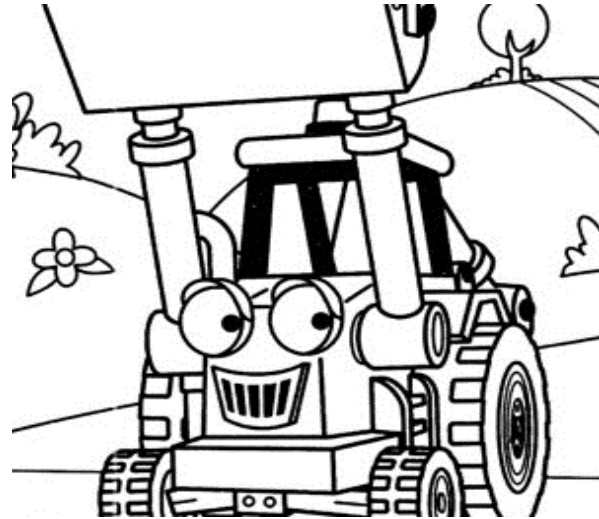


- Between 2-3 million acres annually at an expected loss
- Over \$1B annually in misallocated working capital

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However, What does an OEM think?



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Scope of Work for corn stover baling project

- Cover the 41 AGCO balers and ancillary equipment:
 - field managerial support
 - operator training
 - training on preventative maintenance
 - training on daily maintenance actions
 - field operator training to maximize **Efficiency and Up Time**
- Monitor Equipment:
 - conditions on a daily basis
 - operations and make daily adjustments
 - conditions, advise and schedule heavy repairs during downtime
- Schedule:
 - light repairs performed in field immediately
 - heavy repairs at closest dealer location
 - repairs during downtime when possible
- Provide:
 - reports on operator efficiency and abilities
 - operator rankings

**41 flail shredders; 20 pulled bale collectors;
105 tractors
200+ pieces of equipment**

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Goals of the Project

Production in 2012 set the base line

Increase the following

- In-field availability
 - Goal for 2013 = increase by 14% YoY
- Productivity
 - Goal for 2013 = increase by 20% YoY
- Make better bales
 - Ash content
Goal for 2013 = Reduce by 6.3%
 - Density (moisture free & ash free) –
Goal for 2013 = Increase 5%



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2013 Actuals – Baled 86,000 tons or ~135,000 bales

- In-field availability for 15 crews increased an average of 85.7% not including roading
- Bales per productive hour increased 60%
- Ash content averaged was reduced 1%
- Density was increase by 4.59%

**All matrices improved YOY
Proves that the economics can work and are sustainable!!!**



2014 Actuals – Baled 88,000 tons or ~138,000 bales

Additional gains in 2014 over 2013 were:

- In-field availability for 15 crews increased an additional 18% not including roading
- Productivity reached an additional 60%
- Ash content was reduced another 1%
- Density was increased an additional 5.7%

YOY continued to improve and be impressive



What is Required in a Commercial Logistics Management Solution?

- Direct and actionable knowledge on daily fleet performance and targeted service and coaching opportunities.
 - Visual indicators for rapid analysis.
 - Daily, weekly, and seasonal reports for decisions management.
 - Instantaneous reporting for service providers.
- Direct integration of supply chain business rules.
 - Absolutely must report results in units that match the business cost targets.
 - Must be **brand independent**. Single technology package should provide knowledge across windrowing, baling, stacking, and trucking.
- Telematics data systems allow industrial feedstock managers to:
 - Compare cost of unique harvest teams and incentive strong performance.
 - Make targeted process improvements and certify performance gains.



What does this type of improvement mean?

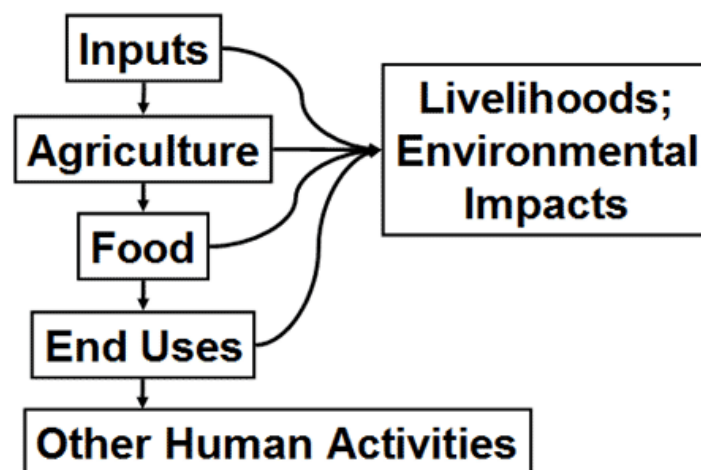
- Between 2010 and 2014 bale density was increased by 26.6%
- That means the project will handle 26.6% fewer bales

This results in a direct savings to the project through a better operating plan



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Working Together Creating a System



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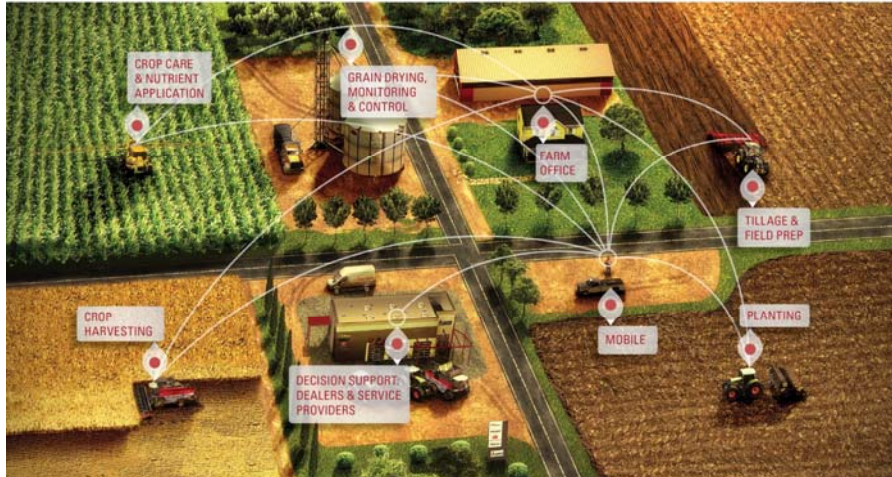
Data – Decisions – Definitions

- Agriculture Technology Providers – ATPs should get together and provide a framework of principles to help guide the development of the industry; growers are not always sure what happens to their data when it is collected
 - **Education** – Grower education will provide clarity and transparency among the parties; growers should be intimately involved in the development of this market and its tools;
 - **Ownership** – We believe the farmer owns the data that is generated on his or her farm but we also believe it is incumbent on the farmer to agree on data use and sharing with other stakeholders;
 - **Collection, Access and Control** – An ATP's collections, access and use of farm data can only occur with the explicit agreement of the farmer; whether in writing or digitally;
 - **Notice** – Farmers must be notified that their data is being collected and the notice should be conspicuous;
 - **Transparency and Consistency** – ATPs shall notify farmers about the purposes for which they collect and use farm data.
 - How will complaints be handles?
 - Who will the farmers data be disclosed to?
 - How will its use be limited
 - An ATP's principles, policies and practices should be transparent and fully consistent with the terms and conditions in their legal contracts. An ATP will not change the customer's contract without his or her agreement.

Wait there's more

- **Choice** – The farmer has to understand and be able to opt in, opt out or disable the system and what those choices mean;
- **Portability** – Farmers should be able to retrieve their data for storage and use in other systems;
- **Terms and Definitions** – With whom are the farmers contracting and does it involve partners, third parties, other ATPs, affiliates; and others;
- **Other terms:**
 - **Disclosure , Use and Sale**
 - **Data Retention and Availability**
 - **Contract Termination**
 - **Unlawful or Anti-Competitive Practices**
 - **Liability and Security Safeguards**

When It's Finished



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Fuse Technologies

AGCO's next-generation approach to precision farming

Always running... optimized

Connecting the crop cycle... seamlessly

Right place, right time... coordinated

Enabling value-added services

What makes AGCO's approach different?

Connecting the mixed fleet

Mobile functionality & logistics

Respecting your data choices

Pioneering the open approach

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