# Economic Benefit of Precision Agriculture

John Deere Intelligent Solutions Group | August 2012

# Feeding a Growing Population

Enables those who feed the world.

Immediate and Ongoing Needs

+ population growth (more to feed)
+ urbanization (decrease in arable land)

Double food production by 2050 to meet world demand.

To meet this need – every inch matters.

# GPS Enabled Precision

**Increases:**

Yield

Efficiency

Productivity

Safety

**Decreases:**

Environmental Impact

Inputs

Costs

Theft

# Precision Seeding

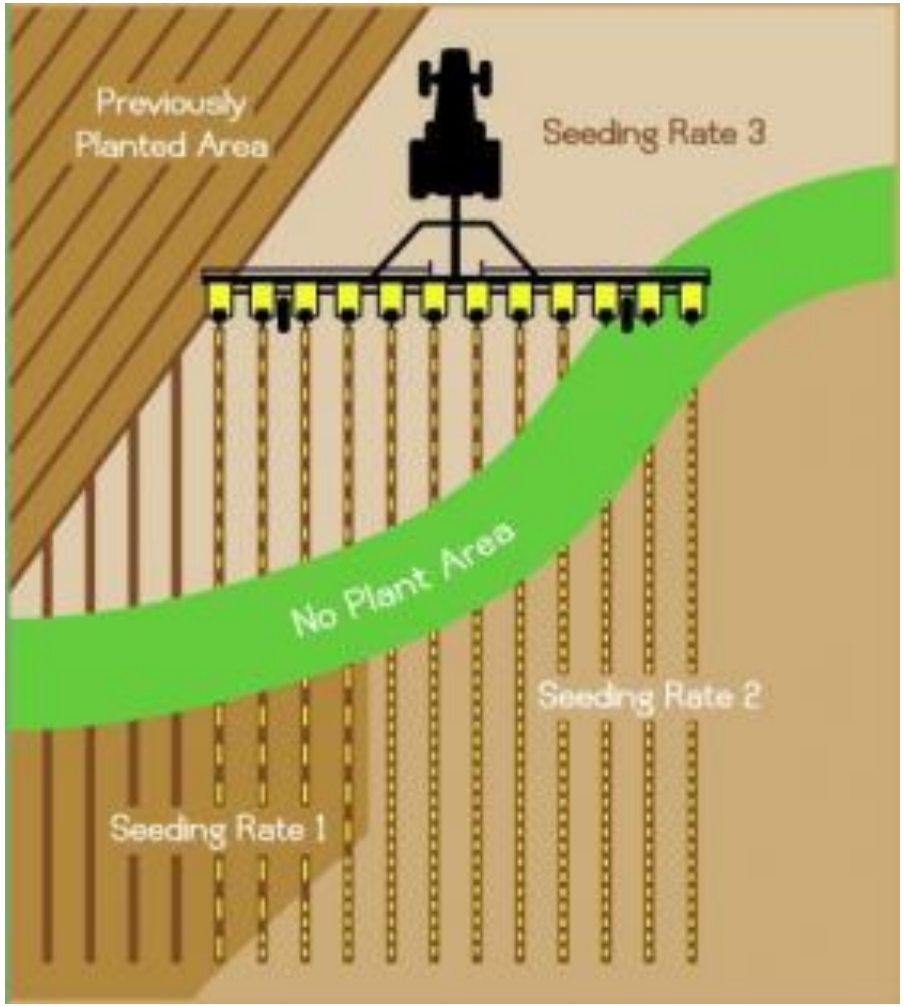


Image Source: http://farmindustrynews.com/site-files/farmindustrynews.com/files/imagecache/galleryformatter_slide_penton/gallery_images/web07RAVNplantcontrolillus.jpg

# GPS Enabled Precision Ag

Field Planted without Swath Control

Field Planted with Swath Control Pro™

# GPS Enabled Precision




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# GPS Enabled Precision Ag

**Overlap used to be measured in feet.**

**With precision GPS, overlap is now measured in inches.**

# GPS Enables Operator Efficiency

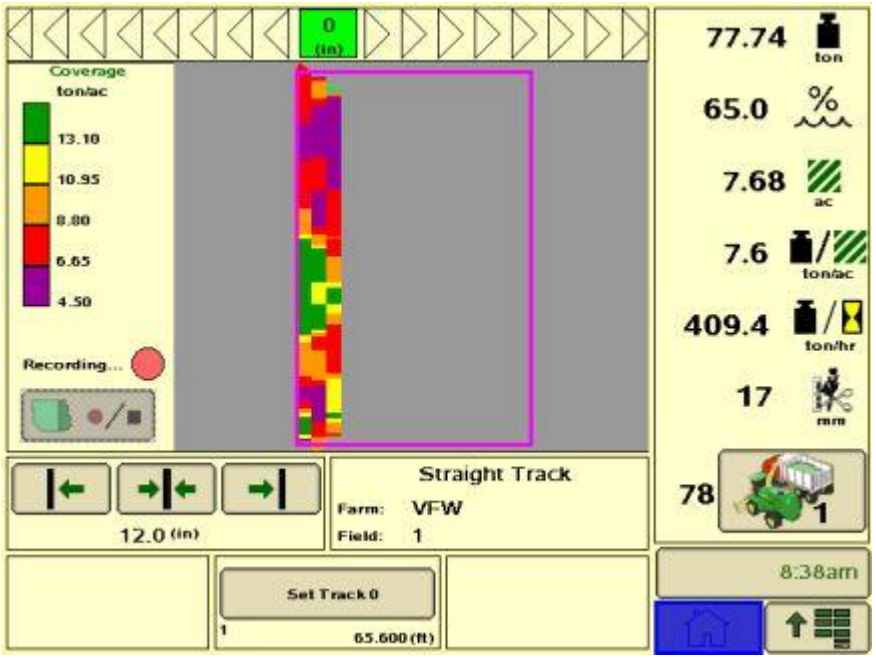
**Decreases Fatigue**

**Increases Health & Safety**

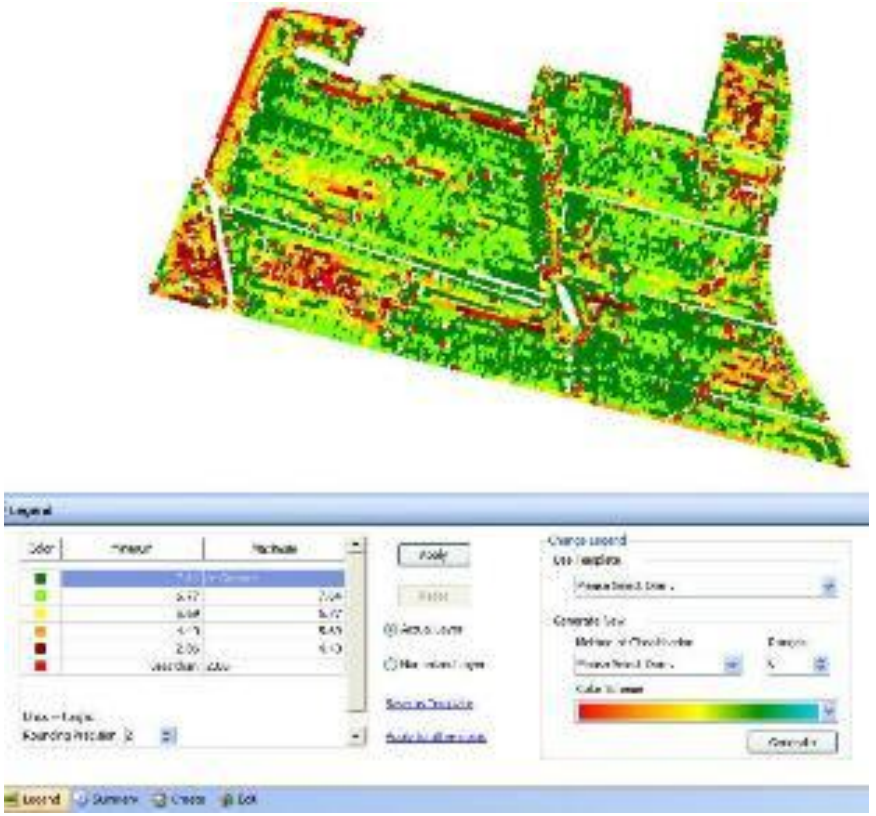
**Enables Night-time Operation**

# Water Optimization & Precise Planting

# Precision Enabled Decision Making




**Record and Adjust While Operating**



**Actionable Information for Analysis and Decision Making.**



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# Improved Agricultural Productivity

## Yield Mapping – used by 80% of grain combine customers in US

- Provides insight for precise seed placement, pesticides and fertilizers

## Auto Guidance – used by 65% of the large agriculture producers in US

- Reduced errors in overlap of tillage, seeding and spraying
- Reduced operator fatigue
- Opportunity to use local unskilled operators

## Improved Output

- Reduced overlap = fewer passes through the field
- Less compaction implies higher yield
- Less tillage required – less fuel, less carbon release and lower food cost

## Future Gains

- Additional advancements needed to feed a growing population

# Specific Input Cost Savings

- **Annual Cost impact: $8.2 billion**
  - Reduced chemical and fertilizer: $4.8 B
  - Reduced seed costs: $1.5 B
  - Reduced fuel consumption $0.5B
  - Labor savings $1.4 B
- **Other Cost impacts**
  - Operation in darkness, fog and high winds
  - Optimal planting time can result in difference of 1% yield per day

# Improved Environmental Impact

## Reduced  pesticide and fertilizer usage

- GPS has saved between 7% to 10% (17.5 to 25 million acres) annually from receiving unneeded pesticide and fertilizer applications.

## USDA data shows technology impact on corn production—compared to 1987 *(Impossible without GPS)*

- Land required to produce a bushel of corn reduced by 37%
- Precision tillage has reduced soil loss by 69%
- Energy required for production reduced by 37%
- Carbon emissions reduced by 30% per bushel

# Summary – Two Examples

## Jonathan Andrews – Central California

- Use of auto guidance annually saves approximately:
  - $12,500 in seed
  - $25,000 in fertilizer
  - $5,000 in fuel
  - Can work in heavy fog which is often present

## Kip Tom – Leesburg Indiana

- Saves over $180,000 per year using GPS technology
- Ascribes 11 bushels per acre of increased yield from use of yield mapping and variable rate seeding.
- Increased total yield amounts to 190,400 bushels with a value of more than $1 million in today's prices

# Summary of Economic Benefit of GPS in Ag

Minimum of $8.2 billion annual input savings

Minimum of $6 billion annually in improved yield

Total of savings and yield improvement of over 14 billion annually

Also saves over-application of pesticides and fertilizer on 17.5 to 25 million acres of land per year.

# GPS Economic Benefit to Agriculture

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