



ADOPTION OF PRECISION AGRICULTURE IN THE TABER IRRIGATION DISTRICT

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PRESENTATION OUTLINE

- Study design and implementation
- Findings
- Implications

STUDY DESIGN AND IMPLEMENTATION

- Received funding from the Alberta Real Estate Foundation
- Started working with Chris Gallagher and the TID Board of Directors
 - Jointly worked on survey design and content
- Survey was loaded onto Qualtrics platform
- Live link to the survey was established
- Invitation to participate in the survey sent by e-mail and text messaging October 9, reminder about 3 weeks later
- Survey link was posted on TID's homepage
- Survey available from October 9 to November 13

OBJECTIVES OF THE STUDY

- **Adoption:**

- Extent
- Types of technologies
- Satisfaction
- Motivations to adopt
- What type of land and crops applied to
- Future adoption intentions
- Farm and personal characteristics of adopters

- **Non-adoption:**

- Extent
- Reasons for non-adoption
- Future adoption plans
- Motivations to adopt in the future
- Farm and personal characteristics of non-adopters

CATEGORIES OF TECHNOLOGIES

BASIC

1. Auto steer technology
2. Yield mapping
3. Soil moisture monitoring
4. Weather monitoring
5. Variable rate fertilizer application
6. Variable rate irrigation application
7. GPS soil sampling
8. Developing management zones

SOIL MAPPING TECHNIQUES

1. Terrain mapping/analysis
2. Spatial variability of available water-holding capacity
3. Electric conductivity mapping
4. Satellite imagery
5. Unmanned aerial vehicle mapping
6. Establishing field boundaries/low spots/unfarmable land

DATA MANAGEMENT

1. Studying/analyzing yield data
2. Using hydrological modeling and forecasting to predict soil moisture status
3. Developing dynamic water management zones
4. Using precision agriculture data management software or services
5. Using precision agriculture technology for records and analysis
6. Using precision agriculture for on-farm research

RESULTS

- 32 irrigators participated in the survey (represents 27%)
- 81% adopted some form of precision agriculture technologies
 - 75% one or more basic technologies
 - 50% one or more soil mapping technologies
 - 44% one or more data management technologies

ON AVERAGE, ADOPTERS HAVE IMPLEMENTED **FIVE** TECHNOLOGIES

Most common:

- Auto-steer technology 85%
- Studying/analysing yield data 50%
- Using weather monitoring technology 50%
- Using satellite imagery 38%
- Using GPS soil sampling 35%

EFFECTS (ANNUAL AVERAGES)

- Increase in crop yield 20%
- Increase in crop quality 16%
- Reduction in irrigation water 24%
- Reduction in fertilizer 21%
- Reduction in herbicides 14%
- Reduction in pesticides 19%

MOTIVES DRIVING ADOPTION

(RATING OF 4 OR 5 ON A SCALE OF 5)

- Reduce energy costs 77%
- Increase annual crop yield 62%
- Reduce machine time 58%
- Increase annual crop quality 57%
- Reduce annual irrigation water 54%
- Reduce labor hours 50%
- Reduce annual fertilizer 50%
- Manage environmental impacts 46%

EFFECTS ON FARM MANAGEMENT APPROACH

- Overall farm management 85%
- Fertilizer strategy, method and/or depth 71%
- Quality of seed 58%
- Amount and type of soil moisture testing 54%
- Amount and type of soil nutrient testing 46%



- **Satisfaction** with the technologies?

- 89% were highly satisfied

- **Future adoption** intentions?

- 92% plan additional adoptions within the next five years

LAND AND CROP CHARACTERISTICS

- Land:
 - 92% irrigated land
 - 8% dryland
- Crops which most benefit:
 - 84% speciality crops
 - Sugar beets
 - Potatoes
 - Canola seed
 - Corn
 - 7% cereals
 - 7% soil seeds
 - 0% forages

NON-ADOPTERS

- Reasons for not adopting:
 - Their operation is too small 32%
 - High investment costs 28%
 - Incompatibility of machines 12%
 - Techniques are too complicated or complex 12%
 - High time requirements 8%
 - Too many unknowns regarding the technology 4%
 - Lack of advisory services 4%

CHARACTERISTICS OF ADOPTERS VERSUS NON-ADOPTERS

Adopters are generally:

- younger
- have spent less years making farm management decisions
- have larger farm size
- higher number of persons working on the farm
- have somewhat higher levels of formal education

SUMMARY

- Precision agriculture technologies:
 - Are being adopted
 - Are being applied primarily to speciality crops
 - Are resulting in favourable effects on crop yield and quality
 - Are reducing inputs of irrigation water, fertilizer, herbicides and pesticides
 - Will continue to be adopted in the future

IMPLICATIONS OF PRECISION AGRICULTURE

Adopters should be experiencing:

- Positive economic effects on farms which leads to:
 - Positive effects on communities that depend on irrigation
 - Positive effects on the environment due to reduced inputs

Non-adopters:

Economics are preventing adoption – small farm size and cost of tech

- These farm sizes may become bigger?
- Cost of precision agriculture technologies may come down?
- Access programs to assist with costs?



Thank you!