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Economic Analysis and Utilization of Sustainable Row Strips

Aaron DuMez

Iowa State University, adumez@iastate.edu

Aaron Gernetzke

Iowa State University, akg@iastate.edu

Jason Krueger

Iowa State University, jkrueger@iastate.edu

Kaleb Schott

Iowa State University, ktschott@iastate.edu

Joseph R. Vanstrom

Iowa State University, vanstrom@iastate.edu

See next page for additional authors

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Economic Analysis and Utilization of Sustainable Row Strips

Problem Statement

Cedar Valley Innovation - owned by Mr. Bob Recker seeks to find a sustainable way to utilize increased sunlight of skipped rows to establish cover or companion crops. This system has been used previously as well in drought prone areas in Nebraska to maximize what little rainfall occurs. Wide acceptance and use by farmers is a concern. Increased management and changes to their current their current practices would be difficult for some operations.

Disciplines

Bioresource and Agricultural Engineering | Industrial Technology

Authors

Aaron DuMez, Aaron Gernetzke, Jason Krueger, Kaleb Schott, Joseph R. Vanstrom, and Jacek A. Koziel

IOWA STATE UNIVERSITY

Department of Agricultural and Biosystems Engineering (ABE)

TSM 416 Technology Capstone Project

Economic Analysis and Utilization of Sustainable Row Strips

Aaron DuMez^a, Aaron Gernetzke^b, Jason Krueger^c, Kaleb Schott^d, Joseph R. Vanstrom^{e*} & Jacek A. Koziel^{f*}

^a Agricultural Systems Technology, ABE, ISU, adumez@iastate.edu

^b Agricultural Systems Technology, ABE, ISU, akg@iastate.edu

^c Agricultural Systems Technology, ABE, ISU, jkrueger@iastate.edu

^d Agricultural Systems Technology, ABE, ISU, ktschott@iastate.edu

^e Dept. of Agricultural and Biosystems Engineering, ISU, 2321 Elings Hall, Ames, IA 50011, vanstrom@iastate.edu, 515-294-9955

^f Dept. of Agricultural and Biosystems Engineering, ISU, 4350 Elings Hall, Ames, IA 50011, koziel@iastate.edu, 515-294-4206

*course instructors and corresponding authors.

Client: Cedar Valley Innovation, LLC, 116 W Schrock Rd, Waterloo, Iowa, 50701, cedarvalleyinnovation.com

- Contact(s): Mr. Bob Recker, President/Owner, cedarvalleyinnovation@gmail.com, 319-240-2200

Problem Statement

Current row crop practices allow very limited use of cover crops and companion crops to grow alongside existing corn or soybeans.

Cedar Valley Innovation - owned by Mr. Bob Recker seeks to find a sustainable way to utilize increased sunlight of skipped rows to establish cover or companion crops.

- This system has been used previously as well in drought prone areas in Nebraska to maximize what little rainfall occurs.
- Wide acceptance and use by farmers is a concern. Increased management and changes to their current their current practices would be difficult for some operations.

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Business Case Statement - Skipping rows throughout the field allows increased sunlight to maintain corn plant yields while using this open space to establish cover or companion crops to help improve soil health, manage runoff, erosion and other positive agronomic factors.

- A. Research shows there may be row crop system benefits from leaving larger than normal row spacing, leading to the question, how does one most effectively use the skipped rows?**
- B. Growers looking to implement these progressive cropping systems will want to utilize all field space. A proper use of this empty field space is necessary**
- C. In skipped rows left unplanted, issues such as increased weed pressure, increased soil loss, and wasted sunlight energy are all present.**
- D. Issues mentioned above may arise if a crop is not planted in the skipped rows. There is opportunity for economic benefit to planting cover and/or companion crop in these skipped rows.**
- E. Growers that plant according to this skipped row cropping system should have a plan on how to utilize the skipped space.**

1 GOAL STATEMENT

The goal of this project was to analyze a cover/companion crop plan that will most effectively use the space that is unplanted when implementing CVI's skipped row cropping plan. Three main areas of consideration used in determining the ideal companion/cover crop will include; economics of the crop, soil health benefits, and compatibility with current crop protection programs.

Main Objective(s) and Specific Objectives

The main objective is to develop a cover crop or companion crop recommendation to use in open spaces left by skipped rows.

Specific objectives include:

- Considerations of various crops that would be good candidates to use as a cover or companion without affecting performance of existing crop.**
- Utilization of companion or cover crop that does not take away nutrients from existing crop; therefore, impacting yield and grower bottom line.**
- Rationale**
 - With the proper cover/companion crop recommendation, the grower implementing the skipped row cropping system will be able to positively influence yield, build soil health, and reduce weed pressures.**

2 PROJECT PLAN/OUTLINE

A. Methods/Approach

- Reference Material(s)**

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- Prior crop protection and fertility records from CVI
- University crop databases and studies
- Agronomy professionals
- **Data collection:**
 - Previous field data from CVI was analyzed¹
 - Alternative crop information was gathered from online resources and other university research data, most likely university research data^{2,5,6}
 - Costs were determined from extension documents and industry literature^{7,8,9}
- **Skills:**
 - Previous agronomic knowledge gained from group members farm and internship experience was applied
 - Beneficial classes included TSM 433, AGRON 212, 154, 354, etc....
- **Solutions:**
 - Solutions (crops) were analyzed in an economic analysis spreadsheet
 - Input for the analysis tool came from research, historical data, and industry professionals
 - Final results will not be available until a crop has been selected and planted into a CVI strip crop trial
- **Organization:**
 - Weekly meetings between the team members were used to discuss progress of the project and future business
 - Mr. Recker was informed of progress and findings periodically
 - Major milestones
 - Cover/companion crop data compilation
 - Compilation of current/desired crop protection and fertility program
 - Input costs determined
 - Opportunity costs estimated
 - Economic analysis spreadsheet developed from all data and costs

B. Results/Deliverables

- Main deliverable is the economic analysis spreadsheet
- Spreadsheet is editable by future users to tailor input costs and benefits to their estimates
- Future users will be able to use the tool to estimate companion/cover crop benefits in their own applications

C. Timeline

Research and Define Goals	11/17/2017
Recommendations for Cover/Companion Crop Use in Future Plots	3/30/2018
Review Findings	4/13/2018
Final Presentations and Recommendations	4/20/2018

3 BROADER OPPORTUNITY STATEMENT

This project is focused mostly towards farmers and growers understanding what cover/companion crops planted into 60" rows can do for them economically. By using our group's economic analysis tool, the farmer/grower can estimate the potential economic returns when planting cover/companion crops within their 60" row trials.

4 PROJECT SCOPE

This plan involved developing a cover/companion crop analysis tool to assist in cover/companion crop selection so that every inch of field space can be utilized in a skipped row field layout. The purpose of this project is not to analyze the performance of the corn from past skipped row trials and determine if this is a viable practice for the future. This project's focus is on looking at potential crops that will provide a mutualistic relationship between the crop and existing corn, while being economically sensible.

5 GRAPHICAL ABSTRACT



6 REFERENCES

¹ Chandler Bane, Mitchell Hora, Gabe Lorack, Nick Lane, Joseph R. Vanstrom and Jacek A. Koziel. Harvest the Sun, Build the Soil. Final Report. TSM 416 Technology Capstone Project, April 28, 2017.

² Clark, Andy. Managing Cover Crops Profitably. 3rd ed., SARE, 2010.

³ Drewnoski, Mary. "Consider Oats and Turnips for Fall Grazing." Drovers, 1 July 2014.

⁴ "Gandy Cover Crop Seeders." Gandy Cover Crop Seeders | Gandy, www.gandy.net/product-categories/cover-crop-seeders.

⁵ Licht, Mark, et al. "Iowa Learning Farms Emerging Farmer Workshop." Using Cover Crops and Conservation Practices In Successful Business Planning. 6 Mar. 2018, Ames, Iowa, Iowa State University.

⁶ "Midwest Cover Crops Council - Cover Crop Decision Tool." Midwest Cover Crops Council, <http://mccc.msu.edu/selector-tool/>

⁷ 2017 Approximate Retail Price (\$) Per Unit of Selected Herbicides for Field Crops. University of Nebraska-Lincoln Extension, 9 Feb. 2017.

⁸ Plastina, Alejandro. "Estimated Costs of Crop Production in Iowa - 2018." Ag Decision Maker, Iowa State University Extension, Jan. 2018.

⁹ Welter Seed & Honey Co. 2018 Seed Guide.

7 APPENDIXES

Cover/Companion Crop Analysis Tool Excel Spreadsheet

- Access at <http://cedarvalleyinnovation.com/>

Analysis Tool YouTube Video Tutorial

- Watch at https://youtu.be/GR_mL8l8wfc

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