Understanding Research Priorities and Criteria Affecting Decisions for Cotton Production in the United States: A Content Analysis

Madalynn Kainer
2116 TAMU
College Station, Texas 77843
979-458-2304
madalynnkainer@tamu.edu

Holli Leggette, Ph.D.
2116 TAMU
College Station, Texas 77843
979-458-3039
holli.leggette@ag.tamu.edu

Thomas Chappell, Ph.D.
2132 TAMU
College Station, Texas 77843
tom_chappell@tamu.edu

Jean Parrella, M.S.
2116 TAMU
College Station, Texas 77843
jparrella@tamu.edu

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Introduction/Theoretical Framework

Cotton producers, along with many others in production agriculture, are faced with a multitude of daily decisions that impact their bottom line (Drysdale et al., 2010), from choosing specific fertilizer blends to purchasing additional land. Advancements in precision agriculture (e.g., GPS and variable rate technology; Bhakta et al., 2019) offer producers assistance in making management decisions. Due to challenges faced outside of the operation, like climate, trade and market variability, producers seek information and support about "diverse and complex" decisions about their operation (Drysdale et al., 2010, p. 115). Such support is often provided by county Extension agents or state Extension specialists.

Our approach considered Drysdale et al.'s (2010) Levels of Decision Making Framework. The framework "describe[s] and categorise[s] the types of farm management decisions made by farmers, and create[s] a platform upon which to plan extension delivery" (p. 117). Level one, *Product Choice Decisions*, is typically includes product development. Level two, *Farm System Components*, focuses on a single component. Level three, *Sub-System Decisions*, focuses on the interactions between components to improve profitability. Level four, *Whole Farm System Decisions*, involves a change to the resource base of the farm. Last, level five, *Beyond Farm Decisions*, involves areas typically not addressed by Extension professionals, including investments. Specifically, we used the framework to identify and understand areas of decision making in cotton production.

Purpose and Objectives

This content analysis was conducted to better understand decision-making factors in cotton production to create a decision support tool. This research aligns with Research Priority Area 2: New Technologies, Practices, and Products Adoption Decisions from the American Association of Agricultural Educators National Research Agenda (2016–2020). Two objectives guided the study: 1) Identify themes and subthemes in conference proceedings to determine what decisions cotton producers make; and 2) Determine the university, Extension and private-sector research priorities as they relate to cotton producers' decision-making during production.

Method

We conducted a qualitative content analysis to understand what decisions cotton farmers make based on university, Extension and private-sector research. Qualitative content analyses can be defined as "a method for systematically describing the meaning of qualitative material. It is done by classifying material as instances of the categories of a coding frame" (Schreier, 2012, p. 1). The population for this study included 652 conference proceedings from the Beltwide Cotton Conferences from 2018–2020. Because the conference proceedings were treated as the sample and not used in the literature review, all proceedings were coded for confidentiality. We analyzed the 652 conference proceedings by reading the title and abstract of each to interpret its research focus. All of the conference proceedings were included in the content analysis—

exclusions were made (n = 127) while analyzing the data. Exclusions included proceedings not about cotton or research that took place outside of the United States. After reading the title and abstract, we used open coding to separate the data into units (Wilson, 2017). Then, we used axial coding to determine relationships, themes, and connections between units (Corbin & Strauss, 2008). We also relied on the constant-comparative method to make comparisons between units (Grove, 1988). When decisions seemed interrelated (e.g., insect control), we used our expertise to determine which theme they aligned with most. Once we established themes and sub-themes, two authors conducted a peer-debrief to ensure accurate interpretations.

Findings

Based on Drysdale et al.'s (2010) levels of decision-making framework, all levels of decision making were addressed in the conference proceedings, especially levels 1(*Product Choice Decisions)*, 2 (*Farm System Components)* and 3 (*Sub-System Decisions)*. Researchers who disseminate information at the Beltwide Cotton Conferences focused on seven areas of decision-making areas for cotton producers (Table 1). The most emphasis was placed on Disease and Pest Management and Soil. These two areas of decisions are very important to cotton production and should be a priority for researchers and Extension.

Table 1

Themes and Subthemes Identified

Theme	Subthemes
Disease and Pest Management (n = 289)	Diseases, Disease Management, Drift Damage/Off-Target Movement, Multi-Faceted Approach, Pests, Pest Management, Pest/Disease Resistance
Equipment and Technology (n = 49)	Equipment, Robotics, Technology Advancements
Harvest (n = 13)	Harvest Aids
Profitability (n = 9)	Profitability, Tools
Seed (n = 56)	Seed Treatment, Seed/Plant Tolerance, Variety
Soil (n = 84)	Conservation Management Practices, Cover Crops, Fertilizer, Soil Health/Management, Soil Type, Sustainability, Tillage
Water (n = 25)	Irrigation Management, Weather

Conclusions and Recommendations

Cotton producers are faced with a plethora of decisions that requires an extensive network of experts, tools, and resources. By better understanding areas of decisions that cotton producers are making during production, Extension personnel and other educators can tailor tools, messages, and information to producers' decision-making needs and researchers can continue their work in advancing and improving the cotton industry. Future research should identify what areas of interest producers place priority on when making decisions to identify similarities and differences between the two groups. There is a gap in the literature and in the available technology that addresses cotton producers' decision-making process and what decisions they must make to remain viable. Therefore, to create tools that cotton producers would use in their farming systems, we must understand their decision-making needs. This project was supported by AFRI Competitive Grant 2019-07543 from the USDA National Institute of Food and Agriculture.

References

Bhakta, I., Phadikar, S., & Majumder, K. (2019). State-of-the-art technologies in precision agriculture: A systematic review. Journal of the Science of Food and Agriculture, 99(11), 4878 – 4888. https://doi.org/10.1002/jsfa.9693

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research*. SAGE Publications.

Drysdale, G., Markham, N., Paine, M., Michael, A., & Crawford, A. (2010). Using a 'levels of decision making' framework in extension. *Extension Farming Systems Journal, 6*(1), 115–121. https://search.informit.org/doi/10.3316/informit.479241002374924

Grove, R. W. (1988). An analysis of the constant comparative method. *International Journal of Qualitative Studies in Education*, *1*(3), 273–279. https://doi.org/10.1080/0951839900030105a

Roberts, T. G., Harder, A., & Brashears, M. T. (2016). *American Association for Agricultural Education national research agenda: 2016-2020*. Department of Agricultural Education and Communication, University of Florida.

Schreier, M. (2012). Qualitative content analysis in practice. SAGE Publications.

Wilson, E. (2017). *School-based research: A guide for education students*. SAGE Publications.