

5-4-2023

Prioritizing Professional Development at the Interface of Natural Resources and Agriculture

Katherine J. Starzec

Kansas State University, kjburke@ksu.edu



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Recommended Citation

Starzec, K. J. (2023). Prioritizing Professional Development at the Interface of Natural Resources and Agriculture. *The Journal of Extension*, 61(1), Article 16. <https://doi.org/10.34068/joe.61.01.16>

This Research in Brief is brought to you for free and open access by the Conferences at TigerPrints. It has been accepted for inclusion in The Journal of Extension by an authorized editor of TigerPrints. For more information, please contact kokeefe@clemson.edu.

Prioritizing Professional Development at the Interface of Natural Resources and Agriculture

Cover Page Footnote

K.B. acknowledges and thanks master's student Katie Messerla for assistance with manuscript edits and Kansas State Research and Extension for support in this study.

Prioritizing Professional Development at the Interface of Natural Resources and Agriculture

KATHERINE J. STARZEC¹

AUTHOR: ¹Kansas State University.

Abstract. Continuous professional development is critical for Extension staff, and many agriculture-focused Extension employees are tasked with outreach related to a wide variety of natural resource topics. The purpose of this study is to help prioritize trainings needed by Kansas Extension agents and specialists based on their current level of knowledge and interest in staying up to date on 18 different natural resource topics. Responses to a statewide survey were analyzed using the Borich model. Results indicate priority professional development needs related to soil health; effects of climate; invasive species, harmful algal blooms; and groundwater, surface water, and air quality.

INTRODUCTION

Continuing education and professional development are critical for Extension professionals, who are “having to develop more effective programs than ever before and should be prepared to better their programs continuously” (Jayaratne, 2016, p.1). In Kansas, Extension agents are employed at the county or multi-county level to develop programming directly for their communities, and Extension specialists are employed at the regional or statewide level to provide topic-specific support to Extension agents. Many county-level Extension agents cover a broad range of program areas, with job titles such as “Agriculture and Natural Resources Agent.” Some counties have multiple agents who specialize in narrow topic areas, while in very rural counties in Kansas, one Extension agent covers all program areas for that county (4-H and youth development, agriculture, natural resources, family and consumer sciences, and community development).

Kansas has one of the highest percentages of privately-owned land in the United States (Summit Post, 2021), which contributes to complexity in natural resource conservation efforts. Agricultural production is the largest economic driver in the state (Kansas Department of Agriculture, 2016), yet Kansas has a rich history in natural resource conservation on agricultural land, with locally-led, grass-roots efforts occurring in various natural resource topic areas since the Dust Bowl (Kansas Department of Agriculture, 2021).

Topics like soil erosion, water conservation, endangered species preservation, air quality, and the overall management of working lands have been tied to discussions around agriculture in Kansas for some time (Adams, 2002). Kansas Extension personnel who have broad programming responsibilities related to agriculture and natural resources are tasked with staying up to date on a wide variety of topics. Newly hired agents participate in “New Agent Training” throughout their first year on the job, which focuses on competencies applicable to all agents, such as program evaluation, working with volunteers, and working with the media. Continuing education in program content areas is not formally structured, and some Extension personnel who complete New Agent Training express a need for additional training in the broad content areas they cover (J. Wilson, personal communication, May 4, 2022). Though Extension specialists and Program Focus Teams – internal, statewide Extension groups that focus on certain hot topics – provide some opportunity for growth in content area knowledge, there is need to provide continuing education about natural resource topics for agents and specialists to assist with both an initial learning curve for new hires as well as continuing education for established Extension personnel.

Needs assessments are critical tools in creating and maintaining programs and services that are relevant to individuals and communities (Garst & McCawley, 2015) and

can be valuable in prioritizing professional development experiences. The Borich Model (Borich, 1980), a common needs assessment tool in Extension program planning, uses a discrepancy analysis between *what is* and *what should be* to rank priorities in training. Because of the large number of natural resource topics affecting Kansas, and because of the wide variety of topic areas many agents and specialists are expected to cover, Kansas State Research and Extension can provide professional development more efficiently with results from a needs assessment.

PURPOSE AND OBJECTIVES

My goal for this project was to assist in the prioritization of natural resource trainings for Kansas Extension agents and specialists who work in areas of agriculture and/or natural resources. A needs assessment in the form of a digital survey was conducted in 2020 to determine Kansas Extension agents' and specialists' existing knowledge and interest in staying up to date on 18 different natural resource topics related to Kansas agriculture and land management.

- Objective 1: Summarize Extension agents' and specialists' current self-reported level of knowledge about 18 natural resource topics relevant to Kansas agriculture.
- Objective 2: Summarize Extension agents' and specialists' level of interest in natural resource topics areas.
- Objective 3: Determine priorities in natural resource professional development for Extension agents and specialists using the Borich model: current level of knowledge vs. interest in staying up to date on each topic.

METHODS

The population for this study was Kansas Extension agents and specialists whose work involves agriculture and/or natural resources. I developed a web-based Qualtrics survey, and the questions focused on 18 natural resource topics relevant to Kansas agriculture. The instrument was reviewed by a panel of experts, which included natural resource professionals and social science researchers, and the instrument was pilot tested by Extension educators in Nebraska. Respondents indicated how knowledgeable they believed they were about each natural resource topic on a 5-point unipolar Likert scale from 1 (*Extremely knowledgeable*) to 5 (*Not knowledgeable at all*) and how interested they were in staying up to date on each topic using a 5-point unipolar Likert scale from 1 (*Extremely interested*) to 5 (*Not interested at all*). The instrument included five demographic questions related to age, gender, years in Extension, what Kansas region they

work in, and their work title. In June-July 2020, the survey was distributed through email to all Kansas State University Extension agents and specialists in the selected population (274), including Kansas State University employees who are involved in agriculture/natural resource outreach and education whose positions are funded at least partially through Extension dollars.

For this study, I compared respondents' self-reported level of knowledge to their level of interest in each of the 18 natural resource topics using the Borich model (Borich, 1980), a common tool used in needs assessments (e.g. Bengé et al., 2020; Conner et al., 2018; Oladele, 2015; Rohit & Anshida Beevi, 2018). The Borich model compares competency statements (e.g. comparing current knowledge or current ability to desired knowledge or perceived importance) in a questionnaire so that gaps in need, or the relative priority of each competency, can be weighted and ranked (Borich, 1980). To produce the weighted ranking of competencies, the Borich model calculates a mean-weighted discrepancy score (MWDS) for each competency:

$$MWDS = S [(I_{ith} - C_{ith}) \times \bar{x}_i] / N \quad (1)$$

where for this study, I = the interest in staying up to date on each topic and C = self-reported competence (knowledge) about each topic. The difference between I and C is multiplied by the mean interest (\bar{x}_i) to calculate a weighted discrepancy score (WDS) for each survey respondent. The sum of the WDSs divided by the sample size, N, achieves an overall MWDS for each competency. I used a resource developed by McKim & Saucier (2011) to calculate MWDS scores, and I used SPSS to summarize respondents' average self-reported knowledge about each topic and frequencies for interest in staying up to date on each topic.

Responses were received from 116 total individuals (response rate: 42%), and Table 1 shows frequencies of key demographics of the respondents. Discrepancies in the sample size in Table 1 are due to individuals responding to some but not all of the demographic questions. Non-response error was not investigated and could be a limitation of the study. Another possible limitation of the study is that the survey was distributed (digitally) during the 2020 COVID-19 pandemic, which could have had an impact on response rate.

RESULTS

OBJECTIVE 1: SUMMARIZE EXTENSION AGENTS' AND SPECIALISTS' CURRENT SELF-REPORTED LEVEL OF KNOWLEDGE ABOUT 18 NATURAL RESOURCE TOPICS RELEVANT TO KANSAS AGRICULTURE

Average self-reported knowledge for each of the 18 natural resource topics remained in the slightly or moderately knowledgeable ranges (real limits: 1.0–1.49 = extremely knowledgeable

able, 1.5–2.49 = very knowledgeable, 2.5–3.49 = moderately knowledgeable, 3.5–4.49 = slightly knowledgeable, 4.5–5.0 = not knowledgeable at all). On average, respondents were “slightly knowledgeable” in eight of the 18 natural resource topic areas, including groundwater quality in Kansas, water conservation in Kansas communities, water conservation practices on irrigated land, harmful algal blooms, forestry practices, water conservation in horticultural operations, air quality issues in Kansas, and urban stormwater runoff. On average, respondents were “moderately knowledgeable” in 10 of the 18 natural resource topic areas, including soil health practices on cropland, erosion control practices on cropland, prescribed burning, controlling invasive species, erosion control practices on rangeland, water conservation practices on non-irrigated land, wildlife habitat, soil health practices on rangeland, effects of climate on Kansas agriculture, and surface water quality.

OBJECTIVE 2: SUMMARIZE EXTENSION AGENTS' AND SPECIALISTS' LEVEL OF INTEREST IN NATURAL RESOURCE TOPICS AREAS.

Figure 1 shows the percentage of respondents who were very or extremely interested in staying up to date on natural resource topic areas. “Effects of climate on Kansas agriculture”

was the topic with the most interest with 60% of respondents (n=67) indicating they were “very” or “extremely” interested in staying up to date. “Soil health practices on cropland” had the second highest interest (59%, n=65), and “Controlling invasive species in Kansas” had the third highest interest (56%, n=63).

OBJECTIVE 3: DETERMINE PRIORITIES IN NATURAL RESOURCE PROFESSIONAL DEVELOPMENT FOR EXTENSION AGENTS AND SPECIALISTS USING THE BORICH MODEL: CURRENT LEVEL OF KNOWLEDGE VS. INTEREST IN STAYING UP TO DATE ON EACH TOPIC.

Table 2 shows priority training need rankings among Extension agents and specialists based on the Borich model calculation (MWDSs comparing current knowledge versus interest in staying up to date on topics), with the larger MWDS indicating higher priority. Table 3 shows the difference in Borich MWDSs between agents (n=60) and specialists (n=52) for the top five priority professional development areas.

SUMMARY, CONCLUSIONS, AND APPLICATION

Many natural resource topics directly relate to agriculture and working lands in Kansas. Often, Extension agents in Kansas cover a wide spectrum of content areas and need opportunities for professional development in unfamiliar topics. Those new to the Extension profession especially have a steep learning curve (Jayaratne, 2016). A large majority of respondents in this study are still early in their careers, as 30% of respondents have worked for Extension for five years or fewer, and 50% have worked for Extension 10 years or fewer. Averages for self-reported current knowledge fell in the “slightly” or “moderately” knowledgeable range, further indicating need to prioritize and implement additional natural resource trainings among Extension professionals working in agriculture and natural resource areas.

Based on both the Borich model and survey respondents’ interests, seven natural resource topics stand out as continuing education priorities for agents and specialists in Kansas:

1. Groundwater quality in Kansas
2. Harmful algal blooms
3. Surface water quality in Kansas
4. Effects of climate on Kansas agriculture
5. Air quality issues in Kansas
6. Soil health practices on cropland and rangeland
7. Controlling invasive species in Kansas

The priority topics listed above span multiple areas of production agriculture in Kansas. For example, air quality

Table 1. Key Demographics of Respondents

Characteristic	%	n
<i>Extension title type (n=112)</i>		
Agent	53.6%	60
Specialist	46.4%	52
<i>Gender (n=110)</i>		
Male	59.1%	65
Female	40.9%	45
<i>Years in Extension (n=113)</i>		
0–1	8.0%	9
2–5	25.7%	29
6–10	16.8%	19
11–15	10.6%	12
16–20	8.0%	9
21–25	9.7%	11
26–30	9.7%	11
31+	11.5%	13
<i>Age range (n=107)</i>		
20–29	19.6%	21
30–39	21.5%	23
40–49	18.7%	20
50–59	13.1%	14
60–69	26.2%	28
70–79	0.9%	1

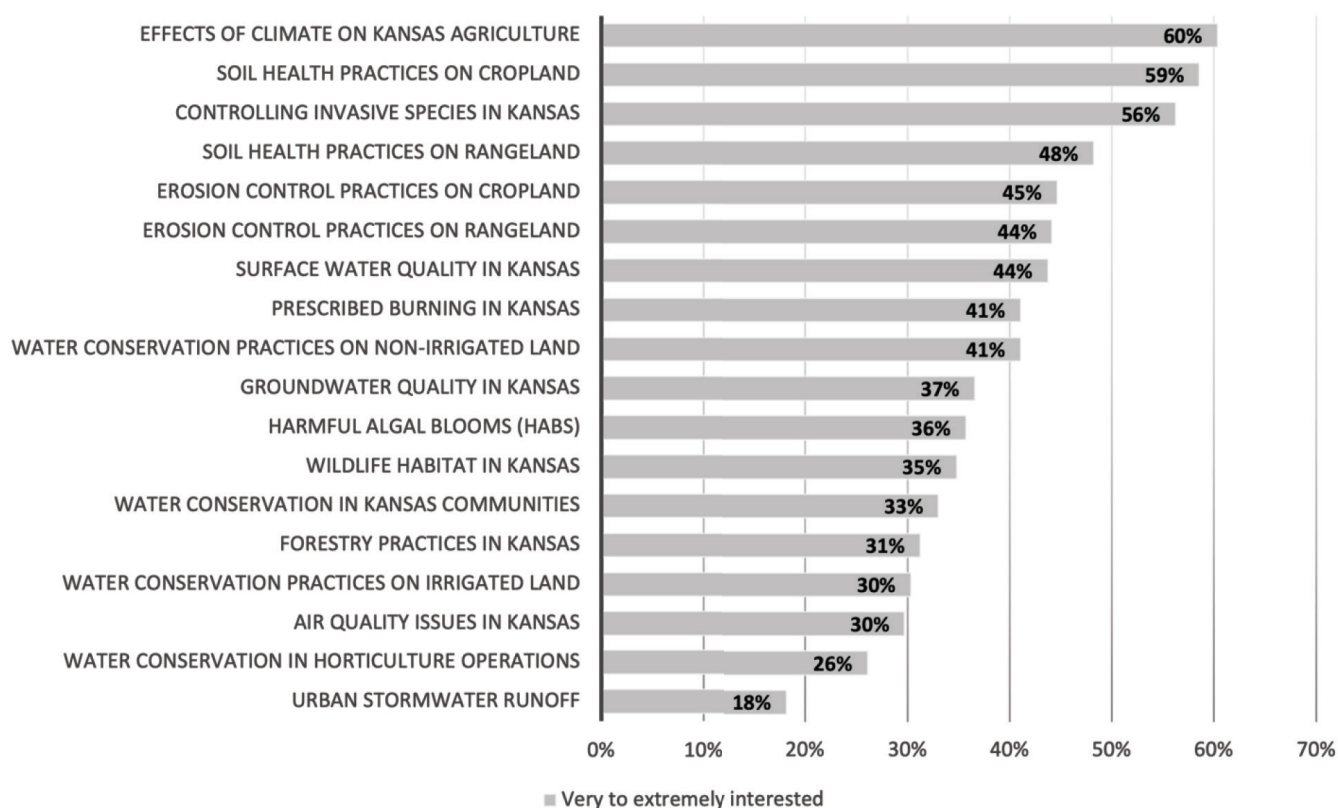


Figure 1. Percentage of respondents (n=112) who were very to extremely interested in staying up to date on natural resource topic areas.

Table 2. MWDSs Ranking of Natural Resource Topics Based on Borich Calculation (Knowledge vs. Interest). All Respondents, n=112

Borich model priority ranking for professional development	Mean-weighted discrepancy score (MWDS)	Natural resource topic
1	2.20	Groundwater quality in Kansas
2	2.01	Harmful algal blooms (HABs)
3	1.96	Surface water quality in Kansas
4	1.95	Effects of climate on Kansas agriculture
5	1.93	Air quality issues in Kansas
6	1.77	Forestry practices in Kansas
7	1.67	Urban stormwater runoff
8	1.62	Water conservation in Kansas communities
9	1.55	Controlling invasive species in Kansas
10	1.34	Soil health practices on rangeland
11	1.27	Wildlife habitat in Kansas
12	1.18	Water conservation in horticulture operations
13	1.15	Water conservation practices on irrigated land in Kansas
14	0.94	Water conservation practices on non-irrigated land in Kansas
15	0.92	Erosion control practices on rangeland
16	0.72	Soil health practices on cropland
17	0.62	Prescribed burning in Kansas
18	0.47	Erosion control practices on cropland

Prioritizing Professional Development at the Interface of Natural Resources and Agriculture

Table 3. Top 5 MWDSs of Agents (n=60) vs. Specialists (n=52) based on Borich Calculation (Knowledge vs. Interest)

Borich model rank	Agents' top 5 MWDSs	Nat Res Topic	Specialists' top 5 MWDSs	Nat Res Topic
1	2.23	Air quality issues in Kansas	2.33	Groundwater quality in Kansas
2	2.21	Effects of climate on Kansas agriculture	2.18	Harmful algal blooms (HABs)
3	2.09	Groundwater quality in Kansas	2.10	Surface water quality in Kansas
4	2.00	Forestry practices in Kansas	1.81	Water conservation in Kansas communities
5	1.94	Urban stormwater runoff	1.59	Effects of climate on Kansas agriculture

issues in Kansas relate to smoke from prescribed burning of grazing lands for cattle; groundwater quality affects water pumped for livestock, crops, and municipalities; and invasive species negatively affect both grazing land and cropland in Kansas. Agents and specialists with broad programming areas (e.g., Agriculture and Natural Resources Agent), and narrow programming areas (e.g., Livestock Specialist), may benefit from professional development in a variety of prioritized natural resource topics.

The first two years of employment in Extension may be the most important for professional development (Martin, 2011). However, New Agent Training in Kansas Extension lasts one year, which is typical for an Extension onboarding timeline (Benge et al., 2021). There is benefit to building “long-term competency development of Extension agents during their early-career stage” (Benge et al., 2021, p. 4), and this research confirms a need to expand professional development beyond the first year of employment. The results of this study suggest three recommendations for Kansas Extension: First, add an additional year of structured on-boarding for new hires that focuses on priority natural resource program content areas listed above. This additional year of professional development can also be available to agents and specialists who are already two or more years into their careers. Second, create “peer-to-peer” continuing education experiences for all Extension personnel led by Extension specialists or other experts in topic areas such as rangeland management, invasive species, or air quality. Third, within the second-year onboarding and peer-to-peer trainings, build in robust program evaluation to monitor Extension employees’ changes in knowledge, intention to utilize the learned information in their own programming, and improvements to Extension delivery of natural resource information in local communities.

REFERENCES

Adams, J. C. (2002). *Natural resource issues in agriculture*. <https://cdm16884.contentdm.oclc.org/digital/collection/p16884coll5/id/524>

Benge, M., Martini, X., Diepenbrock, L. M., & Smith, H. A. (2020). Determining the professional development needs of Florida integrated pest management Extension agents. *Journal of Extension*, 58(6). <https://tigerprints.clemson.edu/joe/vol58/iss6/15>

Benge, M., Muscato, A. F., & Beattie, P. N. (2021). Professional development needs of early-career Extension agents beyond the first year: Florida county Extension director perspectives. *Journal of Extension*, 58(6). <https://tigerprints.clemson.edu/joe/vol58/iss6/11>

Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education*, 31(3), 39–42. <https://doi.org/10.1177/002248718003100310>

Conner, N. W., Dev, D., & Krause, K. (2018). Needs assessment for informing Extension professional development trainings on teaching adult learners. *Journal of Extension*, 56(3). <https://digitalcommons.unl.edu/famconfacpub/246>

Garst, B. A. & McCawley, P. F. (2015). Solving problems, ensuring relevance, and facilitating change: The evolution of needs assessment within Cooperative Extension. *Journal of Human Sciences and Extension*, 3(2). <https://scholarsjunction.msstate.edu/jhse/vol3/iss2/4/>

Jayarathne, K. S. U. (2016). Tools for formative evaluation: Gathering the information necessary for program improvement. *Journal of Extension*, 54(1). <https://tigerprints.clemson.edu/joe/vol54/iss1/7>

Martin, M. (2011). *Influence of human resource practices on employee intention to quit*. [Unpublished doctoral dissertation]. Virginia Polytechnic Institute and State University. https://vtechworks.lib.vt.edu/bitstream/handle/10919/28424/Martin_MJ_D_2011.pdf?sequence=1&isAllowed=y

McKim, B. R. & Saucier, P. R. (2011). An Excel-based mean weighted discrepancy score calculator. *Journal of Extension*, 49(2). <https://archives.joe.org/joe/2011april/tt8.php>

Oladele, I. (2015). Borich needs model analysis of professional competence among Extension officers in North

West Province, South Africa. *Journal of Agricultural & Food Information*, 16(2), 151–162. <https://doi.org/10.1080/10496505.2015.1013110>

Rohit, J. & Anshida Beevi, C. N. (2018). Training need assessment on communication competencies of extensionists working in Krishi Vigyan Kendras (Farm Science Centres). *Journal of Extension Education*, 29(3). <https://doi.org/10.26725/JEE.2017.3.29.5892-5901>

Kansas Department of Agriculture. (2016). *Kansas agriculture*. <https://agriculture.ks.gov/about-kda/kansas-agriculture>

Kansas Department of Agriculture. (2021). *Division of Conservation*. <https://agriculture.ks.gov/divisions-programs/division-of-conservation>

Summit Post. (2021). *Public and private land percentages by US states*. <https://www.summitpost.org/public-and-private-land-percentages-by-us-states/186111>