

Agricultural Education Research Summary Report

**AN EXAMINATION OF ELEMENTARY TEACHERS' AND
AGRICULTURAL LITERACY COORDINATORS' BELIEFS
RELATED TO THE INTEGRATION OF AGRICULTURE**

prepared by

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An Examination of Elementary Teachers' and Agricultural Literacy Coordinators' Beliefs Related to the Integration of Agriculture

Introduction

The purpose of this study was to determine the extent to which elementary school teachers' and agricultural literacy coordinators' beliefs of agriculture are related to the nature and scope (e.g., topics, activities, and number of lessons) of integrating agriculture into their instruction. A random sample of elementary school teachers in Illinois was surveyed to determine selected teacher characteristics, their beliefs about agriculture, and the extent to which they have integrated agriculture into their instruction during the 2002-03 school year.

This study builds on the exploratory-descriptive study conducted by Allen and Harper (2002) and addresses the FY03 Mini-Research Project Topic #1, "Determine the impact of teacher professional development activities including teacher retention, teacher quality, and Agricultural/Horticultural Education program quality in Illinois" and Topic #2, "The impact of the Illinois Agricultural Education infrastructure including ILCAE, ICAE, ISBE, and FCAE on agricultural education initiatives in Illinois and its potential as a model for other education initiatives." This study was grounded on the concept of teacher professional development and investigated the following questions: How are elementary teachers' and agricultural literacy coordinators' beliefs about agriculture related to the topics, activities, and number of lessons they integrate into classroom instruction; what role do the missions and values of agencies that house agricultural literacy coordinators play in the agricultural topics and activities conducted by the coordinators; and, what role do agricultural literacy in-service programs for elementary teachers play in impacting their beliefs about integration?

There is a growing interest of teacher beliefs in educational research because beliefs act as a powerful filter in how teachers interpret new phenomena (Pajares, 1992). Teachers who participate in the Illinois' Summer Agriculture Institutes for Teachers interpret their professional development experiences through the beliefs they have about teaching, learning, educational standards, integration, and *agriculture*. For example, if teachers believe that agriculture is powerful context for experiential learning, they will be more likely to incorporate agricultural concepts into their daily teaching plans. Beliefs play a critical role in how teachers interpret new knowledge and experiences *and* in the value they place upon new knowledge and experiences. A study that investigated the beliefs that elementary teachers and agricultural literacy coordinators have about agriculture related to the nature and scope of integrating agriculture into their instruction will make great strides to better inform agricultural literacy experts in developing and delivering effective in-service programs for teachers.

Objectives

The overall goal of this project was to determine if elementary education teachers' and agricultural literacy coordinators' beliefs of agriculture are related to the nature and scope of integrating agriculture into their instruction. The specific objectives of this research project were to:

1. Describe the teachers and coordinators based on selected characteristics;

2. Identify teachers' and coordinators' beliefs about integrating agriculture;
3. Determine the relationships between teachers' beliefs and the amount of agriculture integrated in their instruction;
4. Explain the relationships between organizational agencies' missions and values, coordinators' beliefs, and the agricultural topics and activities they conducted; and,
5. Explore teacher and coordinator beliefs that may limit the amount of integrating agriculture in the elementary education curriculum.

Procedures

The following procedures were completed to meet the objectives of this proposed research project. This project was evaluated based upon the successful implementation of the research procedures outlined, response rate of participants, reliability and validity of the findings, and conclusions drawn from the study. Implications of the findings and data were assessed regarding further research, concept development, agricultural literacy programs, and teacher and coordinator characteristics related to the integration of agriculture. The following procedures were conducted.

1. An existing instrument was adapted to measure beliefs of agriculture. A new instrument was developed by the researchers to measure beliefs of integration.
2. The instruments were pilot-tested for reliability and field-tested for validity by elementary teachers, nonformal educators, and graduate students in agricultural education who did not participate in the study.
3. Six hundred K-5 elementary teachers in Illinois public education were drawn using a stratified, random sample technique. The strata consisted of 200 teachers from urban districts, 200 teachers from suburban districts, and 200 teachers from rural districts. The sample was drawn with a 5% risk and a 4% margin of error.
4. A census of agricultural literacy coordinators was studied. There were 69 agricultural literacy coordinators identified throughout the state. Twelve were volunteer coordinators the other 57 were paid employees of the Illinois Farm Bureau, University of Illinois Extension or the Illinois Association of Soil and Water Conservation Districts.
5. The contact information of elementary teachers and agricultural literacy coordinators were collected and entered into a database for mailing purposes.
6. A mailed questionnaire survey was conducted to collect the data. The elementary teachers and agricultural literacy coordinators were contacted four to five times to maximize the response rate through a pre-notice message, questionnaire with a cover letter, postcard thank you and reminder, phone call, and replacement questionnaire with a cover letter. Incentives were provided to the participants.
7. Non-response error was controlled by contacting 10% of the non-respondents in each stratum. The non-respondents data were compared to the respondents and there were

differences in how the two groups responded to the questionnaire. The respondents had significantly more teaching experience. Respondents had an average of 17 years of teaching experience compared to the non-respondents, who had 6 years of teaching experience. Perhaps this difference in teaching experience explains why the respondents were different on the following characteristics and variables: (a) 22% of the respondents taught Kindergarten compared to 10% of the non-respondents; (b) 45% of the respondents taught health compared to 21% of the non-respondents; (c) respondents had participated in more educational classes, workshops, and in-service programs than non-respondents; (d) respondents taught agricultural topics in their classrooms more than non-respondents; (e) respondents felt more confident about integrating agriculture than the non-respondents; and, (f) respondents were more positive in their beliefs about integrating agriculture into their classrooms than the non-respondents. Therefore, the results of this study should not be generalized to the population of K-5 public elementary teachers in Illinois.

8. Non-response error for the agricultural literacy coordinators was not controlled for due to the census sampling techniques. There were 60 out of 69 (87%) agricultural literacy coordinators in Illinois who responded to the study. According to McMillian and Schumacher (2001), non-respondents will likely not affect the results when the return rate is at least 70 percent.
9. The questionnaires were entered into a computerized data analysis software program and analyzed using descriptive statistics.

Findings

The following results are presented in two sections: (1) Elementary Teachers; and, (2) Agricultural Literacy Coordinators. The results are presented based on pertinent objectives.

Elementary Teachers

There were 389 out of 600 (65%) public school elementary teachers in Illinois who participated in the study. The usable data set consisted of 334 (55%) elementary teachers.

Objective # 1

The first objective sought to describe the teachers and coordinators based on selected characteristics. For the *elementary teachers*, teacher characteristics are reported in Tables 1.1, 1.2, 1.3, 1.4, and 1.5. Thirty-four percent of the teachers taught in urban communities, 30% of the teachers taught in suburban communities, and 36% of the teachers taught in rural communities (Table 1.1).

Table 1.1: Type of communities in which the teachers taught (N = 331)

Type of Community	N	%
Urban	111	34
Suburban	100	30

Rural	120	36
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Eighty-three percent of the teachers were female. On average, the teachers had taught 17 years (SD = 10.3). Forty-five percent of the teachers had Bachelor's degrees, 54% had Master's degrees, and 1% had Doctor's degrees. The teachers ranged from being in their first year to 39th year of teaching experience (Table 1.2).

Table 1.2: Years of Teaching Experience (N = 322)

Years	N	%
0 – 5	57	18
6 – 10	62	19
11 – 15	43	13
16 – 20	39	12
21 – 25	36	11
26 – 30	44	14
31 – 35	35	11
35 – 40	6	2

Twenty-seven to 29% of the teachers taught 1st through 5th Grade (Table 1.3). Twenty-five percent of the teachers taught other grade levels.

Table 1.3: Grades Taught (N = 334)

Grade Levels	N	%
Pre-K	23	7
K	71	21
1	90	27
2	97	29
3	95	28
4	92	27
5	98	29
6	64	19
Other	83	25

Note. Total percent will exceed 100% because teachers taught more than one grade level.

Reading was the frequently taught content area (Table 1.4). Sixty percent or more of the teachers taught reading, math, English, science, and social science. The fewest number of teachers taught music. Nineteen percent of the teachers taught a farming unit.

Table 1.4: Content Areas (N = 334) and Farming Units Taught (N = 326)

Content Areas	N	%
English	209	63
Reading	246	74
Math	222	66
Social Science	202	60
Science	211	63

Health	146	44
Art	63	19
Music	28	8
Special Education	83	25
Other	55	16
Taught a Farming Unit (<i>N</i> = 326)	62	19

Note. Total percent will exceed 100% because teachers taught more than one content area.

Fifteen percent of the teachers participated in Project WET, 6% in Food, Land, and People, 6% in Project WILD, and 1% in the Leopold Education Project (Table 1.5). Seventy-four percent participated in “other” educational classes, workshops, and in-service programs related to agriculture, food, or the environment.

Table 1.5: Educational Classes, Workshops, and In-Service Programs

Educational Classes, Workshops, & In-Service Programs	<i>N</i>	%
Food, Land, and People (<i>N</i> = 329)	20	6
Project WET (<i>N</i> = 330)	48	15
Project WILD (<i>N</i> = 330)	20	6
Leopold Education Project (<i>N</i> = 329)	4	1
Other (<i>N</i> = 328)	79	24

Objective # 2

The second objective sought to identify teachers’ and coordinators’ beliefs about integrating agriculture. For the *elementary teachers*, they had a mean of 5.1 (Some Influence) for efficacy expectancy belief (I can integrate agriculture) (Table 2.1). The elementary teachers had a mean of 3.7 (Slightly Agree) for outcome expectancy and a mean of 4.0 (Slightly Agree) for value beliefs to integrate agriculture into their instruction.

Table 2.1: Beliefs of Elementary Teachers

Beliefs	<i>N</i>	<i>X</i>	SD
Efficacy Expectation ^A	334	5.1	1.49
Outcome Expectation ^B	330	3.7	.95
Value ^B	331	4.0	.82

Note. ^A: 1 = Nothing, 3 = Very Little, 5 = Some Influence, 7 = Quite A Bit, 9 = A Great

Deal

^B: 1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Strongly Agree

Objective # 3

The third objective sought to determine the relationship between teachers’ beliefs and the amount of agriculture integrated in their instruction. *Elementary teachers* taught food and consumer topics most frequently, followed by general agricultural topics, agricultural impact topics, and agricultural careers (Table 3.1). Efficacy expectancy, outcome expectancy, and value beliefs were moderately related to agricultural impact topics, agricultural career topics, and

general agricultural topics. Further, efficacy expectancy, outcome expectancy, and value beliefs had low relationships to food and consumer topics.

Table 3.1. Means of Agricultural Topics Taught and Relationships with Efficacy Expectancy, Outcome Expectancy, and Value Beliefs

Topics	Mean (SD)	Relationships		
		Efficacy Expectancy	Outcome Expectancy	Value
Agricultural Impact (Cultural, Historical, Economics, Social, Environmental)	.87 (.85) n = 327	.37 Moderate n = 327	.41 Moderate n = 326	.38 Moderate n = 327
Food and Consumer (Nutrition & Wellness, Food & Consumer Choices, Food & Family Traditions, Food & Spiritual Traditions, Food and Social Activities)	1.44 (.93) n = 363	.28 Low n = 363	.27 Low n = 362	.27 Low n = 363
Agricultural Careers (Natural Resources & Conservation, Ag. Production and Farming, Food Processing & Distribution, Horticulture & Landscaping, Ag. Technology & Mechanics, Agribusiness & Industry)	.86 (.72) n = 327	.44 Moderate n = 327	.44 Moderate n = 326	.49 Moderate n = 327
General (Plants, Insects, Animals, Biotechnology, Environment)	1.14 (.76) n = 367	.39 Moderate n = 367	.36 Moderate n = 366	.36 Moderate n = 367

Note. 0 = Never; 1 = Once per year; 2 = Once per quarter; 3 = Once per month; 4 = Once per week

Objective # 4

The fourth objective pertains only to agricultural literacy coordinators. The results for this objective can be found on later in this article.

Objective # 5

The fifth objective sought to explore teacher and coordinator beliefs that may limit the amount of integrating agriculture in the elementary education curriculum. For the *elementary teachers*, individual items were analyzed to identify possible barriers that may limit the amount of agriculture that could be integrated into the elementary education curriculum. Five efficacy expectancy items were identified as possible barriers (Table 5.1): (a) developing agricultural activities; (b) identifying resources; (c) connecting agricultural activities to Illinois Learning Standards; (d) responding to difficult questions about agriculture; and, (e) providing appropriate challenges about agriculture for very capable students. Approximately one out of four elementary teachers agreed that they had very little to no influence in conducting these five skills.

Table 5.1: Possible Barriers Regarding Efficacy Expectancy Beliefs	
Efficacy Expectancy Beliefs	Agreement with Not At All & Very Little
How well can you develop activities that engage students to learn	31%

about agriculture?	
How well can you identify resources that can be used to teach about agriculture?	28%
How well can you connect agricultural activities to the Illinois Learning Standards?	27%
How well can you respond to difficult questions from your students about agriculture?	27%
How well can you provide appropriate challenges about agriculture for very capable students?	26%

Note. Scale: 1 = Nothing, 3 = Very Little, 5 = Some Influence, 7 = Quite A Bit, 9 = A Great Deal

Three outcome expectancy items were identified as possible barriers (Table 5.2): (a) getting additional funding; (b) gaining more respect; and, (c) making a teacher look better. Less than half of the elementary teachers agreed that with any of these three statements.

Outcome Expectancy Beliefs	Agreement
I could get additional funding for instructional resources if I integrated agriculture into my classroom.	34%
I would gain more respect as a teacher if I integrated agriculture into my classroom.	35%
Integrating agriculture into my classroom would make me look like a better teacher.	46%

Note. Scale: 1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Strongly Agree

Nine value belief items were identified as possible barriers (Table 5.3): (a) feeling comfortable; (b) not having time; (c) not having instructional resources; (d) being too busy; (e) taking time away from required content; (f) not being prepared to teach agriculture; (g) needing new instructional methods and activities; and (h) not interested because there are more careers in agriculture than any other industry in the U.S. In addition, only about one-fourth of the teachers were interested in teaching agriculture because of past work experiences and youth development projects in agriculture. Finally, elementary teachers did not believe that agriculture would lower the level of thinking in their instruction, nor did they believe that agriculture was an outdated topic.

Value Beliefs	Agreement
I would need to spend time learning about agriculture to feel comfortable teaching it to my students.	74%
There is no time to teach agriculture in the elementary curriculum.	70%
I do not have the instructional resources to teach my students about agriculture.	69%
I am too busy to integrate agriculture into my classroom.	56%
Teaching about agriculture would take away time from what I am required to teaching.	54%

I am not prepared to integrate agriculture into my instruction.	51%
I would need to learn new instructional methods and activities to teach agriculture in my classroom.	55%
I am interested in teaching about agriculture because there are more careers in agriculture than any other industry in the US.	46%
I am interested in teaching about agriculture because of my past work experience in agriculture.	29%
I am interested in teaching about agriculture because of my experiences with youth development projects (4-H/FFA) in agriculture.	25%
Teaching agriculture would shift my instruction from higher-order thinking to lower-order thinking.	10%
Agriculture is an outdated topic because we live in a post-agricultural economy.	9%

Note. Scale: 1 = Strongly Disagree, 2 = Moderately Disagree, 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Strongly Agree

Agricultural Literacy Coordinators

There were 60 out of 69 (87%) agricultural literacy coordinators in Illinois who responded to the study. The usable data set consisted of 58 (84%) agricultural literacy coordinators.

Objective #1

The first objective sought to describe the teachers and coordinators based on selected characteristics. For the *agricultural literacy coordinators*, agricultural literacy coordinator characteristics are reported in Tables 1.6, 1.7, 1.8, 1.9, and 1.10. Seventy-three percent of the agricultural literacy coordinators have conducted Summer Agricultural Institutes (SAI's) or teacher in-service educational programs and 29% conducted three to five SAI's in the past year (Table 1.6).

Table 1.6: Number of Summer Agricultural Institutes Conducted per year (N = 58)

SAI's Conducted per year	N	%
1-2	12	21
3-5	17	29
6-9	7	12
10 or More	3	5
Do Not Conduct	19	33

Fifty percent of the agricultural literacy coordinators had Bachelor's degrees, 24% had Master's degrees, 17% had high school diplomas only, and 7% had Associate's degrees. (Table 1.7).

Table 1.7: Levels of Education for Agricultural Literacy Coordinators (N = 58)

Degree	<i>N</i>	%
High School Diploma	10	17
Associate's	4	7
Bachelor's	29	50
Master's	14	24
No Response	1	2

The coordinators ranged from being in their first year to 20th year of agricultural literacy instruction. The majority of agricultural literacy coordinators have been in their position for five years or less (Table 1.8).

Table 1.8: Years of Agricultural Literacy Experience (*N* = 58)

Years	<i>N</i>	%
0 – 1	14	24
2 – 5	29	50
6 – 10	8	14
10 or More	3	5
No Response	4	7

Fifty-nine percent of the agricultural literacy coordinators most closely affiliated themselves to the Illinois Farm Bureau. Twenty-two percent worked closest with University of Illinois Extension and 14% were with the Soil and Water Association (Table 1.9).

Table 1.9: Organizational Affiliation (*N* = 58)

Organization	<i>N</i>	%
Farm Bureau	34	59
Extension	13	22
Soil and Water Conservation District	8	14
Other	3	5

The final characteristics ascertained personal experiences of agricultural literacy coordinators. Seventy-four percent of agricultural literacy coordinators have had an experienced agriculture through 4-H, FFA, or another activity. Fifty-five percent have lived or do live in a rural area and 59% are married to someone in the agricultural industry. Finally, 64% of the agricultural literacy coordinators have *not* studied agriculture (Table 1.10).

Table 1.10: Personal Experiences of Agricultural Literacy Coordinators (*N* = 58)

Content Areas	Yes	No
Agricultural Experiences in 4-H, FFA, etc	43 (74%)	15 (26%)
Agricultural Residence	55 (95%)	3 (5%)
Married to Someone in the Agricultural Sector	34 (59%)	24 (41%)
Studied Agriculture	21 (36%)	37 (64%)

Objective #2

The second objective sought to identify teachers' and coordinators' beliefs about integrating agriculture. For the *agricultural literacy coordinators*, determining beliefs about integration of agriculture was achieved through short-answer responses about their definition and purposes of agricultural literacy. The major themes categorized for agricultural literacy definitions were education, diversity, youth and adults, agriculture's role, integration, hands-on, and partnerships (Table 2.2). The education theme was overwhelmingly listed as the major function of agricultural literacy. For example, one agricultural literacy coordinator felt that agricultural literacy education should educate everyone in society on what agriculture is, what service it provides, and how the world can benefit from agricultural advancements. Others voiced similar sentiments involving educating society, students, and people of all ages. In regard to the role of agriculture in society, agricultural literacy coordinators responded that everything, food in grocery stores, clothes in shopping malls, wildlife in parks and zoos, and water that everyone drinks, is based upon agriculture, yet most of society doesn't realize how their food, water, and clothing are related to agriculture. The theme regarding the diversity of topics in agriculture focused on the variety of topics in agriculture. Specific examples of these topics included biotechnology, fiber, renewable resources, food, careers and production. The diversity of methods that agriculture can be taught and how agriculture can be related to many other school courses also were identified within this theme. Integration of agriculture was identified by a few coordinators and was described through the importance of helping teachers properly explain characteristics of agriculture to their students. Hands-on activities were mentioned as part of the integration step as well as mentioned in the materials and methods of agricultural literacy information. Finally, for the theme regarding partnerships, agricultural literacy coordinators responded that forming partnerships between schools, agricultural businesses, and agricultural literacy organizations would help achieve integration and agriculture to students, parents, teachers, and other adults.

Major Definition Themes	
Education	92%
Role of Agriculture in Society	20%
Youth and Adults	18%
Diversity of topics and concepts	14%
Integrated curriculum	6%
Hands-on activities	2%
Partnerships	2%

Note. Total percent will exceed 100% because coordinators may have listed more than one definition characteristic.

Agricultural literacy coordinators were then asked to identify their vision of the purposes of agricultural literacy. The themes that emerged from coordinator responses regarding the purposes of agricultural literacy were identified as: education, covering a wide variety of subjects and using a wide variety of methods, numerous materials for teachers, youth and adult oriented, utilizing workshops to relay information, being an advocate of agriculture to the public, and

presenting a unified presence (Table 2.3). First, coordinators responded that the major purpose of agricultural literacy was education. One example of an agricultural literacy coordinators purpose is “educating students and teachers; provide updated materials to teach, [including] videos, books, newspapers, subject matter...provide agricultural literacy lesson plans that excite students about learning *and* can meet ISBE standards and goals.” In regard to the “variety of subjects and teaching methods theme”, coordinators felt that a major purpose of agricultural literacy centered upon the variety of topics as well as methods. This includes the numerous areas of agricultural education and the many ways that agriculture can be explained to all consumers. The coordinators also responded that another purpose of agricultural literacy was providing materials to teachers. This theme is important because historically the purpose of agricultural literacy has been providing to agricultural materials and topics for teachers to integrate into classrooms. Adapting materials to both youth and adults was defined as a theme because of the need to make everyone agriculturally literate. Materials that students can learn about in classrooms or in person can be just as educational for adults if the adults are encouraged to participate with the students. The information for adults doesn’t need to be made harder or more in-depth, just ensuring that adults receive exposure to the information will help further their education. Conducting workshops for teachers was identified and explained by one agricultural literacy coordinator as, holding teacher training workshops and using guest speakers in those workshops to reiterate the importance of agriculture in elementary classrooms. The workshops should allow those who participate to feel comfortable with some aspect of agriculture and therefore allow the teacher to incorporate agriculture occasionally into his or her classroom. Agricultural literacy coordinators indicated that they were advocates of agriculture, either to elementary school classrooms, community groups or other agricultural organizations. The purpose for agricultural literacy in regard to this theme was to help dispel many myths about agriculture. Finally, the theme labeled, a unified front, was indicated by some of the coordinators as an additional purpose for agricultural literacy. In this theme, coordinators indicated that agricultural literacy organizations should work together so agricultural literacy can make a greater impact in society. For example, one coordinator responded, “the purpose of agricultural literacy is to provide materials and man-power to our school system [and to help] incorporate agriculture into an existing curriculum. Coordinate a unified message to the public about agriculture but combine resources from other county agencies.”

Major Themes	
Education	84%
Variety of Subjects and Teaching Methods	21%
Youth and Adults Oriented	21%
Providing Materials to Teachers	14%
Using Workshops to Relay Information	5%
Advocate of Agricultural Education	4%
Unified Presence of Agriculture to Society	4%

Note. Total percent will exceed 100% because coordinators may have listed more than one purpose.

Objective # 3

Objective 3 pertains only to the elementary teachers that participated in this study. The results to objective three can be found earlier in this article.

Objective # 4

The fourth objective sought to explain the relationships between organizational agencies' missions and values, coordinators' beliefs, and the agricultural topics and activities they conducted. Agricultural literacy coordinators ranked which topics they most frequently instructed in their Summer Agricultural Institutes. The results were separated by the organization in which the agricultural literacy coordinator affiliated most. Leaders of agricultural literacy sponsoring organizations (Farm Bureau, University of Illinois Extension, and Soil and Water Conservation District) were asked to rank their organization's priorities in terms of agricultural literacy topics. The mean ranks between coordinators and the respective organizational leaders were compared and correlated using effect size comparison.

Cohen's (1988) effect sizes were calculated using the means and standard deviations of the ranked responses. Effect size explains the effect of one variable on another. An effect size smaller than 0.2 describes a negligible effect between the coordinators' and managers' ranks. An effect size between 0.2 and 0.49 illustrates a small effect size between coordinators' and managers'. A medium effect size is 0.5 to 0.79. Finally, a large effect size is 0.8 and above.

Farm Bureau *coordinators'* top five topics in order were: farming, renewable resources, careers, environmental, and plant growth. Further, County Farm Bureau *Managers* ranked their top priority areas for instruction as: farming, renewable resources, careers, biotechnology, and conservation, in that order (Table 4.1).

Topics	Coordinators (N = 34)		Managers (N = 65)		Effect Size	Cohen's Scale
	Rank (Mean)	SD	Rank (Mean)	SD		
Animals	10 (5.41)	4.995	9 (6.55)	4.135	0.26	Small
Biotechnology	6 (4.47)	4.447	4 (4.69)	3.235	0.06	Negligible
Careers	3 (2.79)	2.717	3 (4.42)	3.455	0.51	Medium
Conservation	7 (4.47)	4.158	5 (4.97)	3.026	0.15	Negligible
Environmental	4 (3.50)	3.314	6 (5.46)	3.696	0.55	Medium
Farming	1 (2.35)	2.827	1 (2.29)	2.572	0.02	Negligible
Forestry	13 (7.00)	5.710	13 (10.12)	4.310	0.65	Medium
History	11 (5.44)	4.527	11 (7.15)	4.273	0.39	Small
Insects	12 (5.85)	5.076	12 (9.03)	3.980	0.73	Medium
Nutrition	9 (4.85)	4.547	8 (6.20)	3.717	0.34	Small
Plant Growth	5 (4.12)	4.125	7 (5.95)	3.727	0.47	Small
Renewable Resources	2 (2.62)	3.015	2 (4.35)	2.809	0.60	Medium
Rural Life	8 (4.76)	4.533	10 (6.65)	4.421	0.43	Small

Extension *coordinators* indicated that their top five topics of instruction were plant growth, farming, careers, nutrition, and rural life. Extension *Unit Leaders* ranked farming, environmental, nutrition, conservation and biotechnology were the areas of greatest priority importance (Table 4.2).

Topics	Coordinators (N = 13)		Leaders (N = 52)		Effect Size	Cohen's Scale
	Rank (Mean)	SD	Rank (Mean)	SD		
Animals	9 (6.23)	5.166	9 (5.98)	4.612	0.05	Negligible
Biotechnology	11 (6.54)	5.487	5 (4.79)	4.202	0.39	Small
Careers	3 (3.00)	2.582	7 (5.08)	4.019	0.55	Medium
Conservation	8 (4.85)	4.160	4 (3.77)	3.110	0.32	Small
Environmental	6 (4.23)	3.833	2 (3.15)	2.933	0.35	Small
Farming	2 (1.85)	2.794	1 (2.81)	3.296	0.30	Small
Forestry	13 (7.46)	6.050	13 (7.67)	4.942	0.04	Negligible
History	10 (6.38)	5.140	11 (7.17)	5.268	0.15	Negligible
Insects	12 (6.85)	5.305	10 (6.10)	4.281	0.17	Negligible
Nutrition	4 (3.69)	3.521	3 (3.67)	3.324	0.01	Negligible
Plant Growth	1 (1.77)	1.964	6 (4.96)	3.880	0.89	Large
Renewable Resources	7 (4.54)	3.971	8 (5.63)	4.078	0.27	Small
Rural Life	5 (3.92)	3.861	12 (7.25)	5.231	0.67	Medium

The Soil and Water Conservation District *coordinators* selected conservation, renewable resources, environmental, farming and plant growth as their top five areas of instruction. Soil and Water Conservation District *Directors* ranked conservation, environmental, farming, renewable resources and forestry as the most imperative topics of instruction for their organization (Table 4.3).

Topics	Coordinators (N = 8)		Directors (N = 67)		Effect Size	Cohen's Scale
	Rank (Mean)	SD	Rank (Mean)	SD		
Animals	8 (3.00)	4.106	11 (8.49)	3.847	1.42	Large
Biotechnology	10 (3.38)	4.470	10 (7.87)	3.853	1.15	Large
Careers	11 (4.00)	5.632	9 (7.48)	3.874	0.85	Large
Conservation	1 (1.38)	2.722	1 (1.19)	0.875	0.16	Negligible
Environmental	3 (2.13)	3.758	2 (2.66)	1.675	0.27	Small
Farming	4 (2.38)	4.033	3 (3.52)	2.389	0.44	Small
Forestry	7 (2.75)	3.808	5 (4.90)	2.511	0.81	Large
History	6 (2.75)	4.234	8 (7.25)	3.653	1.21	Large
Insects	9 (3.25)	3.882	13 (9.22)	3.801	1.60	Large
Nutrition	12 (4.25)	4.862	12 (9.16)	4.125	1.17	Large

Plant Growth	5 (2.50)	3.625	6 (7.06)	3.571	1.28	Large
Renewable Resources	2 (1.63)	2.264	4 (4.00)	2.361	1.00	Large
Rural Life	13 (4.75)	6.319	7 (7.13)	3.684	0.59	Medium

Objective # 5

The fifth objective sought to explore coordinator beliefs that may limit the amount of integrating agriculture in the elementary education curriculum. The *agricultural literacy coordinators* were asked to respond to an open-ended question regarding the future needs for agricultural literacy. The major needs identified by agricultural literacy coordinators were more funding, finding more volunteers, instructing to both rural and urban areas, stronger agricultural literacy networks, more youth focus, better qualified individuals (both teachers and agricultural literacy counterparts) and ensuring that students understand the impact that agriculture has in society. The agricultural literacy coordinators also suggested the need for better teaching materials in biotechnology, environment, conservation, renewable resources, and health.

Areas of Need	
Funding	38%
Better materials for Biotechnology, Environment, Conservation, Renewable Resources and Health	38%
Urban and Rural Areas	24%
Volunteers	16%
Ensuring awareness of agriculture's importance	14%
Youth	12%
Stronger Networks	12%
Qualified Individuals	4%

Note. Total percent will exceed 100% because coordinators may have listed more than one need.

Conclusions/Recommendations

Elementary teachers in this study were experienced teachers who taught English, reading, math, social science, and science to primarily first through fifth graders. Perhaps the 17 years of (average) teaching experience would explain why the elementary teachers felt they had some influence in performing the abilities necessary, and saw value to integrate agriculture into their instruction. There is much room for growth in recruiting elementary teachers to participate in workshops and in-service education programs related to agriculture, food, and the environment. The data regarding Summer Agricultural Institute (SAI) participants was not available at the time of publication, but it was estimated that 3% of the elementary teachers in Illinois have participated in a SAI. Needs assessments should be conducted to determine effective means to recruit a broader base of teachers to participate in educational workshops related to agricultural, food, and the environment and determine appropriate professional development models.

Elementary teachers in this study taught food, consumer, and general agricultural topics about once a year. It appeared that elementary teachers integrated food, consumer, and general

agricultural topics such as plants, animals, insects, biotechnology, and the environment occasionally. Elementary teachers appear to need to more professional development opportunities on how to develop activities, identify resources, and connect agricultural topics to Illinois Learning Standards, explain agricultural concepts to their students. Teachers expressed that they need to feel comfortable to integrate agriculture more frequently into their instruction. Curriculum analyses should be conducted and teachers should be interviewed to determine relevance and fit of agricultural topics and activities in elementary education curricula. Further, elementary teachers' mental pictures of agriculture should be studied to determine their mental frameworks on how they relate to agricultural topics.

Elementary teachers' efficacy expectancy, outcome expectancy, and value beliefs were related to the amount of integration regarding agricultural careers, agricultural impact, and general agricultural topics. Teachers who feel more confident, foresee positive outcomes, are interested, see relevance, and are willing to expend necessary effort appear to be more likely to integrate agricultural topics into their instruction. Although elementary teachers expressed that there was a lack of time to integrate agriculture, they did agree that it would not lower the level of thinking, nor that agriculture was an outdated topic in today's post-modern era. Teachers concurred that they needed instructional resources, in-service education, and assistance in feeling more comfortable to integrate agriculture into their instruction. Further research should be conducted to determine which of belief factors are more important to predicting the likelihood of integrating agriculture, and which educational opportunities would be most beneficial for elementary teachers.

Agricultural literacy coordinators that do conduct Summer Agricultural Institutes on average conduct 3-5 SAI's per year. However, 33% of agricultural literacy coordinators do not conduct SAI's. This finding could be connected to the finding that 76% of agricultural literacy coordinators do not have Master's degrees. The implication of this finding is that since the majority of coordinators do not have a Master's degree, they are then unable to conduct SAI's that give teachers college or in-service credit for attendance.

Seventy-five percent of Illinois agricultural literacy coordinators have been in their position for less than five years. Sixty percent are Farm Bureau affiliated and most have agriculture backgrounds, but have not studied agriculture in an educational setting. Due to the fact that agricultural literacy coordinators have not studied agriculture in a formal educational setting a good deal of information presented to elementary teachers may be based upon personal beliefs and experiences. Additionally, a great deal of the agricultural literacy coordinators studied are novices at their jobs. Research on novice versus expert teachers indicates that teachers possessing less than five years of experience are still highly focused on learning the curriculum and managing routine tasks of teaching rather than reflecting deeply upon methods that engage students. This premise could be extended to novice agricultural literacy coordinators who instruct teachers in SAI's. Further research is warranted to explore the issues, needs, and techniques of novice agricultural literacy coordinators.

Education is the most important facet of agricultural literacy's definition and purpose. Upon compiling the agricultural literacy coordinators' responses for the definition of agricultural literacy, overall agricultural literacy was defined by the participants as, the education of

agriculture to both youth and adults that illustrates the role of agriculture in society through a variety of topics and concepts. Agricultural literacy uses hands-on activities, organizational partnerships and is integrated into existing elementary curricula to reach as many students and parents as possible.

Further, agricultural literacy coordinators indicated that the major purpose of agricultural literacy was to educate through a variety of subjects and with a variety of methods to youth, teachers, and other adults. The coordinators indicated that agricultural literacy should promote agriculture in a positive manner and could be used to present agriculture in a unified presence. The final group of purposes of agricultural literacy was to utilize workshops for teachers to ensure that the teachers have up-to-date, accurate information so agriculture can be integrated into elementary classrooms.

There were very few differences between Farm Bureau coordinators' ranks of agricultural literacy topics most frequently instructed and Farm Bureau managers' ranks of agricultural literacy topics with the greatest priority for instruction. Coordinators and managers were aligned in the top three ranks of instruction and priority as farming, renewable resources and careers. This finding suggests that the organizational culture of the Farm Bureau is highly aligned. Farm Bureau coordinators and managers are well coordinated with what they say they should do on one end of the organizational chain, to what they actually do on the other. This finding could be supported by the fact that the Farm Bureau organization was the initial leader in agricultural literacy education with Ag in the Classroom. Another explanation of this result could be that Farm Bureau is highly organized in its methods of education and aids in enforcement of agricultural literacy topics.

There were negligible differences between Extension coordinators' ranks of topics most frequently instructed and Unit Leaders' ranks of agricultural literacy topics of priority for instruction. The Extension coordinators ranked plant growth, farming and careers as their three most frequently instructed topics. The leaders ranked farming, environmental and nutrition as the topics of greatest priority for instruction. The most significant difference in rank occurred with the plant growth topic. Its effect size was 0.89. This finding implies that Extension coordinators are more comfortable with plant education than the leaders realize. Further, Extension coordinators could teach plant growth due to teacher need and demand.

There were large differences between Soil and Water Conservation coordinator ranks of topics most frequently instructed and District Director ranks of topics for instructional priority. Except for conservation, environmental, farming, and rural life all other topics had large differences in their rank and standard deviation. The coordinators felt that conservation, renewable resources, and environmental topics were most frequently conducted. The Directors reported that conservation, environmental, and farming topics were the organization's highest priority topics. The large differences between the ranks could suggest that coordinators aren't as closely aligned to organizational priorities. It is recommended that Soil and Water Conservation District coordinators and directors meet to discuss organization priorities and evaluate the degree to which those priorities are being fulfilled.

Farm Bureau, Extension, and Soil and Water Conservation districts are organizations with differing values and missions, but are all deeply rooted in agriculture. The top topics most frequently instructed and of the greatest priority were different for each organization.

Farm Bureau's topics of greatest priority were farming, renewable resources, careers, biotechnology, and conservation. Extension's topics of highest rank included: farming, environmental, nutrition, conservation and biotechnology. Soil and Water's top five areas for agricultural literacy instruction included: conservation, environmental, farming, renewable resources and forestry. All three organizations ranked farming and conservation in their top five areas for agricultural literacy. In addition, renewable resources, biotechnology, and environmental topics were listed by two organizations in the top five. The topics that were the most different among the organizations' top five were careers, nutrition, and forestry. These three different topics may indicate the impact of organizational culture and organizational history on the activities of the organization.

The largest needs for agricultural literacy as indicated by agricultural literacy coordinators are funding and materials for biotechnology, environment, conservation, renewable resources, and health. This finding implies that agricultural literacy coordinators attempt to be responsive to current issues in agriculture and base instruction upon those. Biotechnology, as a high technology topic, could be much more expensive to teach in a hands-on manner due to the cost of equipment and instructional aids. Coordinators and leaders should be supported in efforts to seek funding sources to assist with the cost of providing cutting edge, hands-on agricultural literacy instruction.

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