

Importance of Agricultural Renewable Energy Curriculum Topics

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Abstract

The rationale for this study was that Kentucky high agriculture students were scoring very low on the state agriculture mechanics' skills test in the area of alternative energy. The researcher wanted to investigate this problem to determine potential causes for the low performance. Alternative energy is a relatively "new" subject in the agricultural mechanics' curriculum. Teacher familiarity with the subject and curriculum resources availability could impact the instruction of this topic. The objectives of this study were to establish the importance of agricultural renewable energy as a curriculum topic, determine the topics of relevance, and to ascertain the amount of instructional time that would be devoted to such topics as perceived by Kentucky secondary agriculture instructors. One hundred and fifty six secondary agriculture teachers were surveyed and their responses were coded and subjected to statistical analysis. Descriptive statistics were utilized to describe the demographics of the sample surveyed such as teaching experience, age, gender, and the school's urbanicity. Pertinent findings based on the data were the following. Agricultural renewable energy was very important for inclusion into the secondary curriculum. Teachers would dedicate up to nine class periods of instructional time. Six renewable energy topics were ranked for selection into the curriculum. An outcome of this study will be the development of agricultural renewable energy instructional units to distribute to agriculture teachers.

Keywords: Renewable energy, curriculum

1. Introduction

Agriculture consumes a tremendous amount of energy. Besides the fuel used in the food and fiber production, great amounts of energy are used to produce inputs such pesticides and fertilizers. The U.S. agriculture industry used nearly 800 trillion British thermal units (Btu) of energy in 2012, or about as much primary energy as the entire state of Utah. (EIA 2014) Energy from renewable sources accounted for 12.2% of the energy consumption in the United States. Electricity generated from renewable sources accounted for 14.94% of the total domestically produced electricity in the United States. (EIA 2016) A comprehensive study by the Department of Energy's National Renewable Energy Laboratory (NREL) reports the U.S. can generate up to 80 percent of its electricity from renewable energy by 2050. (NREL 2019) Given the tremendous amount of energy consumed and the potential for a greater percent coming from renewable energy sources, will the consumers be ready for the potential shift in the source of energy for electricity generation?

Support or disapproval for new energy sources is more likely to be based on personal values and experiences, as well as what we perceive to be the stances of others we trust. As a result, it's important to understand that people may harbor different views concerning new energy technologies based on their personal values and experiences, as well as the views held within their social networks, (Boudet 2019). Public opinion about energy issues is widely supportive of expanding both solar and wind power. (Pew 2016) As our society and electricity production progresses towards more renewable energy, educating students and providing them experiences with renewables will assist in the shift.

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Research question(s):

Will Kentucky agriculture teachers find the teaching of renewable energy important?

Null Hypothesis(s):

Kentucky agriculture teachers will not find the teaching of renewable energy topics important.

2. Methods

The survey instrument was distributed to Kentucky agriculture teachers during a statewide conference session. The researcher utilized this method to obtain the highest response rate, (62%). The survey contained a series of questions where participants could answer, using a Likert Scale, by stating that they strongly agree, agree, neutral, disagree, or strongly disagree. Demographic questions were also asked to determine if there were differences among the demographic groups and their responses. The survey data was compiled utilizing Microsoft Excel and the statistical analysis was conducted using SPSS program.

3. Results

Fifty eight percent of the respondents were male agriculture instructors and forty two percent were female. Years of teaching experience for the respondents are shown in Table 1. Thirty nine percent and fifty eight percent responded it was important and very important to teach renewable energy. Sixty seven percent of the agriculture teachers are not currently teaching any renewable energy topics. Thirty two percent responded they were.

Table 1: Teaching Experience

Years of Teaching Experience	Percent
1-5	40
6-10	20
11-15	12
16-20	12
21-25	11
30+	5

The results of the following research questions are displayed in Table 2.

1. How important is renewable energy to the World's future energy demand?
2. How important is renewable energy for Kentucky's future energy demand?
3. How important is renewable energy for creating jobs in the agriculture industry?
4. How important is it to introduce grades 5-12 students to the concept of renewable energy?

Table 2: Renewable Energy Importance

Response	World	Kentucky	Jobs	Introduce
Some Importance		2.3	7.0	2.3
Important	34.9	41.9	44.2	39.5
Very Important	65.1	55.8	48.8	58.1

When asked how many class periods the respondent would dedicate to teaching renewable energy instruction the results were fifty eight percent would dedicate 1-3 instructional periods. Twenty three percent stated 4-6. Seven percent answered 7-9 periods and nine point five percent indicated 10 or more periods of renewable energy instruction. The respondents were asked to rank the renewable energy topics appearing in Table 3 according to their importance to Kentucky. Table 3 displays the mean rank by the agriculture instructors.

Table 3: Renewable Energy Importance to Kentucky

Topic	Mean Rank	Rank
Comparison of fossil fuels vs. renewable energy	2.6	1
Solar	4.0	3
Wind	6.3	8
Geothermal	5.0	6
Oil crop/Biofuel	3.4	2
Biomass	4.9	5
Hydroelectricity	5.3	7
Ethanol Production	4.4	4

4. Conclusion

The majority of the Kentucky agriculture instructors perceived the teaching of renewable energy topics to be important or very important. The majority of the teachers would dedicate up to three instructional periods to teach renewable energy topics. Two-thirds of the agriculture teachers currently do not teach any renewable energy topics which is congruent with the majority of teachers which responded they do not have any instructional resources for renewable energy. Based on the findings of the study the researcher concluded that alternative energy instructional units should be developed with regard to the following areas:

Fossil fuels verses Alternative Energy
 Oil crop/Biofuels
 Solar
 Ethanol Production

A limitation of this study was the opinions of agriculture teachers who chose not to participate were not contacted to determine if they were different than the respondents. A second limitation is the findings cannot be generalized for any other agriculture teacher population.

5. References

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