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Local Applications of the National Livestock and Poultry Environmental Stewardship Curriculum

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Abstract. *Leave the word "Abstract." Then type your abstract here.*

This paper introduces the LPES curriculum project, summarizing the curriculum development process, the final curriculum materials, and the outreach activities. Following an overview of the LPES Curriculum Impact Survey, the authors will present representative examples of uses and modifications made of the LPES curriculum as it is used with targeted audiences. This model for utilizing national expertise to address state and local educational needs may have benefit in other extension education programs as land grant university resources decrease. The paper concludes with a discussion of lessons learned from this national extension education curriculum development effort.

Keywords. Manure management, Environmental education,

Local Applications of the National Livestock and Poultry Environmental Stewardship Curriculum

Introduction

With the implementation of the U.S. EPA Concentrated Animal Feeding Operation (CAFO) regulations in December 2002, it has become increasingly critical that American livestock and poultry producers and their advisors understand current environmental regulations and principles of environmentally sustainable animal production. To comply with new regulations and plan a suitable management system, producers and advisors must have access to relevant, science-based knowledge that addresses the environmental issues facing agriculture. By utilizing the knowledge and experience of a national team of experts, the Livestock and Poultry Environmental Stewardship (LPES) curriculum was developed and shared nationally to assist state and local educational programs in providing that desired access.

In this paper, the authors will discuss the LPES curriculum project, summarizing the curriculum development process, the final curriculum materials, and the outreach activities. Following an overview of the LPES Curriculum Impact Survey, the authors will present representative examples of uses and modifications made of the LPES curriculum as it is used with targeted audiences. This model for utilizing national expertise to address state and local educational needs may have benefit in other extension education programs as land grant university resources decrease. The paper concludes with a discussion of lessons learned from this national extension education curriculum development effort.

Mission and Objectives

The LPES Curriculum Project's mission—to deliver a national curriculum and supporting educational tools to U.S. livestock and poultry information providers, who in turn will help producers acquire certification and/or achieve environmentally sustainable production systems—was to be accomplished by meeting three primary objectives:

1. *To protect soil, water, and air quality, develop a nationally recognized, producer-oriented core curriculum targeting livestock and poultry manure management.* This curriculum will facilitate individual state efforts to implement quality educational programs addressing management and compliance topics. (Year 1: 1999-2000)
2. *Review and pilot test this curriculum across the country.* A team of land-grant extension specialists, NRCS staff, and EPA staff will participate in the review process. Cooperative Extension specialists will pilot test the curriculum with producers. (Year 2: 2000-2001)
3. *Distribute this curriculum to information providers and producers.* Multiple delivery methods will be used and regional in-service programs will be conducted to introduce the curriculum to information providers. (Year 3: 2001-2002)

Curriculum Development

With funding from the U.S. Environmental Protection Agency (EPA), a national team of more than 30 experts from land-grant universities, the EPA Agricultural Compliance Assistance Center (Ag Center), MidWest Plan Service (MWPS), and the U.S. Department of Agriculture's Natural Resource Conservation Service (USDA NRCS) collaborated in the 3-year development of the LPES curriculum materials.

To complete the objectives, three teams with more than 30 participants were assembled: Author, Review and Pilot, and Access. The Author Team was responsible for developing the lessons and presentations. The Review and Pilot Team, as its name suggests, was charged with recruiting technical reviewers in six regionally distributed states and several agencies (EPA and NRCS) to review each lesson and regionally

pilot test the lessons in workshops. Funding agency representatives from the NRCS and the EPA Ag Center staff were also members of the team. The Access Team devised multiple means for the target audiences to obtain the completed curriculum, including electronically via the EPA Ag Center website and in hardcopy publications from MWPS.

The author team prepared a curriculum design which focused educational material development in the areas of animal nutrition, manure storage and treatment, land application and nutrient management, and air quality (see Figure 1). Authors were identified that were recognized nationally for expertise in areas related to each of these topics. Two face-to-face meetings of the author team near the beginning of this project solidified the curriculum design, author selection, and individual lesson organization. These meetings also contributed to the development of a shared purpose and clear understanding of expectations.

A standard look and format was established which included a written summary of an issue, producer-friendly environmental stewardship and/or regulatory compliance assessment tools, and supporting PowerPoint presentation with speaker's notes for use in educational settings. For user convenience, the LPES curriculum materials are now available in the following formats:

- A searchable CD containing the 26 lessons in PDF format, the PowerPoint presentations, and the assessment tools
- A 3-hole-punched printed set of the lessons, including the assessment tools
- A 2-CD set of PageMaker files that can be adapted to state or regional needs
- Online PDF files of individual lessons (and one sample PowerPoint presentation, the presentation for Lesson 2) at the LPES website

The lessons underwent a rigorous review process; they were ultimately reviewed on three occasions including 1) an internal author team review, 2) a peer reviewed by members of the Review and Pilot Team, and 3) a final review occurring during the pilot-testing phase.



Figure 1. Lesson organization of LPES curriculum.

Outreach and Delivery Activities

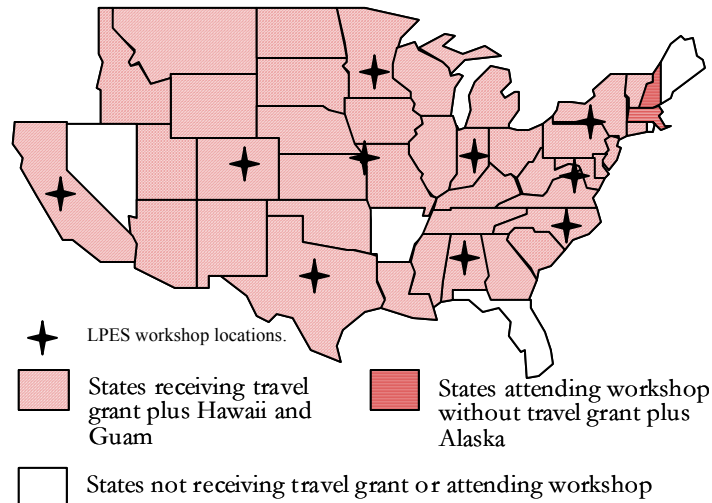
As the curriculum was being finalized and pilot tested, a series of presentations were made before various potential audiences or organizations with a potential interest in the curriculum project. The intent of these presentations was to expand awareness of the planned product and to encourage discussion of how this educational resource could be integrated into stakeholder activities. By the end of 2002, 25 presentations were made to more than 1300 participants representing groups such as International Certified Crop Advisors board of directors, USDA Animal Waste Initiative participants, poultry industry, soil and water conservation district representatives, and EPA Ag Sectors Contacts.

In July 2001, the LPES website first became available for viewing at www.lpes.org (see Figure 2). To date, the website has received more than 20,000 visits, averaging more than 1,500 visits per month. Other statistics indicate that users view an average of 14 documents per visit and 21,560 documents per month. The average number of homepage visits per month, 460, suggests that users are using web browsers and searching for specific topics at the site rather than first visiting the homepage.



Figure 2. LPES web site (www.LPES.org).

The final LPES products were introduced nationally through 11, one-day regional workshops held throughout the United States during a six-month period. A total of 475 people from 46 states, the territory of Guam, and two Canadian provinces attended the workshops (see Figure 3). More than 40% of the participants were from land-grant universities and about 60% were from state and federal agencies, livestock associations, and other agricultural organizations and businesses.



To promote attendance at the LPES Workshops, the EPA Ag Center provided funding for travel grants to partially cover the travel expenses of state teams. Grants ranging from \$1,000 to \$2,500 were available to state teams. State teams were asked in return to provide (1) a one-page summary of their plans to implement LPES curriculum materials, and (2) one year later, a one-page report of the activities completed in their state. A total of 43 states received a grant.

Other outreach activities included:

- Stakeholder awareness was encouraged through a series of 5 newsletters, one conference call, and multiple direct contacts. Several stakeholders have become more actively tied to this project through their participation in an LPES executive committee that guides the continuation of the LPES efforts.
- A promotional brochure of which more than 10,000 have been distributed over the past four years.
- An overview presentation which has been shared among team members for promotional and informational overview presentations
- Two posters illustrating LPES purpose and sample applications.

LPES Curriculum Impact Survey

As a stipulation of their travel grant, state team leaders, generally from the land grant university, were asked to prepare, approximately one year later, a report of the activities featuring the LPES curriculum materials that they had planned, implemented, or completed in their state. Of the 43 states receiving travel grants, 38 team leaders responded to the State Team Leader Curriculum Impact Survey (see Appendix A).

When the state team leaders' responses were examined, the data indicated that the LPES materials were most often used to supplement existing resources (34 of 38 responses) or to support oral presentations (30 of 38 responses). Only 12 responses suggested the LPES material was a primary reference for new resources. The value of LPES material as a supplement, not an independent curriculum, was also common in the examples.

States regularly used the LPES to supplement in-depth educational programs. Fifteen of the 38 state responses indicated that the material was being used in certification programs and an additional 15 responses suggested use with "other, in-depth education". Again, the example applications shared

suggested that the LPES materials were regularly being used as part of in-depth educational programs. Sample applications of the LPES curriculum are summarized in Table 1.

Team leaders reported that the largest group of audience members for these oral presentations or awareness programs was from a land-grant university or government agency. The second largest group of audience members was from a producer association. Audiences most often received information contained in the Manure Storage and Treatment module or Land Application and Nutrient Management module. The Introduction and Animal Dietary Strategies modules were the next most often used.

Table 1. Sample applications of LPES materials.

State	Contact	Summary of LPES Application
Georgia	Mark Risse, U. of Georgia	Continuing education credits for certification training of operators and nutrient management planners. Developed in cooperation with Georgia Department of Agriculture
Illinois	Ted Funk, U. of Illinois	Beginning in 2002, LPES lessons serve as the Certified Livestock Manager's program manual. <i>Principles of Environmental Stewardship</i> ; and lessons from Manure Storage and Treatment module; Land Application and Nutrient Management module; and Outdoor Air Quality module are emphasized.
National	Don Jones, Purdue University	A team is developing a Model Certification Training Program for CAFO Operators using LPES materials as a basis for a nine-lesson program. Development effort is funded by the National Center for Manure and Animal Waste Management
North Carolina	Frank Humenik, North Carolina State University	LPES curriculum materials have been approved for use as part of the continuing education coursework required for certified animal waste applicators in North Carolina.
Utah	John Harrison, Utah State University	Utah's Agriculture Environmental Management Information System, based on the LPES curriculum, stores information in a relational database, enabling information to be efficiently retrieved through web-based technologies.
Kentucky	Monroe Rasnake, University of Kentucky	University of Kentucky as part of the Kentucky Environmental and Natural Resources Issues Task Force, drew heavily from seven LPES lessons to develop a "basic" nutrient management plan (NMP) workbook. The workbook was the foundation for an NMP training session that Kentucky nutrient management planners must take to become certified.
Texas	Saqib Mukhtar and Ellen Jordan, Texas A&M University	Materials have been used in extension education programs targeting the dairy industry with a focus on lessons addressing dietary strategies and open lot odor and dust control. Programs are collaborative with TX Natural Resource Conservation Commission and USDA NRCS
Michigan	Robert von Bernuth of Michigan State University	MSU teamed with the Michigan Department of Agriculture, and the NRCS to implement CNMP workshops for 240 public and private agency advisors and consultants. Lesson 2 on Whole Farm Nutrient Balance and other nutrient management lessons were utilized.
New York	Peter Wright, Cornell University	The 11-member Agriculture Environmental Management (AEM) Outreach Committee is using the LPES curriculum materials in combination with the existing AEM assessment worksheets and New York State's CAFO regulations. Cooperative Extension, Department of Agriculture and Markets, USDA-NRCS, Soil and Water Conservation Districts, and New York Farm Bureau are participating in its development.

When asked to rate the value of the various LPES products, state team leaders ranked the PowerPoint presentations and the printed lessons as being the most valuable. The searchable CD also received high

ratings. A large number of the team leaders indicated that they had not used the 2-CD PageMaker set and the assessment tools. This would suggest that few individuals were modifying the LPES materials to meet state or local needs. The LPES materials appear to be mostly likely used intact and supplemented with local resources.

The LPES materials had been used to supplement or support a wide variety of applications, including certification, computer databases, general information, and regulatory compliance. In this section, the authors will provide representative examples of those applications, discussing how the LPES curriculum materials were implemented at local educational programs.

Ongoing and Future Activities

LPES Executive Committee

An LPES Executive Committee was assembled to ensure that future LPES activities addressed issues of national interest, were compatible with EPA and USDA needs, and continued to promote producer access to science-based information about livestock and poultry environmental issues. With 20 members, the committee includes representation from the EPA Ag Center, USDA (CSREES and NRCS), commodity and professional associations, and land-grant universities. The land-grant university participants were selected to ensure regional and multi-disciplinary representation. When the new CAFO rules were released in December 2002, regulatory issues were given first priority, and the committee authorized the development of the LPES CAFO Fact Sheets.

LPES CAFO Fact Sheets

An LPES CAFO Work Group, headed by Al Sutton of Purdue University and Brent Auvermann of Texas A&M University, is developing fact sheets to inform producers about the provisions of the new EPA CAFO rules and to recommend what steps they can take to comply. Four main author teams have been formed to prepare the fact sheets. Each team is addressing one of the following areas: (1) basic producer questions raised by the CAFO rule, (2) production area issues, (3) land application issues, and (4) provisions in the 2002 Farm Bill that may help producers comply with the revised CAFO rule. Aided by about 20 authors, these teams have completed 15 fact sheets with 5 additional fact sheets nearing completion.

During the review process, LPES team members or colleagues knowledgeable about the topic scrutinize each fact sheet. In addition, the EPA has agreed to formally review six key fact sheets. After being reviewed, the fact sheets will be distributed electronically and posted at the LPES website. The fact sheets will be available in Microsoft Word files, which will allow viewers to add state-specific information, and in PDF files, which will enable viewers to print high-quality documents.

LPES Update Newsletter

Current LPES authors or experts not previously involved with the LPES Curriculum Project are contributing articles to an LPES newsletter. Conceived to fulfill two major goals, the *LPES Update* newsletters (1) provide updates on new research or field experiences that support existing LPES curriculum materials and (2) encourage producers and educators to repeatedly access the LPES website, thus expanding and maintaining their awareness of the LPES materials. Following its electronic distribution to 475 individuals, primarily workshop participants, the newsletters are posted to the LPES website. State and local educators are encouraged to distribute these newsletters to producers and other interested parties.

USDA-CSREES Proposal

On April 7 and 8, 2003, several LPES executive committee members met in Kansas City to discuss the development of a joint proposal in response to CSREES water quality funding opportunities. As a direct result of that meeting, a 16-member team was formed that included representatives from different geographic regions; with various technical backgrounds such as agricultural economics and public policy, agronomy, animal science, and engineering; and of agricultural commodity groups, the EPA Ag Center, several land-grant universities, the original LPES Curriculum Project, MWPS, the National Center for Manure and Animal Waste Management, and the USDA-NRCS. Under the guidance of the proposed project co-leaders, Rick Koelsch of the University of Nebraska and Frank Humenik of North Carolina State University, the team then assembled a proposal, applying for USDA-CSREES funding from its Integrated Research, Education, and Extension Competitive Grant Water Quality Program.

As their mission, the project team targeted the agricultural community and its stakeholders and their need to have direct, single-site access to high-quality, science-based information that addressed water quality issues unique to animal agriculture. To accomplish that mission, the team planned to build on current National Center for Manure and Animal Waste Management activities and implement a national information model that delivered water quality educational resources specifically tailored to the needs of animal producers, advisors, educators, policy makers, and regulators. More specifically, the team proposed to accomplish the following objectives:

- Identify high-quality, science-based resources of national and regional interest, and through a website, enable targeted audiences to access information tailored to their needs.
- Where appropriate, enhance and expand a national network of state, regional, and national contacts, promoting the exchange of information among relevant organizations and increasing the efficiency with which it is distributed.
- Host a series of national outreach workshops addressing high-priority water quality topics for field practitioners involved in animal feeding operation issues. These “train-the-trainer” workshops will enhance awareness of available resources, model educational program delivery strategies, and facilitate the adaptation of existing high-quality state resources to meet regional or national needs.

Noting the profound impact of the new EPA CAFO rules on animal agriculture, the team proposed to initially address the educational and technical assistance needs that these rules may require.

Lessons Learned

As land grant university resources for clientele based education resources diminish, it will be increasingly important for states to collaborate on a regional and national level to produce the high quality education products needed to address priority educational issues. The livestock and poultry environmental issues represent a priority issue drawing heavily upon the resources of state Cooperative Extension programs. The LPES project was able to assemble resources of nationally recognized experts into a comprehensive science-based educational curriculum that could be adapted to state and local educational programs. Our LPES project provided local educators with substantial timesavings in preparing local educational programs and credibility associated with a high quality educational product.

Many factors contributed to the success of this project. If the success of the LPES project is to be duplicated to address other extension educational needs, some of the following factors should be considered:

- Identification of a team was probably the single most important contributor to the success of this effort. Several factors are critical to a successful team. Most important was the individual team members’ strong commitment to extension educational programs. The shared team vision of

delivering science based educational resources for addressing livestock and poultry industry educational needs relative to environmental issues was fundamental to our success. Additional important team member selection criteria include the need for multi-disciplinary and regional representation on the team. One failing of our team was the lack of representation in several key disciplinary areas including economics, veterinary science (pathogen issues), and social sciences (neighbor relations and rural conflict resolution).

- Active involvement of stakeholders at an early stage of the project. Our funder, EPA Ag Center became an active team member involved in all planning meetings and communications from beginning of project. This involvement has simplified several mid-course corrections, built a strong sense of trust among all partners, and contributed to several succeeding joint activities. NRCS has been an active participant and staunch supporter of the LPES program from the beginning. However, this land grant university dominated project would have benefited from a more balanced NRCS and land grant university partnership. An awareness effort with the producer associations and other stakeholder groups was initiated more than one year prior to the release of the LPES curriculum. For most groups, this was the appropriate time. However, for some groups providing leadership for these issues such as the National Pork Producers Council (NPPC), we were remiss in not involving such industry leaders at an earlier date. Active involvement of the funding agency and stakeholders providing leadership is critical to an issue area such as animal manure management.
- Extensive peer review and pilot testing of educational programs targeted for use throughout the US was essential to the credibility and quality of our product. All authors brought many regional or local biases. The regional review and pilot testing helped eliminate many of those biases in final curriculum. It also provided a strong sense of security among the end users of the applicability of the final product to local situations.
- Flexibility for local modification of all educational products was critical to the end use of our educational products. Most local educators implemented our LPES resources as a supplement for existing educational programs, not as a stand-alone product. Providing the end user flexibility in adapting LPES resources to local situations provided a sense of ownership and participation by local educators. In the end, the importance of designing the written curriculum for local modification was less important than originally anticipated. Some states modified our written products but most states selected individual lessons and used them in their original form. Conversely, the flexibility of adapting power point presentations for local use appears to have been of great value.
- Delivery of this educational product was enhanced by two activities. First, promotion of the LPES product for more than a year in advance of its release created a strong interest in our products at the time they were released. Second, a relatively small carrot in the form of EPA funded travel grants provided big returns. Those travel dollars allowed us to encourage the land grant universities to actively recruit stakeholder participants. Travel support also made it practical for many to attend who might have found resources to be a key stumbling block or, at least, a convenient excuse.
- Team member recognition was one activity that our leadership did not properly plan and implement. Efforts were made to insure that all project team members' supervisors, deans and/or department heads were aware of the key contribution of each individual team member. However, the team had little opportunity to celebrate its success and to gain an appropriate level of recognition. If planned again, all project team members should be included in an author role to

obtain reasonable institutional recognition. Our system does not adequately recognize project team members who participated in the review, pilot testing, and access components of this project. In addition, the project team also deserved an opportunity to “celebrate its success” near the end of the project. The strong team camaraderie built during the project and the need to recognize the importance individual contributions suggested the need to celebrate our success at the conclusion of the project. Exemplary efforts deserve to be recognized.

The LPES curriculum is an example of a successful educational resource prepared for national distribution that has been successfully implemented locally. This approach has encourage efficient use of Cooperative Extension resources in delivery of a high-quality education resources to address an high profile issue. The combination of collaborative efforts of national experts, partnerships between land grant universities and other key stakeholder groups, and the flexibility of the end educational product for local use has contributed to the success of this effort. The lessons learned from this effort may benefit other land grant university efforts to encourage the use of science in addressing priority issues.



Appendix A

State Team Leader Curriculum Impact Survey Response Summary

States responding: Alabama, Arizona, California, Connecticut, Delaware, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming

States that have not yet used materials: Arizona and Connecticut

States not responding: Colorado, Guam, Maryland, New Jersey, and Oklahoma

1. How have you used LPES materials in your state? Identify up to three activities.

A summary of sample response is included in the text. A full summary of responses is available upon request from the authors.

2. What organizations/agencies/stakeholders were/are involved in these activities? Check all that apply.

33 Land-grant university 26 Producer association 31 Governmental agency

8 Environmental organization 10 other ag group

Other: 1 High school/college students, 1 Consultant, 1 Equipment providers, 1 Design & service engineers

Note: The above numbers indicate the responses of the state team leaders to this question about audience type, not the number of participants who attended these events.

3. How were/will the LPES materials be used in these educational activities? Check all that apply.

34 To supplement existing resources 15 In certification programs

12 As primary reference for new resource 15 In other, in-depth education

30 To supplement oral presentations 21 In awareness programs

10 To assist with producer risk identification 9 In one-on-one advising

Other: 1 Serve as model for curriculum development

4. From which of the following LPES modules did/will you use one or more lessons? Check all that apply.

19 Introduction 18 Animal Dietary Strategies 27 Manure Storage and Treatment

27 Land Application and 16 Outdoor Air Quality 10 Related Issues

Nutrient Management

5. Did you collect evaluation or impact data about producer/advisor attitudes, practices, or changes for educational programs based, in part, on LPES materials? Would you be willing to share it with us?

5 Yes 30 No

6. On a scale of 1 (very valuable) to 5 (little or no value), rate the value of these LPES products. If you have not used the product, enter "na" for "not applicable."

Number of Responses to	1	2	3	4	5	NA	Total Responses
Printed lessons	12	8	3	3	1	7	34
Assessment tools	3	4	8	4	1	14	34
PowerPoint presentations	15	6	4	0	4	5	34
LPES website	3	8	12	0	1	11	35
Searchable CD	8	12	3	3	2	6	34
2-CD PageMaker set	3	1	4	1	3	22	34
Total responses	44	39	34	11	12	65	205