



Learning Outcomes Assessment of the 4th International Symposium on Managing Animal Mortalities, Products, By- Products & Associated Health Risk

The 4th International Symposium on Managing Animal Mortality, Products, By-Products & Associated Health Risk was held in Dearborn, MI, from May 21—24, 2012. There were 147 participants from 8 countries (Australia, Canada, New Zealand, Nigeria, South Korea, the United Kingdom, the United States, and Vietnam). Attendees from the United States came from 27 States and the District of Columbia, and those from Canada represented 5 provinces. Eighty-five attendees responded to this Learning Outcomes Survey which was sent 6 months after the Symposium, (58 percent response rate). The following report is based on those 85 evaluations.

Learning Outcomes Assessment

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EXECUTIVE SUMMARY

The 4th International Symposium on Managing Animal Mortality, Products, By-products & Associated Health Risk succeeded in the following deliverables:

- Eighty-nine percent of attendees developed new or renewed partnerships and collaborations focused on meeting the needs of stakeholders.
- The Symposium fostered the exchange of technical expertise, best practices, new knowledge, and insights for issues surrounding animal mortality, products, by-products and associated health risk.
- Eighty-seven percent of attendees used materials or gained information and 90 percent took some action as a direct result of attendance at the Symposium.
- Attendance at the Symposium resulted in over half of the attendees working with new partners and collaborators, over one-third expanding an existing educational program or adapting an existing research project based on information gained at the Symposium, and over one-quarter expanding an existing research project.

INTRODUCTION

The 4th International Symposium on Managing Animal Mortality, Products, By-products and Associated Health Risk was held May 21-24, 2012, in Dearborn, MI. The Symposium, held every 2 to 2½ years, brings together government and industry officials, researchers, educators, and other stakeholders who work with animal mortality, and with depopulation, disinfection, and disposal (3D). These Symposia are held to strengthen collaboration and partnership, share research and standard operating procedures, and disseminate the newest information to all groups involved in mortality and 3D issues. This Symposium included pre-symposium tours, concurrent sessions, posters, exhibits, plenary and keynote sessions, a cross-border foot-and-mouth disease (FMD) response workshop, and demonstrations. The 2012 Symposium proceedings are available at <http://cwmi.css.cornell.edu/symposiumproceedings2012.pdf> and the presentations are available at <http://cwmi.css.cornell.edu/symposiumpresentations2012.pdf>.

The Symposium evaluation process was designed to assess the following:

- How well the Symposium encouraged the development of new or renewed partnerships and collaborations focused on meeting the needs of stakeholders.
- How well the Symposium fostered the exchange of technical expertise, best practices, new knowledge, and insights for issues related to animal mortality, products, by-products, associated health risks, and 3D.
- How many participants learned and adopted new or existing methodologies and resources for dealing with mortality and 3D issues.
- The planned and actual impacts of the Symposium.

- Basic feedback on the Symposium that will be shared with the funders and future Symposium planning committees.

The Symposium evaluation was performed in two stages:

1. An end of Symposium evaluation was conducted using the participant-completed hard-copy evaluation forms collected during the Symposium.
 - a. Results of this evaluation have been summarized in the “Evaluation Report Synopsis” submitted to the Symposium planning committee on November 16, 2012.
 - b. Seventy-nine of the 147 Symposium attendees filled out the hard-copy evaluation forms.
 - c. This evaluation indicated that the Symposium encouraged the development of new and renewed partnerships and collaborations, fostered the exchange of technical expertise and allowed for new knowledge and insights on animal mortality, products, by-products, associated health risks, and 3D issues. Participants learned about new and existing methodologies and resources that would be taken back with them to their respective countries, jobs, etc. and put to use.
 - d. Critical gaps in research, outreach, policy, and response capabilities that still need to be resolved were identified and suggestions were made for the next Symposium.
2. The Learning Outcome Survey (appendix A) was e-mailed six months after the Symposium to all participants to evaluate learning outcomes, the efficacy of the Symposium in enhancing knowledge, and changing attitudes and behaviors. The following is a summary of this survey.

RESPONDENT DEMOGRAPHICS

Eighty-five (57.8 percent) of the 147 Symposium attendees responded to the Learning Outcome survey. The majority of respondents were from the United States (table 1), representing 24 States and Washington, DC. The rest of the respondents were from Canada (four provinces), Australia (three regions), Nigeria, and the United Kingdom. Professional affiliation is also shown in table 1. Thirty-eight (45 percent) of the respondents were government affiliated and 30 (35 percent) were affiliated with an educational institution. The remaining 17 included 11 (13 percent) from the private sector, 4 (5 percent) with non-governmental organizations (NGOs), and 1 (1 percent) each with an international development agency and a research institute. Respondents to this survey were affiliated somewhat differently than the hard-copy survey where 59 percent were government employees, 17 percent were from an educational institution, 11 percent were from a research institute, 7 percent were from the private sector, and 5 percent were from an NGO.

SYMPOSIUM SATISFACTION

Respondents were asked two questions to gauge their satisfaction with the Symposium: 1) Did the Symposium meet your or your organization’s needs? 2) How satisfied were you with the information provided at the Symposium? Table 2 shows the answers to both questions.

Table 1: Survey respondent demographics—country and professional affiliation (n=85)

Country	Affiliation	Number	Percent of country	Percent of respondents
Australia	Government of public enterprise	4	100.0	
	Total Australia	4		4.7
Canada	Educational institution	3	21.4	
	Government or public enterprise	5	35.7	
	Non-governmental organization	2	14.3	
	Private sector	4	28.6	
	Total Canada	14		16.5
Nigeria	Educational institution	2	100.0	
	Total Nigeria	2		2.4
United Kingdom	Educational institution	1	100.0	
	Total United Kingdom	1		2.4
United States	Educational institution	24	37.5	
	Government or public enterprise	29	45.3	
	International development organization	1	1.6	
	Non-governmental organization	2	3.1	
	Private sector	7	10.9	
	Research institute	1	1.6	
	Total United States	64		75.3

Over half of respondents indicated that the Symposium completely met their or their organization's needs; almost half indicated they were completely satisfied with the information provided at the Symposium. No one indicated that needs were not met. Two indicated that they had no objectives for attending the Symposium. Six respondents specifically commented on whether or not their

Table 2: How well the Symposium met the needs of respondents or their organizations (n=82) and how satisfied respondents were with the information provided (n=85)

Needs Met	Number	Percent	Satisfaction	Number	Percent
Completely	52	63.4	Completely satisfied	42	49.4
To some extent	28	34.1	Satisfied	41	48.2
Not at all	0	0	Neither satisfied nor dissatisfied	3	3.5
Had no objectives	2	2.4	Dissatisfied	0	0
			Completely dissatisfied	0	0

needs were met.

From two that did not answer the question:

- “I was at only one day of the Symposium and I’m not sure what our “needs” are. Several of us attended various sessions and one later went to the composting educational week in Maine. I think we all enjoyed the Symposium and brought back a lot of good information.” (United States, government or public enterprise)
- “I worked at the Symposium and did not attend any meetings.” (United States, government or public enterprise)

From two that answered “to some extent”:

- “Nothing ever meets our needs completely so that’s too high a standard to set. It was a great meeting with important and timely talks and opportunities to network.” (United States, educational institution)
- “I felt that the Symposium was very well done, and I appreciated the updates on new research in composting. While many questions were answered, new ones were posed, which is why I cannot, in full honesty, say that all our needs were met. However, I truly appreciated the opportunity to learn new questions to ask.” (United States, government or public enterprise)

From two that answered “completely”:

- “There was a good variety of topics covered and a lot of opportunity to meet people in this field, with an extraordinary international perspective. The only thing that was not so good was that there were concurrent sessions in which I would have liked to be able to attend all presentations.” (United States, educational institution)
- “The Symposium provided new information on animal mortality and stimulated development of collaborations with the Department of Ag in developing new procedures for managing emergencies involving animal mortalities, and the development of new educational programs in the coming year.” (United States, educational institution)

Twenty-six people provided additional comments when completing the survey. These comments ranged from reasons why this Symposium was good to general observations about the logistical management of the Symposium and suggestions for the next one. All of these comments can be found in appendix D. Overall, feedback on the organization and content of the Symposium was positive indicating that the planning committee did a good job. There were a few specific suggestions on the Learning Outcomes survey for consideration now and at the next Symposium:

1. “I would appreciate seeing a summary of the [cross-border FMD] workshop findings placed on the Symposium website.”
2. “I look forward to more African participants at the next symposium. African researchers should be carried along in these emerging and very important discussions that border on human, animal and environment. Salvaging the problem of disease outbreak requires collective efforts of researchers all over the world. Disease does not recognize boundaries/borders of local, state,

country and continents. I am of the view that where possible, participants from Africa should be encouraged to attend this all-important Symposium by providing them with seed grant to cushion the cost of their participation. In addition, participants should be presented with certificate of participation at the end of the Symposium. In all, the planning, organization, and execution of the symposium were quite commendable. I look forward to future events!”

3. “I think that tours and demonstrations are great for this symposium and the next location should be prioritized based on both.”
4. “I would like to see more people there to be able to plan for events; I think there are still major gaps when we have disasters with livestock losses. I also think that we have put ourselves into alarming situations to maximize profit over sustainability when borders will close at some points in time for whatever reason.”

Based on respondents’ experiences at this Symposium, 89 percent said that they would attend the next Symposium. Of the remaining nine answers, seven said they would not attend and two said they may attend. The number of respondents who said they would attend again is slightly lower than the 95 percent who indicated on the hard-copy survey they would recommend the Symposium to a colleague.

SYMPOSIUM IMPACT

The Learning Outcomes Survey asked a series of questions designed to assess the long-term impact of the Symposium. (See questions 5 to 10 in appendix A). Of respondents to the question asking “if the information had been used,” 87 percent indicated they have used information presented at the Symposium, 12 percent said they had not and one person indicated she had not yet used any, but probably will in the future. Of the 73 respondents that answered yes, 60 explained how the information was used. These responses were tallied by sorting into the following categories: Collaboration, Education/Outreach, Planning, Policy, and Research.

Table 3 shows the number of responses, the percentage of people using the information, and the percentage of responses in each of the categories in which the information obtained at the Symposium was used. Individual responses, including country and affiliation of the person who answered, can be found in appendix B. The category in which the information and/or materials were most used was in education and/or outreach. Fifty-five percent of the people who indicated that they had used information and materials from the Symposium said that it had been used for educational purposes.

Over one third of respondents (12 of 33) used information gleaned on composting in one way or another and about one-quarter (8 of 33) indicated that general disposal information (one or more

Table 3: How Symposium information/materials have been used (60 people gave 72 responses)

Category	Number of responses	Percent of people	Percent of responses
Collaboration	6	10.0	8.3
Education/Outreach	33	55.0	45.8
Planning	11	18.3	15.3
Policy	11	18.3	15.3
Research	11	18.3	15.3

methods) had been incorporated into lectures or delivered to or discussed with colleagues, clients, or stakeholders. Symposium information and materials were used for planning, for policy, and for research by 11 people (18 percent) in each category. For planning, eight respondents were government employees who used information to

help set priorities or to better understand procedures available for disposal. In the policy category, 7 of 11 respondents used the information to revise to or to add to current policy. In the research category, new or revised research was performed by people from four of the five countries and four of the six professional affiliations represented by this survey. When asked if they would continue using the information or materials, only 1 of the 72 said no.

Most respondents said they had discussed or shared information with others. Only 4 of 82 respondents said they had not discussed or shared the information with others; all of them came from the United States (2 were affiliated with educational institutions and 2 with government or public enterprise).

Attendees were asked to pick the three sessions at the Symposium that were most and least useful to their work, even if they did not they actually attend the session (table 4). The question was intended to gain an understanding of the topics and/or delivery methods that would have the greatest impact on the largest number of people in the field. However, respondents were reluctant to “rank” sessions with one specifically saying “I’d prefer not to rank in this manner. Each presentation delivered ‘nuggets’ of useful information. To rank is to compare apples to oranges.” Therefore, although 70 respondents identified the most useful sessions, only 50 identified the least. One person, who picked only the most useful said, “Honestly, and this is a rare thing, I found all sessions useful to some extent”. Table 4 shows the results of this question (answers were not ranked as 1, 2 and 3 but as equally useful or not useful for each respondent).

Breakout session 5, Animal Mortality Composting, was the most useful session according to 39 percent of respondents. Reasons given for this session’s usefulness included:

- Content: Three attendees indicated that the content of this breakout session made it the most useful as indicated by the following comment: “Animal mortality composting was entirely new

Table 4: The most and least useful sessions as rated by respondents

Session	Most useful (n=70)		Least useful (n=50)	
	Number	Percent	Number	Percent
Pre-Symposium Tour A—CIFA Import Station	8	11.4	8	16.0
Pre-Symposium Tour B—Rendering	6	8.6	8	16.0
Pre-Symposium tour C—MSU Research and Education	9	12.9	4	8.0
May 22 Keynote—Don Klingborg	3	4.3	6	12.0
May 22 Plenary—Gary Flory	6	8.6	4	8.0
Breakout Session 1—Emergency Response and Policy	18	25.7	6	12.0
Breakout Session 2—Alternative/Mechanical Disposal	5	7.1	4	8.0
May 22 Plenary—Juan Reyes	3	4.3	9	18.0
Breakout Session 3—Environmental Effects of Disposal	20	28.6	4	8.0
Breakout Session 4—Depopulation, Decontamination/Disinfection & Recovery	9	12.9	4	8.0
May 23 Keynote—Dr. Heekwon Ahn	19	27.1	6	12.0
May 23 Plenary—Dr. Steven Halstead	3	4.3	4	8.0
Breakout Session 5—Animal Mortality Composting	27	38.6	3	6.0
Breakout Session 6—Depopulation, Decontamination/Disinfection & Recovery	18	25.7	1	2.0
May 23 Plenary—Tom Glanville				
Breakout Session 7—Policy and Education	3	4.3	16	32.0
International Panel	5	7.1	7	14.0
Breakout Session 8—By-products and Foods of Animal Origin	2	2.9	14	28.0
Poster Session	2	2.9	13	26.0
Cross-border FMD response workshop	18	25.7	12	24.0
Demonstrations	20	28.6	3	6.0

to me and I am very optimistic that it is a technology which when acquired and perfected through training and retraining of experts in Nigeria will help handle large-scale animal mortality in my country.”

- Direct correlation with position or job: Six attendees indicated their job or position made this session most useful as shown by the following comment: “As a manufacturer of in-vessel composting equipment primarily focused on the animal mortality industry, it is beneficial to keep up with the latest advancements in animal mortality composting and animal by-product disposal methods.”

Approximately one-quarter of respondents felt that breakout Sessions 1, 3 and 6, as well as Dr. Ahn’s keynote address, and the cross-border FMD response workshop, were the most useful sessions for their job or position. Thirty-four respondents gave reasons for their choices and these can be found in appendix C. In most cases, the reason for a session’s usefulness was either that the

content was informative or interesting (13 of 34), or the subject matter had a direct correlation with the respondent’s position or job (15 of 34). The FMD workshop and demonstrations were cited as useful not only because of content but also because of the method of information delivery. Sessions rated as least useful were so rated because they did not directly correlate with the respondent’s position, job, or interests. Other than the poster session, which 26 percent indicated was least useful and only 3 percent said was most useful, the results of this question give equal “most” and “least” useful for each session, which indicates that there was a good mix of sessions for the varied interest and positions of all attendees.

Table 5: Number of new or renewed partners or collaborators with whom respondents have been in contact (n=85)

Number of partners/collaborators	Number of responses	Percent of responses
None	10	11.8
One to two	36	42.4
Three to five	29	34.1
Greater than five	10	11.8

Table 5 shows how many new or renewed partners or collaborators respondents have been in contact with since the Symposium. As more than 75 percent of respondents indicated they have been in contact with between one and five new or renewed partners, it appears the Symposium successfully established contacts and helped with collaboration.

The last question asked to assess Symposium impact had respondents check off statements that described their actions as a result of attending the Symposium. Forty-five of the 83 people (54 percent) who answered this question reported doing 1 or 2 of these actions as a result of the Symposium (table 6) and 35 percent reported doing 3 or more.

Table 6: Number of actions taken by attendees as a result of the Symposium (n=83)

Number of actions	Number of responses	Percent of responses
None	9	10.8
One	20	24.1
Two	25	30.1
Three	15	18.1
Four	7	8.4
Five	4	4.8
Six	2	2.4
Seven	1	1.2

Table 7 shows the specific actions and the number of respondents that undertook each. More than half of those answering the survey indicated that as a result of attending the Symposium, they “identified one or more partner(s) or collaborator(s) to work with this year”. Almost half indicated that they “adapted an existing program/project based on information gained”. One quarter or more of the respondents indicated that they had completed each of the following: “expanded an existing education or outreach program”, “expanded an existing research project” and/or “adapted an existing program/project to better meet the needs of stakeholders”. The fact that all of these actions were taken indicates that the Symposium had a very positive impact on the attendees. Two people specifically identified their actions:

- A Canadian government employee: “Identified areas for potential enhancement; confirmed much of what we are already doing. Used information to support funding of a research proposal.”
- A United States educational institution employee: “There was a question about how hot the bone marrow got during composting. We had the opportunity, because a cow was being put into a compost pile in another project, to drill into the bone and place temperature probes there to record what was happening inside the bone.”

Table 7: Specific actions taken by Symposium attendees (n=83)

Action	Number of responses	Percent of responses
Expanded an existing education or outreach program	30	36.1
Designed and implemented a new education or outreach program	5	6.0
Completed a funding request for a new or existing program	8	9.6
Expanded an existing research project	22	26.5
Designed and implemented a new research project	8	9.6
Completed a funding request for a new or existing research project	6	7.2
Identified one or more partner(s) or collaborator(s) to work with this year	48	57.8
Adapted an existing program/project based on information gained	36	43.4
Adapted an existing program/project to better meet the needs of stakeholders	19	22.9

APPENDIX A: LEARNING OUTCOME SURVEY

1. Please indicate where you are from by filling in the boxes below
 - a. Country
 - b. State/Province/Region
2. What is your professional affiliation?
 - a. Government or public enterprise
 - b. Research institute
 - c. Private sector
 - d. Educational institution
 - e. Non-governmental organization
 - f. International development agency
 - g. Other (please specify)
3. Did the Symposium meet your or your organization's needs?
 - a. Completely
 - b. To some extent
 - c. Not at all
 - d. Had no objectives
 - e. Other (please specify)
4. How satisfied were you with the information provided at the Symposium?
 - a. Completely satisfied
 - b. Satisfied
 - c. Neither satisfied or dissatisfied
 - d. Dissatisfied
 - e. Completely dissatisfied
5. Have you used any of the information and/or material(s) provided in your job?
 - a. Yes
 - b. No
6. If the answer to question 5 is "yes", please give details of use.
7. Do you expect to continue to use this information/material(s) in the future?
 - a. Yes
 - b. No
8. Have you discussed and/or shared the information with others?
 - a. Yes
 - b. No

9. With how many new or renewed partners or collaborators have you been in contact since the Symposium?
- None
 - 1 – 2
 - 3 – 5
 - > 5
10. Please place a check next to each of the below statements that describe your actions as a result of this Symposium
- Expanded an existing education or outreach program
 - Designed and implemented a new education or outreach program
 - Completed a funding request for a new or existing program
 - Expanded an existing research project
 - Designed and implemented a new research project
 - Completed a funding request for a new or existing research project
 - Identified one or more partner(s) or collaborator(s) to work with this year
 - Adapted an existing program/project based on information gained
 - Adapted an existing program/project to better meet the needs of stakeholders
 - Other (please specify)
11. From the drop down menu please select the three most AND the three least useful sessions for your work (which you may or may not have attended) and briefly explain the reason for each in the text box that follows. *The box below included a drop-down list of the Pre-Symposium tours, keynotes, plenary sessions, breakout and poster sessions, FMD workshop and the demonstrations. Respondents simply picked from the list.*

	Most Useful	Least Useful
Session 1		
Session 2		
Session 3		

12. Based on your experience at this Symposium, would you like to attend the next one?
- Yes
 - No
 - Other (please specify)
13. Please use the space below for any additional comments/suggestions you would like to make.

APPENDIX B: INDIVIDUAL RESPONSES TO HOW INFORMATION AND/OR MATERIALS OBTAINED AT THE SYMPOSIUM HAVE BEEN USED

Collaboration

1. Engagement with waste management industries on topics presented at the symposium (Australia, government).
2. New technologies reviewed and discussed with colleagues (Australia, government).
3. Provided at least one more contact for information and potential collaboration (Canada, government).
4. Sharing the information that was presented (Canada, government).
5. Working with people I met through attending the program (United States, educational institution).
6. Contacts were important (United States, educational institution).

Education/Outreach

1. Review of emergency disease animal disposal manual (Australia, government).
2. Have used some of the information for international travels and seminars on carcass disposal management (Canada, educational institution).
3. Student discussions and grant proposal (Canada, educational institution).
4. The conclusions of the FMD table top have been fed into exercises here and into discussions regarding cross jurisdictional management of an outbreak as well as capacity and resources issues regarding decontamination needs (Canada, government).
5. The idea on composting and emergency response to dead animal carcass disposal forms part of my undergraduate lecture in my Institution (Nigeria, educational institution).
6. Used some of the knowledge in lectures and when liaising with policy-makers that are involved with animal by-products disposal (United Kingdom, educational institution).
7. I've used information presented on burial in publications and presentations. I've also shared information on rendering that I learned more about. I gained further knowledge on composting and its effects on drug residues (United States, educational institution).
8. I used information on size reduction and alkaline hydrolysis for my Extension presentation on mortality composting (United States, educational institution).
9. Referenced the proceedings and used information presented in my own presentations to producer and agriculture service provider groups (United States, educational institution).
10. Working with a couple of farms setting up on-farm mortality composting. Also, planning an article for our newsletter (United States, educational institution).
11. Carcass disposal options were presented. Knowing these options is important when we are discussing euthanasia with others. We are involved in mass euthanasia programs as well as individual animal (United States, educational institution).
12. Used the material on the Korean FMD outbreak and the Canadian study suggesting cleaning is

- most important aspect of cleaning and disinfection (United States, educational institution).
13. Use info in teaching from many sessions (United States, educational institution).
 14. Information was used in assisting master's student with literature review and refining of her composting project (United States, educational institution).
 15. Made educational presentations (United States, educational institution).
 16. I have some used of the information as background in preparing discussion papers and briefings (United States, government).
 17. Knowledge gained has been used in conversations with producers; also in some emergency depopulation events (United States, government).
 18. Information on foaming was helpful with our poultry industry (United States, government).
 19. I'm able to provide updated information to farmers (United States, government).
 20. Info from some of Gary Flory's presentation (United States, government).
 21. Proceedings (United States, government).
 22. I have used information on mortality disposal methods in technology transfer with fellow workers (United States, government).
 23. The presentations regarding whether burial of carcasses causing "pollution" have been used and various other topics (United States, government).
 24. I attended the day that we all went to the demonstrations at the learning center farm. I have mentioned some of the composting procedures and the poultry euthanasia systems to several farmers (United States, government).
 25. Precautions and awareness for farm operations to manage their farm animal facilities and mortalities to protect their herd/flock from contamination and/or vandalism and a reminder of the importance of biosecurity in our work during inspections at farm animal facilities (United States, government).
 26. Composting information used for inspection disposal of custom slaughter plant disposal (United States, government).
 27. I have helped set up several carcass compost operations (United States, government).
 28. Incorporating the research and educational materials concerning composting into how I educate producers about composting animal mortalities (United States, government).
 29. I've used it quite a lot in conversations with cohorts (United States, NGO).
 30. Providing information to our association members - especially related to composting (United States, NGO).
 31. Primarily used Dale Rozeboom's presentation on the costs of disposing of carcasses through various methods to show others the benefits of in-vessel composting (United States, private).
 32. I have had many conversations relating to topics addressed at the Symposium in my daily sales activity for composting equipment (United States, private).
 33. Shared lessons learned power point with customers working in this area (United States, private).

Planning

1. Exploring asset needs within the organization (Australia, government).
2. Used multiple papers to assist in decision making and setting of work priorities for the next financial year (Australia, government).
3. Provided some insight to help define priorities for work in this area - specifically developing estimates of logistical requirements for a major disease or mass mortality event (Canada, government).
4. Development of planning tools for disposal with other groups (Canada, government).
5. Understanding of composting times and limitations; volume of animals needed to be dealt with if disease outbreak occurred; understanding of poultry deflocking management (Canada, government).
6. We have been of the position that composting would not be a viable method of carcass disposal during certain disease outbreaks - for volume/leachate reasons as well as potential biocontainment issues. The presentations and information were very helpful in allowing us to reconsider this (Canada, government).
7. The conference provided a lot of information on carcass disposal which is not something my organization has really spent much time considering during its emergency preparedness discussions. I have been including the concept that disposal would be the rate limiting step in all medium to large scale responses (Canada, NGO).
8. Future planning information (Canada, NGO).
9. Incorporated the use of technologies in scenarios that were presented (United States, government).
10. Much of the composting information was incredible. I really appreciate being able to get a better grasp on the mechanics of successfully managing compost, and have been able to use some of the material to help interpret our current Dead Animal Disposal laws, which allow for composting, but is not necessarily a simple plan to allow producers to properly apply the technique (United States, government).
11. Used information to know the direction various countries are headed in relation to this area (United States, private).

Policy

1. Revision of emergency management plans (Australia, government).
2. New information incorporated into revision of National Disposal Plans (Australia, government).
3. Confirmed some of the things we are already doing (Canada, government).
4. We compost dead animal remains. Prior to my attending the conference this was not the case (Nigeria, educational institution).
5. Information has been referred to while developing a revised MOU among government agencies regarding managing emergencies involving animal mortalities. Information about methods of

managing mortalities has been included in a new "state" procedural document for government agencies involved in managing emergencies involving animal mortalities (United States, educational institution).

6. To inform and complete evidence that is used to support positions and policy (United States, educational institution).
7. I have relayed information and come up with SOPs if there is a future outbreak in our livestock herds (United States, educational institution).
8. Have used the anaerobic digester info to write state regulations for this use in handling swine and poultry mortality (United States, government).
9. Used some of the methods described at the conference and in the proceedings to establish environmental monitoring procedures within our organization for mortality disposal methods (United States, government).
10. I gained greater knowledge of the anaerobic digestion process and was able to use it to evaluate a request for use of this technology for carcass disposal (United States, government).
11. Carcass disposal for emergency response (United States, international development organization).

● **Research**

1. Humane stunner (TED) purchased and trialed (Australia, government).
2. We have been refining our research program to address some of the gaps involved in carcass disposal (Canada, educational institution).
3. Incorporated the information into planning for future areas of research to meet the types of priorities identified during the symposium (Canada, educational institution).
4. Some novel ideas for research opportunities and collaborations (Canada, government).
5. Some of the information about strategic plan and opportunistic funding to support evaluation of new technologies on 3D (Canada, private sector).
6. Composting ideas (Canada, private sector).
7. The idea on composting and emergency response to dead animal carcass disposal has also guided my interest in collaborating with some friends in writing proposal on handling animal mortality (Nigeria, educational institution).
8. Investigated temperature in bone in composting carcasses (United States, educational institution).
9. Helped with writing my project (United States, educational institution – graduate student)
10. Used in ongoing project (United States, government).
11. We are implementing in vessel road kill composting in Virginia. Previously we evaluated both a forced air system and a rotary drum system. The forced air system is very successful, the rotary drum less successful. We have now decided to restart the rotary drum system based on information from the Symposium (United States, research institute).

APPENDIX C: REASONS GIVEN FOR MOST AND LEAST USEFUL SESSIONS

Most Useful:

All Useful

1. These were very tough choices, in reality it was very difficult to differentiate between the most useful and least useful because I thought they were all very informative and provided extremely useful information (Pre-Symposium Tour C – MSU Research and Education, Breakout Session 1 – Emergency Response and Policy, Breakout Session 6 - Depopulation, Decontamination/Disinfection & Recovery).
2. Picking the most and least useful is difficult because they were all useful (Breakout Session 1 – Emergency Response and Policy, Breakout Session 3 – Environmental Effects of Disposal, Breakout Session 5 – Animal Mortality Composting).

Content

1. Amount and quality of information received (Dr. Heekwon Ahn, Breakout Session 5 – Animal Mortality Composting, Breakout Session 1 – Emergency Response and Policy).
2. Could only attend one day. Dr. Heekwon Ahn - real life experience invaluable. Breakout Session 6 – Depopulation, Decontamination/Disinfection & Recovery - the questions were as useful as the presentations. Dr. Steven Halstead - learned of follow up from the situation that was new info.
3. Demonstrations provided direct experience of a number of DDD activities and resources. Dr. Ahn's address was a clear, frank account of the challenges associated with a large-scale FMD outbreak - very useful lessons given. MSU tour provided exposure to many aspects of livestock emergency management in Michigan and research into new disposal technologies.
4. Dr. Ahn's practical example and frank discussion of how it was handled in the real world led me to profound thoughts on how we are ready for such a disaster here in the U.S. The animal mortality composting session and research in this area showed me some very good scientific information and research results that surprised me even in the area of pile composting. Don's keynote was very entertaining and focused on some useful and general guiding thoughts that led towards all the following symposium presentations. I enjoyed his presentation technique and value. I found value in all the presentations and the presenters.
5. I found these sessions (cross-border FMD response workshop, demonstrations and international panel) to be the most interesting and learned a lot from them. The FMD response workshop and international panel discussion brought up new and interesting ideas that I had not considered before.
6. I have used information from the three most useful (Dr. Heekwon Ahn, Demonstrations, Breakout Session 6 - Depopulation, Decontamination/Disinfection & Recovery). Lori Miller's presentations were also useful.
7. I learned a significant amount about rendering, a subject I knew little about (Pre-Symposium

Tour B).

8. I was more interested in the research aspects in general than the policy side of things (Breakout Session 3 – Environmental Effects of Disposal, International Panel, Breakout Session 2 – Alternative/Mechanical Disposal).
9. The discussion by Gary Flory was quite interesting and revealing. Experience shared on the 'One Health' concept was new to me and must be encouraged in order to reduce to minimum the spread of disease both to human and animal and by so doing protect the environment. Animal mortality composting was entirely new to me and I am very optimistic that it is a technology which when acquired and perfected through training and retraining of experts in Nigeria will help handle large scale animal mortality in my country. Cross-border FMD response workshop was perfect! When compared with what is obtainable in Nigeria, we need to institute such cross-border response strategy to curb disease spread into the country. It is a practice that I know most developing countries are yet to get to that stage.
10. The rendering tour was excellent! It helped me see where rendering can be used for disposal AND that there are probably a lot more renderers available than I originally thought there were. Dr. Ahn's talk was fascinating. It helped me understand where the potential problem points can be and gave me a new understanding of the FULL picture involved in emergency response.
11. The sessions that I chose as most useful were, in the cases of session 6 - Depopulation, Decontamination/Disinfection & Recovery and 7 – Policy and Education, where I found a great deal of useful information that will assist our department of agriculture most in addressing emergency response to mass mortality, and new research that may assist us in managing those responses. The keynote address (Dr. Heekwon Ahn) was fascinating, and it brings home the reality of having to deal with a situation like FMD.
12. You know I can't really say that there were any least useful choices as I was able to take away something to use from all that I was able to attend. This symposium is one of the most important of all the conferences that I attend, because of my involvement and the help I receive from all the attendees, we have seen an increase in the marine mammal composting across the US; this has been a slow process, but one that is increasing (Pre-Symposium Tour A – CIFA import station, Gary Flory, Cross-border FMD response workshop).
13. Learned and processed new information. I have no least options. Some do not apply to my work as much as others but I think there was important info in all sessions (Dr. Heekwon Ahn, Cross-border FMD response workshop, Breakout Session 7 – Policy and Education).

Delivery

1. The practical demonstrations and other sessions where there was an open forum seemed to appeal to me. This enabled a better interrogation of information for me. Being a visual learner the demonstrations provided a great opportunity to see some of the technologies that are currently available and being considered.
2. FMD workshop and demonstrations provided excellent networking and concrete knowledge

exchange.

Direct correlation with position/job

1. As a manufacturer of in-vessel composting equipment primarily focused on the animal mortality industry, it is beneficial to keep up with the latest advancements in animal mortality composting and animal by-product disposal methods. The demonstrations allowed us a chance to gain first-hand experience with some complimentary processes to what we build equipment for (Breakout Session 5 – Animal Mortality Composting, Breakout Session 8 – By-products and Foods of Animal Origin, Demonstrations).
2. I collect deadstock (Pre-Symposium Tour A – CIFA import station, Breakout Session 1 – Emergency Response and Policy, Breakout Session 3 – Environmental Effects of Disposal).
3. My research area is composting, thus I gained further knowledge in that area. The information gained about the effects of burial will be referenced in future publications and outreach efforts (Breakout Session 5 – Animal Mortality Composting, Breakout Session 3 – Environmental Effects of Disposal).
4. I work on the policy side of things, so gaining practical knowledge is always beneficial and refreshing. The cross-border exercise, while very limited in scope due to time, was useful in underscoring the complexities of the relationship between state/federal and provincial/federal responsibilities during a crisis. Honestly, and this is a rare thing, I found all sessions useful to some extent (Pre-Symposium Tour – CIFA import station, Breakout Session 5 – Animal Mortality Composting, Cross-border FMD response workshop).
5. I work solely with animal mortality composting (Poster session, Breakout Session 5 – Animal Mortality Composting, Breakout Session 3 – Environmental Effects of Disposal).
6. These are most relevant to my work (Pre-Symposium Tour A – CIFA import station, Breakout Session 6 - Depopulation, Decontamination/Disinfection & Recovery, Breakout Session 1 – Emergency Response and Policy).
7. Most useful because of the topics discussed. Information relates directly to a project I am currently working (Breakout Session 4 - Depopulation, Decontamination/Disinfection & Recovery, Dr. Heekwon Ahn, Demonstrations).
8. Most useful because they relate more to my everyday job (Pre-Symposium Tour A – CIFA Import Station, Demonstrations, Cross-border FMD response workshop).
9. Our research program mainly looks at carcass burial, and its effects on the environment, along with other disposal options research (AD). That is why the three most useful for me were related to our research program. I found all the sessions useful in their own way, so the three least useful is sort of irrelevant to me, as I didn't feel any of them were not useful (Pre-Symposium Tour C – MSU Research and Education, Breakout Session 3 – Environmental Effects of Disposal, Dr. Heekwon Ahn).
10. The "most useful" selections are directly related to my work and provided context and logistical information. Although familiar with most of the information these session provided, they did

provide new insights, understanding of "connecting" events and details that can only be **obtained** from an actual event --- it was difficult to limit this to 3 (Breakout Session 3 – Environmental Effects of Disposal, Breakout Session 6 - Depopulation, Decontamination/Disinfection & Recovery, International Panel).

11. The most useful choices seemed to have more relevance to my role and interests on this topic (Don Klingborg, Breakout Session 5 – Animal Mortality Composting, Cross-border FMD response workshop).
12. The most useful sessions provided me with information I can take home and put to work in my job as a regional extension educator (Gary Flory, Breakout Session 4 - Depopulation, Decontamination/Disinfection & Recovery, Demonstrations).
13. Environmental Effects of Disposal is the area in which I work the most, so it was good to hear from others in the same area (Breakout Session 3 – Environmental Effects of Disposal).
14. These topics most closely aligned with current interest and research topics (Breakout Session 1 – Emergency Response and Policy, Breakout Session 3 – Environmental Effects of Disposal, Breakout Session 5 – Animal Mortality Composting).
15. The three most useful will help begin to prepare policies in case of emergencies in Canada. The workshop highlighted just how much is left to do (Breakout Session 1 – Emergency Response and Policy, Cross-border FMD response workshop, Pre-Symposium Tour A – CIFA import station).

Interests

1. My choices were based on my interests and work. Although all sessions were of some interests, those that were furthest from my interests were not as useful (Pre-Symposium Tour C – MSU Research and Education, Cross-border FMD response workshop, Breakout Session 6 - Depopulation, Decontamination/Disinfection & Recovery).
2. All was of use, and the 3D is my response interest and use (Dr. Heekwon Ahn, Breakout Session 5 – Animal Mortality Disposal, Breakout Session 1 – Emergency Response and Policy).
3. A lot had to do with my personal interests, or having heard certain speakers before (Demonstrations, Breakout Session 3 – Environmental Effects of Disposal).

Least Useful:

Content

1. Did not find the panel discussion as information filled as expected (International Panel).
2. Environmental effects of disposal very suited to environmental professionals. (I'm not one of those.) Cross-border workshop - this highlighted the similar difficulties experienced in many parts of the world, but could not greatly assist in resolving issues. (my experience may not be accurate; I would appreciate seeing a summary of the workshop findings placed on the Symposium website.)
3. CFIA tour did not provide useful information. Don Klingborg is out of date in material he presents.

4. Some of the talks given were less relevant to someone from outside the US. (however they were still enjoyable, it's just that the question forced me to answer this!) (Juan Reyes, Cross-border FMD response workshop, Breakout Session 4 - Depopulation, Decontamination/Disinfection & Recovery).
5. Don Klingborg's talk was basically the same as what he has presented before, so nothing was gained. Although the demonstrations were held in a lovely place and they were good demonstrations, they were the same ones that have been done at other Mortality Symposiums, so they were not useful to me.
6. For the least useful, breakout session 2 (Alternative/Mechanical Disposal) was incredibly interesting, but much of the discussion centered around research that may not be practical to large scale disposal in a state emergency response. Both tours (Rendering and MSU) are only marked because I have had an opportunity to visit both Darling and MSU DCPAH during my career as a field veterinarian, so I had a sneak preview, so to speak!
7. I had no previous experience in a cross-border FMD response. (thus I did not understand current guidelines/principles pertaining to FMD response.)
8. Being least useful does not mean “not” useful. These were chosen because I was either generally more familiar with the information or found this information less relevant to an emergency event. For example "rendering" will be important for an emergency but will not be sufficient alone to address a major event; I need to know the rendering capacity available but not the rendering process itself. I typically prefer the formal presentations and/or discussion sessions (Poster session, Breakout Session 5 – Animal Mortality Disposal, Pre-Symposium Tour B – Rendering).

Delivery

1. The poster sessions were hard to navigate and understand using Prezi without having someone there to talk you through them. In addition if someone came up in the middle of paging through it, you either had to start over, or they only got half of it. A simple static electronic poster would have been better (i.e. regular posters, but presented on large displays without having to be printed).
2. I do not like poster sessions (ever).

Correlation with position/job

1. Policy was of the least value to me but of great value to the majority of others attending due to their government involvement and ties (Breakout Session 7 – Policy and Education).
2. The least useful choices didn't have much relevance to my role and interests on the topic (Dr. Heekwon Ahn, International Panel, Breakout Session 8 – By-products and Foods of Animal Origin).
3. The sessions that were least useful were those outside my area of expertise and interest (Pre-Symposium Tour B – Rendering, Breakout Session 8 – By-products and Foods of Animal Origin).

Interests

1. My choices were based on my interests and work. Although all sessions were of some interests, those that were furthest from my interests were not as useful (International Panel, Juan Reyes, Breakout Session 7 – Policy and Education).

APPENDIX D: ADDITIONAL COMMENTS ABOUT THE SYMPOSIUM

General thank you

1. Congratulations to the organizing committee on a job well done (Australia, government)
2. Great work and looking forward to the 5th! :) (Canada, government).
3. Great symposium - very well planned and organized (Canada, government).
4. The symposium genuinely surpassed my expectations. I found it really interesting, well-arranged, informative and welcoming. Congratulations on an excellent event (UK, educational institution).
5. Can't wait for the next one!!! (United States, educational institution).
6. Very well rounded conference (United States, educational institution).
7. The symposium was fantastic (United States, government).
8. Valuable information. I plan to attend each year, and will encourage other department staff to attend (United States, government).

Networking

1. This was a wonderful meeting that provided a great opportunity to meet many people working in this specialized field, and learn of new and emerging alternative technologies (Australia, government).
2. It was great to be able to meet and talk plainly with people who share a common passion and have invested a large amount of time in this work area (Australia, government).
3. Excellent interaction of participants!! (United States, educational institution).
4. It further helped to create an atmosphere conducive to building long lasting relationships (United States, government).
5. This was a great opportunity to meet key players in the industry and attain knowledge and a better understanding of the animal mortality management practice (United States, private industry).
6. I have a basic science background and limited amounts of degrees but found this entire group and subject matter very interesting. I made efforts to meet many people and all were very interesting characters with which I enjoyed many great discussions. The material presented was fully understandable by me and applicable to my job in sales of composting equipment. When all was said and done I felt that I spent quality professional time with many new friends (United States, private industry).

Organization

1. The program was very well organized and I think catered for a diverse group. There was a good blend of indoor and outdoor activities (Australia, government).
2. Having a public institution host the symposium brought many academics/professionals into the presentation and discussion that may have not attended normally (United States, private industry).

Content

1. As always the lessons learnt sessions from countries of recent major outbreaks provided

particularly valuable information i.e. what not to do & what to do. In regards to the whole carcass management issue we still need to be mindful of the range of environments we live in. In Australia we have a very different environment and this can affect our decision making and preferred options (Australia, government).

2. Glad to see that DHS, USDA and FAZD have addressed the 3D issue of diseased animals in a federal defense level. I think it is very important to have some new technology and preparedness available to protect US agriculture from naturally occurring and man-made FAZ diseases (Canada, government).
3. The workshop enriched my knowledge of animal mortalities management (Nigeria, educational institution).
4. Demonstrations were great; Information on environmental impact of different disposal options was great (United States, educational institution).
5. Overall, the symposium was very helpful. It helped define the procedures of handling animal mortalities (United States, government).
6. Once again, I truly enjoyed the opportunity to expand my knowledge in this area. As a veterinarian, I tend to focus largely on the health and well-being of a live population, but this symposium brings home the importance of managing mortalities in a way that does not negatively affect live populations. It was a good perspective, and the information was much appreciated (United States, government).

Needs

1. We need more research on the fate of prions in composting (United States, educational institution).

Comment

1. I continue to value the new “working” relationships which came about through committee work. The appropriateness and success of facilitation by committee needs to be included in the evaluation (amount and ability of all to contribute); what responsibilities belong to committees and sub-committees and host institution. We will need to evaluate the outcomes of having sought and accepted funding of this educational effort and how we would do so in the future. I think the deliverables (Evaluation Synopsis, Learner Outcomes, and White Paper) will provide long-term impact to those who attended and who were unable to attend (United States, educational institution).

Suggestion

1. I look forward to more African participants at the next symposium. African researchers should be carried along in these emerging and very important discussions that border on human, animal and environment. Salvaging the problem of disease outbreak requires collective efforts of researchers all over the world. Disease does not recognize boundaries/borders of local, state, country and continents. I am of the view that where possible, participants from Africa should be encouraged to attend this all important Symposium by providing them with seed grant to cushion

the cost of their participation. In addition, participants should be presented with certificate of participation at the end of the symposium. In all, the planning, organization and execution of the symposium was quite commendable. I look forward to future events! (Nigeria, educational institution).

2. I think that tours and demonstrations are great for this symposium and the next location should be prioritized based on both (United States, educational institution).
3. Get rid of the politically correct speakers and find folks who are at the state of the art level of involvement (United States, educational institution).
4. Would like to see more people there to be able to plan for events, I think there are still major gaps when we have disasters with livestock losses. I also think that we have put ourselves into alarming situations to maximize profit over sustainability when borders will close at some points in time for whatever reason (United States, educational institution).
5. I would like to see more international participation (United States, government).

Thumb drive

1. I never received the flash drive containing all of the presentations from the Symposium. There was a short supply at the event and I was told that one would be mailed to me. If that could be done I would be very appreciative. Thanks! (United States, government).
2. On the last day of the symposium as we returned from the demonstrations, we were told to turn in our symposium evaluations and we would be given a jump drive with all the presentations on it. However, there was no organization and no one to collect our evaluations or give us jump drives. Someone ended up collecting the evaluations and saying that the jump drives would be mailed but 6 months later, I have never received a jump drive and I would really like to get one (United States, government).
3. I was not given a jump drive with notes on it at the meeting. When one was sent to me it was blank. After much difficulty in contacting someone to get another copy, I still have not been sent an electronic copy of the notes. What is the problem with getting these sent off in a reasonable time? (United States, government).