

## **Evaluation of Forestry Programming Following the Reorganization of the North Carolina, USA Cooperative Extension Service**

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**Abstract:** North Carolina Cooperative Extension Service had significant funding reductions over the past 10 years, leading to its reorganization, which has impacted county-based programming. To understand the needs of field faculty who conduct county-based forestry programming an Internet-based survey was administered to 94 field faculty covering North Carolina's 100 counties. Results indicate field faculty are doing minimal forestry programming, which is their preferred level, a level that provides clients' nominal benefit. The lack of desire from field faculty to increase the level of programming is likely due to a deficiency in their forestry knowledge, coupled with a high demand for their time due to multiple areas of responsibilities. Assessment of underlying factors known to drive programming success indicates a majority of the field faculty have not implemented these competencies, indicating a lack of commitment to forestry programming over other assigned responsibility. The demand on the field faculty's time and knowledge deficiency underscores the need for a strong training program, one focused on organizational development and subject matter training. Organizational development should focus on the underlying factors that lead to better time management among field faculty. The deficiency in field faculty knowledge should be addressed by the development of an in-service training program that is conscious of field faculty's time, but is meaningful and brings field faculty to a level of comfort in working in forestry. By addressing field faculty's time management and enhancing field faculty's forestry knowledge one could expect an increase in county-based forestry programming.

**Key words:** Forestry, needs assessment, in-service training, evaluation

### **Introduction**

In recent years, the Cooperative Extension Service (NCCES) in North Carolina, USA has seen major changes in their budgets, staffing and programming, which was driven by significant funding reductions from state and federal sources (NCCES, 2014a). These funding losses have significantly impacted campus and county-based positions and programs to include forestry in North Carolina, as well as nationally (Serenari et al. 2013). Many of the field faculty who conducted forestry programming at the county level have retired or left Extension for other career opportunities or reasons.

But the need for forestry programming is great as ever. Forestry is a major economic driver in North Carolina, with \$29.4 billion contributed to its economy in 2013 (McConnell, et al. 2016). In some North Carolina counties, forest products and services are the single largest economic development force. Over seventy-five percent of this resource base is in private ownerships with private individuals owning 61 percent of this resource (Brown 2015). These forest landowners rely on NCCES field faculty for education and information on a day-by-day basis (Bardon, Hazel, and Miller 2007). The role of Extension Specialists in the NCCES campus-based forestry program are to provide educational opportunities and information to county field faculty for them to assist citizens in making wise, informed decisions about their forestlands.

For the Extension Specialists to accomplish their role, improve their ability to meet client needs, and serve field faculty better, a needs assessment of the 100 county Extension offices in North Carolina, USA for county-based forestry program was conducted. The objective of this needs assessment was to obtain a better understanding of the level of forestry programming occurring in the counties and field faculty educational needs following reorganization of the North Carolina Cooperative Extension Service. This information allows campus-based Extension Specialists to develop a plan of action if necessary to address county programming and field faculty training needs.

## **Methods**

An Internet-based survey was administered using the Dillman et al. (2014) approach via email to 94 field faculty covering North Carolina, USA's 100 counties over five extension districts. The list of field faculty was obtained from the NCCES online database of responsibilities and emails, a database that indicates a faculty's areas of responsibility and their email address. For each of the 100 counties, 41 field faculty, which includes county extension directors, were selected who indicated forestry as an area of responsibility. For those counties in which no one indicated forestry as a responsibility then the county extension director was chosen.

Prior to administering the survey, the survey was developed with support from the NCCES State Program Leader for Extension Evaluation, tested with field faculty and approved by NC State University Institutional Review Board for the Protection of Human Subjects in Research. The survey was designed to elicit the following information from field faculty who are responsible for delivering forestry extension programs.

- County field faculty responsibilities and years of service.
- Factors that historically have been perceived a part of successful county forestry programming. These factors are:
  - Commitment to programming as indicated by including forestry programming in field faculty annual plan of work,
  - Given credit as indicated by receiving credit in field faculty annual employee evaluation for doing forestry programming,
  - Involve people in program planning as indicated by field faculty having a forestry advisory committee to guide their programming needs, and
  - Program meets clients' need, as indicated by field faculty self-assessment in meeting clientele needs.
- Current and preferred level of forestry programming being conducted at the county level. The levels of programming are:
  - Level 0: Do not conduct programming,
  - Level 1: Answer clientele questions and provide information,
  - Level 2: Conduct 1-2 evening meetings, answer clientele questions and provide information,
  - Level 3: Conduct 2-3 evening meetings, a field trip, conduct on-site visits with clientele, answer clientele questions and provide information, and
  - Level 4: Use an advisory committee, support a forestry club/landowner association, conduct evening meetings, workshops, field trips, conduct on-site visits with clientele, answer clientele questions and provide information.

- Limitations to increasing the level of forestry programming field faculty conduct.
  - Limited time/too many areas of responsibility,
  - Lack of training in forestry, either formal or through in service training,
  - Lack of support from Extension Specialists,
  - Do not receive credit in my annual evaluation, and
  - Forestry-related issues not a formal responsibility
- County field faculty training needs related to forestry. Training needs include current knowledge about key forestry topics, preference on type of in-service training, and best season to participate in training.

The survey was administered over a 4-week period in June and July 2016. Reminder emails were sent each week for three weeks following the initial email. The survey was closed July 13, 2016.

Data was summarized using descriptive statistics. T-tests were used for pairwise comparisons between current and preferred programming levels perceptions. One-way analysis of variance was conducted to determine difference among limitations to increasing level of engagement in forestry programming, season of training, and knowledge level of field faculty by forestry topic. To determine preferred method of training, a weighted sum was calculated for each training type. The weighted sum is the sum of the number of respondents choosing a rank times the rank.

## Results

Ninety-four field faculty, covering the 100 North Carolina counties across five extension districts, were contacted via email to complete the internet based survey. Forty-nine field faculty completed the survey for a response rate of 52%. Field faculty represented all five extension districts in North Carolina, with 20.83% of the field faculty participating from the North Central district, 18.75% of the field faculty participating from the Northeast district, 16.67% of the field faculty participating from the West district, 22.92% of the field faculty participating from the South Central district, and 20.83 of the field faculty participating from the Southeast district.

To get a basic understanding of the type of field faculty who are assigned forestry responsibilities field faculty were asked to provide information on how many areas of responsibilities they have, their main area of responsibility, and the number of years of service. Field faculty responsible for forestry programming are accountable for three or more areas (Mode = 3, Mean = 3.25, Std. Error = 0.25, N = 45) of responsibility, with the number of responsibilities ranging from 1-10. These field faculty are predominately agricultural agents (60.42%) or have 10 or more years of experience (62.5%) in Extension (Table 1).

Table 1. Percent of North Carolina Cooperative Extension county field faculty by Years of Extension Experience and Area of Responsibility who conduct forestry programming.

Area of Responsibility	Years of Extension Experience			% Total
	<1 to 4 years	5-10 Years	>10 years	
4-H Youth Development	0.00%	0.00%	2.08%	2.08%
Agriculture	8.33%	14.58%	37.50%	60.42%
Local Foods	0.00%	0.00%	0.00%	0.00%
Horticulture	8.33%	2.08%	14.58%	25.00%

Community Development	0.00%	0.00%	4.17%	4.17%
Family and Consumer Sciences	0.00%	0.00%	2.08%	2.08%
Natural Resources	2.08%	2.08%	0.00%	4.17%
Other	0.00%	0.00%	2.08%	2.08%
% Total	18.75%	18.75%	62.50%	100.00%

The majority (89.6%) of field faculty surveyed indicated doing some level of forestry programming with only 10.4% indicating they are not conducting any forestry programming (Table 2). Most of the forestry programming by field faculty (47.92%) is limited to Level 1, answering questions and providing information, with 27.08%, 8.33% and 6.25 of the field faculty conducting programming at Level 2, 3 and 4 respectively. For a majority of the field faculty (68.75%) they indicated that they were not (37.5%) or did not know (31.25%) if they were conducting forestry programming at a level that met their clientele's needs. For the current levels of forestry programming 31.25% of the field faculty indicate meeting their clientele's needs with 46.66% of those field faculty providing programming at Level 1, which is answering clients' questions and providing information. Only 2.08% of the field faculty feel they are meeting clientele's needs by not providing programming.

Table 2. Percent of North Carolina Cooperative Extension county field faculty by current programming level and meeting client needs.

Current Programming Level <sup>1</sup>	Meeting Client Needs			Total
	Yes	No	Do Not Know	
Level 0	2.08%	2.08%	6.25%	10.42%
Level 1	14.58%	14.58%	18.75%	47.92%
Level 2	6.25%	16.67%	4.17%	27.08%
Level 3	6.25%	0.00%	2.08%	8.33%
Level 4	2.08%	4.17%	0.00%	6.25%
Total	31.25%	37.50%	31.25%	100.00%

<sup>1</sup>Level 0: Do not conduct programming; Level 1: Answer clientele questions and provide information; Level 2: Level 1 plus conduct 1-2 evening meetings; Level 3: Level 1 plus conduct 2-3 evening meetings, a field trip, conduct on-site visits with clientele; and Level 4: Level 3 plus use an advisory committee and support a forestry club/landowner association.

In further exploring programming efforts field faculty were asked what their preferred level of forestry programming would be (Table 3). Results were not statistically different between current and preferred levels of forestry programming, but shift in the data indicates that about 7% more of the field faculty would prefer not to be conducting forestry programming. The preferred level of programming did not change significantly from the current level of programming, with almost half of the field faculty (45.65%) preferring to conduct programming at Level 1. The remaining field faculty, 17.39%, 7.39% and 2.17% prefer to conduct programming at Level 2, 3 and 4 respectively.

Table 3. Percent of North Carolina Cooperative Extension county field faculty by current and preferred programming level.

Programming Level	Current Level	Preferred Level	t	df	Sig. (2-tailed)
	$\bar{X}\%$ (SE <sup>1</sup> )	$\bar{X}\%$ (SE <sup>1</sup> )			
Level 0	10.86 (4.64)	17.39 (5.65)	0.89	90	0.37
Level 1	47.83 (7.45)	45.65 (7.43)	-0.206	90	0.84
Level 2	28.26 (6.71)	17.39 (5.65)	-1.238	90	0.22
Level 3	6.52 (3.68)	7.39 (5.65)	1.612	90	0.11
Level 4	6.52 (3.68)	2.17 (2.17)	-1.017	90	0.31

<sup>1</sup> $\bar{X}\%$  <sup>1</sup>Standard Error

Successful field faculty, those with established education programs that make an impact, have several underlying competencies, driving their engagement (Bardon 2001, Cooper and Graham 2001). These competencies include commitment to programming, as identified by forestry programming being included in field faculty's annual plan of work; given credit, as indicated in field faculty's evaluation for doing forestry programming; involving people in program planning, as identified by field faculty having forestry advisory committees to guide their programming needs; and program meets clients' needs. Survey results indicate 51.02% of the survey participants indicated receiving credit for doing forestry programming on their annual evaluation, but only 35.42%, 31.25%, and 14.58%, respectively, have forestry in their plan of work, feel program meets clients' needs, and who have an advisory committee (Table 4).

Table 4. Percent of North Carolina Cooperative Extension county field faculty who indicate having competencies known to drive county programming.

Competencies important to driving programming	$\bar{X}\%$	N	Std. Error
Given credit; Field faculty receive credit on employee evaluation	51.02	49	7.22
Commitment to programming; Forestry included in plan of work	35.42	48	6.98
Program meets clients' needs	31.25	48	6.76
Involve people in programming; utilize a forestry advisory committee	14.58	48	5.15

To increase the level of programming in forestry at the county level it is important to understand what is limiting field faculty ability to increase their engagement in forestry programming. Study results indicate field faculty's time/number of responsibilities and lack of training in forestry, either formally or through in-service training, are the two limitations that impact them the most when it comes to increasing the level of forestry programming they conduct (Table 5). Approximately one-third of the field faculty indicate they are limited in increasing their programming in forestry because forestry-related issues are not a formal responsibility. The lack of support from Extension Specialists is also a limitation for 14.29% of the field faculty, followed by other limitations such as loss of staff being limitations for 8.16% of the field faculty. The limitation that impacts them the least, less than 5%, is if they receive credit in their annual evaluation.

Table 5. Percent of North Carolina Cooperative Extension field faculty by limitations to increasing level of engagement in forestry programming.

Limitations	$\bar{X}\%$	N	Std. Error
Limited time/too many other areas of responsibility	63.27 <sup>a</sup>	49	6.96
Lack of forestry training, either formal or through in-service	61.22 <sup>a</sup>	49	7.03
Forestry-related issues not a formal responsibility	32.65 <sup>b</sup>	49	6.77
Lack of support from extension specialist(s)	14.29 <sup>c</sup>	49	5.05
Other (please specify – Loss of staff most cited)	8.16 <sup>c,d</sup>	49	3.95
Do not receive credit in my annual evaluation	4.08 <sup>d</sup>	49	2.86

<sup>a</sup> Limitations with the same letter are not statistically different at the  $p < 0.05$  level,  $F(5, 288) = 21.65$ ,  $p = 0.00$

The type of forestry training program the field faculty prefer (Table 6) and when it is offered (Table 7) provides insight into the likeliness field faculty will participate in the training. The top three choices for type of training in order of preference is District-based, day-long training, Campus-based, day-long training, and District-based, multi-day training. Online training types are less popular than face to face trainings, with field faculty preferring to attend Online graduate course for credit, followed by Online synchronous training (non-credit) and Online asynchronous training (non-credit) respectively. Only 4.08% of field faculty prefer not to participate in any forestry training, which was the least preferred choice among the 7 options.

The time of year that is best for field faculty to attend in service training is winter, as indicated by a majority (57.45%) of the field faculty. Fewer faculty found fall and summer, 23.4% and 14.89% respectively, as the best time of year to participate in in-service training. Spring was the time of year that was the best time for in-service training for only 4.26% of the field faculty.

Table 6. Preferred training type of North Carolina Cooperative Extension field faculty by overall rank, weighted sum, and percent of respondents by first, second and third choice rank.

Training Type	Rank			Weighted Sum	Overall Rank
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>		
District-based, day-long training	34.69%	14.29%	36.73%	85	1
Campus-based, day-long training	14.29%	24.49%	20.41%	61	2
District-based, multi-day training	20.41%	28.57%	10.20%	53	3
Online graduate course	6.12%	12.24%	10.20%	30	4
Online non-credit synchronous training	6.12%	6.12%	6.12%	18	5
Online non-credit asynchronous training	6.12%	6.12%	2.04%	12	6
Not Participate	4.08%	0.00%	4.08%	8	7

Table 7. Percent of North Carolina Cooperative Extension field faculty by the best time of year for them to attend an in-service training

Season	$\bar{X}\%$	N	Std. Error
Winter	57.45 <sup>a</sup>	47	7.29
Fall	23.40 <sup>b</sup>	47	5.25

Summer	14.89 <sup>b</sup>	47	5.25
Spring	4.26 <sup>c</sup>	47	2.98

<sup>a</sup> Seasons with the same letter are not statistically different at the  $p < 0.05$  level,  $F(3, 184) = 16.47$ ,  $p = 0.00$

Field faculty need to have a basic understanding in an array of forestry topics to meet the needs of their clients. Results from this study indicate that the field faculty's knowledge about 10 of 11 key forestry topics ranges from no understanding of forestry to having limited knowledge about forestry (Table 8.). In most cases field faculty often refer clients to others with more knowledge of forestry or at best can only answer basic questions about forestry. The only topic Field faculty indicated having a greater knowledge of forestry such that they could explain basic concepts is the types of forest landowners and why they own forest land.

Table 8. Knowledge level of field faculty by forestry topic. (1 = No understanding of forestry, so I refer clients to someone more knowledgeable, 2 = Have limited knowledge about forestry, so I can answer clients' basic questions, 3 = Would not consider myself an expert in forestry, but I can explain basic concepts to clients, 4 = I feel I have a strong understanding of forestry and can explain complex concepts to clients = 4)

Forestry Topics	Mode	Mean	N	Std. Error
State and federal cost share programs	1	1.81 <sup>a,b</sup>	48	0.118
Forest management plans	1	1.83 <sup>a,b</sup>	48	0.127
Selling timber and harvest operations	1	1.83 <sup>a,b</sup>	48	0.127
How to put together an effective forestry program	1	2.00 <sup>a,b</sup>	48	0.139
Forest type and how to manage	2	1.96 <sup>a,b</sup>	48	0.129
Forest Products Industry	2	2.06 <sup>b</sup>	48	0.131
Forest health issues	2	2.08 <sup>b</sup>	48	0.129
Forest management activities such as thinning	2	2.15 <sup>b</sup>	48	0.129
Present Use Valuation and other tax implications	2	2.21 <sup>b,c</sup>	48	0.139
Where to seek technical assistance	2	2.58 <sup>d</sup>	48	0.122
Types of forest landowners & why they own land	3	2.46 <sup>c,d</sup>	48	0.133

<sup>a</sup> Training topics with the same letter are not statistically different at the  $p < 0.05$  level,  $F(10, 517) = 3.74$ ,  $p = 0.00$

## Discussion

In North Carolina forestry programming is most often conducted by field agents whose major program responsibility is agriculture or who have more than 10 years of experience in Extension education. The fact that the majority of NCCES field faculty conducting forestry programming have agriculture as their main area of responsibility is not surprising since NCCES's roots are based in agriculture (National Institute of Food and Agriculture 2017). Agriculture is the number one industry in the state with an \$84 billion impact on North Carolina's 2014 economy (Walden 2016). The fact that the majority of field faculty participating in the survey had 10 or more years of experience, and are considered career field faculty, is most likely an indication of the impact reduced budgets has had on the retention of county-based positions. In North Carolina, declining budgets from 2010-2014 resulted in the loss of 157 campus and county-based positions (NCCES

2014b), many of which would have been filled with personnel having little to no experience in Extension.

The majority of field faculty who are conducting forestry programming in North Carolina are responding only reactively to clientele's needs by providing Level 1 programming, which is to answer clientele questions and provide information. Many of these faculty though do not feel or do not know if they are meeting their clients' needs. This level of programming provides immediate benefit to the client, but does little to enhance the educational experience and provide clientele with the knowledge to make higher level informed decision about broader forestry issues that may be impacting them. Programming at higher levels, such as level 3 or 4, field faculty would be more proactive in providing educational experiences that would allow their clientele to explore deeper into many of the forestry issues they face.

It is not surprising that field faculty do not have a preference for conducting programming at a higher level than level 1. The field faculty, even though a majority receive credit for conducting forestry programming on their evaluation, fail to implement the competencies identified by Bardon (2001) and Cooper and Graham (2001) for county agents that are successful in their job. The competencies that were less likely to be implemented were commitment to programming as indicated by having forestry in their plan of work, ensuring programming meets clients' needs and involve people in program planning as indicated in utilizing a forestry advisory committee. This lack of commitment to forestry programming will likely not change at the county level until more emphasis is placed on incorporating forestry into the field faculty's plan of work and utilization of forestry advisory committee (Robinson, Dubois, & Bailey, 2005)

Field faculty have also identified two major limitations that prevent them from focusing time and effort into building a more formal program in forestry, and likely, is impacting the implementation of the core competencies necessary for successful programming. These limitations include lack of time/multiple assigned areas of programming responsibilities and lack of formal education or training. Similar results were found by Bardon (2001) and Kleist et al. (2010) of field faculty asked to conduct forestry and wildlife programming in North Carolina. They found that the lack of time and number of areas of responsibility field faculty have are underlying factors when it comes to enhancing forestry and wildlife programming at the county level that must be addressed within the larger Extension organization by Extension administration. They also indicate that the lack of knowledge in forestry and wildlife though, can and should be addressed by Extension Specialists through in-service training.

Research by Burnett et al. (2014) of field faculty in North Carolina indicate that in-service training is necessary to address conflicts, gather information, and emphasize relevancy in order for field faculty to engage in climate change programming. In order to design the in-service training, Extension Specialists need an understanding of the type of training field faculty prefer, when to offer it, and the level of knowledge in key forestry topics. Results from this study indicated NCCES field faculty prefer face to face trainings over online trainings, with district-based, day long training ranked as their number 1 choice. They prefer to participate in training during the winter. They also have little to no knowledge on forestry. Participating in day-long training based in the district during the winter months addresses the issues around time commitment, since a majority of the field faculty are responsible for agricultural programs, which most likely have higher clientele demands during other times of the year. The fact that the field faculty had little to no knowledge on forestry is not surprising since there is only one field faculty in North Carolina with a forestry degree (REB, personnel observation).

## Conclusion and Implications

NCCES field faculty are doing minimal forestry programming in which only about a third of them meet the needs of their clients in a state in which forestry is a major economic force, contributing over \$29 billion towards North Carolina's \$84 billion agricultural industry. This minimum level of programming, which is answering clientele questions and provide information, is the preferred level of forestry programming for the field faculty. This level of programming is a reactive response to individual clients' needs that is providing nominal benefit.

The fact that many of the field faculty have not implemented some competencies that are associated with programming success indicate a lack of commitment to forestry programming over other areas of assigned responsibility. This lack of commitment is probably due to a deficiency in forestry knowledge among field faculty coupled with high demand of their time due to multiple number of responsibilities.

This demand on the field faculty's time and knowledge base underscores the need for a strong training program, one focused on organizational development and subject matter training. Organizational development focused on the underlying factors that lead to lack of time is a broader issue that will need to be addressed through organizational development within the larger Extension organization. The lack of subject matter training can and should be addressed by Extension Specialists. Extension specialists should be conscious of developing training in context of field faculty's time, but the training should be meaningful and bring field faculty to a level of comfort in working in forestry. By enhancing field faculty knowledge level will most likely lead to field faculty implementing the core competencies necessary to enhancing forestry programing across North Carolina.

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