

Factors Influencing the Adoption of Practice by Participants of a Southern U.S. Distance Education Forestry Shortcourse



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Need for Research – Background Information



- ▶ NIPF lands are important from economic, ecological, social and environmental perspectives.
- ▶ According to several reports, NIPF lands are under-managed (Sampson, 1997 others).
- ▶ Various factors influence the decision to undertake a management practice (personal, social, economic, etc).
- ▶ Extension's role is to increase knowledge and awareness with the goal of assisting course participants with decisions regarding adoption of practice

Research Questions

- ▶ What influences the decision to adopt a practice?
- ▶ Conversely, what barriers exist to adoption of practice?
- ▶ Specific to education (Extension), do we know whether an educational program has an impact on the decision to adopt/not adopt?
- ▶ Do we know how the characteristics of the educational intervention influence the knowledge, behavior and adoption?



Adoption of innovation research hypothesis

- ▶ Roger's diffusion of innovation meta-theory will provide a useful framework to evaluate the factors that influence the adoption of practice by participants of the shortcourses.



Origin of diffusion of innovation theory

- ▶ Ryan Bryce, and Neal C. Gross. 1943. "The diffusion of hybrid seed corn in two Iowa communities." *Rural Sociology* 8:15-24.
- ▶ Everett M. Rogers wrote the first textbook on the subject in 1962.



Diffusion of Innovation Theory Defined

- ▶ “....as the process by which an innovation is communicated through certain channels over time among the members of a social system.”

Everett M. Rogers, *Diffusion of Innovations*, 2003

Diffusion vs. adoption

- ▶ Diffusion of innovation concepts concerning groups or a social system
- ▶ Adoption of practice concepts concerning the individual



Components of a Meta-Theory

- ▶ innovation-decision theory
 - knowledge,
 - persuasion,
 - decision,
 - implementation, and
 - confirmation stages
- ▶ the individual innovativeness theory
 - innovators,
 - early adopters,
 - early majority adopters,
 - late majority adopters and
 - laggards
- ▶ the theory of rate of adoption
 - S-shaped curve of innovation
- ▶ the theory of perceived attributes
 - perceived complexity,
 - compatibility,
 - trialability,
 - relative advantage and
 - observability

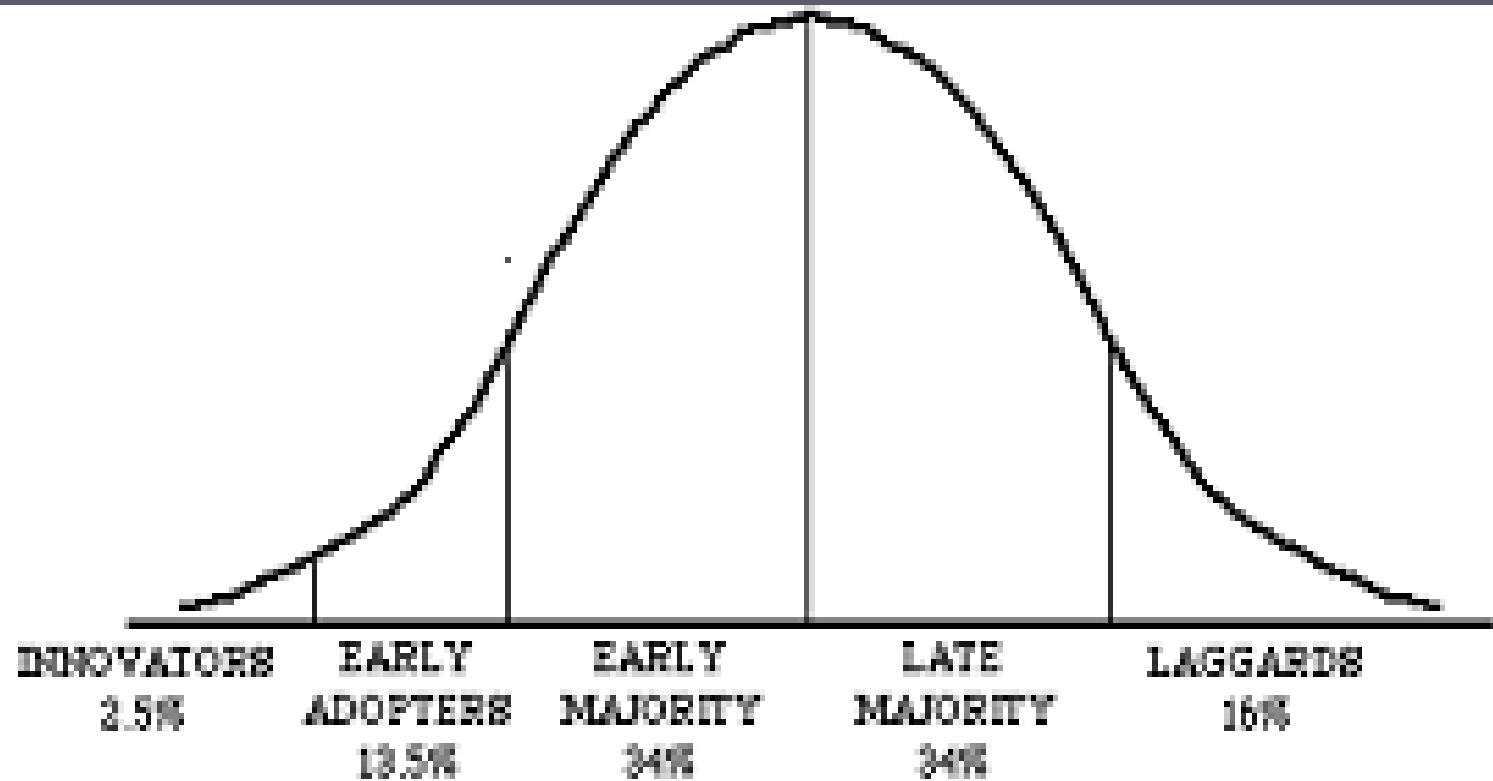
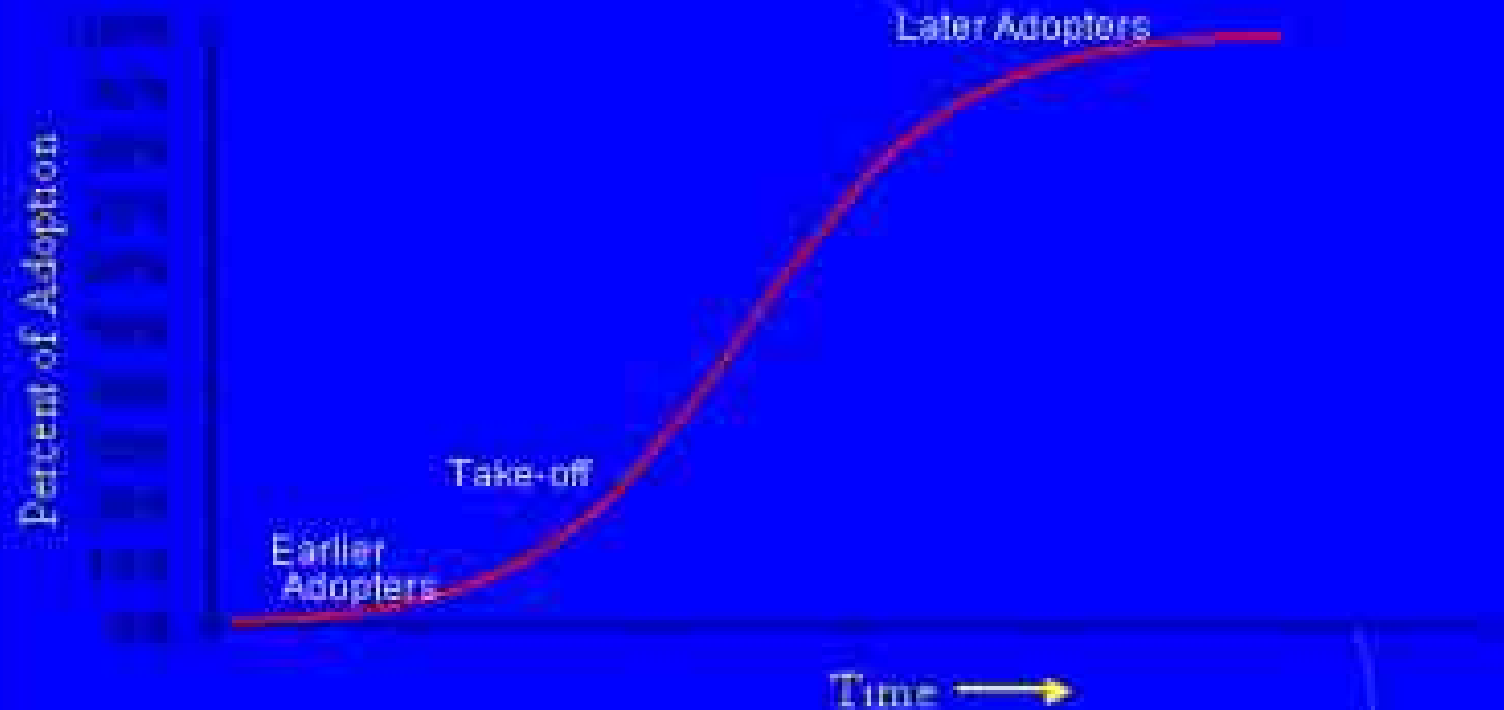
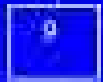


Figure 1. Bell shaped curve showing categories of individual innovativeness and percentages within each category

Diffusion of Innovation

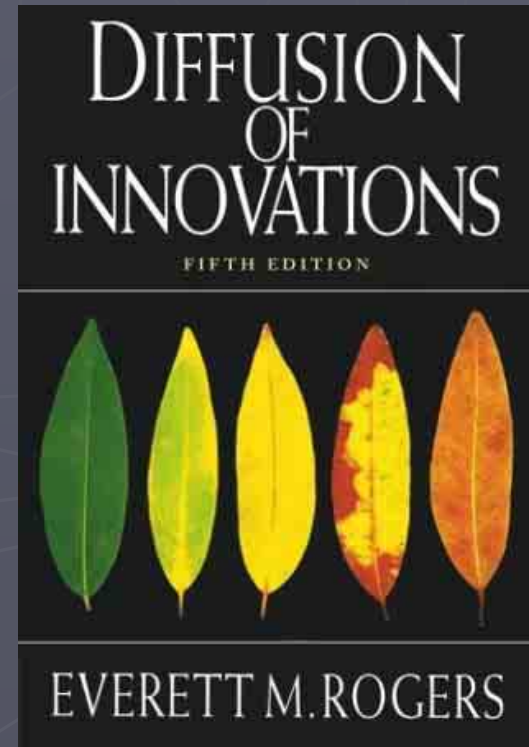


Rogers, 1995

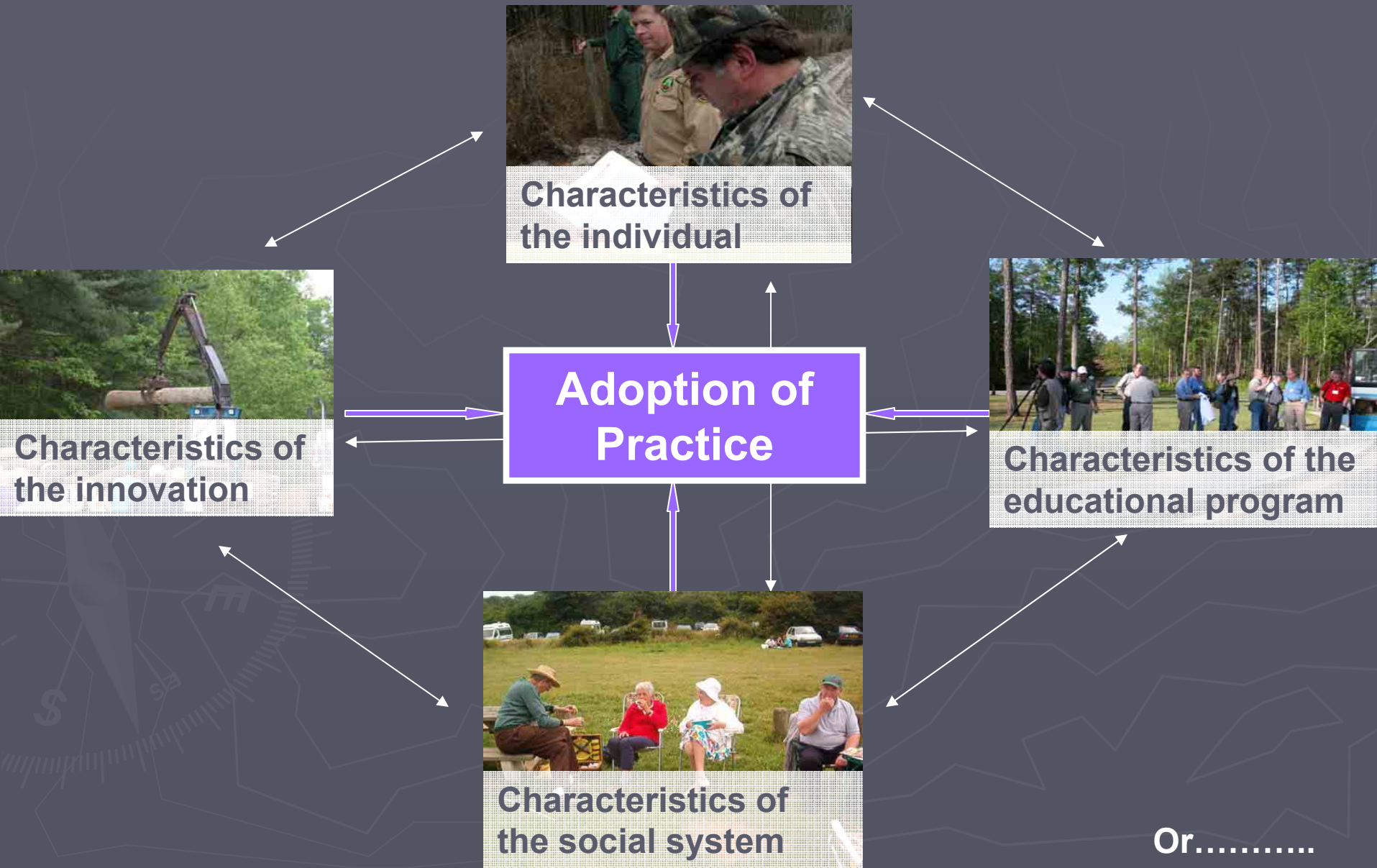


Theory of Perceived Attributes Refined for Evaluation and Development Purposes

- ▶ Adoption of a practice is influenced by:
 - Characteristics of the practice
 - Characteristics of the landowner
 - Characteristics of the landowner's social network
 - Characteristics of the educational program
 - Others (perception of future markets, etc)



Use of a Meta-Theoretical Model (Rogers' Diffusion of Innovations Meta-Theory)





The Shortcourse(s)



- ▶ Actually three different satellite-based, live-feed shortcourses:
 - Master Tree Farmer Level I (offered in 2000, 2001 and 2004)
 - Master Tree Farmer Level II (offered in 2002)
 - Master Wildlifer (offered in 2003 and 2005)
- ▶ Live sessions are offered each Tuesday evening from 7 pm to 10 pm Eastern Time in February and March (seven consecutive weeks)
- ▶ Increasingly, tape sets are being used as well.

Shortcourse goals and audiences

▶ Shortcourse goals:

- Increase basic forestry and wildlife awareness, knowledge and skills of course participants (short-term or proximal outcomes)
- Increase the adoption of sustainable forestry and wildlife practices by shortcourse participants (long-term or distal outcomes)

▶ Shortcourse audiences:

- Forest landowners and potential landowners
- Forest and wildlife area managers
- Natural resource professionals
- County Extension agents
- Students in high schools and colleges



Logisitics

- ▶ Regional steering team including funding agencies and key partners
- ▶ Regional implementation team including one or more state contacts for each participating state
- ▶ Funding comes from USDA Forest Service, BASF, American Tree Farm and others
- ▶ Broadcast live from Clemson University
- ▶ Participants pay fees ranging by state from \$50 to \$100 or more for the 7-week course
- ▶ Clemson collects a production fee from each participant of \$20.

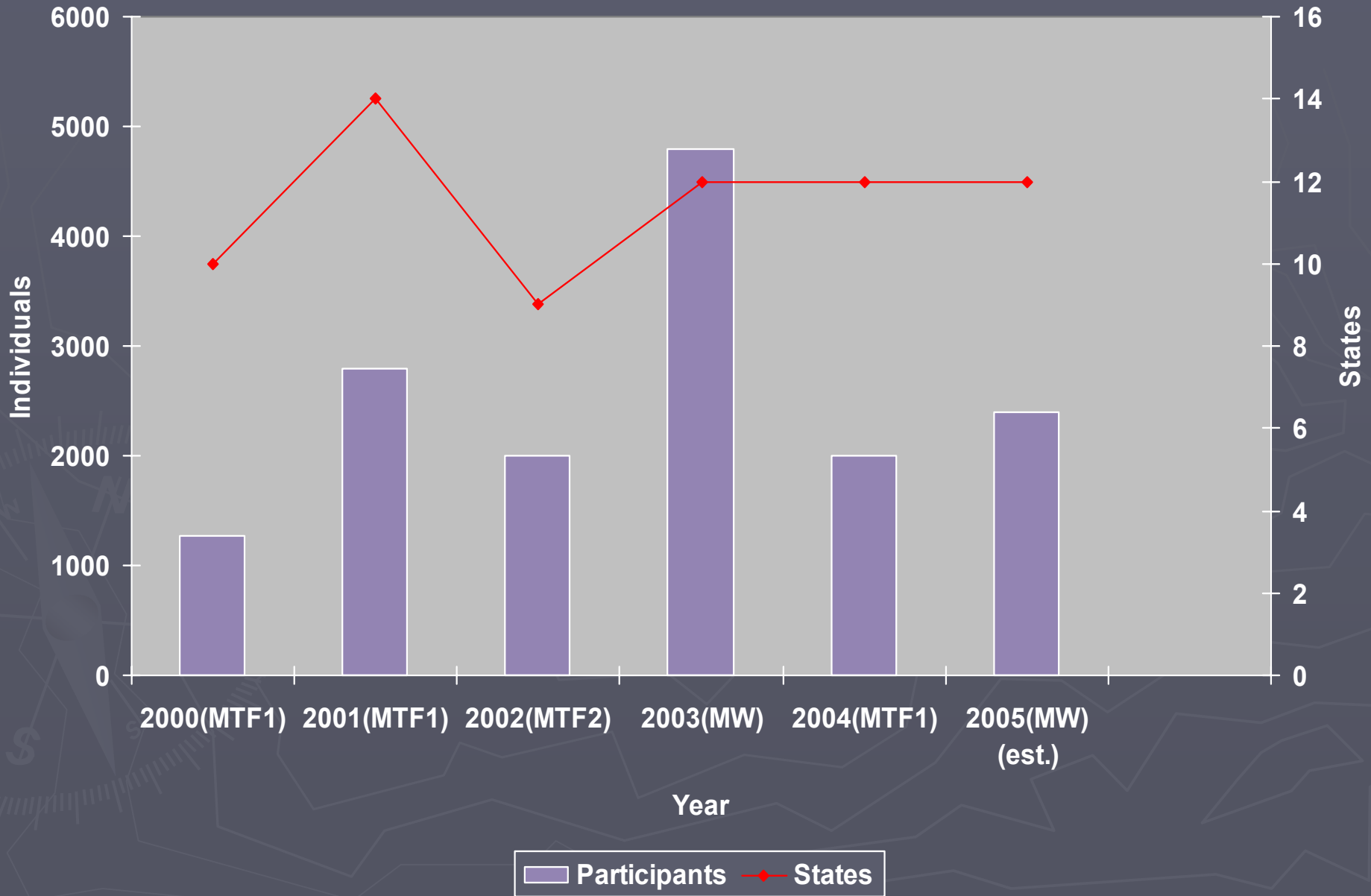


Program information

- ▶ Over 15,000 participants in the 3 courses in 6 years – 315,000 contact hours
- ▶ Countless others have viewed tapes
- ▶ Courses are also online in streamed format at www.sref.info



MTF/MW Program Participation





HOW GOOD IS THE PROGRAM

MTF		MW
98%	Will recommend the course	97%
98%	Will take another satellite course	96%



KNOWLEDGE LEVEL

Knowledge level	%Before		% After	
	MTF	MW	MTF	MW
Poor	3.74	6.77	0.09	0.00
Fair	39.59	23.87	4.85	1.41
Average	31.59	38.28	18.45	9.31
Good	20.81	27.96	64.71	70.24
Excellent	4.27	3.12	11.90	19.05



AS A RESULT OF THE PROGRAM

MTF		MW
89%	Plan to change how they manage their land	92%
94%	Report they will save money	77%
95%	Report they will earn money	55%
90%	Want to take an advanced course	90%

Diffusion of Innovation in Forestry and Forestry Extension

- ▶ “*Technology Transfer and Human Behavior*” (Journal of Forestry, 1980)
- ▶ “Diffusion of Innovation: A Sociological Approach to the Nonindustrial Private Forests Challenge” (Haymond, 1987)
- ▶ “Factors Affecting the Decisions of NIPF Owners to Use Assistance Programs” (Lorenzo and Beard, 1996)
- ▶ “Predicting Adoption-Diffusion Behavior of Opinion-Leading NIPF Landowners” (Greene and Cross, 1996)
- ▶ “Diffusion-Adoption Behavior of Timber Harvesters in Mississippi” (Straka, 1990)

Research Methodology

Adoption of practice $k = f(\text{characteristics of the educational program, characteristics of the participant, characteristics of the practice, characteristics of the social system, other characteristics})$

Where k could be any number of forest management practices that were taught as part of the shortcourse. Examples include:

- **Reforestation**
- **Planting wildlife food plots**
- **Thinning**
- **Fertilization**
- **Control burn**
- **Preparing a management plan**
- **Preparing an estate plan**
- **Conducting a financial analysis**
- **Or any one of several other practices....**



Mathematically, this model can be expressed as such:

$$f_k = \mu_0 + \mu_1 X_{1k} + \mu_2 X_{2k} + \dots + \mu_n X_{nk}$$

where:

f_k = adoption of practice k (yes or no),

X_{nk} = value of independent characteristic n on practice k ,

μ_n = coefficient of the characteristic n .

Dependent Variables Identified for Study

- ▶ Did the participant:
 - Develop a written forest management plan
 - Reforest or afforest property
 - Plant wildlife food plots



Model Component: Characteristics of the Practice

<u>Characteristic as Perceived by Participant</u>	<u>Hypothesized relationship to adoption of practice</u>
Relative advantage (financial, status, etc)	+
Compatability with current objectives, ethics, relevance to situation, etc.	+
Complexity of practice under consideration	-
Trial ability of the practice	+
Observability	+

Model Component:

Socio-demographic and Personal Influences

<u>Characteristic as Perceived by Participant</u>	<u>Hypothesized influence on adoption of practice</u>
Demographic (age, race, gender, income, etc)	+ or -
Length of tenureship	+ or -
Size of landholdings	+
General educational level achieved	+
Previous forestry/wildlife experience	+
Recipient of forestry information (newsletters, magazines, etc)	+
Personal innovativeness levels and leadership styles	+ or -

Model Component: Social System Influences

<u>Characteristic as Perceived by Participant</u>	<u>Hypothesized influence on adoption of practice</u>
Membership and involvement in a forestry association	+
Networks with forested neighbors, friends, etc.	+
Interaction with professional natural resource manager or Extension agent	+
Participates in forestry meetings and field days.	+

Model Component: Educational Program Influences

<u>Characteristic as Perceived by Participant</u>	<u>Hypothesized relationship to adoption of practice</u>
Goals & objectives clearly defined?	+
Goals to needs match?	+
Educational format matches participant's learning style?	+
Credibility of the instructors?	+
Clarity of information	+
Participation in course	+

Methodology

- ▶ Cross-sectional survey of 2004 Master Tree Farmer Shortcourse program participants
 - 7-week, 21-hour, evening course across the South in nine states at 75 sites.
 - Query the entire population (~1,500 participants)
 - Sample of “convenience”...i.e. county agents must be contacted to get these addresses.
- ▶ Post-facto, self-administered mail survey (Dillman, 2000) sent once with two follow-up postcards.
- ▶ Sampling bias will be estimated via phone calls to non-responders (exact number tba)

Use of Research Results

▶ Public Policy

- Impact of technical, financial, educational and information forms of assistance.
- Provide insight into better ways state, federal and private agencies can work together to meet the needs of private owners.

▶ Behavioral/basic research

- Psychological – why do people adopt practices
- Social – what social network factors influence a landowner's decision to adopt.

▶ Program Evaluation

- Potentially useful form that can quantify the impact of an educational program as well as it's relative value in the decision-making process.

Conclusions

- ▶ Shotgun approach to Extension programming is inefficient
- ▶ We need to understand our clientele better
 - i.e. we know their “needs” and demographics but do we know what motivates them to practice what we teach?
- ▶ We need to better understand our part in the bigger picture
 - i.e. education and information is just one piece of the solution, what are the others?

