

People, Partnerships, and Communities

The purpose of the People, Partnership, and Communities series is to assist The Conservation Partnership to build capacity by transferring information about social science related topics.

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The Adoption and Diffusion of Conservation Technologies

Why is the Adoption Diffusion (A-D) Model Important?

“Getting conservation on the ground” requires not only an understanding of physical resource data, but also social data. This publication outlines and discusses the key elements of the Adoption-Diffusion (A-D) Model which social scientists use to describe, explain and predict human behavior relative to the adoption and diffusion of agricultural technologies.

Adoption-diffusion is a way of looking at what influences a producer’s decision to adopt an agricultural practice. Influences include information or what is known about the practice. How and when a producer receives information is critical in the adoption process. The size, scale and type of operation are also relevant to adoption. Other influences include personal characteristics of the producer, characteristics of the community and characteristics of the practice/innovation.

Who will benefit from this topic?

Any member of the Conservation Partnership who wants to use and apply social sciences information to conservation activities can benefit from this PPC. More specifically, Social Sciences Coordinators and field staff who need a guide on applying social information to participation in “locally-led” activities can benefit.

Evertt Rogers, a prominent social scientist, is most credited for his work in the refinement of the Adoption-Diffusion Model.

In using Roger’s A-D Model, certain terms must first be defined.

Definition of Terms

Adoption is the behavior associated with an individual or group’s deciding whether or not to accept new ideas, practices or products.

Diffusion is the process by which the adoption of a new idea, practice or product spreads throughout a group, community or society.

Innovation is an idea, practice or product that is perceived as new by the individual or group.

How the Model Works

Rogers outlines six stages in the adoption process:

1. Awareness of the problem
2. Interest in more information
3. Evaluation—how the technology can be applied to the producer’s operation
4. Trial—testing the applicability at a specific site
5. Adoption—full use of the technology
6. Adaptation—customization of the practice or technique by the producer

Although the stages are outlined sequentially, the model is dynamic; an individual farmer or rancher may return to any one of the stages at any time during the adoption process.

Information and Information Sources

Throughout the various stages, information is vital to the producer. It provides knowledge used in deciding whether or not to adopt a particular practice or system. Because of its key role, producers need timely, accurate, inexpensive and easily obtainable information. Site specific information on the agronomic, economic and environmental costs and benefits aids the producer in the decision-making process.

The sources of information that a producer uses are also vital to the adoption process. Producers use different sources of information at the different stages of the adoption process. Findings from over 2,500 research studies have resulted in the following summary table. The key information sources at work in each of the stages of the classic Adoption-Diffusion Model are listed below. The identified sources are listed in the priority of use. Note that while these key sources of information remain valid, today additional new sources such as the Internet and Certified Crop Consultants are in use when applying the model to current agriculture situations. Who, what and when an information source is used will vary by the particular producer group. For example, research in the 1980's

found that private industry was the main information source and especially so for large producers.

Personal Characteristics

Along with information and information sources, Rogers and Shoemaker associate certain characteristics with the adoption of innovations or agricultural technologies:

- above average income
- greater number of years of formal education
- high number of agency contacts
- high participation rates in agricultural organizations
- greater reliance on mass media
- high awareness of conservation problems
- willingness to take risks
- full-time operator
- desire to pass farm/ranch on to children

Farm/Ranch Characteristics

As with personal characteristics, Rogers found a relationship between a select set of farm/ranch characteristics and adoption. The characteristics Rogers cited are as follows:

- large scale farms
- high gross farm sales
- owner operated

Characteristics of the Technology (Practice/System)

Research has found that certain characteristics of technology/innovation are related to the adoption process. The practice must be:

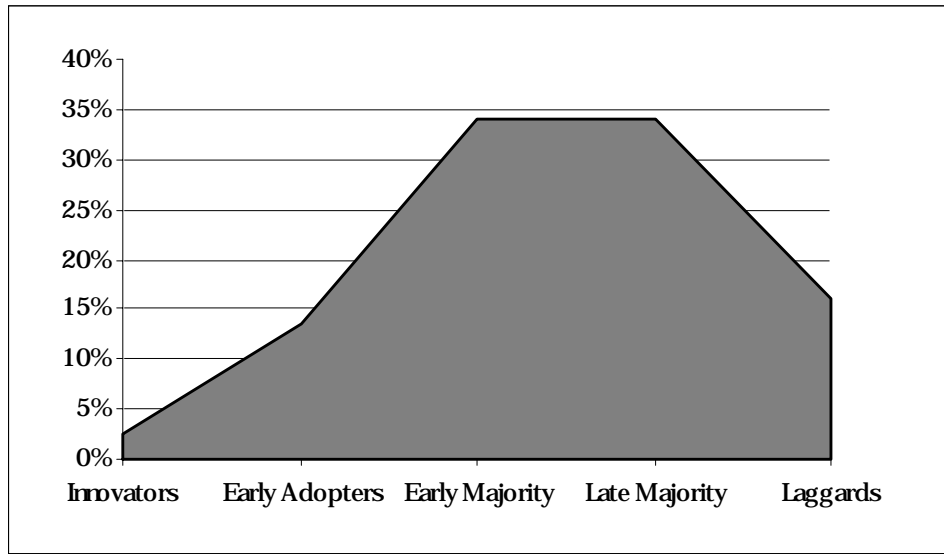
- economically feasible
- observable, simple to use and divisible into manageable parts
- compatible with a farmer's beliefs, ideas and management style
- flexible, easily fitting into the producer's management of the operation

Stages of Adoption	Sources of Information (in priority)
Awareness	1) Mass media 2) Government agencies 3) Friends and neighbors 4) Dealers and salespeople
Interest	1) Mass media 2) Government agencies 3) Friends and neighbors 4) Dealers and salespeople
Evaluation	1) Friends, neighbors and family 2) Government agencies 3) Mass media 4) Dealers and salespeople
Trial	1) Friends, neighbors and family 2) Government agencies 3) Mass media 4) Dealers and salespeople
Adoption	1) Friends, neighbors and family 2) Government agencies 3) Mass media 4) Dealers and salespeople
Adaptation	Personal Experience

(Rogers & Shoemaker, 1971)

Community Characteristics

In his model, Rogers categorized adopters into five groups based on how quickly they are likely to adopt new technology. These five groups are *innovators*, *early adopters*, *early majority*, *late majority* and *laggards*. The percentage of the population that falls into any one of these categories is represented in the following illustration. The bell shaped curve also indicates how early one group adopts relative to the other group.



Adopter Categories

(Rogers & Shoemaker, 1971)

Each of the adopter groups has characteristics that are uniquely associated with their adoption-diffusion behavior, namely socially shared ideas within a group of what is considered

good, right and/or desirable personal characteristics, communication behavior and social relationships. Rogers & Shoemaker summarize these characteristics in the following table.

Adopter category	Salient values	Personal characteristics	Communication behavior	Social relationship
Innovators	"Venturesome"; willing to accept risks	Youngest age; highest social status; largest and most specialized operations; wealthy	Closest contact with scientific information sources; interaction with other innovators; relatively greatest user of impersonal sources	Some opinion leadership; cosmopolite
Early Adopters	"Respect"; regarded by many others in the social system as a role-model	High social status; large and specialized operation	Greatest contact with local change agents	Greatest opinion leadership of any category in most social systems; localite
Early Majority	"Deliberate"; willing to consider innovations only after peers have adopted	Above average social status; average-sized operation	Considerable contact with change agents and early adopters	Some opinion leadership
Late Majority	"Skeptical"; overwhelming pressure from peers needed before adoption occurs	Below average social status; small operation; little specialization; small income	Secure ideas from peers who are mainly late majority or early majority; less use of mass media	Little opinion leadership
Laggards	"Traditional"; oriented to the past	Little specialization; lowest social status; smallest operation; lowest income; oldest	Neighbors, friends, relatives who have similar values are main information source	Very little opinion leadership; semi-isolates

(Rogers & Shoemaker, 1971)

As referred to in the table, community leadership is key in the diffusion process. Although innovators are first to adopt, they are not typically the most respected people in the community. This may be due to a perception that they are extraordinarily fond of gadgets and will adopt untested technologies. In contrast, the most respected leaders are often the early adopters, who are more cautious in their approach to new technologies and tend to gather data on the reliability of the technology from many sources. These early adopters can also help others adapt to change. Members, particularly the early majority respect and value the opinions of the early adopters as they are viewed as “one of us” and therefore their opinions count. The late majority and especially the laggards, almost exclusively place value on opinions and more readily trust friends, neighbors and family.

Along with community leaders, the existence of supportive social structures (people and businesses who understand and focus services on agriculture) within the community play a significant role in the diffusion of conservation technology. Such social structures might include a strong and viable Conservation District, conservation clubs, conservation awards, knowledgeable lenders or processors and dealers who understand conservation.

The community as groups of producers with similar values, personal characteristics, communication behavior and social relationships as well as support within the community are instrumental in shaping and modifying the diffusion process. In deciding if a practice/system is workable for them, a producer will most often listen to trusted leaders, neighbors, family and friends. Additionally, producers keenly observe the diffusion of agricultural technologies in the community.

Obstacles

Time has shown that there are obstacles to the adoption of conservation. These obstacles include:

1) Farmers may not be aware of or understand:

- on-site and off-site causes and consequences of erosion and other natural resource problems.
- the short and long term benefits of conservation.
- the types and sources of available assistance.
- the nature of conservation plans, that is, voluntary implementation.
- that alternative practices/systems can be custom designed to meet the producer’s needs and conditions.

2) Farmers may not have technical information on:

- the economic, agronomic and environmental costs and benefits of alternative practices, assistance or agency programs.

3) Community constraints include:

- the absence of support from leaders, family, friends and neighbors.
- absence of active community support structures such as districts, salespeople or local USDA offices.
- unequal access to information, financial and technical assistance and support.

4) Social psychological characteristics include:

- aversion to risk.
- lack of appropriate management skills.

5) Organizational barriers include:

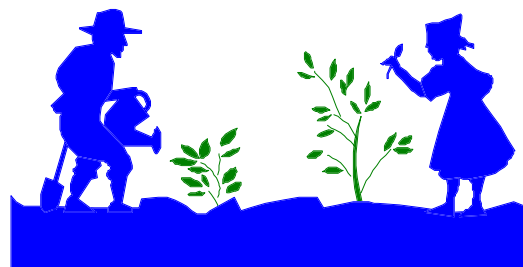
- conflicting messages from different sources.
- confusion over the roles and responsibilities among the various agencies.
- lack of coordination between and among agencies.

6) Economic obstacles include:

- lack of cash or credit for producers share of cost.
- limited cash flow while waiting for government reimbursement.

7) Landlord-tenant relationships:

- short term leases may serve as obstacles to installation and maintenance of practices/systems.
- program sign ups may require long term commitments.



Key points to remember when applying the A-D Model

- Timely and accurate information can help to accelerate a producer's movement through the stages of adoption.
- Field staff should regularly and continually use local information sources to promote conservation technologies.
- Outreach strategies and locally-led activities will be most effective in "getting conservation on the ground" if the values, personal characteristics, communication networks and social relationships associated with each adopter category are integrated in local planning activities.
- Field staff should seek out and work with early adopters. They are leaders and their opinions and experiences are highly respected. For example, use early adopters to demonstrate conservation technologies to the rest of the community.
- Demonstrations, pilot projects and field tours continue to be viable ways that producers can use to evaluate how a practice/system may work in their operation.
- Among small-scale producers, peers, friends and neighbors serve as trusted leaders and play a significant role in the adoption-diffusion process.
- People who might be characterized as belonging to different types of groups in the community tend to respect their "own" leaders (i.e. leaders that are similar to them in status, race, ethnicity and their farming situation).
- For small-scale producers, demonstration and pilot projects must include alternative low cost technologies.
- Technical assistance and "hand-holding" during the trial stage can help a producer acquire the needed management skills in order to have a successful experience with the innovation.
- Community support structures such as environmental education programs/centers, "Conservationist of the Year" programs, active watershed coalition and "Ag Days" help to reinforce and shape the diffusion of a technology.
- Based on farm/ranch characteristics as well as their personal characteristics, low-cost practices/technologies should be made available to small-scale operators.
- Whether field staffs are working one-on-one, designing outreach or setting up locally-led activities, the known obstacles to adoption can serve as a springboard for field staff to increase and to influence the adoption-diffusion process.

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History of the Adoption-Diffusion Model

Gabriel Tarde, a judge in France at the turn of the Twentieth Century, was a keen observer of human behavior. His interest in the repetitive behavior of humans resulted in what has come to be known as "the laws of imitation". His interest in imitation spread to England, Germany and America. In 1943, Bryce Ryan and Neil Gross applied the laws of imitation theme to the famous hybrid seed corn study which investigated the spread or diffusion of this seed innovation throughout the farming community. In the 1950's Everett Rogers developed a theoretical model of the diffusion of innovations using the results of Ryan and Gross' work. The model Rogers developed was the Adoption-Diffusion Model (A-D). In the model, Rogers outlined six stages of the adoption-diffusion process and several categories of social factors. Rogers (1962), Rogers and Shoemaker (1971) and other practitioners in the social sciences continue to refine this model. Research on the application of the model to conservation began in the mid 1970's as awareness and funding in the environmental arena increased.

Where do I get more information?

Nowak, P.J. "New Challenges for Conservation Partners." *Journal of Soil and Water Conservation* Ankeny, Iowa: Soil Conservation Society of America. Sept/Oct 1986 v.41 (5) pp. 278-284.

Nowak, Peter. "Why Farmers Adopt Production Technologies." *Journal of Soil and Water Conservation* 1992 vol. 47, no. 1 pp. 14-16.

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Social Science Institute. "Conservation and the 1996 Farm Bill: Social Factors Influencing Implementation of Programs." Technical booklet released May 1998. Contact Gail Brant (610) 792-9207.

"Defining Communities: An Issue Based Approach." People, Partnerships, and Communities information sheet. Issue 22, August 1998. Contact Michael Johnson (520) 626-4685 or visit the SSI Homepage <http://people.nrcs.wisc.edu/socsciinstitute>.

"Methods to Identify Community Leaders." Paper presented at the Social Sciences Coordinators Meeting. April 6-9, 1998. Baton Rouge, LA. For more information contact Barbara Wallace (616) 942-1503.

"Working with Asian & Hispanic Limited Resource Farmers and Ranchers." Technical report. Release 4.1 by L. Clair Christensen and Myriam Grajales-Hall. Published by the Social Sciences Institute January 1997. Download this publication from the SSI Homepage <http://people.nrcs.wisc.edu/socsciinstitute>.

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