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Abstract

It happened January 11, 1992. Eighteen-year-old John Thompson was seriously injured in an agricultural machinery accident on the family's North Dakota farm.

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Fields Of Danger: Communicating Agricultural Safety And Health Information

Judy Barnes Oskam

It happened January 11, 1992. Eighteen-year-old John Thompson was seriously injured in an agricultural machinery accident on the family's North Dakota farm. After both of John's arms were severed in the accident, he ran four hundred yards to his home and opened the door with his mouth. Holding a pencil in his teeth, John dialed the telephone and called for help ("Teen. . . Reattached Arms," 1992).

News of John Thompson's farm accident quickly spread across the country. The mass media were fascinated by this tragic story with an apparent happy ending. After hours of surgery, John's arms were reattached and he now faces years of therapy and rehabilitation.

While the Thompson accident is by far the most widely publicized farm accident in recent years, the issue of agricultural safety and health deserves much more national attention. Throughout this article, we will explore the various theories involved with communicating agricultural safety and health information to the farming community through the mass media. By investigating the diffusion and social organization theories, we can determine the most effective method to communicate safety and health information.

Background

Farming is often depicted as natural, safe and serene. But, according to the National Safety Council, agriculture is currently ranked as the nation's most dangerous industry. The National

Safety Council (1991) estimated there were 42 deaths per 100,000 farm workers in agriculture in 1990. This compares to approximately 9 deaths per 100,000 workers for all other occupations (National Safety Council, 1991).

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The tragic toll of farm injuries is well known. More than 1,300 deaths per year occur to agricultural workers and approximately 120,000 non-fatal injuries result in temporary or permanent disability (National Safety Council, 1991). Farm hazards include: machinery; chemicals; exposure to sun, heat and noise; livestock handling; and stress.

A major obstacle to current efforts to lower the toll of agricultural injuries is a fundamental lack of knowledge of the causes and risk factors associated with these injuries (Layde, 1990). Because of this tremendous danger in the farm environment, there is great need to communicate information about agricultural safety and health to farmers and their families. By studying and applying the theories of social organization and diffusion we can learn how to educate farmers about the issue of safety and health.

Theory of Social Organization and Group Norms

In order to effectively communicate with the farming community, it is important to understand the social make-up of the American farmer. The social evolution of the farmer may give us some insight into why this population has such a distinctive social organization.

The American transition from rural-agricultural to urban-industrial was accomplished by people familiar with farming. Only within the last two generations has a substantial fraction of city dwellers been born in the city (Bogue, 1959). Farm and rural populations declined proportionally as industrialization and urbanization advanced in this country (Rohrer & Douglas, 1969). Though not as strong as in years past, the agrarian tradition is alive and well in rural America. The institutions of

the American countryside included small local government, homestead ownership, country schools and churches, individually owned small businesses, and a spirit of equalitarianism (Rohrer & Douglas, 1969).

Like other groups, farmers have extremely complex standards of social organization. They may share the same views on political, educational, religious and economic issues (DeFleur & Ball-Rokeach, 1989). While city dwellers group themselves according to class, occupational, or cultural lines; rural dwellers tend to group themselves by neighborhoods. To the rural resident, space or distance is more important as a factor of separation than differences of occupation and culture (Lundquist & Carver, 1927).

By nature, farmers have strong independent, anti-regulation attitudes that make them suspect any government intervention. The geographic relationship between the farmer and his/her community breeds independence. In years past, self-sufficiency was not only possible but necessary for the isolated American farm family. According to sociologist Paul Johnstone, "the independent person was not only the equal of any other person, the independent farmer literally was in partnership with God" (in Rohrer & Douglas, 1969). These strong statements typify the attitude of the American farmer.

Socialization involves internalization of social norms, roles and other aspects of culture, which occurs mainly through interaction with other persons (Slocum, 1962). The way farmers interact may lead to clues about the most effective method to communicate information about agricultural safety and health. Farmers, like other people associated with a social system, usually share cer-

tain norms and values. Norms are general rules that are commonly understood and followed by all members of a group (DeFleur & Ball-Rokeach, 1989). They define a range of tolerable behavior and serve as a guide or a standard for the members of the social system (Rogers, 1983). For example, the members of a particular farm family will have a common set of values that may differ from families with different backgrounds or traditions (Slocum, 1962).

Research shows there is a great difference between rural and urban family life in America. The ties that bind the farm family may also serve to strengthen the bond between individual family members. It is believed that urban families are held together by affectionate bonds, with emphasis on individual rather than group values. On the other hand, the traditional farm family is conceived to be held together to a considerable extent by common participation in the farm enterprise and by emphasis on family solidarity and kinship ties. The farm family may be more likely to participate as a family group in neighborhood and community affairs (Slocum, 1962).

While common values are often an asset, a system's or group's norms can also be a barrier to change. For example, a two-year campaign by a public health worker in Peru was aimed at persuading housewives to boil drinking water to guard against bacteria. For the most part, the diffusion campaign failed. Reasons for failure can be traced partly to the cultural beliefs of the villagers. Since local tradition linked hot foods with illness, boiling was seen as appropriate only for the sick. This proves that an important factor affecting the adoption rate of any innovation is its compatibility with the values, beliefs and the past experiences of the so-

cial system. The fact that the public health worker was unsuccessful in convincing villagers to boil water also demonstrates the importance of interpersonal networks in the adoption and rejection of an innovation (Wellin, 1983).

Oklahoma State University Extension Safety Specialist Pat Lewis confirms that farmers conform to a rigid set of group norms. As the statewide safety specialist for Oklahoma State University, Lewis interacts with the rural farming community on a regular basis to spread information about agricultural safety and health. In an interview, Lewis described farmers as "set in their ways, resistant to change and suspect to any new innovations or ideas." Lewis says, "farmers are reluctant to adopt safe farming practices because they don't perceive the true dangers involved with the agricultural industry" (Lewis, interview, 1992).

Oklahoma State University Agricultural Engineer Ed Barnes agrees that, in general, farmers are "self-sufficient, independent and live by traditional values." Barnes says that since the average age of Oklahoma farmers is over fifty years old, the majority of them have grown up on farms. He notes that, for the most part, farmers have a negative attitude toward government and are very resistant to change. Because of these characteristics, Barnes believes the communicator and the methods of communication are very important factors that influence farmer acceptance of new ideas or innovations (Barnes, interview, 1992).

The social organization and group norms of the agricultural population should be considered when developing an educational program for safety and health. In order to effectively communicate with this population, we must first be sensitive to these

cultural characteristics before we begin the diffusion of the innovation.

Theory of Diffusion

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1983). Channels of communication now exist that make it possible for new agricultural information to reach interested farmers much more quickly than in years past. Some farmers are so interested in new technology that they keep in touch with agricultural experiment workers and Extension specialists (Slocum, 1962). It is important to remember that diffusion occurs within a social system, because the social structure of the system affects the innovation's diffusion in a number of ways (Rogers, 1983). In our case, the social system is the farming community. It constitutes a boundary within which the innovation diffuses.

In order to effectively communicate information about agricultural safety and health, it is important to understand the process of diffusion. The four main elements are the innovation, communication channels, time and the social system (Rogers, 1983). An in-depth look at each of these elements will give us some insight into the potential benefits of the diffusion theory.

For the purposes of this research paper, safe and healthy farming practices are the primary innovation. Everett Rogers (1983) describes an innovation as an idea, practice, or object that is perceived as new by an individual or other unit of adoption. Safe farming procedures may not actually be new, but they certainly could be considered new to a farmer who does not currently utilize these practices.

The innovation of safety and health on the farm may, in fact, be

new to many Oklahoma farmers and ranchers. According to an Oklahoma Department of Health issue paper on the Prevention of Farm-Related Injuries (1989), there are no federal regulations or guidelines for the family farm concerning safety, basic or recurrent training, or child care provisions. This absence of legislation for the family farm may be a contributing factor leading to the high rate of injuries and deaths related to agriculture as an industry and an occupation.

The various characteristics of innovations should be considered as educational Extension programs are developed. It will be important for farmers to first understand the relative advantage of safe farming practices. If they do not perceive a clear benefit, the innovation will more than likely not be adopted (Rogers, 1983). The farming community must be convinced that safe farming practices will result in savings of human, as well as, economic costs. A decreased number of injuries and deaths will result in less human suffering and, therefore, fewer economic woes.

While the sacrifices of farm accidents are very real, they still do not demonstrate the innovation as advantageous to many farmers. Adopting safe farm practices must also be perceived as being consistent or compatible with existing values or needs. Many farmers believe that nothing tragic will ever happen to them. Farmers, like many of us, may feel they are invincible. The image of the farm as a "field of danger" may conflict with the ideal of the "field of dreams." Because of this existing standard, farmers may shun safety information, feeling it is totally unnecessary. Unless they accept the fact that the farm is truly a hazardous place and farming is a dangerous occupation, farmers will not adopt safety practices.

To better the chances of educating farmers about agricultural safety and

health, it is important to present the information as simply as possible. This factor is illustrated in the research cited earlier on the adoption of boiled water by villages in Peru. The villagers did not understand the germ theory, which the health worker tried to explain was the reason for boiling their water (Rogers, 1983). The villagers correlated the boiled water with their existing value that hot water was only for ill people. Had the villagers understood the germ theory, they may have adopted the innovation. The perceived complexity of an innovation greatly influences the rate at which it will be adopted (Rogers, 1983).

Once farmers understand the advantage, compatibility and complexity of safe farming practices, they should be able to try the ideas. According to Everett Rogers, an innovation that is triable represents less uncertainty to the individual considering it for adoption (1983). Attempting to use the new idea or technique gives the farmer an opportunity to learn by doing. Because of their independent nature, farmers may prefer to "try before they buy" to see if the innovation is worth their while.

Observation is another characteristic of innovation that leads to adoption. If farmers can see the results of the innovation, they are more likely to accept the idea. A 1979 California study showed that solar panels on a household's roof are highly observable and the typical solar adopter showed his/her equipment to about six of his/her peers (Rogers et al. 1979). Like the solar adopters, farmers who observe the safety innovations and realize the benefits may embrace them more readily.

How and by whom information about the innovation is communicated to the farming population is crucial to the success of the diffusion process. The mass media are an im-

portant link in this communication chain. The majority of farmers own television sets, and most, if not all, have radios. A large proportion of farmers also read daily or weekly newspapers (Slocum, 1962). While the mass media explosion has impacted how the farmer receives information, interpersonal channels are often more important in persuading an individual to adopt an idea, especially if the interpersonal channel links two or more individuals who are near-peers (Rogers, 1983).

Another important element in the diffusion process is time. The amount of time between when the individual learns about an innovation and the time he/she actually adopts or rejects it should be considered as agricultural safety and health materials are being developed. Farmers often think change will cost them time and money. If we can convince them that safety practices will actually save them time and money in the form of health and their well being, they may accept these innovations more readily.

A landmark diffusion study was carried out by Iowa State University in the 1940s. The investigation focused on the diffusion of hybrid seed corn to Iowa farmers. Hybrid seed corn was the result of twenty years of genetic research by agricultural scientists. The new hybrid seed increased corn yields by about 20 percent, withstood drought better and was better suited to harvesting by mechanical corn pickers. In 1928, this high-tech seed corn was made available to Iowa farmers and was promoted by the Iowa Agricultural Extension Service and commercial seed companies. The hybrid seed spread rapidly and by 1941, the innovation was adopted by almost 100 percent of Iowa farmers (Rogers, 1983).

In order to duplicate its successful diffusion efforts in other areas of

agriculture, the Iowa Agricultural Experiment Station sponsored a research project to give them some answers. Researchers were interested in knowing, for instance, why some farmers waited thirteen years to adopt while others adopted the innovation almost immediately (Rogers, 1983).

Professor Ryan and graduate student Neal Gross selected two small Iowa communities and interviewed all 259 farmers living in the area. Gross asked farmers when they had decided to adopt hybrid corn, the communication channels used at each stage of the innovation-decision process, and how much of their corn acreage was planted in the new hybrid variety (Rogers, 1983). The surveyors also asked the farmers about their formal education, age, farm size, income, and other variables.

The results of the survey told researchers a lot about the adopters and the role communication played in the diffusion process. According to the study, the average farmer heard about the hybrid seed from a salesperson, but neighbors were the most frequent channel leading to persuasion. The farmer-to-farmer exchange of personal experiences with the use of the hybrid seed seemed to lie at the heart of the diffusion. This confirms the social organization and group norms theories discussed earlier in this paper. When these positive experiences were accumulated by farmers (especially the innovators and early adopters) and exchanged within the community, the rate of adoption increased significantly (Rogers, 1983).

Ryan and Gross compared the hybrid corn spread in the two Iowa communities to a kind of "social snowball." They were one of the first to substantiate this "snowball effect" and prove that the heart of the diffusion process consists of interpersonal network exchanges and social

modeling between those individuals who had already adopted and those who then would be influenced to do so (Rogers, 1983).

What factors influence farmers to adopt a new practice or innovation? And what makes them different from nonadopters? Research in the Midwestern United States indicates that adopters have different characteristics from farmers who do not adopt new practices. A report in *Rural Sociological Society* (1952) showed that adopters have more education than others, have a high level of participation in general farm organizations and cooperatives, and have children in 4-H clubs or vocational agriculture. It will probably come as no surprise that innovation adopters also have contact with new ideas through bulletins, farm magazines and newspapers, and are risk-takers rather than security-seekers.

The mass media can greatly assist the diffusion process and help spread the word about agricultural safety and health. A 1963 study in Costa Rica investigated the relationship between the mass media and the diffusion of agricultural, health and social education innovations. On a voluntary basis, small groups of villagers listened to weekly radio programs, discussed them and summarized their discussion to the radio programmer while another group participated in a reading treatment. The agricultural innovations chosen for the communications included: soil conservation, use of fertilizers, use of tractors, general mechanization, and use of insecticides. The radio-farm forum and reading programs continued on a weekly basis for approximately one year (Roy, Walsanen & Rogers, 1969).

The results of the study suggest that the radio forum technique has greater impact than the reading treat-

ments. However, the findings are bound by a time dimension which was relatively short (Roy, Waisanen & Rogers, 1969). Although, this was just one portion of the research, it does show the influence the media can have in assisting to diffuse an innovation. Considered broadly, many stimuli communicated through mass media may be viewed as educational influences.

Conclusion

While there are many theories that could be applied to the issue of agricultural safety and health, the social organization and diffusion theories are among the most important constructs to consider. Because of the opportunity for interaction, these two theories work very well together and should be utilized to communicate safety and health information.

The farming community, like other sub-cultures in America, represents its own set of values, attitudes and traditions. There are even various sub-groups within the farming community. Dairy farmers, wheat farmers and cattle ranchers all have very different interests. Each group should be recognized for its particular sensitivities. Until this is accomplished, the diffusion process cannot be successful.

Because of the nature of the diffusion theory, understanding the groups' social culture or system is paramount to its success. Applying the two constructs should result in more efficient agricultural safety and health Extension programs.

While the tragic case of John Thompson will serve as a constant reminder to some people of the dangers of farming, other farmers and ranchers will need more education. Scott Scrivner, a 13-year-old Arkansas boy whose hands were mangled in farm machinery, said he got help

after recalling the story of John Thompson. Scrivner said he remembered seeing on the television show *Rescue 9-1-1* how Thompson got into his house after having his arms severed. Like Thompson, Scrivner also opened the door with his mouth ("Teen's Example," 1992).

These graphic examples paint a grim picture of the hazards of farming. Increased attention by the media and comprehensive educational programs can promote agricultural safety and health. But before these programs can be truly effective, an in-depth review of the social organization, group norm and diffusion theories must be initiated.

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