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Abstract

This case study presents selected findings related to communication for agricultural health and safety of a convenience sample of California farmers. The overall purpose of the study was to document, analyze, and assess how agricultural operators conduct safety programs, seek and use safety-related information, and how they organize their operations to ensure a safe workplace. The study was carried out in the Fall, 1996, with the 662 safety award winners which comprise 5% of the 13,000 insured farmers throughout California. Responses from 137 respondents (20% response rate) indicate that while operators use a variety of information sources, they question the sources' effectiveness and utility. A number of directions to follow in developing effective communication and education approaches that can impact the health and safety practices of California farmers are indicated. Results also indicate that new challenges for extension communicators and educators in the area of agricultural health and safety exist.

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Historically, educators and communicators of the Cooperative Extension Service have designed and utilized various media and educational programs in a multitude of subject areas to meet information needs of their clientele. Recent examples have reported on communication delivery preferences of extension's audiences (e.g., Richardson, Clement, & Mustian, 1997), new information technologies (e.g., Tavernier, Adelaja, Hartley, & Schilling, 1996), environmental issues (e.g., Bruening, 1991), production practices (e.g., Buchner, Grieshop, Connell, Kreuger, Olson, & Hasey, 1996), and on information sources used by farmers (e.g., Martin & Omer, 1988).

Interestingly however, the issue of communication and agricultural health and safety has received scant attention.

As an example the *Journal of Agricultural Safety and Health (JASH)*, which provides a scholarly outlet for such topics, has published only two articles in four years that deal with communication and farm safety (Rodriguez, Schwab, Peterson, & Miller, 1997); Grieshop, Stiles, & Domingo, 1995). Moreover, a *JASH May 1998 Special Issue (No. 1: Papers from the NIOSH Agricultural Safety and Health Conference, July, 1997)* did not include any articles that addressed agricultural health issues from a communication and/or education perspective.

This critique is not to suggest that researchers and extension educators ignore agricultural health and safety topics. Many studies have been published: an investigation of farm and farm worker behaviors (Aherin, Murphy, & Westaby, 1990; Arcury, 1997; Wadud, Kreuter, & Clarkson, 1998); the promotion of safe behaviors (Rodriguez, et. al, 1997; Beaudin, Jacoby, & Quick, 1997); and on-farm injuries (Osorio, Beckman, Geiser, Hustung, Inai, & Summerill, 1998).

Nevertheless, there appears to exist a need (as well as the opportunity for communication specialists) to conduct and publish research and extension work on communication and agricultural health and safety.

The case study reported here focuses on communication for agricultural health and safety in the context of California agriculture. As such it is one part of a social marketing effort that is organized to aid in the design, delivery, and promotion of agricultural health and safety messages and programs.

It is an educational (or communication) effort, as opposed to engineering or enforcement, used to promote safe workplaces and practices (Murphy 1992).

California is a worthy test area for developing effective communication methods to reach those involved in agriculture. Although there is a relatively small number of farms in the state (approximately 78,000), these operations generated over \$26 billion in agricultural products in 1997. Despite the small number of farms there are an estimated 800,000 to 1.2 million agricultural/farm workers in California's fields (Martin, 1992). California agriculture also produces more than 250 major commodities and crops.

For the Cooperative Extension Service, the issues associated with farmer and farm worker health and safety are multiple and substantial. Since the early 1990s with the California legislature's implementation of Senate Bill 198 on workplace safety and training, agricultural operations, as with all businesses, have had to pay more required attention to their safety practices and programs. This development by itself has created challenges for extension personnel, among which are those related to the design and implementation of effective communication programs, methods, and materials. The case study findings reported here represent a single part of results from a larger assessment made of the safety and health best practices as used by safety award-winning farmers throughout California.

Subjects

In 1995, the California Farm Bureau, in conjunction with the State Compensation Insurance Fund, made Safety Awards to 662 of its insured agricultural operations to recognize them as the "best of the best" practitioners of good agricultural workplace safety and health. This convenience sample, which represented 5% of all insured operations (13,000), consisted of 1995 award-winning farmers and ranchers, nursery operators, and owners of agricultural services. It included large, medium, and small operations as defined both by size and insurance premium levels paid for required workers compensation. For each of the insurance company's three premium-level categories (i.e., Level I: \$1000 to \$10,000; Level II: \$10,000 to \$25,000; and Level III: greater than \$25,000), Farm Bureau and State Fund identified operations with the lowest loss ratio for each of California's counties.¹ For each category in each county, they randomly selected from those operations with the lowest loss ratio, a 5% sample as

¹The overwhelming majority of operations (90%) insured by the State Compensation Fund have premium levels of \$25,000 or less.

awardees. In total, this 5% sample of 662 awardees was drawn from a total pool of over 13,000 eligible farm operations or 1 of every 6 farms in the state.

Table 1 presents a profile of both the 5% sample and the actual respondents based on the three premium levels. In addition, this profile is presented according to their geographic distribution using four regions that correspond to administrative regions used by the University of California Cooperative Extension Service. This profile suggests that the respondent group, based on the associated percentages by premium levels and geography, closely matches the percentages for the distribution of the 5% sample. Although no claim is made that the sample is representative of the full range of California farms, it is argued that the sample is diverse enough to provide a worthy case

Table 1 <i>Total Sample and Respondents by Region and Premium Level [n (%)]</i>					
PREMIUM LEVEL					
		ALL	I	II	III
Statewide Total	5% Sample	662 (100%)	511 (77%)	85 (13%)	66 (10%)
	Respondents	137 (100%)	99 (72%)	21 (15%)	17 (13%)
Northern Region	5% Sample	147 (22%)	114 (22%)	19 (22%)	14 (21%)
	Respondents	30 (22%)	25 (25%)	3 (18%)	3 (18%)
North Central Region	5% Sample	132 (20%)	99(19%)	16 (19%)	17 (26%)
	Respondents	27 (20%)	17 (17%)	4 (19%)	6 (35%)
South Central Region	5% Sample	274 (41%)	214 (42%)	32 (38%)	28 (42%)
	Respondents	58 (42%)	40 (40%)	11 (52%)	7 (41%)
Southern Region	5% Sample	109 (17%)	84 (16%)	18 (21%)	7 (11%)
	Respondents	22 (16%)	4 (18%)	1 (6%)	1 (6%)

study sample with implications for the larger farming population in California.

Method

In October, 1996, a previously field-tested survey was mailed to the 662 awardees. Reminder postcards and letters were sent two and four weeks after the original mailing to encourage participation. After six weeks, a total of 137 usable responses (20%) were received. Another 30 responses (approximately 5% of the total sample) were returned but were unusable.

The questionnaire was designed to collect and assess respondents' views on safety and safety practices, what components were part of their safety programs, sources of safety information, their workforce, as well as background and demographic questions on their operations. Results presented here focus specifically on sources of safety and health information, the user's evaluation of sources and communication materials, and uses of a variety of communication approaches and devices.

The largest percentage of respondents (41%) came from California's Central Valley (the South Central Region noted in Table 1), arguably the most productive agricultural area in the world. The majority (81%) was directly involved in farming and/or ranching (Figure 1).

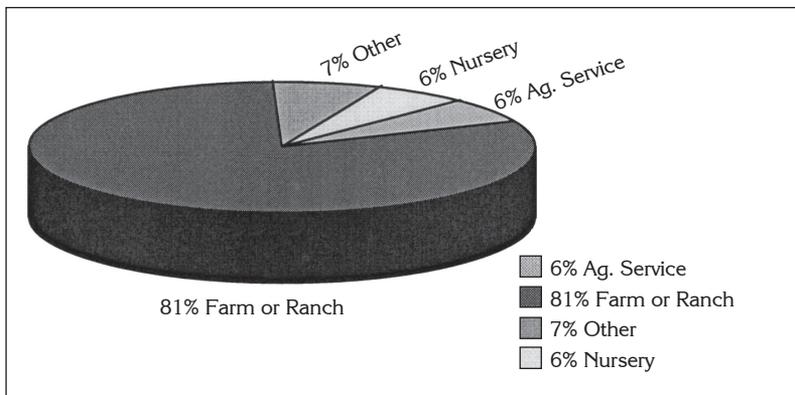


Figure 1. Type of operation.

Information from the *California 1992 Census of Agriculture*² and a *1996 Report on California Agriculture* (Carter & Goldman, 1996) provide a basis of comparison of the present study group with the approximately 78,000 Californian farm operations. Whereas 71% of all California farms range from 1 to 99 acres, only about 18% of the study's respondents had farms of this size (Table 2). Participants tended to operate larger farms—nearly 42% had operations of from 100 to 449 acres—and a larger than expected number of respondents were those in the higher premium category levels II and III. The average size of farms in the state is 373 acres, well within this group's range. Larger operations (500 to 2000+ acres) were found in higher numbers than in the *1992 Census*. Eighty-four percent of operations were owned individually or with family members, a figure very similar to that cited in the *1992 Census* (83%) (Table 3). The average age of farm operators across the United States is 55, which was the approximate average age for the response group (Figure 2). As a group, respondents were also well educated; nearly 60 percent of all respondents had either attended college or had obtained a bachelor's degree. In general the profile of the respondents appeared to be similar to the larger California farm enterprise population's profile.

The majority of respondents (60%) said they used a computer at their operations for reasons including bookkeeping, record keeping,

Farm Size (acres)	Survey Respondents (%)	California Total (%)*
1 - 99	22 (18)	72
100 - 499	49 (42)	17
500 - 999	14 (12)	5
1,000 - 1,999	14 (12)	3
2,000 +	20 (16)	3
* "California Fact Sheet," <i>1992 Census of Agriculture</i>		

²The use of the *1992 Census* is justified since the awards made in 1995 were based on safety and premium levels for the year 1994.

Type of Total Ownership	Survey Respondents (%)	California (%)*
Individual/Family Corporation	110 (84)	83
Partnership with Non-Relative	6 (5)	15
Non-Family Corporation	3 (2)	1
Other Ownership Type	12 (9)	1

* "California Fact Sheet," 1992 Census of Agriculture

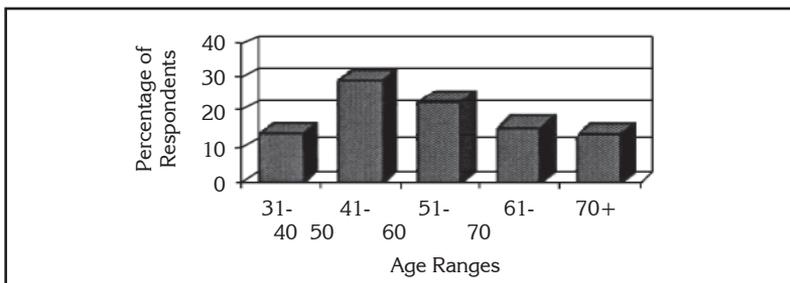


Figure 2. Age of respondents.

and personal correspondence. As a comparison, a 1994 study of California farmers found that only 33% of the responding farmers reported using computers (Buchner et al., 1996). The new figure likely reflects the ongoing increase in use of computers.

Ninety percent of the respondents employed permanent workers with an average of 7 permanent workers and a range of from 1 to 45 workers. Sixty-four percent of the employers used directly-hired seasonal labor (with an average of 22 and a range of from 1 to 300 workers); 33% used farm-labor contracted employees.

Results

Safety in Context

Since attitudes and beliefs about safety often tend to be important indicators of what owners or managers may do in terms of safety practices, a set of questions was designed to gather information on their views and attitudes about safety in the workplace. Using 1994 as the reference point (the year of implementation of the aforementioned SB 198), the majority (62%) of the respondents felt that the difficulty of maintaining safety at their operation had “remained about the same” over the past three years, although about one-third (32%) believed safety had become “more difficult” (Table 4). Very few (7%) believed it had become less difficult.

“Since 1994 safety standards are . . .”	Number Responding (%)
More difficult	39 (32)
Remained the same	75 (62)
Less difficult	8 (7)

Sources of Safety Information

Respondents were asked to indicate their sources of health and safety information and the usefulness of those sources. Twelve possible sources of safety information were listed and categorized as **individual/personal** (e.g., insurance representative; farm advisor), **organizational** (e.g., Farm Bureau, Cooperative Extension), and media (e.g., magazines). Overlap in the response categories was a factor since the source “Farm Bureau” may also include “Insurance Representative” or “F.E.L.S.” (a Farm-Bureau-affiliated safety education organization), as well as its member magazine. “Helpfulness” of the sources was categorized as Very Helpful, Somewhat Helpful, or Not Helpful.

More operators reported receiving their information about safety from magazines and newspapers (87%) than from any other source (Table 5). The next most used source was the Farm Bureau (78%), to which all respondents belonged. Among the Individual/Personal

Table 5
Usefulness of Sources of Information on Safety

Source	Users	Very Helpful	Somewhat Helpful	Not Helpful
Insurance Rep.	79 (62.7)	26 (33)	45 (57)	8 (10)
Farm Advisor	61 (48.8)	17 (28)	40 (65)	4 (7)
Indep. Safety Consultant	20 (16.8)	5 (25)	11 (55)	4 (20)
Other Growers	75 (62.1)	12 (16)	58 (77)	5 (7)
Agricultural Commissioner	69 (55.6)	18 (26)	45 (65)	6 (9)
Farm Bureau	99 (78)	43 (43)	54 (55)	2 (2)
Cal. OSHA	23 (19)	4 (17)	13 (57)	6 (26)
F.E.L.S	41 (33.6)	17 (41)	22 (54)	2 (5)
Grower Assoc.	53 (44.2)	8 (15)	41 (77)	4 (8)
Cooperative Extension	59 (48)	16 (27)	39 (66)	4 (7)
Magazine/News	110 (87.3)	17 (16)	87 (79)	6 (5)
Electronic Media	10 (8.9)	1 (10)	5 (50)	4 (40)
Other	21 (41.8)	13 (62)	8 (38)	0

sources, the “Insurance Representative” of the Farm Bureau insurance program was used by nearly two-thirds of all respondents (62.7%). Noteworthy was the second most commonly reported source— Other Growers. In California, the Agricultural Commissioner, a regulatory role, was followed by the Farm Advisor (or county agent) as relied-upon sources. The Cooperative Extension Service (as an organization), at 48% use level, was accessed at virtually the same level as the Farm Advisor (as an individual representative) (48.8%). From that point on, use of all other sources dropped off precipitously.

With the sole exception of the separate “Other” category (most commonly identified as “one-on-one communication”), no single source received a “very helpful” rating of over 50%. Most notable about the helpfulness ratings was the tendency for respondents to

rate sources as “somewhat helpful,” presumably a safe, middle-of-the-road response. As a group the respondents, while they use and rely on multiple sources, do not appear to believe any one source has great utility. However, it is interesting to note and speculate on what could be the enhanced role of mass media, especially “magazine/news.” Nearly 90% of the respondents reported using this source for safety information, but they also tended to rate it only as “somewhat helpful.”

Another category of questions was directed at identifying communication and education practices used by farmers to inform, educate, and/or train their workers (Figure 3). Since more than 90% employed permanent workers and nearly 65% hired seasonal workers, their own delivery of safety-related information is a significant issue. As the results suggest, most respondents used methods for communicating safety to their workers that were readily available, low in cost and complexity, and generally passive. Although posters (88%), handbooks, and brochures (both 66%) were the most widely used, respondents again did not rate them “very effective” (i.e., posters received a “very effective” rating from just over 20% of users, whereas nearly 55% rated them “somewhat effective” (Figure 4). One-on-one communication with workers (the “Other” category) generally was rated the most effective method for safety communication (74% of those who wrote in “Other” specified one-on-one or verbal communication).

A finding relevant to this point was found in results from another component of this study. Growers, when asked, among other questions, whether they agreed or disagreed with the proposition that “communication about safety practices between me and my workers is very good,” replied in this way: more than 90% either “agreed” or “strongly agreed” with the statement. One-on-one communication

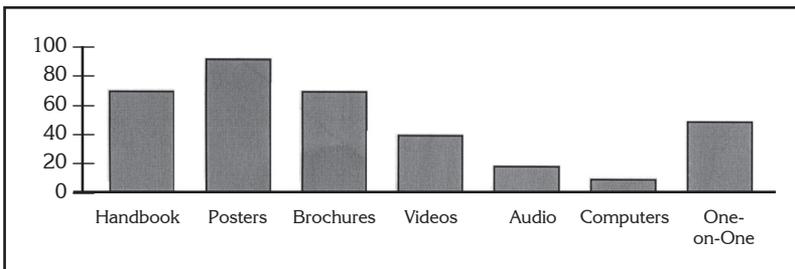


Figure 3. Safety information used.

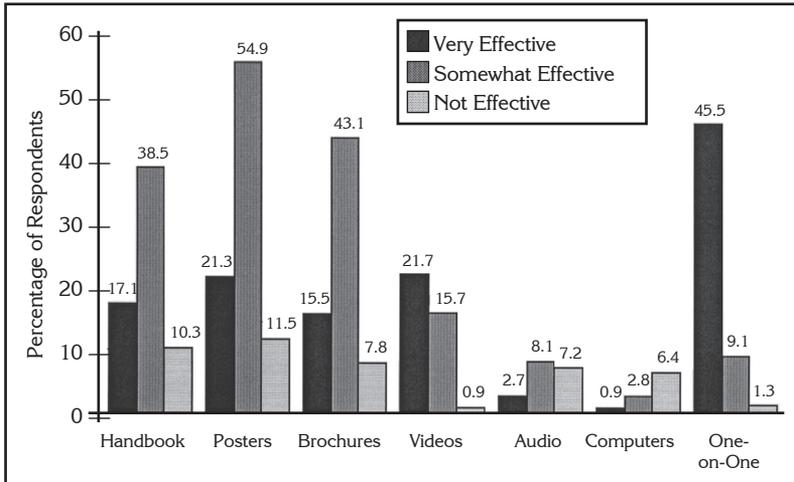


Figure 4. Effectiveness of safety information provided.

may not be the easiest method, depending on the size of the operation and languages spoken; but it is generally viewed to be “very helpful.” It is also argued that this method is viewed by users as both necessary and probably the most trusted of the available methods.

The majority of growers (94%) reported the use of some form of “safety training” in their overall safety program. On-farm safety training (79%) was offered by more growers than off-farm training (28%). For growers, whatever the form, such training was a very significant component (55%) in their set of safety practices. Respondents’ beliefs relative to their role in ensuring a safe workplace were measured through questions focused on their own role and that of luck. Most respondents (60%) felt strongly that low injury rates were not a matter of luck, but were due to their own efforts. In fact, nearly 80% of the respondents agreed or strongly agreed with the proposition that they are in control of their workplace safety practices.

Discussion

The results from this case study would appear to have implications for those interested in communication and education for agricultural health and safety. However, those implications must be assessed against the backdrop of two limitations of this study. First, since this study was conducted with a convenience sample the question of the representativeness of this group to larger groups of California

farmers must be raised. But since the original 5% sample of 662 was drawn from a sample of approximately 13,000, this limitation may be softened. Also, as noted, the profile of respondents, based on percentages of respondents by premium level and geographic distribution (see Table 1) closely matched the percentage distributions of the 5% sample. A second limitation was the low response rate (20%) of the sample. Thus, caution must be exercised in generalizing from the results. Nevertheless, the results of this case study can be instructive and add to the understanding of how to approach the challenge of effectively using educational and communication approaches for enhancing agricultural safety.

These California farm operators, with family operations as the most common type, rely on a broad mix of sources of information, as well as safety practices and techniques, to maintain a safe workplace. Results suggest that the information sources that managers use to inform themselves and to communicate safety to their employees, are not generally viewed as "very helpful." This finding may suggest a lack of trust in the sources' utility or effects. The finding that nearly 90% of the respondents use magazines and newspapers as sources of information yet view them in a rather luke-warm fashion would appear to raise important questions for agricultural communicators. One is, how can the usefulness of these sources be increased? Also, what features of this medium need to be strengthened or enhanced in order to raise its level of usefulness? How can communicators learn more about these farmers in order to enhance the power of information sources?

Responses to other survey questions indicated that these farmers believe they can and must control the safety level in their operations and not rely on "luck." The concept of personal responsibility and commitment appears to be further reflected in the farmers' stated belief in one-to-one communication as the effective way to ensure a safe workplace. Furthermore, the respondents were decidedly luke-warm toward the multiple sources and types of information available. A challenge for communicators is to find and utilize methods and media that build on this sense of personal control.

These findings provide an interesting glimpse inside today's farming operations in California and their safety programs. Since this is a case study of a select population, care must be taken not to general-

ize to other farmers. Nevertheless, results from other studies can be used as comparisons. For example, Rodriguez, et al. (1997) found that Iowa farmers, like their California counterparts, reported a high use of mass media (95% for print media; 82% for radio; 77% for TV) as the preferred source for safety information. Extension staff, at 33%, were further down the source list. Although Rodriguez did not discuss the usefulness of those sources, use is an issue central to questions related to effective communication for agricultural health and safety.

These California and Iowa results indicate that workplace health and safety are important concerns for farmers. Results also reinforce the point that questions of agricultural health and safety and use and usefulness of safety communication should be a central concern for agricultural and extension educators and communicators. If the communication methods and media are viewed as just “somewhat useful” or “somewhat effective” by the vast majority of the recipients, more attention must be given to those methods and media, to the messages sent, and to the communication networks utilized. Although newsletters and posters are important, by themselves they likely have little impact on attitudes or knowledge, and likely even less effect on behaviors. For such devices to be effective, more attention must be given to the design of the messages for different audiences, as well as to the design of the delivery methods, their frequency, the media used, and a host of other dimensions. The social marketing approach (Andreasen, 1995) may have much to offer, not only theoretically but also practically.

These considerations and the social marketing perspective may be even more important if the reported use of ‘other farmers’ is credible. In this study, respondents stated that they used ‘other growers’ at a rate almost equal to the insurance representatives (62%). With that degree of use it is obvious that “other growers” are a potentially powerful communication tool, and quite possibly the most potent tool. This point is further reinforced by the stated preference for one-on-one or personal communication. If an effective agricultural health and safety communication program can be mounted that utilizes farmers as communicators and their helpfulness and effectiveness can be increased, the multiplier effect could be powerful. In such a program, safe farmers might serve as “models” who could systematically communicate with other farmers one-on-one, through available mass media, audio and videotapes, CD ROMS, printed materials, and workshops.

Since agricultural work is by nature hazardous, health and safety of those who work in it must be a concern to many. The growing attention that it has commanded is well deserved. However, at this point it deserves more attention from those skilled in communication. Extension communicators and educators have much to contribute to this movement and can help to reduce avoidable injuries and illnesses due to unsafe farm practices. Rich opportunities for the development and extension of innovative and powerful communication methods (with important payoffs) beckon to us.

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