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ABSTRACT

A study examined (1) how the use of interpersonal information sources, the use of print media sources, and the use of radio sources are interrelated for agricultural decisions, and (2) which patterns of media use or interpersonal source use are most closely associated with knowing recommendations made by agricultural extension services and with adoption of those recommendations. A cluster sampling technique was used to select six random agricultural zones in the Dominican Republic. The six zones were subdivided and farmers from 20 small to medium-sized farms were selected from each of the 12 subzones for interviews. Data were collected on the farmer's use of mass media, interpersonal contacts with extension agents, activities in local organizations, main crop of the farm, and demographic information. Results of data analysis suggest that for farmers in the Dominican Republic use of print, radio, and interpersonal sources of information are closely interrelated, with a particularly close relationship between print and interpersonal source use. Among other conclusions are that elements of the information system work together and that adoption behavior is closely linked to interpersonal source use. (DF)

Interrelationships Between Mass Media Use and Interpersonal Source Use In Agricultural Development: The Case of the Dominican Republic

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Interrelationships Between Mass Media Use and Interpersonal Source Use In Agricultural Development: The Case of the Dominican Republic

A major issue in rural agricultural communication in the developing world continues to be the proper role of mass media in getting information to farmers. One reason for the persistence of this issue has been contradictory findings from various studies. However, a more important reason in the 1980s has been the dramatically different approaches taken to agricultural communication by two different funding groups.

The Training and Visit system, developed by Daniel Benor and others, has been implemented by the World Bank in a number of countries including India, Indonesia, Thailand, Nepal, Turkey, Bangladesh and Malaysia (Chow Kam, 1982). Through the Inter-American Development Bank it was implemented in Costa Rica and the Dominican Republic. Since the mid-1970s, hundreds of millions of dollars have been targeted through various loan and grant programs to build and train a cadre of extension agents for this program.

At the core of the T&V system is interpersonal communication. Although mass media are not discarded entirely, their role is clearly supplementary. Benor, in a 1978 interview, said: ". . I do know that the media will have little impact unless their use is combined with an extension service. Farmers may listen, but they won't follow, and that makes all the difference" (Development Communication Report, April 1978). The T&V system utilizes trained extension agents who work with groups of contact farmers via fortnightly visits. The contact farmers then pass the information on to 10 other farmers each (See Benor and Harrison, 1977). In the Dominican Republic, where the T&V approach was dominant from 1979-1983, the program's manual for extension never mentions mass media (Secretaria de Estado de Agricultura, 1980).

The second major thrust in agricultural communications, known as social marketing, evolved through various efforts to combine use of radio and other media with effective advertising techniques applied to social problems. The United States Agency for International Development (USAID) and the Academy for Educational Development have been active in development of this approach, which emphasizes mass media as a primary means of delivering information and changing behavior.

Health communications in rural areas was a major area of testing for the social marketing approach. This was a field in which it had commonly been assumed that face-to-face communication was essential. In 1977, an American Public Health Association survey found that 92 percent of all health education programs in developing countries rely on face-to-face communication (Rasmuson, 1977). However, 59% make some use of communication media.

The social marketing approach assumes that past failures of mass media projects have been due -- not to a fatal characteristic of the media -- but to the fact that the messages were irrelevant to the farmer's situation, uninteresting, or incomplete. "The evidence is that the mass media can be effective in health education under prescribed conditions and disciplines. We believe that there will be more such evidence as the social marketing skills of health and nutrition professionals improve" (Manoff, 1985, p. 69).

Manoff cites a number of successful social marketing projects, all of which use mass media as the basic message transmission system (see Koskela, K., Puska, P., Tuomilehto, J., 1976; Farquhar, J.W., Maccoby, N., Wood, P.D. et al, 1977; Manoff International, Inc., 1983; Schellstede, W. P. , Ciszewski, R.L., 1984; Cooke, T.M., Romweber, S.T., 1977). De la Macorra even reported success with the social marketing approach in distributing birth control devices in Mexico (de la Macorra, 1980).

Although both of these approaches may be successful in bringing about rural change in agriculture, they have led to several research and development problems. First, the reliance of each approach on either mass media or interpersonal communication makes it difficult to evaluate whether either approach, or a combination of mass media and interpersonal communication would be optimum in various communication situations. Fett (1974) argued for a combination approach. He concluded that in Brazil, extension agents often underestimate media use by farmers for agricultural decision-making, and thus agents fail to optimize media use.

Second, the effect of the projects has been damaging to the development of a truly integrated media/interpersonal approach to rural communications. In the Dominican Republic, the rise of the T&V system meant near-total neglect of the nation's agricultural radio transmission system, a system which had been built and encouraged by a prior USAID project (Martinez, 1984).

Use of Media and Interpersonal Sources by Farmers

A number of studies have examined the general communication situation of farmers. One problem which has received attention has been the extent to which some farmers are isolates -- not receiving agricultural information from any source. Illiteracy, small farm size, low education, and advanced age have been variables studied which tend to reduce the number of information sources used.

Rogers (1969) found a general pattern of overlapping media audiences for mass media in five Colombian villages. If a person uses one medium he is also likely to use another. In a multivariate analysis, Rogers found functional literacy, formal education, and cosmopoliteness to be the prime predictors of media exposure in Colombia, India and Kenya. The idea of media isolates versus non-isolates was further elaborated in Rogers and Kincaid (1981).

Axinn and Mallick (1978) reported in their study of 69 Nepalese farmers that:

"Two patterns taken into account in this study are fairly common in the rural developing world. First, the major information channel seems to be word of mouth, and most information seems to come to small farms through visits from relatives, various officials, and commercial people. Second, some farms in this area receive information from many different channels, and others are relatively cut off. Twenty of the 69 families were found to be receiving information on at least three of the four available channels: 1. radio; 2. letters; 3. membership in an organization; 4. three or more official visits. Ten of these families received information through none of these channels, and 14 farms reported that only one of the channels was available to them."

Brown (1970), in a study in Chile, found that illiteracy was tied not only to lower general print media usage, but also to lower radio usage. "This suggests that radio may not be as widely accessible to illiterates as is sometimes imagined," he reported (p. 729). Furthermore, he found that illiterates were less likely to become involved in interpersonal discussions of agricultural circulars read to them. For his entire sample of Chilean farmers, 83 percent said they had participated in several conversations about the circulars. However, for illiterates, nearly half were relatively inactive in discussing the circulars outside their own households (Brown, 1970, p. 729).

This finding is especially interesting in light of recent research by Tichenor et al (1980, 1973) showing that mass media coverage of community problems alone was only weakly related to increases in knowledge. However, interpersonal discussions about important local issues were related both to higher knowledge and to mass media use. Thus, it may be that interpersonal communication -- whether with change agents or not -- plays an important role in learning from mass media. The success Brown's circulars in Chile in increasing knowledge of illiterates, and success of both open broadcast and radio forums in Guatemala (AED, 1976) demonstrates that interpersonal communication may not always be necessary for learning and behavior change to take place. However, these were both experiments in which the usual media system was disrupted by

especially targeted messages (and a new channel in Brown's case). Whether or not interpersonal communication in general might be important in relating media content to individual farmers remains to be demonstrated. The literature for open broadcasting alone, as Jamison and McAnany (1978) note, shows more experience of failure than success in reaching an unorganized audience.

Another question concerning farmer use of communication sources focuses on cropping or livestock activities of the farm. Beal and Sibley (1967) found, for example, that crop was associated with patterns of adoption by Guatemalan farmers. This makes sense, since certain crops are associated with higher income or larger farm units. However, crop may also affect access to communication opportunities. Crops such as coffee, which are often grown on steep hillsides away from roads and communities, might be associated with fewer communication opportunities. Irrigated rice, on the other hand, is usually grown in flat areas near good road systems.

Summary of Research Questions

From this discussion, we can identify several important research questions:

1. How are the use of interpersonal information sources, use of print media sources, and use of radio sources interrelated for agricultural decisions? If one finds that they are relatively unrelated, then a communication strategy for reaching farmers would suggest identifying the one which reaches farmers best, and utilizing that one to carry agricultural information. However, if one finds a high degree of interrelatedness, and especially if that interrelatedness is associated with adoption of agricultural practices, a combination of multi-media/interpersonal would be suggested.

2. Which patterns of media use or interpersonal source use are most closely associated with knowing recommendations made by agricultural extension, and with adoption of those recommendations?

3. How do variables such as illiteracy, small farm size, or agricultural crop affect overall patterns of information use?

Extension Communication Approaches in the Dominican Republic

One of the least studied areas in agricultural communications concerns the ways in which agricultural communication systems evolve. Yet we know that the stability of these institutions and the messages they produce and distribute are probably factors of major importance in the confidence placed in them by farmers. In the Dominican Republic, the Agricultural Extension Service was established in 1962 by means of a loan agreement between the country and USAID. Since its inception, it has gone through five stages, each of which has paid a different amount of attention to mass media. These stages were documented by Martinez (1984).

In the first stage (1962-1967), the extension service was patterned closely after that of the United States. Some use of radio was made in the first years, but mass media, bulletins, and other materials were secondary in importance to personal visits. Each year during the first stage, several new districts were included in the extension service's operation. In 1967, the USAID contract ended, and the agency relied only on country funds.

A gradual deterioration of services set in during the second stage (1968-72). By 1971, the extension service had only 41 technicians (only one of whom had a college degree). In 1973, the third stage began, again with assistance from international donors. There was a regional coffee project (International Coffee Organization with FAO assistance), an integrated agricultural development program (Inter-American Development Bank), and a special program to aid small farmers through training and loans (USAID). During this stage, which lasted until 1978, emphasis was placed on communication activities. A Technical Information Unit was created as part of the Extension Service. Equipment such

as movie vans, printing machines, video-tape recorders and projectors was purchased. A budget for teaching materials and communication training was available. In the period, 64 publications were produced for both farmers and extension agents, and extensive use was made of radio to deliver agricultural messages.

A change in power brought in a new government in 1978. The new leaders brought in the fourth stage of the extension service, the Training and Visit system, which lasted from 1979 to 1983. No use was made of the mass media for agricultural extension information during this period.

The fifth stage of the extension service began in 1983 and continues to the present. First, the T&V system was terminated. Yet no new system was installed to take its place. It is likely that the new system will be a compromise between the T&V system's interpersonal approach and the more multi-media approach of the 1974-78 period. Currently, there are 363 extension workers focusing on the needs of 316,353 small and medium-sized farmers. About two-thirds of farming areas in the country are directly served by extension personnel. Radio is the primary mass medium used by extension, but its use has not been coordinated with interpersonal activities. The Catholic Church operates a radio system for farmers which also gives direct information about agriculture as well as other topics.

Methodology

In order to contrast use of interpersonal channels for information seeking with uses of mass media, and to see if an identifiable group of non-information seekers exists, a sample of farmers with small to medium-size holdings was selected for personal interviews. A cluster sampling technique was used to randomly select three agricultural zones in the northern region of the country

and three more in the southern region of the country. Each region was rural (that is, not near a large city). Then, two subzones were selected for each of the six zones to insure a wide variety of agricultural cropping activities. Farmers from 20 small to medium size farms were selected from each of the 12 subzones for personal interviews. Interviews were conducted during January, 1983.

Each farmer was interviewed by a member of a three-person research team. Care was taken that the local extension workers were not present during the interviews. A total of 235 interviews were completed. The remaining five were not completed due to dispersion of farmers and lack of time in one of the subzones.

Data were collected on the farmer's use of mass media, interpersonal contacts with extension agents, activities in local organizations, main crop of the farm, and demographic information.

Specific information obtained included: length of time in farming, membership in an agricultural organization, farm size, education, age group, literacy test, use of printed materials such as newspapers, magazines, comic books, novels, brochures, etc.; radio ownership and use for agricultural information; TV ownership and use; general sources of ag information (both mass and interpersonal), and principal crop.

Also included in the survey was a question about whether or not the farmer knew of an extension recommendation that had recently been made for the area. In each case, farmers were asked where they would place themselves on an adoption scale for that recommendation. They could be (1) unaware of it; (2) heard of it but know few details; (3) know some information but haven't decided whether to do it or not; (4) Have thought about it, but haven't decided yet; (5) Have definitely decided to do it; (6) Have definitely decided not to do it; (7) Are now using the new practice; (8) Have done it, but have discontinued. At the

end of the interview, several questions were also asked about the relationship between the farmer and his local extension agent.

Interpersonal and Media Communication by Farmers

Results show interpersonal communication sources -- mainly through farmer organizations and extension agents, are commonly used sources of agricultural information. Fifty-eight percent of the farmers said they were members of an agricultural organization. Radio is the most commonly used mass media source, but it was third behind organizations and extension contacts in both reported frequency of use and level of use. (See Tables 1 and 2).

Table 1
Sources of agricultural information, and frequency of use

Source	Frequency of Use			
	Almost Never	Sometimes	Frequently	Very Frequently
Interpersonal				
Farmer Org.	43.8%	14.5%	25.5%	16.2%
Extension Agent	27.7	33.6	27.2	11.5
Relatives	71.5	13.2	6.4	8.9
Other farmers	40.9	34.0	19.6	5.5
Other officials	66.0	22.1	9.8	2.1
Buyers/sellers	94.0	3.4	1.3	1.3
Church Personnel	83.8	12.8	2.1	1.3
Short course	71.4	21.7	6.0	0.9
Private company	79.1	14.5	5.5	0.9
Media Source				
Ag Radio Program	30.6	40.9	23.4	5.1
Extension Pubs.	73.1	20.9	5.1	0.9
Newspaper/Mags.	73.2	19.1	6.8	0.9
Ag TV program	84.7	13.2	2.1	0.0

A total of 49.8 percent of respondents said they had not read any printed materials during 1983. This corresponds to the 34.5 percent of farmers who were unable to read any words on the literacy test, plus the 12.8 percent who were able to read only some of the words in the test. Almost three-fourths of

Table 2
Level of Use of Source of Agricultural Information

Source	Low Use	High Use
Interpersonal		
Farm Orgs.	58.3%	41.7%
Extension agents	61.3	38.7
Relatives	84.7	15.3
Other farmers	74.9	25.1
Other gov't officials	88.1	11.1
Intermediaries	97.4	2.6
Church personnel	96.6	3.4
Short Courses	93.1	6.9
Private companies	93.5	6.4
Mass Media	**Low Use**	**high use**
Ag Radio programs	71.5%	28.5%
Extension Publications	94.0	6.0
Newspapers/Magazines	92.3	7.7
Ag TV programs	97.9	2.1

farmers own a radio set, and 43 percent say they are listening from noon to 2 p.m., the peak radio listening time of the day. One-fourth of farmers now have a TV set.

Relationships Between Use of Interpersonal Information Sources and Mass Media

To examine the inter-relationships between radio use, print media use, and use of interpersonal sources, a weighted score summarizing each farmer's activity in the three areas was created. For example, one point was scored for each time of day the farmer indicated he used radio. Two points were awarded if the farmer was able to name a specific station or program source. Two, three, or four points were awarded if the farmer said he used radio sometimes, frequently, or very frequently as an agricultural information source. A similar approach was used to construct scores for print media use and interpersonal communication.

A correlation matrix of the communication variables and other demographic variables shows that significant inter-relationships exist among all three communication variables (.01 level of probability). Other variables significantly related to communication variables are level of education (significantly associated with all three communication forms), literacy (significantly related to use of print media) and adoption behavior (significantly related to print media and interpersonal behavior).

Table 3

Correlation Matrix for Communication and Demographic Variables

	Time Farming	Farm Size	Education	Age	Literacy	Adoption	Radio Score	Print Score	Interpersonal
Time Farming	1.000								
Farm Size	.062	1.000							
Education	-.236**	.080	1.000						
Age	.344**	.140	.262**	1.000					
Literacy	-.086	.166*	-.624**	-.026	1.000				
Adoption behavior	.039	.064	.038	-.023	.090	1.000			
Radio Source use	-.056	-.001	.197*	-.087	.082	.118	1.000		
Print Source use	-.083	.093	.504**	-.112	.570**	.223**	.341**	1.000	
Interpersonal use	.052	.046	.206**	-.007	.141	.344**	.445**	.427**	1.000

* p less than .01
** p less than .001

In order to sort out these inter-relationships, stepwise regression analyses were run with each of the information sources variables as a dependent variable. Other variables in the analysis included: time of farmer in agriculture, size of farm, education, age, literacy level, and main agricultural crop activity. For crop activity, farmers were divided into two groups: coffee farmers (who exhibited low information seeking activity), and rice farmers (who exhibited a high degree of information seeking).

For use of print media, results (See Table 4) show that four variables -- literacy, interpersonal communication score, radio use score, and education were

the best predictors of print media use. Literacy was by far the strongest predictor, with a beta of .436. The beta for interpersonal communication use was .271, and radio source use was .152. Together, the four variables had an adjusted R^2 of .481.

Table 4
Stepwise Regression Predicting Use of Print Media

Variables Included	Beta
Literacy	.436
Interpersonal source use	.271
Radio source use	.152
Educational level	.139

F=54.6
Sig.=0.0
Adjusted R^2=.481

The variables used were less effective in predicting radio use, since literacy was not a powerful discriminating variable. The most powerful variable predicting radio use was interpersonal source use with a beta of .371. Use of print media was second in importance with a beta of .186. The adjusted R^2 was .224. These were the only variables to show a significant predictive relationship to radio use (See Table 5).

Table 5
Stepwise Regression Predicting Use of Radio

Variables Included	Beta
Interpersonal source use	.371
Print media use	.186

F=34.5
Sig.= 0.0
Adjusted R^2=.224

Interpersonal communication was predicted best by use of radio sources (beta=.332). The second best predictor was use of print with a beta of .268. Agricultural crop was the third predictor, with a beta of .159 (See Table 6).

Table 6
Stepwise Regression Predicting Use of Interpersonal Communication

Variables Included	Beta
Radio source use	.332
Print source use	.268
Agricultural crop	.159

F=34.0
Sig.=0.0
Adjusted R^2=.300

The data indicate that significant interrelationships exist between all three forms of information seeking, and that these three forms are the best predictors of each type of information seeking. Thus, a pattern of farmer information seeking for agricultural information is suggested which utilizes a number of media choices.

Communication Behavior and Adoption

Earlier, it was noted that adoption behavior was significantly associated with the use of print media (r=.223) and interpersonal source use (r=.344), but not with radio (r=.118) (See Table 3). To explore relationships between information source use and adoption, a stepwise regression analysis was run including the adoption variable as the dependent variable, and the information source use variables, plus demographic variables, as independent variables. The results (Table 7) show that interpersonal information use was the only significant predictor of adoption behavior. This result is consistent with the fact that the Extension Service in the Dominican Republic in recent years has relied upon personal visits under the T & V system, rather than using print and broadcast media. However, the results are inconsistent with the report by farmers of use of both print sources and radio. It may be as classical diffusion studies suggest that mass media are most effective in the early stages

of the adoption process, and interpersonal sources are most closely associated with adoption or rejection.

Table 7
Stepwise Regression with Adoption as Dependent Variable

Variables Included	Beta
Interpersonal source use	.348

F=31.7
Sig_A=.0000
Adjusted R^2=.117

A crosstabulation of stage of adoption by information source shows that farmers at the unaware stage use print and interpersonal sources significantly less than those at either the awareness or adoption stages. Radio results are in the same direction, but are not strong enough to be significant. Results also show that those at the awareness stage have the highest reported use of radio and print media sources, but the difference is only fractionally different than media behavior of adopters (Table 8).

Table 8
Crosstabulation of Adoption by Information Source

A. Adoption by Use of Radio Sources.

		Radio Use: Low		Medium		High	
		n	%	n	%	n	%
Adoption	Unaware	15	34.9	16	37.2	12	27.9
	Aware	13	26.0	17	34.0	20	40.0
Stage	Adopt/Reject	36	25.4	52	36.6	54	38.0

n=235 X^2=2.34 with 4 df N.S.

B. Adoption by Use of Print Sources.

		Print Use: None		Low		High	
		n	%	n	%	n	%
Adoption	Unaware	29	67.4	12	27.9	2	4.7
Stage	Aware	17	34.0	21	42.0	12	24.0
	Adopt/Reject	56	39.4	52	36.6	34	23.9

n=235 X^2=14.9 with 4 df p = .01

C. Adoption by Use of Interpersonal Sources.

		Interpersonal Source Use					
		Low		Medium		High	
		n	%	n	%	n	%
Adoption Stage	Unaware	29	67.4	9	20.9	5	11.6
	Aware	13	26.0	24	48.0	13	26.0
	Adopt/Reject	29	20.4	60	42.3	53	37.3

n=235 X^2=37.0 with 4 df p<.0001

An analysis of specific interpersonal communication items shows that adoption behavior is significantly related to having contact with an agronomist, knowing one's area extension agent, belonging to a cooperative or association, and being a member of a farm organization in that order.

Thus, these data suggest that despite the significant correlation between print media use and adoption, adoption behavior is most significantly linked only to interpersonal communication activities, particularly contact with extension and an agronomist.

Literacy and Communication Sources

Literacy was measured by asking each farmer to read the statement (in Spanish) "the man moved his hand rapidly in a gesture of respect." This approach was originally suggested by Frederick B. Waisanen of Michigan State University. Those who could read none of the words were classified as "illiterates." Those who could read some of the words were classified "semi-literate," and those who could read all the words were classified as "literate." This test has been used by Brown (1970) and others.

As expected, literacy was significantly related to level of education and use of print media. However, literacy was not significantly related to either use of radio or interpersonal communication, although both correlations were in a negative direction, suggesting slightly less use of these sources by

illiterates (See Table 3).

Surprisingly, age and time in agriculture were not significantly related to literacy. This is because most farmers are older and have spent many years in farming. Farmers with larger farms are significantly more likely to be literate. Type of crop was also a factor in literacy, with coffee farmers significantly more likely to be illiterate, and rice farmers more likely to be literate.

Illiterate farmers were equally likely to adopt agricultural recommendations, but illiterates and semi-literates were also slightly more likely to be "unaware" of the recommendation (See Table 9).

Table 9
Literacy by Rate of Adoption of Agricultural Recommendations

		Adoption Stage					
		Unaware		Aware		Adopt/Reject	
		n	%	n	%	n	%
Literacy Status	Literate	16	13.2	32	26.4	73	60.3
	Semi-literate	8	26.7	4	13.3	18	60.0
	Illiterate	19	23.5	14	17.3	48	59.3

n=235 X^2=6.9 with 4 df. N.S.

One interesting finding was that although most illiterate farmers had few interpersonal communication contacts, about one-fourth reported a large amount of interpersonal source use. In order to examine their information seeking behavior, a three-way crosstabulation was run. Results, shown in Table 10, indicate that for illiterates, use of print media is significantly associated with a high rate of interpersonal contact. Eleven of the 12 illiterates (91.6%) reporting some print media use also report medium to high use of interpersonal sources. For the 69 illiterates reporting no print media use,

only 53.6 percent reported medium to high use of interpersonal communication sources.

Table 10
Crosstabulations of Use of Interpersonal, Print and Radio Sources by Illiterates

	Low Interpersonal		Medium/High Interpersonal	
	n	%	n	%
No print use	32	46.4	37	53.6
Some print use	1	8.3	11	91.7

n=81 $X^2=6.12$, $p < .05$

	Low Interpersonal		Medium/High Interpersonal	
	n	%	n	%
Lowest Radio Use	18	66.7	9	33.3
Medium/High Radio Use	15	27.7	39	72.2

n=81 $X^2=11.27$, $p < .001$

	No Print		Some Print	
	n	%	n	%
Lowest Radio Use	25	92.5	2	7.5
Medium/High Radio Use	44	81.4	10	18.6

n=81 $x^2=1.76$ N.S.

Radio use follows a similar pattern. Among illiterates, those with low radio use also have significantly lower use of interpersonal information sources. Those with high radio use also have high use of interpersonal sources.

Use of radio was less related to use of print media sources. At all levels of radio use, print media use was low, although there was a slight movement toward higher radio use in association with higher use of print media sources.

Since media (radio and print) use tends to rise and fall with use of interpersonal communication sources, media strategists might be most effective with a combination of media and interpersonal methods.

Crops and Information Source Use

The results show that farmers with certain principal crops have patterns of

information source use that are very different from average. Although sufficient numbers for many crops are lacking, analysis was made of two principal crops -- coffee and rice.

Results for 23 coffee farmers shows:

*Coffee farmers are almost twice as likely to be illiterate (61% are compared to 35% average) (X^2=7.56 with 1 df, $p < .01$);

*Coffee farmers are more than twice as likely to have no education (61% have none compared with 30% average) (X^2=11.7 with 1 df, $p < .001$);

*Coffee farmers are <u>not</u> different in their adoption behavior from other farmers;

*Coffee farmers use significantly fewer print media sources (only 30% used any print media source) (X^2=7.10 with 2 df, $p < .05$)

*Although coffee farmers do not use any one interpersonal source significantly less than other farmers, their overall use of interpersonal sources is significantly lower than average (X^2=8.49 with 2 df, $p < .05$)

*Coffee farmers use radio sources slightly less than average. However, the difference only approaches significance (X^2=5.10 with 2 df, N.S.

Results for 36 rice farmers show:

*Rice farmers are significantly older than average (X^2=9.97 with 1 df, $p < .01$) yet they have average education. They are not significantly different than other farmers for literacy.

*Rice farmers are <u>not</u> different from average in adoption behavior.

*Rice farmers use significantly more print media sources than average (X^2=10.0 with 2 df, $p < .01$);

*Rice farmers use significantly more interpersonal media sources than average (X^2=14.5 with 2 df, $p < .001$);

*Rice farmers are <u>not</u> significantly different from other farmers in their use of radio sources;

*Rice farmers have significantly more interpersonal contact with the following sources than do average farmers:

1. Extension agent visits to their farm (X^2=10.6 with 2 df, $p < .01$);
2. Contact with an Agricultural Agronomist (X^2=5.07 with 1 df, $p < .05$);
3. Contact with other government employees (X^2=35.8 with 1 df, $p < .001$).

Results suggest that cropping behavior is linked to differences in patterns of information source use. Coffee farmers tend to be quite isolated from

print or interpersonal sources, and their use of radio is slightly lower than average. This could be due to geographic isolation patterns, since coffee is usually grown at higher elevations where fewer roads or communities exist. Rice, on the other hand, especially if irrigated, is grown in lower flatter areas which often are linked by road systems to cities.

Since coffee farmers are most likely to rank low in education and literacy, one might conclude that this explains their low use of information sources. Literacy is an obvious barrier to use of print media (although a number of illiterates report using such sources), but it is more difficult to explain the accompanying lack of interpersonal source use. Since rice farmers are only average in education and literacy, these variables would seem unlikely to explain their higher print and interpersonal source use.

One would expect that since coffee farmers are information-deprived, and rice farmers are information rich, adoption behavior should be higher for the rice farmers. However, results showed adoption behavior to be no different from average in either group. Part of the explanation for this could be the fact that the adoption variable was measured along only one dimension, while other variables were measured in many different ways. It is also possible that some key channel -- such as contact with an extension agent -- is responsible for adoption, while other sources are relatively unimportant. Though this is possible, the data for coffee farmers show no significant relationship between use of any one contact point measured by this survey and adoption.

Overall Conclusions

It is evident that for farmers in the Dominican Republic, use of print, radio and interpersonal sources of information are closely interrelated, with an especially close relationship between print and interpersonal source use.

This study did not make possible any direct causal inferences. Does

interpersonal source contact lead to print and radio contact? Results here are in accord with Tichenor's findings in rural Minnesota, since interpersonal source contact is the best predictor of radio and the second best predictor of print source use (behind literacy). However, a reciprocal relationship is also possible, since radio use and print media use are the two best predictors of interpersonal source use.

What seems most clear here is that elements of the information system work together. Thus, communication strategists for both the T&V approach and the social marketing approach should explore how to use the three source areas together. For researchers, the future question is, what is the nature of these linkages? In what ways are they causal or reciprocal in terms of stimulating use of channel or adoption behavior?

Adoption behavior was most closely linked to interpersonal source use. This may be because the innovations used in the study were at the end stage of the adoption process. Rogers and others consistently find greater use of interpersonal channels at this stage. This result could also be due to the particular extension information situation in the Dominican Republic, which has recently emphasized interpersonal channels over mass media channels. Thus, for adoption this study suggests a primacy of interpersonal source use, but it may not have been a fair test of either print or radio.

The detailed analysis of literacy and specific crops shows audience segmentation may be desirable by both variables in future projects. Overall, literacy was significantly related to print media source use, but not significantly related to either radio or interpersonal use. This would suggest the latter two sources may be effective in reaching illiterates. However, when coffee farmers, who are very high in illiteracy rates, are examined, we find they are significantly lower in use of print and interpersonal sources and slightly lower in radio use. Perhaps some additional variable, such as

geographic isolation, is responsibile for these results. These findings suggest that while illiteracy may not prevent use of radio and interpersonal channels, careful pre-testing is essential before launching a communications project in an area of high illiteracy.

Results also show that a farmer's principal crop can be an important indicator of use of information sources. A causal linkage is not implied here. Rather, the results are likely due to geographic requirements of the crop, required investment to produce the crop, extension emphasis more on one crop than another, or other factors. However, principal crop probably deserves more emphasis than it has received, since it is something that is commonly known by communication strategists and extension agents before communication projects are launched. If it is predictive of channel use, strategies could be shaped accordingly.

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