

**The Effectiveness of Different Radio Program Formats
for the Dissemination of Information on
Safe use of Insecticides in Paddy Cultivation in
Mahaweli System – C of Sri Lanka**

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ABSTRACT. *The study was conducted to determine the effectiveness of talk, discussion, interview and drama formats in changing knowledge and attitude of farmers on safe use of insecticides. A research design with a before and after survey with a control group was adopted. Representative sample of farmers was selected with the help of cluster sampling combined with simple random sampling techniques. The total sample comprised of 180 farmers with 140 in four treatment groups and 40 in the control group. A fully structured questionnaire with knowledge measures and attitude scale was the main research instrument. Data were gathered at three levels, before, immediately after and one month after treatment.*

The results suggested that all four formats influence knowledge of farmers immediately as well as after one month. However the extent of influence varies on program format and time period after the exposure to instructions. Interview format is the most effective in terms of immediate knowledge gain, while drama, discussion and talk formats follow in order. Discussion format has the highest knowledge retention after one month followed by drama, interview and talk formats.

With respect to attitude change, the influence of all formats was much lower compared to that on knowledge. In addition, a relatively high level of attitude change was observed after one month compared to that of immediately after treatment. Only drama format had influenced attitude change significantly.

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INTRODUCTION

Agricultural extension basically concerns with the dissemination of relevant information to farmers in order to make their farming more productive. With respect to strategies adopted, the process of agricultural extension in Sri Lanka is made up of interpersonal as well as mass communication. Broadcasting over radio and television, newspaper publications and distribution of leaflets are major mass communication methods used.

Television and Farm Broadcasting Service is a part of extension service of the Department of Agriculture. The radio broadcasting for agricultural extension was formally initiated in Sri Lanka in the early 1960s (Hewawitharana, 1979). Since then, many agricultural programs had been broadcast over the radio in order to disseminate various agricultural information to farmers. Although farm broadcasting has been assisting the agricultural extension service for more than 30 years, the importance of this service was never felt to the extent it was after the changes took place in agricultural extension activities in 1990. In particular, the removal of 'krushi viyaptha seva niladharies' from the extension service had hampered the agricultural extension activities to a great extent. Since then, the Department of Agriculture emphasizes the use of broadcasting for agricultural extension to the maximum potential and further exploit the intrinsic strength of radio broadcasting with respect to agricultural extension in Sri Lanka (Rathnayaka *et al.*, 1994).

Agricultural information broadcast over the radio has been varied in nature. Researchers, extension workers and farmers have been the main source of information for radio programs. Program formats such as quiz, interview, discussion, drama, straight talk, magazine and feature have been used in agricultural radio programs.

In order to assess the effectiveness of radio agricultural programs, a study was conducted in Mahaweli System - C in Sri Lanka, to investigate the effectiveness of radio program formats using radio talks, interviews, discussions and drama, in changing the knowledge and attitudes of farmers in the safe use of insecticides in paddy cultivation.

MATERIALS AND METHODS

According to McQuail (1987) mass media denote the entire system which is involved in selection, production and transmission of messages,

reception and also the feedback. Mody (1991) describes the term mass communication as the design of information products in media factors (*i.e.*, studios) by professionals and the distribution of these products through technological devices (radio and TV) to people scattered over a wide area. However McQuail (1987) suggests that the terms mass media and mass communication can be used interchangeably.

Mass communication provides information. According to Ismach (1989), information has become a crucial ingredient today. McQuail (1987) suggests that media become a channel reaching more people with more information. Although information is the most important, how to deliver the information also has a great relevance for message comprehension. According to a study carried out in Sri Lanka, Sivayoganathan, (1986) suggests that the manner in which the message is delivered is equally important as the message itself for the acceptance of media message among paddy farmers.

There are various ways to present a media message. The particular manner in which the message is presented is referred as the message format. According to Altheide (1985), program formats are rules and procedures for defining, selecting, organizing and presenting information. He further explained that formats are the nature of presentations of specific points of information or content. Formats are not only a key to understanding media production but also relevant to the question of media effects on society, since they shape the perception of reality acquired from media. The importance of the format in message development was further raised when Mody (1991) questioned whether it is known what format is preferred by the target group when the message is developed.

Research methods

A research design with a before and after treatment survey having a control group, was used in this study (Oppenheim, 1992). This design has three main components as mentioned below:

- i. Before (pre) treatment survey
- ii. Treatments (instructions provided in forms of straight talk, discussion, interview and drama)
- iii. After (post) treatment survey

Data collection was undertaken twice after treatment in order to assess the immediate as well as long term effects of program formats.

Cluster sampling (Sarantakos, 1994) and simple random sampling techniques were used. From 4 blocks in Mahaweli System C, 180 farmers were chosen. The total sample for the study consisted of 35 farmers from each block as treatments and 10 farmers from each block as the control.

Knowledge measures were constructed to set an appropriate scale to measure the knowledge change of farmers, if any, after their exposure to treatments. In order to measure the change, the existing knowledge as well as the knowledge of farmers after the exposure to treatments were measured making use of knowledge measures.

Construction of knowledge measures

Chosen 10 important knowledge items in relation to safe use of insecticides were grouped separating complementary items together. There were three item groups and these groups were referred to as knowledge measures in this study. Three knowledge measures were intoxicating effect of insecticides, application of insecticides and absorption of insecticides into the human body each of which comprised of 4, 3 and 3 knowledge items respectively.

Construction of attitude scale

An attitude scale was used to measure changes in attitudes of farmers after they were exposed to the radio programs. The change in attitudes was measured by comparing the levels of attitude before and after the radio programs.

The Likert attitude scaling procedure (Bailey, 1987; Oppenheim, 1992) was adopted to construct the attitude scale since the reliability of this scale tends to be high partly because of the greater range of answers permitted to respondents.

Under the procedure of Likert scaling, a five point scale is used with the response categories of (1) strongly agree, (2) agree, (3) uncertain, (4) disagree, and (5) strongly disagree. The corresponding scores of the above five

responses were 5, 4, 3, 2 and 1, respectively, and the scoring was reversed for the negative statements.

Eighty attitude statements were tested with 125 farmers who were more or less similar to farmers in the sample but from outside the sample area, in order to set the attitude scale. After eliminating the statements which had same 'median' score and closely associated in both lowest and highest quartiles, the set of 20 statements that best discriminated between the highest and the lowest quartiles of item score was chosen and included in the attitude scale. The number of positive and negative statements were equal in the scale.

Field experiment (Field survey before and after, with control technique)

The main research instrument was a questionnaire consisting of mainly structured questions. This was finalized after pre-testing in the field with five farmers outside the sample and modifying accordingly. The attitude scale and knowledge measures were included in the 'before' and 'after' questionnaires.

Before treatment survey

The questionnaire was administered and data related to socio-economic conditions, existing level of knowledge and attitude on safe use of insecticides, information related to exposure to media and listening preferences of farmers in the sample were gathered under this survey.

Treatments

There were four treatments under this study and they were instructional radio programs in 'interview', 'drama', 'straight talk' and 'discussion' formats with instructions on safe use of insecticides. Message characteristics, namely, rational appeal, both side of the argument, climax order and conclusion at the end, were similarly adopted in all four treatments.

In each of these treatments the plant protection officer was the main source of information. The program producer was involved in providing information on safe use of insecticides only in the discussion format. The procedure of 'matched-group assignment' (Suen and Ary, 1989) was followed

in assigning treatments for each group. Pre-recorded instructional programs were separately played back to farmers in each group collected at one place.

After treatment survey

After the treatment, the data related to change in knowledge and attitude were gathered twice, making use of knowledge measures and the attitude scale. First and second data gathering were undertaken three days and one month after treatment, respectively.

RESULTS AND DISCUSSION

The effectiveness of different radio program formats for the dissemination of information on safe use of insecticides was analyzed based on knowledge and attitude changes. Initial (pre), immediately after treatment and one month after treatment knowledge and attitude levels were taken into consideration for the analysis.

Knowledge

Pre-knowledge score

Results showed that every farmer in the sample had some knowledge on safe use of insecticides in paddy cultivation. Pre-knowledge score ranged from 1 to 7 out of the maximum possible score of 10. The mean pre-knowledge score was 4.23.

Pre-knowledge level

Assuming 50% of the possible knowledge score as cut off point, farmers in the sample were categorized into two knowledge levels as 'low knowledge' (knowledge score 5 and less) and 'high knowledge' (knowledge score 6 and above). Results showed that 78 percent of the sample had a low knowledge level whereas 22 percent had a high knowledge level before farmers were exposed to treatments.

Immediate knowledge change

Immediately after the treatment the mean knowledge score of the sample was 5.81. Further, 43.4 and 56.6 percent of the sample had high and low knowledge levels, respectively. With respect to change in knowledge level, there were 34 farmers whose score changed from low to high and 5 farmers who changed from high to low immediately after treatment. The immediate knowledge increase was highly significant (χ^2 value = 20.10; $P < 0.01$).

Knowledge change after one month

The mean knowledge score of farmers after one month was 4.84 which clearly demonstrated the loss of knowledge between immediately and one month after treatment. Further more, there were 47 (34.5%) and 89 (65.5%) farmers in high and low knowledge levels, respectively. With respect to change in knowledge level, the number of farmers who changed from low to high and from high to low were 28 and 11 respectively.

Results indicate that there was a loss of knowledge gained after one month from the treatment. However the increase in knowledge level after one month was significant but to a lesser extent when compared with immediate change in knowledge level (χ^2 value = 6.56; $P < 0.01$).

Effect of formats on knowledge change

Talk format

The pre-knowledge score and pre-mean knowledge score of farmers in this group were 148 and 4.382 respectively. Nevertheless, immediately after treatment, the knowledge score and the mean knowledge score were 188 and 5.549, showing a 26.7 percent increase in knowledge score. Similarly the number of farmers having high knowledge had increased from 8 to 13. However the change in knowledge level was not significant (χ^2 value = 2.29; $P > 0.05$).

One month after treatment the knowledge score and mean knowledge score of farmers were 157 and 4.617, respectively. Similarly the number of farmers having 'higher knowledge level' decreased from 13 to 10 during the

period between immediately and one month after treatment. However, the number of farmers having a high knowledge level was more than that of pre-treatment, even though the difference was not significant.

Discussion format

Immediately after the treatment, the knowledge score and mean knowledge score of farmers in this group were 178 and 5.393, respectively. This shows that there was 31.8 percent increase in immediate knowledge score due to the influence of the discussion format. Furthermore, discussion format had influenced the knowledge level of the farmers by increasing the number of farmers having a high knowledge from 7 to 13. However, the change in knowledge level was not significant.

One month after the treatment, the knowledge score and the mean knowledge score were 155 and 4.696 respectively. The number of farmers having a high knowledge level was 9. Thus, findings indicated that there was a reduction in knowledge score as well as the knowledge level after one month.

Interview format

The knowledge score and mean knowledge score of farmers in the interview group immediately after treatment were 211 and 6.205 respectively. There was a 45.5 percent change in immediate knowledge score due to the influence of interview format. This format had immediately increased the number of farmers having a 'high knowledge level' from 8 to 18 which was significant at 0.05 level (χ^2 value = 6.75; $P < 0.05$).

After one month, the knowledge score and mean knowledge score of farmers were 167 and 4.911 respectively. Even one month after treatment there were 14 farmers having high knowledge. However, this change in knowledge level was not significant. After one month the influence of interview format had decreased in knowledge score obtained as well as the knowledge level.

Drama format

Immediately after treatment the knowledge score and the mean knowledge score of farmers in drama group were 213 and 6.085 respectively.

The change in knowledge score was 38.8 percent. Drama format had immediately increased the number of farmers having 'high knowledge' from 7 to 15, which was significant at 0.05 level (χ^2 value = 4.08; $P < 0.05$).

One month after treatment the knowledge score and the mean knowledge score of farmers were 179 and 5.114 respectively. Similarly the number of farmers having high knowledge was reduced from 15 to 14 after one month. The change in high knowledge level over the pre treatment level was not significant.

Comparison of program format effect on knowledge change

The effectiveness of program formats is discussed under three major aspects of knowledge.

1. Immediate knowledge gain
2. Knowledge loss
3. Knowledge retention

Immediate knowledge gain

There are two aspects in knowledge gain: (a) change in knowledge score and (b) change in knowledge level. The change in the total score is the sum of changes in knowledge scores of each individual under each program format, whereas changes in knowledge level is the transformation of farmers from low to high knowledge levels. The comparison of knowledge score change with knowledge level change indicates the nature of program format effect, showing whether the effect is over majority or particular section of farmers in the sample.

When considering the knowledge score, the highest immediate gain in knowledge was recorded for the interview format. Talk format records the lowest gain whereas drama and discussion formats record the second and third positions, respectively.

When considering the knowledge level, the highest change was observed for the influence of interview format. Further, the influence of drama format was second and the discussion and talk formats were in third and fourth positions, respectively. However, this order changed slightly after one month.

After one month, the drama format had the highest influence on knowledge level of farmers whereas interview format was found to be in the second position. Discussion and talk formats had an equal effect and were in the third position (Table 1).

Table 1. Change in number of farmers in knowledge level.

| Knowledge level | | Program format | | | |
|-------------------|------|----------------|-------|-------|------------|
| | | Interview | Drama | Talk | Discussion |
| Pre | High | 8 | 7 | 8 | 7 |
| | Low | 26 | 28 | 26 | 26 |
| Immediately after | High | 18(10) | 15(8) | 12(5) | 13(6) |
| | Low | 16 | 20 | 21 | 20 |
| One month after | High | 14(6) | 14(7) | 10(2) | 9(2) |
| | Low | 20 | 21 | 24 | 24 |

Figures in brackets indicate the change in number of farmers in high knowledge category over the 'pre' situation.

Knowledge loss

Knowledge loss was calculated on the basis of percentage knowledge score difference between immediately and one month after treatment. Accordingly the highest loss of knowledge was recorded on the influence of talk format, whereas, interview, drama and discussion formats recorded the second, third and fourth places, respectively (Table 2).

Knowledge retention

Knowledge retention was calculated on the basis of percentage knowledge score retained over the knowledge gain. Table 2 shows that 'discussion format' records the highest knowledge retention whereas 'talk

Table 2. Gain, loss and retention of knowledge under each program format.

| Program format | Knowledge score | | | Knowledge | | |
|----------------|-----------------|-----------|-----------------|-----------|-----------|-----------|
| | Pre | Immediate | After one month | gain | loss | retention |
| Interview | 145 | 211 | 167 | 66 (45.5) | 44 (66.6) | 22 (33.0) |
| Drama | 154 | 213 | 179 | 59 (38.3) | 34 (57.6) | 25 (42.0) |
| Talk | 148 | 188 | 157 | 40 (27.0) | 31 (77.5) | 9 (23.0) |
| Discussion | 135 | 178 | 155 | 43 (31.8) | 23 (53.5) | 20 (46.0) |

Figures in brackets indicate the percentage values.

format' records the least. 'Drama format' and 'interview format' fall in between, though 'drama format' is more toward the higher gain compared to that of the 'discussion format'. However, as far as absolute retained knowledge was concerned, the 'drama format' records the highest.

Attitude

The possible range of total item score of farmers in the sample in the attitude scale was from 20 to 100. This range was divided into three categories as unfavourable (20–50), neutral (51–70) and favourable (71–100). However, the observed pre-treatment total item score range was from 21 to 63 which implies that farmers in the sample were in the unfavourable and neutral attitude categories toward the safe use of insecticides in paddy cultivation.

Table 3 shows that there was a change in attitude level of farmers immediately after treatment. However, it further shows that all farmers were yet in unfavourable and neutral attitude categories. The observed immediate change in attitude level was not significant (χ^2 value = 2.45; $P > 0.05$). Similarly there was a change in attitude level of farmers after one month. But farmers still remain at the same attitude categories and the observed change was not significant.

Table 3. Total attitude change of farmers in the sample.

| | Attitude level | | | | | | Attitude change | | | |
|------------|----------------|------|--------------|------|---------------|------|-----------------|--------|---------------|--------|
| | Pre | | 3 days after | | 1 month after | | 3 days after | | 1 month after | |
| | Neu | Unf | Neu | Unf | Neu | Unf | - to + | + to - | - to + | + to - |
| Frequency | 24 | 112 | 32 | 104 | 33 | 103 | 14 | 6 | 18 | 9 |
| Percentage | 17.6 | 82.4 | 23.5 | 76.5 | 24.5 | 75.4 | 10.3 | 4.4 | 13.2 | 6.6 |

Neu - Neutral

Unf- Unfavourable

Program format effect on attitude change

The effect of program formats such as talk, discussion, interview and drama on attitude change is presented in Table 4.

Talk format

Immediately after treatment there was a change in attitude level of farmers in talk group. However this change was not significant (χ^2 value = 0.25; $P > 0.05$). There was no change in attitude level after one month.

Discussion format

Immediately after treatment there was a change in attitude level of farmers in this group. However the observed change was not significant. One month after treatment, the change in attitude level was similar to that of immediately after treatment (Table 4).

Interview format

Interview format had influenced the attitude level of farmers resulting in a change in attitude level immediately, as well as one month after treatment

Table 4. Attitude change of farmers in talk, discussion, interview and drama formats.

| | Attitude level | | | | | | Attitude change | | | |
|-------------------|----------------|------|--------------|------|---------------|------|-----------------|--------|---------------|--------|
| | Pre | | 3 days after | | 1 month after | | 3 days after | | 1 month after | |
| | Neu | Unf | Neu | Unf | Neu | Unf | - to + | + to - | - to + | + to - |
| Talk | | | | | | | | | | |
| Frequency | 9 | 25 | 11 | 23 | 9 | 25 | 3 | 1 | 3 | 3 |
| Percentage | 26.5 | 73.5 | 32.4 | 67.6 | 26.5 | 73.5 | 8.8 | 2.9 | 8.8 | 8.8 |
| Discussion | | | | | | | | | | |
| Frequency | 6 | 27 | 7 | 26 | 7 | 26 | 3 | 2 | 3 | 2 |
| Percentage | 18.2 | 81.8 | 21.2 | 78.8 | 21.2 | 78.8 | 9.1 | 6.1 | 9.1 | 6.1 |
| Interview | | | | | | | | | | |
| Frequency | 4 | 30 | 6 | 28 | 5 | 29 | 4 | 2 | 3 | 2 |
| Percentage | 11.8 | 88.2 | 17.6 | 82.8 | 14.7 | 85.3 | 11.8 | 5.9 | 8.8 | 5.9 |
| Drama | | | | | | | | | | |
| Frequency | 5 | 30 | 8 | 27 | 12 | 23 | 4 | 1 | 9 | 2 |
| Percentage | 14.3 | 85.7 | 22.8 | 77.2 | 34.3 | 65.7 | 11.4 | 2.8 | 25.7 | 5.7 |

Neu - Neutral

Unf- Unfavourable

(Table 4). However, the change in immediate attitude level (χ^2 value = 0.17; $P > 0.05$) as well as after one month was not significant.

Drama format

There was a change in attitude level of farmers in this group immediately after the treatment (Table 4). However this change was not significant ($\chi^2 = 0.8$; $P > 0.05$). Similarly the change in attitude level of farmers after one month was not significant at 0.05 level ($\chi^2 = 3.27$; $P > 0.05$).

CONCLUSIONS

Talk, discussion, interview and drama formats had influenced the knowledge of farmers on safe use of insecticides. However, these formats differ in their potential in influencing knowledge immediately as well as after one month. With respect to immediate knowledge gain, interview format had the highest influence while talk format had the least influence. The influence of drama and discussion formats were second and third in order. Nevertheless, only interview and drama formats had significant influence on immediate knowledge of farmers. The 'discussion format' had the highest knowledge retention after one month whereas the drama, interview and talk formats followed in order. However, none of the formats significantly influenced the knowledge level of farmers after one month. With respect to the influence on attitude levels, none of the formats influenced the attitudes positively at 0.05 level.

REFERENCES

- Altheide, D.L. (1985). *Media power*. Sage Publication, London, New Delhi, Newbury Park.
- Bailey, K.D. (1987). *Methods of social research* (3rd Ed.). Free Press, London, New York.
- Hewawitharana, S.R. (1979). *Listener opinion of agricultural radio programs* (unpublished survey report). Agricultural Information Division, Colombo.
- Ismach, A.H. (1989). *The media world : an introduction*. In: Emery, M.C. and Smythe, T.C. (Eds). *Reading in mass media concepts and issues in mass media* (7th Ed.). Brown Publishers, Iowa.
- McQuail, D. (1987). *Mass communication theory* (2nd Ed.). Sage Publication, London, Beverly Hill, Newbury Park.
- Mody, B. (1991). *Designing message for development communication. An audience participation based approach*. Sage Publication, London.

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Oppenheim, A.N. (1992). Questionnaire designing, interviewing and attitude measurements (new Ed.). Printer Publishers, New York, London.

Rathnayaka, W., Hanifa, M.M., Illangasinghe, M., Chandrathilaka, B.M., Kendaragama, K.M., Weerathunga, D.B. and Alahakoon, N. (1994). Integrated agricultural extension strategy: Operational procedures. Second Agricultural Extension Project, Department of Agriculture Press, Gannoruwa.

Sarantakos, S. (1994). Social research. Charles Stuart University, Australia.

Sivayoganathan, C. (1986). A study of farmer perception of the usefulness of publications and farm radio programs of the Department of Agriculture. Department of Agricultural Extension and Economics, University of Peradeniya.

Suen, H.K. and Ary, D. (1989). Analyzing quantitative behavioural observational data. Lawrence Erlbaum Associates, Hove and London.