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AGRICULTURAL DEVELOPMENT: THE IMPACT OF COMMUNICATION[1]

E. KARAMI, G.H. ZAMANI, M.B. LARI AND H.S. HAWKINS[2]
College of Agriculture, Shiraz University, Shiraz, Iran and School of Agriculture and Forestry, the University of Melbourne, Parkville, Victoria 3052, Australia.

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ABSTRACT

During the past decade, a consensus has emerged that new strategies of communication are needed if we are to achieve development in the Third World. This paper argues that existence of a communication impact model is vital to development of effective communication strategies. Based on data collected from 320 farmers in Fars province, Iran, the validity of the communication impact models which use bivariate analysis as their statistical tool to prove the hypothesised relationships are questioned. Recommendations for future research toward development of more effective models are proposed.

1. *This paper was completed at the Department of Agricultural Economics and Extension, The University of Melbourne, Australia, where the senior author was a visiting scholar there during 1992-93.*
2. *Associate Professor, Assistant Professor, Instructor and Senior Lecturer, respectively.*

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توسعه کشاورزی : اثرات ارتباطات

عزت اله کرمی، غلامحسین زمانی، محمدباقرلاری و استوارت هاکینز
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چکیـــده

در طول دهه گذشته توافقی حاصل شده است که برای دستیابی به توسعه در جهان سوم استراتژیهای جدیدی برای ارتباطات مورد نیاز می‌باشد. در این مقاله چنین استدلال می گردد که فراهم بودن مُدلی برای تبیین اثرات ارتباطات در توسعه استراتژی‌های مؤثر ارتباطات، ضروری می‌باشد. بر مبنای داده‌های جمع آوری شده از ۳۲۰ کشاورز در استان فارس، روائی مدل‌های تبیین اثرات ارتباطات که واکاری دو متغیره را به عنوان ابزار آماری جهت اثبات روابط فرضی خود بکار می‌برند، مورد سؤال قرار گرفته است. در این رابطه توصیه‌هایی برای تحقیقات آتی جهت توسعه مدل‌های مفیدتری ارائه گردیده است.

INTRODUCTION

Despite the growing literature on the role of communication in national development (2, 28, 33), there are still contradictory views about what development means and how the Third World can achieve development (23). The communication, development and communication development fields have undergone criticism and change during the past two decades (6, 24). Servaes (30) criticises both modernization and dependency perspectives of development. He perceives another perspective

in terms of a new paradigm which is gradually emerging but is still in the process of formation. Many researchers have been trying to establish the core components of "Another Development" (3, 4, 22, 34). The concept of Another Development is need-orientated, endogenous, self-reliant, ecologically sound and based on structural transformations and participatory democracy (18, 30). In addition to the concept of Another Development, one can talk about the concept of Another Communication. Perspectives on Another Communication have been presented by Berrigan (1), McAnany (16) and Matta (15). In contrast to the earlier "oligarchic" model, the present view on communication is fundamentally two-way, interactive and participatory at all levels (30).

In the years following World War II, conventional educational strategies for face to face instruction were established in the Third World countries through extension organizations. Development theorists argued that poor rates of development might be explained in part by defects in knowledge and skills among people in these countries, hence mass communication programs were used to supplement these efforts. Of course, agriculture, the main source of income for most people in the Third World, was a prime target for communication programs. Such programs flourished as a means of achieving development in almost all Third World countries. The only problem was that communication for development was not producing the development that had been promised (7). The perspective on what communication can do for development changed with the fall of the modernization paradigm and rise of the dependency paradigm (7, 9, 30). The communication component of the dependency paradigm is most often referred to as "media" or "cultural imperialism". In contrast to modernization scholars who take the nation state as their framework of reference, dependency theorists believe in an international level of analysis. Most dependency theorists take for granted that, together with the huge

volume of western media messages, a conservative capitalist ideology and a consumer culture will be introduced simultaneously. Thus they question the belief of the modernization paradigm - a belief held especially by the diffusion theorists - that mass media can work as agents of change (30). As has been noted earlier, both modernization and dependency theories have been criticized, and a new development paradigm is flourishing which Servaes (30) calls the "multiplicity paradigm"- a perspective which calls for a pluralistic approach.

Few people may have doubts about the impact of communication on development but how it works - what the functions of communication are - remains controversial. Hornik (7) perceives the function of mass communication as a low-cost loud speaker, institutional catalyst, political lighting rod, organizer and maintainer, equalizer, accelerator of interaction, legitimator/motivator, magnifier of dependency/integration, creating and supplying demand and improving quality. On the other hand, Schramm (29) focuses on how communication interacted with other mobilizing factors. He discusses the role of communication in raising aspirations, teaching skills, extending markets and encouraging participation.

Agriculture is the primary source of employment and income for the majority of world population, and it will continue to be so in the foreseeable future. Therefore, increasing farmers' productivity, at least in the developing world, is still one of the legitimate goals of any rural development plan. Welch (35) argues that farmer productivity is substantially affected by two types of efficiency - technical and allocative - each of which is related to information transformation. This recognition has made development communication an indispensable part of any agricultural development effort.

Extension systems are the primary source of information flow through interpersonal and mass communication channels. There may be argument

about the mechanism of extension effects but there is no argument about the fact that extension does have an impact (12, 20, 25, 26). Extension contact seems not only to predict adoption of innovations, but also productivity. Reviews of studies by Orivel (19) and Lockheed *et al.* (14) reveal a positive relation between extension and output. Most of these studies have been criticized methodologically on the basis of not controlling the effect of other variables (7). Radio is the most widely used mass communication channel to support agricultural development. Many farmers in different countries reported listening to agricultural programs (11, 13, 17, 21). As far as the effects are concerned, although self-reported data are difficult to evaluate, most of the studies which have used this technique show a positive impact (21, 25). Other studies which have examined the relationship between media exposure and innovation adoption have usually found positive associations (5, 25, 27).

According to Shore (32), almost all earlier research concerning access and exposure to media in rural areas failed to distinguish clearly between access, exposure, content, information outcomes and social outcomes. He has developed the following model which is called "a progressive model for mass media impact":

→ ACCESS → EXPOSURE → CONTENT → INFORMATION OUTCOME → SOCIAL OUTCOME

This model is called "progressive" because the progress from the outer to the inner part is usually in stages. It suggests that in the process of different kinds of information diffusing to rural people through mass media, a series of stages needs to be distinguished. To test the model, Shore (32) reanalyzed the data from two studies in India and Nigeria. The findings from the Indian study revealed that radio was the most equally distributed across socioeconomic groups, whereas exposure to newspapers

had the greatest socioeconomic bias. Of the four socioeconomic variables, only education acted as somewhat of an intervening variable. Radio and film exposure played a negligible role in knowledge and trial adoption of health and agricultural innovations. With a few differences, the Nigerian findings were similar to those from India.

As was concluded by the International Commission for the Study of Communication Problems (8), communication is a major resource for development and equity. Considering the crucial role of communication in agricultural development (especially with the emergence of new concepts, such as ecodevelopment and sustainable development, which have a strong knowledge base ingredient) and lack of an effective model to adequately explain the impact of communication, the aim of this study is the identification of the relative impact of mass (radio, TV, extension publications) and interpersonal (extension agents, extension courses, local opinion leaders) communication on agricultural development. The theoretical model used in this study to explain the impact of communication is as follows (a more comprehensive picture of the model is presented in Fig. 1):

→ SOCIOECONOMICS STATUS → ACCESS → LEARNING → TECHNOLOGY ADOPTION → YIELD

Unlike the "progressive model for mass media impact" (32), this model will be used to study both mass media and interpersonal communication impact. The model assumes that socioeconomic conditions are determinants for access to mass and interpersonal communication channels. Furthermore, access to different channels is vital for learning from those channels. Learning will lead to adoption of innovations, and consequently the adoption will result in higher yields.

More specifically, the objectives of this study are to investigate the

validity of the above model in explaining the impact of different communication channels on agricultural development, and to assess the relative effectiveness of different types of communication channels.

METHODOLOGY

Sample and Population

The target population for this study consisted of farmers in Fars province, Iran. Since no frame listing of farmers was available, a two-stage cluster sampling was used, with villages as clusters. A simple random sample of 48 clusters (villages) were selected, then within each cluster a simple random sample of farmers was selected. The final sample consisted of 320 farmers. Data were collected in 1990-91 using a standardized interview schedule.

Variables and Measurements

To test the research questions of this study and, in particular, the relationship between different components of the communications impact model (Fig. 1), several variables were measured and included in the model. A brief discussion of these variables and their measurements follows:

Socioeconomic factors. The first socioeconomic factor was the amount of wheat seed a farmer used ("seed" in the model refers to this variable). Since there are difficulties and errors in measuring the more direct indicators of wealth such as income and amount of land due to the unwillingness of farmers to provide accurate answers to these questions, the amount of seed cultivated was used as a rather indirect measure of farmers' income. A second measure was the age of farmers. The final socioeconomic factor measured was the level of farmers'

education. Illiterate farmers received a score of zero and the education score was increased with years of education.

Access. Farmers' access to different sources of mass and interpersonal communication was measured by asking appropriate questions regarding these sources. Access was generally defined as the essential physical potential for exposure to mass and interpersonal communication channels.

Learning. A scale was developed for each communication channel to measure the amount of learning from that particular channel. A cumulative learning index also was developed by adding the learning scores from different sources.

Technology. A scale was developed to measure the level of farmers' adoption of wheat technologies as wheat is the major crop cultivated in all villages in Fars province. A weighing technique was used to make the scale sensitive to the adoption of more modern and more complicated technologies.

Yield. Farmers' productivity was measured by the yield of the wheat crop they harvested from irrigated wheat - in tons per hectare.

RESULTS AND DISCUSSION

The Communications Impact Model

Much of the earlier research and speculation on communication indicate that communication is a key determinant of development and change, but writers stop short of providing a complete picture of the

impact of interpersonal and mass communication channels. Most of the past research is concerned only with either mass or interpersonal channels and does not provide a holistic picture of the impact of both. Furthermore, most of these studies used bivariate analyses of relationships as their statistical tools (32). The main concern of the present study is, therefore, to explore the impact of communication on agricultural development in a more comprehensive way than earlier studies.

Socioeconomic factors and access. The findings indicated that among mass communication channels, radio has the highest access level and extension publications have the lowest access level. The proportion of farmers who had access to radio and extension publications were 80.4 and 1.9 per cent, respectively. These findings are consistent with reports by Karami (11), Shore (32) and Mowlana and Wilson (17). Among the interpersonal communication channels, 61.5 per cent of farmers have contact with local opinion leaders, and the lowest access level measured was 16 per cent for extension courses, with extension agent access level in the middle. Only 32 per cent of farmers indicated that they have access to extension agents. The findings regarding high access and exposure to local leaders is consistent with those of Sharma (31) in India.

The communication impact model is illustrated in Fig. 1. From this it can be seen that education as a socioeconomic factor has a significant positive correlation with access to radio, TV, local opinion leaders and extension agents. In other words, the more educated farmers seek information from more abstract sources such as radio and TV. The positive correlation between education and access to agents may be due to a homophily factor which results in agents actively seeking contact with more

educated farmers. There was no correlation between education and access to extension courses and extension publications. While a lack of relationship between education and access to extension courses seems reasonable, the low and non-significant correlation between education and access to extension publication ($r = 0.10$) needs some explanation. As was explained earlier, only a very small proportion (1.9 per cent) of farmers has access to extension publications. In addition, earlier studies (10) had indicated that the farmers' family education level is a stronger determinant of use of extension publications than is the farmer's education level alone. Thus, in this case it is possible that farmers who have higher family education levels, and who use extension publications, are not exactly the same farmers who have high education level themselves.

The relationships between age and access to all sources of communication were non significant except for access to leaders ($r = -0.15$). This finding indicates that younger farmers seek more information from local leaders than older ones. The fact that younger farmers are better educated is perhaps the reason why the correlation between education and access to leader is positive - the younger, more educated farmers are using local opinion leaders more often as sources of agricultural information. The amount of wheat seed cultivated, used as a measure of economic prosperity, showed a significant positive correlation with access to radio, TV, agent and leaders, thus indicating that the most important channels of communication in extension are used more by, and are accessible, to larger and relatively wealthier farmers. This finding must raise concern for the equity issue in the role of communication. Some researchers (7, 29) have assumed an equity role for mass communication. The above finding shows that, contrary to generalizations by some researchers, access to mass communication also is unequally oriented.

Access and learning. It was hypothesized in the model that access will lead to exposure and finally to learing. The results presented in Fig. 1 indicate that bivariate relationships between access to communication channels and learning from that particular channel are all strong and highly positive. Therefore, this demonstrates that access to each source of information is important because they contribute to learning of new agricultural knowledge.

Learning and adoption of technology. Fig. 1 provides information about the relationship between learning from communication sources and wheat technology adoption. This relationship is positive and significant, except for learning from extension publications, which indicates that the few farmers who read extension publications are not the most innovative.

Technology adoption and yield. Extension organizations try to persuade farmers to adopt new technologies, by increasing their knowledge and expanding their needs and aspirations. However, there is always a question of whether this increase in knowledge, which causes the adoption of new technology, will actually contribute to increased yield. As presented in Fig. 1, the findings of this study confirm that adoption of wheat technology has a high correlation ($r = 0.60$) with wheat yields. This result supports those reported by Orivel (19) and Lockheed *et al.* (14).

Validation of Communications Impact Model

Although the communications impact model (Fig. 1) provides a better understanding of communication impact on agricultural productivity than earlier models (32), there are still some valid questions about this model.

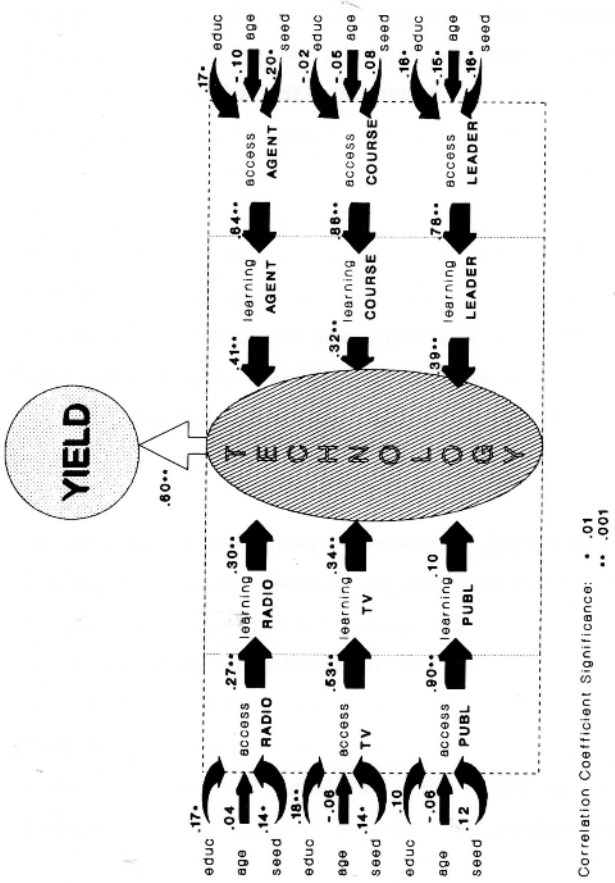

Fig. 1. The communications impact model.

The main weakness remains on the basis that the model uses a bivariate relationship analysis as the statistical tool to prove the existence of postulated relationships. The model leads one to believe that access to different sources has more or less the same effect on learning, and learning from different sources makes the same contribution toward adoption of technology. A multiple regression technique was used for further evaluation of the model.

A stepwise multiple regression was performed between total learning as the dependent variable and access to radio, TV, extension publications, extension agents, extension courses and opinion leaders as independent variables. Table 1 displays the nonstandardized regression coefficients (b) and intercept, the standardized regression coefficients (Beta), R, R^2, adjusted R^2 and R^2 changed. All independent variables contributed significantly to prediction of total learning. The six independent variables explained 61.7 per cent of the variability in total learning. However, the contributions of the independent variables were not equal. Access to leaders, extension courses, extension agents and TV explain 34.1, 19.2, 4.4 and 2.5 per cent of variability in total learning, respectively, while access to radio and extension publications explain only 0.07 and 0.05 per cent of variability in total learning, respectively. Therefore, this multivariate analysis which provides a more realistic picture is in contradiction with the simple bivariate coefficient which was presented in the model. Simply stated, access to some sources is more important than others as far as total learning is concerned. Therefore, the assumption that sources such as low-cost loud speakers for mass communication channels can compensate for shortage of agents (7) may not be valid.

Table 1. Stepwise multiple regression on total learning.

Independent variables	b	Std error b	Beta	Signif. T
Dependent variable = Total learning				
Access to leaders	2.239	0.265	0.336	0.0000
Access to courses	3.265	0.356	0.370	0.0000
Access to agents	1.667	0.286	0.240	0.0000
Access to TV	0.990	0.241	0.151	0.0001
Access to radio	0.764	0.297	0.093	0.0107
Access to publications	1.780	0.857	0.075	0.0386

Constant = - 0.211 ; F = 82.66 ; Significant = 0.0000

Summary statistics

Step	Multiple R	R^2	R^2 Adjust	R^2 Changed
1. Access to leaders	0.584	0.341	0.339	0.341
2. Access to course	0.730	0.533	0.530	0.192
3. Access to agents	0.760	0.578	0.574	0.044
4. Access to TV	0.777	0.603	0.598	0.025
5. Access to radio	0.782	0.612	0.605	0.007
6. Access to publications	0.785	0.617	0.609	0.005

Multiple regression also was used as the statistical tool to evaluate the contribution of learning from different sources on adoption of wheat technology. Stepwise regression was used with adoption of wheat technology as dependent variables and amount of learning from the six different channels of communication as independent variables. Table 2 displays the results of this analysis. Only learning from agents, leaders, TV and extension courses contributed significantly to prediction of the adoption of technology. Learning from radio and extension publications did not qualify for inclusion in the equation; that is, their contributions to predict the variability in adoption of technology were negligible and the addition of them to the equation did not reliably improve R^2. The four independent variables included in the equation explain 31.3 per cent of variability in the equation. Learning from extension agents was the most important variable in explaining variability in adoption of technology (R^2 changed = 0.17).

The results of this second multiple regression analysis also show that the effects of learning from different sources on adoption of technology are more complicated than those assumed by the communication impact model. While the model gives an understanding that learning from all sources except extension publications provides the same contribution to adoption of the technology, the multivariate analysis indicated that this speculation is not true. The important point which emerged from the above discussion is that despite widespread use bivariate relationships analysis is not an appropriate tool for constructing communication impact models and in fact might be misleading.

Table 2. Stepwise multiple regression on level of technology.

Independent variables	b	Std error b	Beta	Signif. T
Dependent variable = Level of technology				
Leamin from agents	0.668	0.174	0.222	0.0001
Learning from leaders	0.628	0.119	0.262	0.0000
Learning from TV	0.622	0.149	0.228	0.0000
Learning from courses	0.491	0.205	0.134	0.0170

Constant = - 1.951 ; F = 35.148 ; Significant = 0.0000

Summary statistics

Step	Multiple R	R^2	R^2 Adjust	R^2 Changed
1. Learning from agents	0.412	0.170	0.167	0.170
2. Learning from leaders	0.505	0.255	0.250	0.085
3. Learnig from TV	0.548	0.299	0.293	0.044
4. Learning from courses	0.559	0.313	0.303	0.014

CONCLUSIONS

Central to the study of development is the meaning and philosophy of the phenomenon itself. Unless this quesion is well articulated and defined, there is bound to be confusion in the secondary and peripheral areas of both policies and strategies of development and communication. Although this study made no attempt to define development, the literature review indicated that no matter what meaning and philosophy one adopts, communication always remains an integral part of development. To this end, "Another Development" carries with it the notion of "Another Communication". The new paradigm for development demands that we devise and practice new approached and models of communication. Only by using more accurate and effective communication impact models we can make development more culturally appropriate, socially desirable and ecologically sustainable in a world characterized by diversity and change. The failure of many development perspectives with a communication component can in part be blamed by the lack of effective communication impact models.

The findings of this study indicated that communication does make a considerable impact on adoption of agricultural technology and as a result can lead to yield increases. However, the earlier models do not explain the impact of communications. Even the more comprehensive model incorporating mass and interpersonal communication, which is developed in this study, does not provide an accurate picture when established on the basis of bivariate relationships. The model based on bivariate analysis leads to unwarranted conclusions that access to radio, TV, extension publication, extension agents, extension courses and local opinion leaders contribute

equally to learning, and consequently learning from these sources has more or less the same impact on technology adoption (except extension publications) and, as a result, on agricultural production.

Based on the multivariate analysis, this study revealed that access to local opinion leaders, extension courses and extension agents make a greater contribution to learning than other sources. As for the adoption of technology, learning from extension agents and local opinion leaders have greater impact than learning from other sources. These conclusions render premature some of the roles assumed for mass communication based on the models which used bivariate analysis as its statistical tool.

Finally, although this study stops short of providing an accurate communication impact model for agricultural development, it makes a significant contribution towards future research to this end. First, in any communications impact model both mass and interpersonal communication channels should be considered. Second, bivariate analysis of relationships is not a useful tool for designing models of this type. Multivariate analysis can provide a better contribution to understanding the phenomena. Third, the impacts of different channels of communication are not the same and the models which assume a mechanical linear relationship between different components of the model are subject to failure.

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