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ABSTRACT

The paradox of the diffusion of innovations research is that in its efforts to find ways and means of breaking the communication constraint in Third World countries, it has generated many bottlenecks that cumulatively constitute the major constraint: lack of an efficient system for delivering adequate and reliable information, knowledge, and skills of a quality that rural people can understand and use to increase their productivity. For example, obsession with effects of mass media on behavior alteration through increased exposure to media gives little consideration to the content of the messages to which the audience is exposed. Among the other bottlenecks generated by diffusion research are (1) inadequate consideration of media message content and differences in their use and perception by the audiences; (2) the assumption that adoption of nontraditional innovations is advantageous to all potential users; (3) the misalignment between what the communication theorists define and what the researcher actually measures; and (4) lack of knowledge about the shortcomings and deficiencies of the source or initiator of the innovation. It would seem that diffusion research has created more bottlenecks to the diffusion of information rather than identifying and breaking communication constraints. (HOD)

INTERNATIONAL COMMUNICATION DIVISION

THE PARADOX OF THE DIFFUSION OF INNOVATIONS RESEARCH: CREATING MORE COMMUNICATION BOTTLENECKS THAN BREAKING THEM

by

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THE PARADOX OF THE DIFFUSION OF INNOVATIONS RESEARCH: CREATING MORE COMMUNICATION BOTTLENECKS THAN BREAKING THEM

One way of substantially improving the quality of rural life in the Third World, as emphasized in diffusion research, has been through the adoption of new ideas and practices by peasants which would enable them to increase their productivity. As Ascroft and others[1] note, "the paradigm was simple enough to comprehend. The agricultural sciences showed over and over again that where five bags of grain were yielded using traditional seeds, techniques and implements, twenty bags were possible using scientifically improved seeds, techniques and implements. All that remained was for the peasant masses to adopt them."

However, agricultural innovations which promised to improve peasant productivity have not penetrated very deeply into the small-scale sector of rural economy in the Third World nations. Ascroft and others point out that adoption rates were generally so low that they produced incomplete adoption curves when the cumulative percentage of adoptions were plotted against time. The S-shaped curve denoting complete adoption of an innovation, commonly struck in the

Western nations, was seldom found in the rural Third World, particularly within subsistence communities.[2]

Misaligned Research Focus

As much of the classical diffusion research was a post hoc preoccupation with already diffused innovations, the reasons for the apathy of peasants in developing nations to adopt innovations, unlike their counterparts in Western countries, gave rise to theoretical generalizations on their social-psychological characteristics. These peasants were labeled as lacking in achievement motivation, empathy, innovativeness, deferred gratification, etc., and at the same time, afflicted with traditional ills such as fatalism, familism, limited aspirations, and so on, all of which were synthesized into a "subculture of peasantry."[3] As Ascroft and others[4] note "the researches grew increasingly long on generalizations and diagnostics, and correspondingly short on practice and prescriptions... There were few insights about strategies for 'pushing' the process, for 'causing' it to occur more rapidly, reliably, efficiently, and completely." The diffusion researchers, therefore, steered clear of field experimentation leaving the onus of applied diffusion in the hands of practitioners such as agronomists, nutritionists, family planning workers, etc. These professionals experienced limited success in their campaigns

but found little of use in existing diffusion literature to help them remove or overcome the bottlenecks impeding the adoption process. Quite clearly, there was a misalignment between what the diffusion researchers chose to examine and what development professionals actually needed.[5]

The exaggerated emphasis of diffusion research on the individual-blame causal hypothesis, has obscured the existence of constraints generated by the system on the individual peasant. In the Third World, the peasants face a host of constraints that act as bottlenecks to their adoption of new ideas and practices. Usually, it is these bottlenecks in their path that make an innovation unattractive, unprofitable and risky. Thus, many of these barriers to development could be discouraging the peasants from adopting innovations, rather than their psychological characteristics as enunciated by diffusion research. Based on their research studies among African peasants, Ascroft and others[6] have identified some of the major bottlenecks to adoption of innovations: (1) Lack of an equitable system for delivering knowledge and skills; (2) Lack of an equitable system for delivering financial and material inputs; (3) Inadequate market development; (4) Infrastructure underdevelopment; (5) Lack of employment opportunities; and (6) Lack of local people involvement in

the designing, planning, and execution of development projects.

The overcoming of the above constraints is a prerequisite for successful adoption of innovations by peasants in the Third World nations. The diffusion of innovations research, however, has not come up with, "a more dynamic a priori experimental approach focused on testing alternative strategies for overcoming bottlenecks and thus accelerating the process of diffusion."[7]

Among the six bottlenecks listed above, this paper puts the spotlight on the first which deals with the diffusion of knowledge, information and skill inputs to the peasants. The author feels that one of the major bottlenecks to non-adoption of innovations is the lack of an equitable system for delivering adequate information, knowledge and skills to the rural people of a quality they can understand and use to increase their productivity, and thereby, their income generating capacities. The paradox of the diffusion of innovations research is that in its efforts to find ways and means of breaking the communication constraint, it has generated many more bottlenecks which cumulate to constitute the major constraint: lack of an efficient system for delivering adequate and reliable information, knowledge and skills to the peasants.

Constraints Generated by Diffusion Research

Some of the bottlenecks identified by this study are discussed in detail below.

Communication Effects Bias

The predominant concern of communication research has been on the effects of a particular source, medium, message or a combination of these elements on the receiver. Rogers notes, " Much present-day communication research focuses on the effects of the source, message, or channel on change in knowledge, attitudes, and overt behavior of the receiver."[8] This explicit attention given to the general question of communication effects in the modernization process is also present in much of classical diffusion research. The communication effects orientation gave undue importance to the question of exposure to mass media. "Larger mass media audiences, accompanied by high levels of mass media exposure per capita, can be expected to lead those exposed to more favorable attitudes toward change and development to greater awareness of political events, and to more knowledge of technical information."[9]

The obsession with effects of mass media on behavior alteration through increased exposure to media gave little consideration to the content of the messages to which the

audience was exposed. In fact, there is an implicit assumption that any kind of mass media exposure would lead to development:

> Nor does our measure of exposure consider the specific nature of the messages received from the mass media---whether musical, news, or technical content. It should be remembered that exposure, not influence or internalization, of mass media messages is what is being dealt with here.[10]

The methodology, therefore, in much of classical diffusion of innovations studies reveals a serious shortcoming. As no attempt was made to discover the type of media messages the audience was exposed to, little or no attention was given to the content and quality of information, knowledge and skills emanating from these messages. The corollary to this was that there was no attempt to investigate whether the content of the messages were internalized by the audience, i.e., if the messages were consumable, reliable and efficient leading to internalization of the message. The mass media exposure index was constructed thus: the respondents' indications of degree of exposure to each medium, in terms of number of radio shows listened per week, and so on, contributing to form a standard score.[11] This quantitative approach to media exposure revealed nothing on the respondents' media message preferences: the respondent could have been listening to film music, news, plays, talks, or even static noise from

the radio set. The lack of a qualitative indication to media exposure, therefore, made no measurement of what programs the respondent listened to on the radio or watched on the television, whether these programs were prodevelopment, neutral, or anti-development in content, the quality and relevance of the programs and differences in their use and perception.[12]

The lack of adequate interest in the content of media messages and, consequently, individual or group differences in their use and perception led to a lack of interest in the second dimension of communication effects. Most diffusion of innovations studies focused predominantly on the first dimension, i.e. behavioral dimension of communication effects. They posed questions such as: 'Has there been any effect of the media on respondents' behavior? If so, what has been the nature and direction of that effect on adoption behavior?' Very rarely did research seek to investigate another dimension of media effects on the audience: the cognitive dimension or what they know. Diffusion studies did not posit questions such as: Did the communication attempt have a relatively greater effect on the cognition of certain receivers than on others? Why? Whereas the first question asked about the level of communication effects on the adoption behavior, the second question directed

communication research to the differential levels of cognition among receivers and to the concern with knowledge gaps.[13] The lack of such focus, therefore, did not reveal to the early researchers the potential inequality media exposure could breed by creating "knowledge gaps" among different sections of the audience, particularly the disadvantaged sections low on socioeconomic status.[14]

Shallow Depth of Knowledge

The important dependent variable in most diffusion studies was adoption of non-traditional innovations by peasants. In the measurement of this consequent variable, however, most studies reveal methodological and conceptual weaknesses. Insufficient attention and treatment were given to the amount and depth of knowledge and skills the respondent possessed prior to his adoption decision. Shingi and Mody[15] report that diffusion students substituted the broader concept of knowledge of innovations with the more easily measurable concept of awareness of new practices. The empirical definition of the awareness of an innovation was confined to 'Have you heard of...?' kinds of queries and did not measure the 'how-to' knowledge consisting of information vital to use an innovation efficiently, and 'principles-knowledge' dealing with the fundamental principles underlying an innovation. Thus, in

the correlational analyses of diffusion studies the farmer variables were associated with this rather limited concept of knowledge of new practices with no measurement of the shallow depth of such knowledge or their conditional association with adoption. Shingi and Mody caution that, "the long-range competence of farmers to evaluate and adopt (or reject) future innovations is not directly facilitated by mere awareness of a great number of innovations... In our opinion, the innovation-decision process is considered to be initiated not when the individual is merely exposed to information on the innovation but when he gains some understanding of how it functions."[16]

Prodevelopment Content of Media

An implicit assumption running through diffusion literature is that since the mass media (especially electronic media) are government controlled in many developing nations, the mass media messages have a strong prodevelopment content.[17] So the assumption went that exposure to such media messages by the peasants would obviously create the 'climate for modernization' in the villages in the Third World. This view of prodevelopment content of media messages is not entirely correct. Larry Shore[18] cites a substantial amount of research, mainly in Latin America, done mostly on the content of newspapers and

some on the content in radio and television, which suggest that consistently lesser preference is given for information relevant to development than for the trivial and non-development-oriented subjects such as sports, entertainment, etc. He draws a useful distinction between two types of programs: commercial programming and purposive(development communication) programming and feels that impact of these two types of media content on rural development could be very different.

Even if governments in some developing countries actively promote prodevelopment content in their mass media, this has to be viewed from the perspective of the total program structure constructed for each medium and the total time allotted to each type of program. For example, in India, though the government is committed to rural development and carries rural programs which are clearly prodevelopment, the total percentage of such programs is very low. In 'home-service' radio programs, only 5.8 percent of total program time was devoted to rural programs while more than 38.4 percent of broadcast time was claimed by music and 34.8 percent by news.[19] Thus there is the anomaly here of rural programs being prodevelopment but the total time accorded to such programs being rather insignificant.

Assuming that much of the media messages in developing nations are prodevelopment, there is still reason to be concerned with other factors. First, there is the question of selective exposure of the audience to particular media messages because, more often than not, such selectivity is towards messages which may not be prodevelopment. As Rogers observed on one of his visits to a village in a developing nation, "the only radio in the village, owned by the president of the village council, was tuned to music rather than to news of the outside world."[20] Second, there is the question of internalization of the content of media even if the rural peasant chooses to listen to prodevelopment programs. The absence of programs in regional languages or major dialects, the irrelevant content due to the largely urban control of media production in many developing nations make the message unsuitable for rural audiences.[21] The classical diffusion research, due to its inadequate consideration of media message content and differences in their use and perception by the audiences, has made very little contribution to the understanding and solving of these problems.

There are other problems in the Third World nations. For example, the ministry of information and broadcasting in India is structurally separated from the ministries of

agriculture, health, nutrition, and family planning[22] where a bulk of the developmental programs are developed for execution. Due to bureaucratic rigidities leading to limited coordination between these numerous ministries supposed to be working for rural progress, the media do not provide situation-specific cognitive information support. For example, the media do not provide situation-specific information support to farmers on a day-to-day basis as is done, for example, in developed nations such as the United States. A major problem in most Third World nations is the inadequate spread of mass media across rural hinterlands.[23] It is an irony that in a country like the U.S., which has a common language and a homogenous culture, there is a multiplicity of media with atleast one radio station in every small town, whereas in developing nations, saddled with heterogenous cultures and a babel of tongues, there are just a few radio/television stations dotting the national maps. So, it is not feasible and also unrealistic in these nations to have the broadcasting setup hook on to a single village with specific development support information as done in developed nations such as the United States. Therefore, till the media services are decentralized in many of the developing nations, the mass media will continue to play a very minimal role in development.

In developing nations, the mass media in their present form are not suited for the kinds of developmental tasks they have to perform and western-originated examples and assumptions are irrelevant in the Third World situation.[24] An adequate response to the challenging task of rural development in developing nations would "involve a re-consideration of the structure of the broadcasting system, the location of transmitters and studios, and the language and content of the programs... It is clear that unless policies are changed, the services expanded and decentralized there is little chance of the mass media playing a significant role in bringing about rural change."[25]

Conceptual and Methodological Biases

The lack of innovativeness among diffusion researchers in employing experimental and panel study designs in place of the familiar post hoc one-shot surveys gave rise to important conceptual and methodological biases:[26] (1) A pro-innovation bias, and (2) A Lack of a process orientation. A discussion of these biases will be useful.

A Pro-Innovation Bias

An implicit assumption running through diffusion tenets is that adoption of non-traditional innovations would be

advantageous to all potential adopters. While this assumption was true in a few cases, it could not, however, be justified in a majority of cases in the rural Third World where the innovations were clearly ill-adapted to local conditions.[27] An example of the incompatibility of technological innovations with local practices can be seen in the area of traditional subsistence farming in the rural Third World. Bortei-Doku[28] notes that diffusion researchers arrived in peasant communities with a built-in bias toward Western ideals of agricultural practice with its orientation to permanent commercial enterprises concerned with plant population per unit area, planting distances, fertilizer use and other technologies primarily developed for single-crop systems. The mixed cropping and shifting agriculture practised in these areas were considered backward. In fact, the very nature of mixed-cropping prevented easy application of scientific technological recommendations about planting distances, crop protection and the application of fertilizer and weedicides. So, the peasants were persuaded to adopt the single-crop system with all its attendant technologies to ensure increased productivity. However, this innovation was not only incompatible to local conditions but also complex for the poor, illiterate farmers. If the small farmer was reluctant to adopt the innovation, it was not

because he did not care to increase his productivity with the new techniques. Instead, there were many factors which served to perpetuate his practice of traditional farming:

> The truth of the matter is that traditional farm practices are based on the farmer's concept of the most efficient use of his land, given his available resources. Lacking financial resources not only to invest in cash crops but also to tide him over till they mature and produce food-purchasing means for himself, his priority crops became those which guaranteed him his subsistence with minimum risk. To make sure he has a food supply in the early part of the growing season, he mixes his crops, planting, for example, early millet with some later maturing crop. Lacking the labour to clear and maintain large tracts of land, he farms on small manageable plots, mixing his crops to ensure himself self-sufficient variety... Unable to obtain a loan to purchase a plough or hire a tractor for deep ploughing, he scrabbles the land with a hoe, dibbling corn on it with a pointed stick.[29]

Thus, adopting the new innovation or adapting it to his traditional system were too risky for him to bear alone. Experimentation could lead to relative successes but then there was a greater likelihood of crop failure due to inadequate knowledge of application of modern technologies and methods.

New methods are not always better as illustrated by the failure of Gezira Scheme in Sudan.[30] Before modern agricultural methods were adopted in this cotton growing area, the average yield was about five bales of cotton per acre a year. Now, the yield is about two bales per acre.

The Wall Street Journal notes that the problems began in the 1970's when the government decided to increase the output at Gezira by adopting modern farming methods. Some of the innovations were the use of modern fertilizers, pesticides, crop rotations and more frequent irrigation to improve yields. "But the new farming techniques undermined the traditional balance in the Gezira. The initial dose of pesticides, for example, killed predators of the white fly but left the cotton crop more vulnerable then before. Worse, the Sudanese found themselves locked into ever-rising costs. Where they had initially planned only one spraying of pesticides annually, Gezira agronomists soon found it necessary to spray up to seven times a year. They didn't have enough money for the required crop dusting planes."[31] There were other problems. The increased use of irrigation carried silt and other debris which choked the canals and ditches. Some of them were so full of mud and weeds that the simple gravity-flow system became ineffective. But the farmers could not afford the exacavation equipment needed to reopen the choked canals. The Journal neatly sums up the situation: "That a step forward in technology should be followed by a step backward in production is an anomaly of economic life in poor countries such as Sudan, where the simple ways of the past sometimes work better than expensive new ways."

A discussion of the pro-innovation bias brings to surface an aspect which has not received much thought among diffusion theorists: the painful contradiction between diffusion theory and its practice. Early diffusion research delineated the characteristics of the innovation itself which would affect its rate of acceptance (or rejection) by the potential adopter. Some of these factors were: relative advantage, compatibility, complexity, divisibility and communicability. Rogers, who coined these terms, underlined their importance: "It matters very little whether or not an innovation has a great degree of advantage over the idea it is replacing. What does matter is whether the individual perceives the relative advantage of the innovations. Likewise, it is the potential adopter's perceptions of the compatibility, complexity, divisibility, and communicability of the innovation that affect its rate of adoption."[32] Yet, from some of the examples illustrated above it is seen that, very limited attention has been given in diffusion practice to these characteristics of an innovation before it was diffused and no study has looked into this anomaly. Therefore, the pro-innovation bias has been, in essence, a lack of critical look at the innovation itself.

Absence of a Process Orientation

There was a misalignment between what the communication theorists defined and what the researcher actually measured. Though communication has always been conceptualized as a process in communication research, the research designs in diffusion studies have mostly consisted of analyses of cross-sectional data collected through surveys at a single point in time.[33] The dynamic process conceptualization of communication is thus obscured by this approach:

> Very few communication researchers include data at more than one observation point, and almost none at more than two such points in time. So almost all communication research is unable to trace the change in a variable over time; it deals only with the present-tense of behavior. Communication thus becomes, in the actuality of communication research, an artificially halted snapshot.[34]

Mainstream diffusion researchers did not just obscure the concept of communication as a process. They, in fact, distorted the concept of communication process itself. Contrary to the assertion of Rogers in the above quotation that research deals with the present-tense of behavior, diffusion research dealt with not the present-tense but the past-tense of behavior. In the correlational analyses, the dependent variable of innovativeness was measured with recall data about past adoption behavior. The diffusion research, therefore, went into the history of adoption behavior of the recipient and constructed, not an

"artificially halted snapshot," but an artificially constructed movie or biographical history of the adopter.

The pro-innovation bias coupled with an overwhelming use of post hoc survey design confined the focus of diffusion research to testing of strategies of "what-is" or reaffirming current practice rather than "what might-be" or testing alternative strategies. Since the innovation was thought to be good to the adopter and the present process of diffusion satisfactory, the survey design was used to replicate the status quo. There was no attempt to use field experimental designs and go beyond current practice to gain knowledge of effective means to reach an alternative, desired state.[35]

A discussion of the foregoing methodological and conceptual biases reveals the post hoc preoccupation of diffusion research with already diffused innovations. The diffusion tenets, Ascroft notes, "provided researchers with few insights about strategies for 'pushing' the process, for 'causing' it to occur more rapidly, reliably, efficiently and completely."[36] The dearth of experimental designs in diffusion theory, therefore, have given rise to biases such as lack of process orientation, a pro-innovation bias and ignoring of the issue of causality. This lack of an experimental approach in earlier research may perhaps be the reason for the theory to be so stunted.

In addition to the above three biases, there are many more which have not been stated explicitly in diffusion literature.

Pro-Source Bias

While diffusion literature abounds with studies on the weaknesses, shortcomings or deficiencies of receivers which could impede the adoption process, there is little or no research into the shortcomings and deficiencies of the source or initiator of the innovation. The source was considered to be faultless and blameless and any anomaly in the diffusion process was attributed to the recalcitrance of the receivers. There was even an explicit assumption that the source knew what kind of change was desirable for the adopter. This can be seen in the manner in which a change agent was defined: "A change agent is a professional who influences innovation decisions in a direction deemed desirable by a change agency."[37] This pro-source bias has its roots in the influence of the dominant paradigm on diffusion research. The top-down, one-way, linear model of message flow in the dominant paradigm, by its very nature, supported the source against the receiver. Diffusion research, influenced as it was by the paradigm, could not overcome this bias.

In-the-head Variable Bias

Much of diffusion research was preoccupied with in-the-head variables of the receivers such as empathy, familism, fatalism and so on about which nothing much could be done. As Roling[38] notes, such an orientation resulted in diffusion research dwelling at length on the relationship between variables which were not manipulable. Diffusion literature, partly because of its post hoc orientation, usually aimed at reaching conclusions about peasant communities instead of finding out methods and techniques of changing these communities. Use of over-time research designs and deciding what the goal of diffusion campaign was and working back from that point, would have revealed a number of other manipulable variables. One such variable, for example, is the knowledge variable, the lack of which was acting as a crucial constraint to adoption. However, much of diffusion research chose to study non-manipulable variables in current practice and seldom about what would happen if one tried to change current practice.[39]

Absence of Researcher Self-Examination

Operational measures for important concepts such as empathy, fatalism, etc., among the Third World peasants, did not actually measure these variables. As Golding notes, "the scale of nine items Lerner used to measure empathy may

or may not measure the ability to identify with other roles. His respondents were asked, 'What would you do if you were...?' in circumstances of counterfactuality. Furthermore, all questions require upward empathy of low-status actors."[40] In a study conducted by Gans,[41] he showed that American slum dwellers whom he called "urban villagers" scored very low on empathy scales. Thus, Golding concludes that for the American slum dwellers as well as for the Third World peasant such as Lerner's Balgat shepherd "the perception of massive structural constraint against upward mobility mitigates against 'role empathy' far more than does an inert imagination. Lack of empathy, in other words, is the result of frustrated experience, not the cause of fatalism."[42] Thus, operational problems with concepts such as empathy, fatalism, etc., were largely due to the researcher's poor knowledge of his respondents and their cultural milieu. It was actually the researchers who lacked empathy with the respondents and their cultures.

Pro-Persuasion Bias

The preoccupation with effects, as illustrated in an earlier section, implied that the aim of communication research was to determine the persuasiveness of messages in changing respondent's behavior for whatever purpose. This pro-effects and pro-persuasion bias can also be seen in much

of diffusion research. An important task for diffusion researchers was to change the multitudes of ignorant peasants from a 'traditional' to a 'modern' way of living mostly through persuasion. However, by using the persuasion approach there was an implication that these peasants were resistant to change. This approach influenced a dichotomous categorization of respondents into the persuasible and the recalcitrant. An investigation of the analysis of adoption curves would show that those who were persuaded to adopt non-traditional innovations were literate with superior mental ability, they had higher social status, they had exposure to many channels of communication and so on, while the non-adopters comprised the resistant group which was open only to the most localite sources of information and generally ignorant of the process of modernization going on around it.[43] There is a logical inconsistency in this approach. How could a group which had little information on the new methods and generally ignorant of the modernization process be resistant? Logically, an individual can effectively resist a new idea or practice if he has sufficient knowledge about it and can logically and rationally argue against its acceptance. This preoccupation with effects and persuasion, therefore, did not make sure that the receivers knew enough about the innovation to start

with. Did the receivers understand what change was expected of them? Did they have sufficient information and knowledge to adopt a non-traditional innovation? These kinds of queries were not made and an attempt was made to persuade people to change without checking if the prerequisites for that change were fulfilled. As illustrated above, those who were most resistant to change were also the most ignorant. So, the test of resistance cannot be made till the pro-persuasion approach is preceded by a pro-information strategy.

One-Way Message Flow Bias

On a macro-level too, there are conceptual biases. There has been an implicit assumption in diffusion research that changes within developing nations happen exogenously. It is only through continuing contact with Western ideas and technology that nations of the Third World become modern. This has been the overall framework within which much of the work on communication and development has occured.[44] This assumption has been reinforced by the dominant paradigm of development giving rise to the idea of one-way, dependent relationship. This approach, to quote Rahim, "has tended to block the researcher from seeing the reverse flow of ideas and innovations from the poor to the rich, from the less developed to the more developed, from the peasants to the

technicians, administrators, and scientists."[45] Thus, in diffusion research there has been not only a North to South[46] communication flow between nations, but even within a nation, there has been a top-down message flow from administrators, scientists and donor agencies, to rural peasants. Thus, in a nutshell, the flow of communication has been from a Northerner to a North-like-Southerner[47] in the developing nations, and from them to the rural peasants. This one-way message flow, as explained earlier with the example of multicropping agricultural system, could not see the virtue of traditional methods. Discussing about multicropping traditional agriculture, an FAO report has this to say: "There are increasing indications that such systems should not be rejected wholesale as primitive and uneconomical. In fact, it appears that past research aimed at improving cropping systems had not shown enough attention to some of the techniques developed by small farmers, and that a scientific approach to such systems can sometimes give better results than the use of technology primarily developed for single-crop systems."[48] So, as Bortei-Doku[49] points out that instead of finding ways to adapt new technology to existing patterns of farming, efforts were made instead to train a whole new generation of farmers through agricultural institutes. "Such trainees, however,

hardly ever returned to the farm to apply their new knowledge. They went instead in search of government jobs as field assistants and technical officers, leaving the problem of the development and improvement of traditional agriculture largely unsolved."[50] Instances such as these could have been avoided to a great extent if diffusion research accommodated reverse flow of ideas and practices from peasants to scientists or donor agencies.

The neglect of a broad framework which considers diffusion of ideas and practices as a multiway flow between individuals at the micro-level and between nations at the macro-level, has been, therefore, a serious conceptual and methodological weakness of diffusion research.

Conclusion

From the foregoing analysis of the shortcomings of diffusion research, this paper is of the view that attention on constraints to diffusion of knowledge, information and skill inputs has been inadequate and inappropriate. All things considered, the lack of empathy, aspirations, innovativeness, etc., which constitute the "subculture of peasantry," may not be the main constraints to adoption of productivity-increasing innovations by the peasants. Within the domain of communication, one of the crucial bottlenecks has been the delivery of equitable, adequate and relevant

cognitive inputs such as knowledge, information and skills to the peasants. Diffusion research, as discussed above, has created more bottlenecks to diffusion of information rather than identifying and breaking the communication constraint.

No study to date has examined the constraints generated by diffusion research as potential hypothesis for testing and verification. So to the present day there exists a lack of an equitable system for delivering adequate information, knowledge and skills to the rural folk of a quality they can understand and use to increase their productivity, and thereby, their income generating capacities.

Notes

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