COMPARISON OF GENERALIZATIONS FROM DIFFUSION RESEARCH ON AGRICULTURAL AND FAMILY PLANNING INNOVATIONS

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> It would also be useful if someone...could summarize the state of our knowledge. In this field of tactics, there is a very great danger that knowledge will not be accumulated.... It will no longer do to wait six years for the massive book to come out: the field is moving too rapidly and the information will be obsolete before publication occurs. It is important that we have better accumulation of our recorded experience, and I doubt that this accumulation has thus far been accomplished.
>
> (Frank W. Notestein, President, Population Council)

> ...We do believe in planned parenthood, but it is not easy to introduce all at once in China and it is more difficult to achieve in rural areas, where most of our people live, than in the cities.
>
> (Premier Chou En-lai**)

INTRODUCTION

Investigations of the diffusion of agricultural and of family planning innovations have been completed in recent decades by two distinct coteries of researchers. The objective of the present paper is to contrast the generalizations emerging from these two bodies of communication research, and to discuss possible

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**As interviewed by Edgar Snow in 1964 at Conakry, Guinea, Africa.

reasons for these differences and similarities in terms of their research methodologies and theoretical underpinings.

CONTENT ANALYSIS OF THE DIFFUSION DOCUMENTS

The raw materials on which the present paper is based are 119 publications; 95 of these deal with the diffusion of agricultural innovations, and 24 deal with the diffusion of family planning ideas.* The locale for all of these investigations are less developed countries. Originally, we had intended to also include diffusion sutdies conducted in more developed countries, but this was judged unwise as almost all of the family planning studies available to us were completed in less developed countries, and comparison with agricultural innovation studies in both less and more developed countries would be "unfair".

The 119 publications were obtained by searching journals and dissertation abstracts, and by requesting copies of publications from their authors. Although the Diffusion Documents Center (DDC) at Michigan State University does not claim to possess copies of all publications dealing with the diffusion of innovations, the strength of our compilation is indicated by the fact that in our continued searchings we now find very few studies that are over one year old. Our confidence is further bolostered when we receive few additional publications or suggestions for inclusion from the leading researchers to whom we send copies of an annual bibliography on diffusion.

The criteria for inclusion of a publication in the DDC (and also in the present paper) is that it deals with (1) an innovation, defined as an idea perceived as

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*A listing of these publications may be found in Everett M. Rogers, Bibliography on the Diffusion of Innovations, East Lansing, Michigan State University, Department of Communication, Diffusion of Innovations Research Report 4, 1966.

new by the individual to whom it is presented, (2) which is communicated via channels (3) to members of a social system, (4) over time.

Each publication included in the present paper was content analyzed for two types of variables:

1. The methodology of the study was coded in terms of the authors' research tradition, the locale of the study, the kind of innovation studied, the type of respondent, nature of the analysis, etc.

2. The content or findings of each study were coded in terms of the relationship between any two-variable relationships reported.

The content analysis phase of our study may be made clearer with an example. We would look at a study, decide that an innovation of some type was involved, and that it occurred in a less developed country. Then we would note that the author claimed that he was dealing with innovativeness (the relative time of adoption of a new idea). We might also note that the author obtained data relating innovativeness to education, and reported a positive relationship. In the present study, this would be noted as "innovativeness is positively related to years of education." Our content analysis schemata also noted those relationships which are conditional in nature. For example, we would be able to report a finding that "Innovativeness is positively related to education, except for very high income groups."*

METHODOLOGIES OF THE TWO TYPES OF STUDIES

In this section, we shall deal with a comparison of the methods used in the agricultural and family planning diffusion studies. First, however, we shall view some of the general trends in diffusion research studies of all kinds.

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*In spite of the flexibility that use of the conditional reporting scheme gives us, our content analysis suffers from our general inability to encode-decode more than two-variable relationships. This is not a serious shortcoming with present research findings, as relatively few of these more-than-two-variable findings have been reported.

Trends in Diffusion Research

Our content analyses of the 708 publications now in the DDC of which the 119 selected for this study are a fair subsample, suggests the following trends...

1. When these reports are classified by research tradition, defined as a series of related studies by scientists in a field in which each previous study affects those that follow, we see that rural sociology is the most prolific in almost every decade, both in the U.S. and elsewhere (Table 1). This dominance has continued in recent times, with rural sociology being represented by roughly five times as many publications as its nearest rival. If we combine all studies done by sociologists, regardless of their special area of interest (i.e., rural, medical, early, and general), there are 451 publications, or over half of the total.

2. A second trend illustrated in Table 1 is the move to non-U.S. settings for diffusion research. During the 1960's almost as many publications were completed outside of the United States as within. This trend reflects both the overseas migration of U.S. researchers as well as a growing number of non-U.S. scientists engaged in diffusion research. This trend toward internationalization of the field is heartening if we hope to find hypotheses about the diffusion of innovations that are generally true regardless of the geographic and cultural locale of the study.

3. A third trend in the field is the closer integration across traditions, which is documented by the average number of cross-citations (to other research traditions) over time (Table 2).

4. Also obvious in Table 2 is the general sharp increase in the number of diffusion studies per year. Perhaps the sharpest rate of increase in number of publication in the 1960's has occurred in the communication and in the medical sociology traditions, especially in non-U.S. settings (Table 1).

TABLE 1

Number of Empirical Diffusion Publications by Research Tradition, Completed in the U.S. and Outside the U.S., by Time Periods

	Diffusion Research Tradition	Number of Publications								
		U.S.				Non-U.S.				
		1940's or Before	1950's	1960's	Total	1940's or Before	1950's	1960's	Total	Grand Total
1.	Early Sociology	7	1	2	10	1	0	0	1	11
2.	Rural Sociology	12	115	98	225	0	18	83	101	326
3.	Medical Sociology	1	11	12	24	0	1	17	18	42
4.	General Sociology Unspecified	2	23	21	46	0	5	11	16	62
5.	Anthropology	2	10	6	18	1	21	11	33	51
6.	Agricultural Economics	0	8	4	12	0	5	10	15	27
7.	Consumer Behavior, Marketing, and Market Research	0	5	11	16	0	0	3	3	19
8.	Industrial Engineering	0	1	1	2	0	2	1	3	5
9.	Economics (General Economics and Economic History)	1	3	6	10	0	0	2	2	12
10.	Education	3	6	15	24	0	0	1	1	25
11.	Communication	0	1	18	19	0	0	20	20	39
12.	Journalism and Speech	1	2	3	6	0	0	3	3	9
13.	Geography	0	0	3	3	0	1	2	3	6
14.	Psychology	1	3	2	6	0	4	6	10	16
15.	All Other Traditions	4	10	8	22	0	10	26	36	58
	Totals	34	199	210	443	2	67	196	265	708

TABLE 2

Average Number of Cross-Citations per Empirical Diffusion Publication by Year

Year of Publication	Average Number of Cross-Citations Per Publication	Total Number of Publications Completed
Before 1940	.083	12
1940 - 1944	.643	14
1945 - 1949	.300	10
1950 - 1954	.430	79
1955 - 1959	.522	186
1960 - 1964	.964	334
1965 - 1966	1.370	73
Total	-----	708

A Specific Comparison of Agricultural and Family Planning Research

The research methodologies characteristic of the diffusion studies of agricultural and family planning innovations may be summarized as follows...

1. There has been a sharp increase in the number of publications in both fields, but the most pronounced rate of increase has been in the family planning area (Figure 1).* In comparison, while the studies of agricultural innovations in less developed countries are also increasing, there are more investigations of agricultural innovations in the more developed countries (especially the U.S.). Historically, the first major diffusion research was completed by rural sociologists in the U.S. on the spread of farm practices; these findings and methods served as an implicit model for later conduct of similar agricultural research in less developed countries, and, to a lesser extent, seem to have served as a model for family planning research.

2. The most popular locales for agricultural innovation studies are...

   -India, with 46 of the 95 publications

   -Mexico and Colombia, with 6 each

   -Costa Rica, with 5

   -Brazil, Nigeria, Pakistan, and the Philippines, with 4 each

   -Puerto Rico and South Korea, with 2 each

   -And nine other countries with one publication each.**

3. For family planning innovation studies, the locations are...

   -Taiwan, with 8 publications

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*Figure 1 shows, for example, that from 1960-65 the number of family planning reports increased from 2 to 24 (a 1000 percent increase), while the number of agricultural innovation publications went from 26 to 95 (a 265 percent increase).

**Plus three publications in more than one nation.

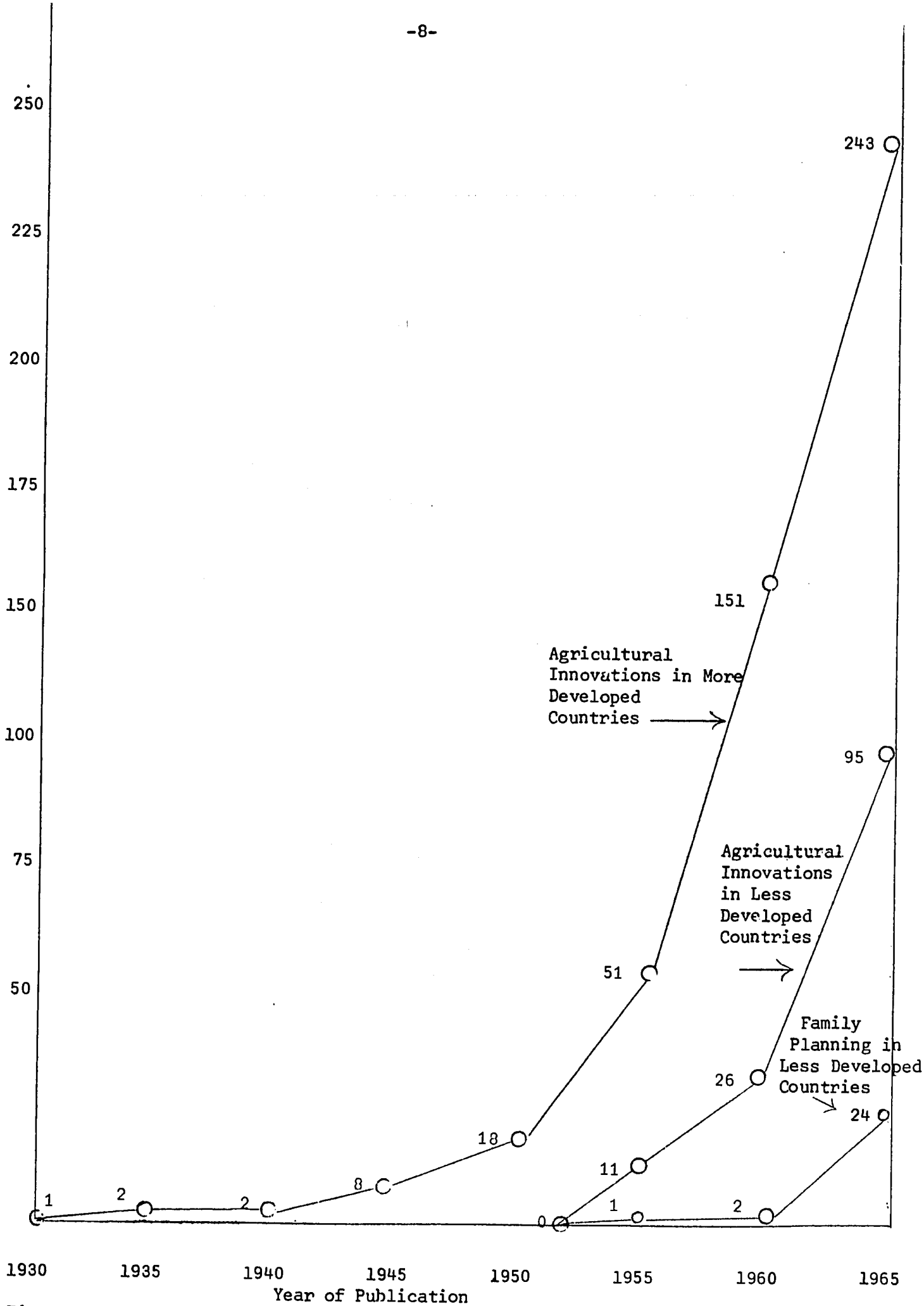

Figure 1. Cumulative Number of Empirical Diffusion Research Publications by Year of Publication

-India, with 6

-Pakistan, with 3

-Puerto Rico with 2

-And Chile, Turkey, Paraguay, and South Korea, with one each.*

4. The academic affiliation of the senior author of the family planning studies is mainly medical sociology (including public health), with lesser representation from general sociology and rural sociology. In comparison, the senior authors of the agricultural innovation studies are mainly in rural sociology (50), extension education (11), communication (9), and anthropology (9).**

5. The main sponsors of the family planning studies are the Population Council (13 of 24 reports), universities (8), and the host country government (2).*** In contrast, the agricultural investigations are mainly sponsored by host country governments (27), universities (17), foundations (8), DOS (3), and UNESCO (3).****

6. The most common methods of data-gathering utilized by both family planning (18 of 24 reports) and agricultural innovation investigators (71 of 95 publications) are personal interviews with structured interview schedules.

7. A common type of research design used in both types of studies has been recall of previous behavior (78 of 95 agricultural publications and 9 of 24 family planning reports).

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*Plus one publication in more than one nation.

**The other 16 agricultural publications are authored by agricultural economics (4), general sociology (2), journalism (2), psychology (2), marketing (1), general economics (1), and unknown (4).

***One sponsor is unknown

****Three publications are unsponsored; 17 sponsors are unknown; 2 each are US AID, Community Development Research Council (Philippines), PIIP, and commercial associations; and 6 are other.

The family planning studies (10 of them) have made much use of before-after designs with treatment and control groups; there have also been 3 panel studies over time. In contrast, only 4 of the 95 agricultural innovation publications report before-after or panel designs.

8. There is an obvious difference between the two fields in the type of respondent; 84 of the 95 agricultural publications report data from farmers* while 16 of 24 family planning reports deal with data from housewives.

9. Probability sampling is most common in both fields (38 of 95 agricultural studies and 11 of 24 in family planning), followed by enumeration of a complete census, such as all the households in a village (35 agricultural publications and 9 in family planning).

FINDINGS

A look at generalizations that emerge from our synthesis of the 708 studies presently in the Diffusion Documents Center shows that the studies we have selected for this report are very similar to the remaining studies in the DDC. Innovativeness is operationally defined as (1) the adoption or non-adoption of one new idea or a set of new ideas, or (2) the degree to which the unit of adoption is relatively earlier in adopting new ideas than other members of his social system.** Innovativeness is the dependent variable on almost 60 percent of the 4,197 cards which we have in the Center.***

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*The other 11 utilize household heads (3), villages (2), students (1) change agents (1), or unspecified (4).

**The first of these two types of innovativeness is a dichotomous variable, while the second is a continuous variable.

***For additional detail on the operation of the DDC and on the correlates of innovativeness in all 708 publications, see Everett M. Rogers and J. David Stanfield, "Adoption and Diffusion of New Products: Emerging Generalizations and Hypotheses," Paper presented at the Conference on the Application of Sciences to Marketing Management, Purdue University, July 12-15, 1966.

The most frequently studied dependent variable in both the agricultural and family planning studies reported here is innovativeness.* Table 4 summarizes the most commonly studied variables related to innovativeness.

In general, we can observe that both fields have placed considerable emphasis upon studying such social characteristics as age, formal education, literacy, farm or family size, and, especially in the case of agricultural innovations, on social status indicators. Each of these variables is strongly positively related to innovativeness except age and formal education.

Agricultural innovation publications have dealt with a number of attitudinal, social relationships, and communication variables which have largely been ignored in family planning diffusion studies (Table 4). Examples of these variables are knowledge level, attitude toward innovations, opinion leadership, group participation, cosmopoliteness (an orientation external to the individual's social system), mass media exposure, interpersonal communication, and change agency contact.

Historically, the early agricultural innovation diffusion studies in the U.S. concentrated on easy-to-measure, demographic variables like age, education, and social status. Perhaps family planning researchers are at a similar point today. They should take advantage of the experience gained in the agricultural studies with attitudinal, social relationship, and communication variables. Perhaps an additional reason for the heavy dependence upon studying demographic variables in family planning diffusion research is that many of the investigators in this field are specialists in demography with relatively little past experience in research on communication processes.

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*Fifty-nine of the 111 family planning contents cards (53 percent), and 337 of the 582 agricultural contents cards (58 percent) deal with innovativeness.

TABLE 4

Variables Related to Innovativeness

Independent Variables Related to Innovativness	Percentage of Publications Reporting a Positive Relationship with Innovativeness		Total Number of Publications Reporting a Relationship with Innovativeness	
	Agriculture	Family Planning	Agriculture	Family Planning
1. Favorable norms on change	100%	(100%)*	9	2
2. Age	11%**	50%**	27	6
3. Years of formal education	16%	45%	31	11
4. Literacy	78%	45%	9	5
5. Social Status	83%	(100%)*	47	1
6. Size (of farm or family)	75%	70%	28	10
7. Knowledgability	84%	(0)*	8	1
8. Attitude toward innovations	91%	(66%)*	11	3
9. Opinion leadership	100%	-	9	0
10. Group participation	100%	-	18	0
11. Cosmopoliteness	100%	-	13	0
12. Mass Media exposure	92%	(0)*	13	1
13. Interpersonal communication	100%	-	3	0
14. Contact with change agencies	100%	-	18	0

*The percentages in parentheses indicate a figure based on very small numbers.

**Only in the case of age were many negative relationships (rather than conditional or no relationships) reported. For age 22 percent of the agricultural findings and 50 percent of the family planning reports were negative.

SUMMARY

The following conclusions seem justified from the analyses we have made.

1. Research on the diffusion of agricultural innovations and family planning ideas show similarities in design, methodology, and data-collection procedures.

2. Research differences between the two traditions center around the type of respondent, the sponsoring agencies, and the academic affiliation of the researcher.

3. Both traditions have depended heavily on an analysis scheme which correlates innovativeness with other variables such as age, education, literacy, etc. Positive relationships are reported between innovativeness and favorable norms for change, age, education, social status, size of farm or family, and attitude toward the innovation (for both types of studies).

4. Our impression of family planning studies is that they suffer from the same lack of attention to social and social-pyschological variables (like attitudes, mass media exposure, etc.) that characterized early studies in agricultural diffusion.

CONCLUSIONS

Needed Research

Neither agricultural nor family planning diffusion research has paid sufficient attention to the consequences of adoption of innovations; however, family planning researchers have studied the relationship between adoption and changes in fertility rates more frequently than agricultural diffusion scholars have investigated the correlation of farm innovativeness and its consequences in agricultural production and efficiency. In both fields, a justification for diffusion research is that the understandings which result will lead directly to improvements in how to change human behavior, and indirectly to desired consequences of the adoption of these new ideas. We have many studies of the antecedent correlates of innovativeness, but few investigations of the relationship of innovativeness to its consequences.

Further, research is needed on perceptions or images of innovations, and how these perceptions are related to rate of adoption and innovativeness. For example, do Latin American men perceive the adoption of family planning methods as interferring with their machismo?

Lastly, we need analyses of the success-failure of change programs and change agents, in which the independent variables might be change agent strategies or aspects of the social structure of the audience. Thus, we would determine why a family planning clinic program succeeds in one Indian village and fails in a neighboring community.