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Linking Agricultural Research with Extension: Iranian Agricultural Researchers' Attitude Toward Collaboration with Extension Workers

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ABSTRACT

This study examines Iranian agricultural researchers' attitudes regarding collaboration with extension workers and the variables associated with the researchers' attitudes. Data were obtained using a questionnaire developed by Agricultural Research Centers of Charmahal and Bakhtiari, Isfahan, Safiabad and Khuzestan in 1998. The findings revealed that the researchers' attitudes towards collaboration with the extension workers were generally positive although actual collaboration between researchers and the extension workers was at a low level. Therefore, it seems that lack of an overall strong relationship of attitudes with current behavior as well as weak collaboration is related to other factors that need to be studied more, for example management of participation or internal factors in each sub-system of extension or research etc. identified that The following factors/characteristics of agricultural researchers were identified as having a positive correlation/association with their attitude towards collaborating with extension workers: higher research experience, greater interaction with extension workers, a lower scientific position or possessing a higher management position, greater participation in seminars and colloquiums related to extension, and the influence/thinking of colleagues and managers.

Keywords: Agricultural Research, Attitude, Extension.

INTRODUCTION

Studies on rural and agricultural development show not only the importance of factors related to extension, research and farmers in the development process but they also highlight the fact that these factors are interrelated and must work together for appropriate development to occur (Zamanipour, 1994; Mosher, 1987). Therefore, one can safely say that, one of the essential conditions for achieving agricultural and rural development is a linkage between extension, research and farmers.

As Röling (1988) noted, an agricultural information system consists of different subsystems, mainly research, extension and farmers. A systematic linkage should exist between them. Linkage between research and extension is particularly important for efficiency and effectiveness among other reasons. As Evanson (1997) noted, focus or investment in only one of these (extension or research) can have negative effects on the other. For instance, in the creation and finding of inputs and new procedures, if attention is not given to their adoption by producers, anticipated economic returns may not materialize (Najafi, 1992). It is therefore, imperative that we build and maintain an strong linkage between extension, research and farmers. As Mounder (1973) observed, research without appropriate linkages to

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extension may neither be aware of the difficulties faced by farmers (knowledge of which is crucial to formulating appropriate research) nor know how their findings are applied or the results of such application. Hence, extension's role as a major promoter of the agricultural development process necessitates it being rooted firmly in scientific and research resources (Shahbazi, 1996). Similarly, the role of researchers as the main generators of the technologies and information that extension dessiminates, requires working closely and collaboratively with extension workers who not only apply research findings but also have first-hand knowledge of what really needs to be researched.

Worldwide, lack of a linkage between agricultural research and extension institutions and different categories of farmers is one of the most important institutional constraints with which the Ministry of Agriculture of most of the so-called developing countries are faced with (Kaimowitz, 1990; Swanson, 1997). Researchers such as Kaimowitz (1990), Asopa and Beye (1997), Arnon (1981), Contado (1985), McLaren and Jons (1993) reported many cases of communication obstacles between research and extension. Examples include:

1. Poor generation of the necessary information and/or adoption and productivity.
2. Institutional and organizational estrictions.
3. Human and cultural barriers such as attitudes, education, social problems.
4. Management weakness and inappropriate views of managers.
5. Inappropriate reward system.
6. Lack of systems approach to program planning.
7. Inappropriate considerations.
8. Inappropriate allocation of resources (human and non-human).

In Iran, lack of communication between agricultural research and extension has also been one of the major constraints on the agricultural information system. In a bid to improve the linkage between research and extension, therefore, the Agricultural Research, Education and Extension Organization (AREEO) was established at central and provincial levels in 1992. The Agricultural Research Council at the provincial level was changed to the AREEO Council and a representative from extension participated in these Councils. In certain instances, committees, colloquiums and joint meetings between researchers and extension workers were organized.

Despite this, communication between researchers and extension workers remained weak according to the observations of the responsible authorities and a large number of researchers (Monitoring and Evaluation Office of AREEO, 1997; Karami and Najafi, 1996; Karami Dehkordi, 1999; Yaghubinejad, 1989). In order to address this problem, AREEO recommended that agricultural researchers collaborate with extension workers in problem identification groups, research-extension and regional projects, preparation of extension publications, and offering educational activities to extension workers (Karami Dehkordi, 1999).

A common strategy for creating a linkage between the research and extension system is *integration* which is the functional or structural linkage of research and extension organizations, institutions or departments. While integration of organizations and institutions is essential, it cannot by itself resolve all issues that affect linkage between research and extension (Arnon, 1981). In this regard, researchers such as Asopa and Beye (1997), Swanson (1997), Bagchee (1994), Arnon (1981), have proposed the following practical solutions in addition to the integration of organizations and institutions: A) Joint planning and management of research and extension; B) Joint units; C) Contact and coordinating personnel; D) Joint projects, such as meetings, visits, field days, preparation and production of joint materials and publications, training of extension staff by researchers and vice versa, on-farm research programs and Farming Systems Research and Extension.

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Ultimately, however, it is human beings who have to create the necessary communication with one another. This makes the desire to create and maintain a collaborative working relationship between researchers, extension workers and farmers imparative (Arnon, 1981). Hence, the human and cultural factor particularly the attitude of researchers and extension workers is considered one of the most interesting factors affecting the linkage between research and extension. More specifically, many people in Iran believe that agricultural researchers do not have a positive attitude towards collaboration with extension workers and consider this to be one of the most important obstacles to linkages between research and extension in Iran. Against this background, this study examines Iranian agricultural researchers' attitudes toward collaboration with extension workers.

The overall alum of this study was to measure researchers' attitudes regarding collaboration with extension workers and to investigate variables associated with these attitudes. Specific objectives were as follows.

1. Measure agricultural researchers' attitudes towards participation with extension workers.
2. Examine the relationship of selected variables to the researchers' attitudes towards collaboration.

MATERIALS AND METHODS

This study utilized a descriptive survey research methodology. The population included all researchers (180 people) at the Agricultural Research Centers of Charmahal and Bakhtiari, Isfahan, Safiabad and Khuzestan that had completed at least one research project and had two years work experience by at least early 1998. From this population, using a *Random Stratified Sampling* strategy, a sample of 125 respondents (approximately 70 percent of the population) was selected for an interview out of which 110 were successfully interviewed. Data were collected through individual structural interviews with respondents using a questionnaire (interview quid) developed by the investigators.

The questionnaire was developed based on a careful study of documents of AREEO, participation in various meetings of AREEO, and consideration of various views and approaches suggested by local experts. A panel of experts consisting of academic staff of Agricultural Extension and Education Department at Tarbiat Modares Univerity, Extension and Participation Organisation specialists, AREEO specialists, and the Deputy Director of AREEO for Extension were used to check and assure the content, construct and face validity of the questionnare. By using a specialized panel and participation experts, the number of questions was decreased and necessary adjustments made. The questionnaire was pilot-tested using researchers at the Kermanshah Agriculture Research Center and was checked for relaibility using Chronbach's Alpha. It reached 87 percent on Chronbach's Alpha Index.

The questionnaire elicited information about the attitudes of researchers towards collaboration with extension workers; Nine constructs using Likert-Type questions were used with 5 scales (strongly against, against, neutral, support, and strongly support). The nine constructs that relate to the proposed solutions for developing a necessary linkage between research and extension are as follows.

1. Integration of research and extension in institutional structures.
2. Participation of extension representatives in AREEO Councils at provincial level.
3. Participation of researchers and extentionists in problem diagnosis/ identification committees.
4. Training of extension workers by researchers.
5. Joint units of research and extension.
6. Use of subject matter specialists and liaison persons between research and extension centers.

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7. Collaboration in the preparation of "extension and technical publications" and other mass media programs such as radio and TV.
8. Joint and two-way meetings and visits.
9. On-farm research-extension projects.

Next, the questionnaire elicited information about several independent variables in order to examine if and how these variables related to the researchers' attitudes toward collaboration with extension workers. The independent variables examined included:

1. Working experience of respondents in the extension organization.
2. The distance of the work place of respondents from the nearest "agricultural service center" (at the county level).
3. Participation of respondents in any extension seminars.
4. Reading papers about extension and research linkage by respondents.
5. Formal education and training of respondents in extension.
6. Awareness of respondents about extension science and the profession.
7. Joint visits of respondents along with extension workers from farms.
8. Visits made by extension workers to respondents and of their activities in research stations and centers.
9. Teaching experience of respondents in the training of extension workers.
10. Experience of respondents in preparing extension publications.
11. Participation of respondents in AREEO council meetings.
12. Attendance of respondents in joint committees and meetings with extension workers.
13. Participation of respondents in on-farm research-extension projects.
14. Experience of respondents in using extension workers' views in preparing/designing on-farm research-extension projects.
15. Participation of respondents in the implementation of on-farm research-extension projects.
16. Proportion of conducted on-farm research projects to total research projects implemented by respondents
17. Information resources of respondents for identifying priorities and ideas for their research projects.
18. Collaboration of respondents with extension workers in all potential common activities.

Additionally, two variables (expectations of others and motivation to comply with these expectations) were used to measure the subjective norms of respondents. The questionnaire also elicited information about personal and demographic characteristics of the respondents such as age, educational level, fields of specialization, professional rank and place of employment. Data were analyzed by using descriptive and correlational statistics using SPSS software for Window and a personal computer.

RESULTS

Characteristics of Respondents

The distribution of respondents from the Research Centers at Isfahan, Khuzestan, Safiabad and Charmahal and Bakhtiari was 45.1 prcent, 21.6 percent, 17.6 percent and 15.7 percent respectively. With regard to their professional field, most of the researchers (47.1 percent) were in the general area of agronomy, seed and plant improvement/breeding. The rest of them were from plant pests and diseases diagnosis, entomology and pathology (21 percent), soil and water science (20.5 percent) machinery and irrigation engineering (9.8 percent) and agricultural economics (1 percent). The majority of the respondents (60.8 percent) possessed Msc. degrees, followed by BSc. (25.5 percent) and Msc. students (8.8 percent). About 78.4 percent of those respondents did not hold any managerial position. The average age of respondents was 37 years and average research experience was 9 years. On average, each one of the respondents who had completed the projects had five

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research projects as leaders and three projects as collaborators. In the past five years each one of the respondents had, on average, participated in six research projects. The scientific positions of respondents were Research Assistant (50 percent), Specialist (44 percent), Lecturer/Assistant Professor (2.9 percent), Associate Professor (1 percent) and Professor (1 percent). Joint projects which each one of the respondents had executed with their colleagues in other research departments was only one project.

Respondents' Attitudes

Table 1 presents information about the respondents' attitudes towards collaboration with extension workers. The findings revealed an overall positive attitude among the researchers towards collaboration with extension workers. The average rank was 3.75 on a scale of 5 where 1 is strongly against and 5 is strongly support. So it is mostly a positive attitude.

It was identified that among the various constructs, although all attitudes were positive, the degree of attitude (average score) toward specific activities varied as follows.

- Preparation of joint publications by researchers and extension workers (4.02).
- Participation of researchers and extension workers in problem-finding committees (3.99).
- Training of extension workers by researchers (3.93).
- Joint meetings and visits between researchers and extension workers (3.92).
- Joint organizational framework (3.82).
- Joint units between research and extension (3.81).
- Utilization of liaison persons between research and extension and subject matter specialists (3.80).
- Participation in research-extension projects (3.71).
- Attendance of extension representative at the AREEO council (3.70).

When factor analysis was used to reduce the constructs and examine the relationship among them, four distinct factors were observed (see Table 2). The first factor entitled *Joint programs between research and extension* included: participation in problem diagnosis/identification committees; preparation of joint publication programs; joint and two-way meetings and visits; and participation of researchers in research-extension projects.

The second factor was related to participation of researchers with farmers that has not described in this article (for more information see Karami-Dehkordi, 1999). The third factor is not explained by a specific title and includes: joint units with extension; liaison persons and subject matter specialists; and training of extension workers. However it seems more related to the management of linkage. The forth factor, entitled *Joint functions* includes the following: joint organiza-

Table1. Researchers' attitudes towards collaboration with extension workers.

Participation type	Number	Mean	SD	Rank
-Preparation of Joint publications program	101	4.02	0.52	1
-Participation of researchers and extension workers in problem-finding committees	101	3.99	0.62	2
-Training of extension workers	101	3.93	0.69	3
-Joint meetings and visits	102	3.92	0.55	4
-Joint (integrated) organizational framework	102	3.82	0.62	5
-Joint units between extension and research	102	3.81	0.62	6
-Liaison persons and SMSs	102	3.80	0.73	7
-On-farm research-extension projects	102	3.71	0.4	8
-Attendance of extension representative in provincial AREEO Council	102	3.70	1.14	9
-Total mean of attitude	101	3.85	0.38	

Scoring scale: 1= strongly against, 2= against, 3= neutral, 4= support, 5= strongly support.

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Table 2. Correlation matrix of factors with attitude constructs after rotation in factor analysis.

Attitude construct	Factor1	Factor2	Factor3	Factor4
-Participation of researchers and extension workers in problem diagnosis/identification committees	0.587	-0.039	-0.069	0.305
-Preparation of joint publications program	0.683	0.237	0.109	-0.113
-Joint meetings and visits	0.694	-0.037	0.140	0.118
-On-form research-extension projects	0.686	0.222	0.276	0.145
-Two- way visits between researchers and farmers	0.128	0.638	-0.139	0.361
-Attendance of farmers' representative in provincial AREEO Council	0.045	0.737	0.084	0.204
-Considering local/indigenous knowledge of farmers	0.116	-0.615	0.065	-0.330
-Participation of farmers in on-farm research-extension projects	0.229	0.684	0.027	0.007
-Joint units between extension and research	0.367	-0.001	0.639	-0.201
-Training of extension workers	0.146	0.138	0.504	0.265
-Liaison persons and SMSs	0.003	-0.083	0.808	0.251
-Joint (integrated) organizational framework	-.022	0.140	0.395	0.710
-Attendance of extension representative in AREEO council of province	0.248	0.054	0.094	0.685
-Eigenvalue of each factor	3.18400	1.70621	1.29124	1.02900
-Percentage of variance of each factor	24.5	13.1	9.9	7.9
-Cumulative percentage of variance	24.5	37.6	47.5	55.5

tional framework and attendance of an extension representative in the AREEO Council. The third factor was more highly scored, so it was preferred over the other factors.

Examination of subjective norms (expectations of others and respondents' motivation to comply with the expectations of others) revealed that both (1) the expectations of others (colleagues and managers) and the respondents' motivation to comply with these expectations are at average levels. The overall average for expectations and motivation were 1.94 and 2.04 respectively on a 3 point scale. Nevertheless, about 91 percent of the researchers stated that co-workers and their bosses have played a large or comparably large role in their research activities.

Awareness of Respondents Regarding Extension Science/profession.

About 91 percent of the respondents did not have service or work experience in extension. About 77 percent of the respondents were active in areas situated more than 10 Km away from the first Agricultural Services Centers. Over the last two years, 45 percent of the respondents had not studied any published papers in the field of extension, rural development and relevant issues. On average, each of the respondents had studied only one paper. Moreover, about 34 percent of the respondents had not participated in any seminars, colloquia, training courses regarding extension, rural development, research-extension relationships and other related subjects. Furthermore, the average number of such occasions in which each respondent had participated in was one. About 16 percent of the respondents had not covered any course regarding agricultural extension and rural sociology during their studies in their former universities and each respondent had completed 3 units/modules of course work on average. Based on merit points, the above indices ascertained that, in total, the level of awareness among respondents with respect to extension was low.

Collaboration of Respondents with Extension Workers

About one half of respondents indicated that they had participated in activities per-

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taining to research-extension programs/activities, agricultural research committees, education and extension in neighboring provinces and joint workshops between research and extension (in the past 5 years). More than one half of the respondents had participated in visits to farmer's fields (one year ago), AREEO Research Council meetings (past 5 years) and visits by extension workers to the Research Stations (one year ago). Less than half of the respondents had also participated in activities related to regional projects, preparation of extension of publications (5 years ago) and training extension workers (one year ago). Investigating the degree of linkage and cooperation of each one of the activities shows that respondents had participated to a very small extent in on-farm projects. The views of extension workers in preparing/designing and implementing on-farm research-extension projects had been taken into consideration to a small extent. The respondents also expressed the view that extension workers had visited the research centers very infrequently, as had the researchers visited farmer's fields very infrequently. There were few opportunities for the training of extension workers by respondents; joint preparation of technical and extension publications; joint committees and meetings with extension workers; and participation in AREEO meetings. The respondents reported that extension workers had a very small influence on the respondents' research ideas and priorities. In total, the degree of cooperation and collaboration (experience) of respondents with extension workers was at a low level (average 2.14 percent).

Degree of Awareness in Respect to New Decisions of AREEO

The respondents were to a certain degree aware of the new decisions of AREEO pertaining to the allocation of 25 percent of the time of researchers in extension.

Job Satisfaction

The job satisfaction of respondents was lower than average (2.7). The minimum level of satisfaction was related to the monthly salary, but satisfaction from colleagues was comparatively positive. Findings indicated that there was a positive significant correlation between age, management position and evaluation grades of respondents with job satisfaction.

The Effect of Ministry of Agriculture Policies and AREEO

Respondents declared that the policies of the Ministry of Agriculture and AREEO had a relatively high influence on their research ideas and priorities. However, respondents usually reached their research priorities by means of journal articles and magazines, past experiences and other research work.

Variables Associated with Attitude

Correlation analysis conducted to examine the relationship of selected variables and respondents' attitudes towards participation with extension workers is presented in Table 3. The findings showed that there was a positive correlation between respondents' attitude towards participation with extension workers and variables of: research records/experience (r =0.19), cooperation of researchers with extension workers in joint activities (r =0.22), the number of research projects executed (r =0.18), scientific position (r =0.21), number of joint research projects executed with other researchers (r =0.19), effect of policies in the determination of research priorities (r=0.20), subjective norms (r =0.37), management positions (r =0.13) and age of researcher (r =0.19).

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Table 3. Relationship between selected variables and researchers' attitude towards collaboration.

Variable	number	Correlation coefficient	sig.
-Working experience in extension organization [a]	98	-0.09	0.188
-The distance of work place from the first agricultural service centers [b]	101	-0.07	0.178
-Participation in any seminars about extension [b]	95	0.14	0.042
-Studying extension and research linkage papers [b]	98	0.09	0.187
-Formal education and training regarding extension [b]	99	0.03	0.344
-Awareness of extension science and profession [a]	91	0.01	0.456
-Joint visits along with extension workers of farmers' farms [b]	93	0.06	0.277
-Visits made by extension workers in research stations and centers [a]	93	0.10	0.179
-Training experience given to extension workers [a]	96	0.11	0.132
-Preparing extension publications [a]	101	0.02	0.492
-Participation in AREEO Council meetings [b]	100	0.02	0.383
-Joint meetings with extension workers [b]	98	0.10	0.099
-Participation in extension-research projects (5 years) [a]	99	0.16	0.059
-Taking views of extension workers in preparing / designing on-farm research-extension projects [b]	101	0.22	0.002**
-Participation in implementing of on-farm extension-research projects [b]	100	0.20	0.005**
-Proportion of on-farm research to total projects [a]	95	0.10	0.162
-Identifying research priorities from extension workers [b]	101	0.04	0.311
-Collaboration with extension workers in all potential common activities [a]	59	0.22	0.049*

[a] Pearson correlation coefficient (r)
[b] Kendall's Tau B coefficient (tb)
*** $P \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$

It is necessary to explain that between the variables of respondents' awareness of extension science/profession, the following variable had a significant but weak relationship with respondents' attitude: participation of respondents in seminars, conferences and in-service training regarding the subjects of extension, rural development and linkage between research and extension (tb=0.141).

Among the variables of collaboration of researchers with extension workers, two variables had a statistically significant relationship with respondents' attitude: using extension workers' views in preparing/designing on-farm research-extension projects and participation of respondents in implementation of these projects (tb = 0.22 and tb =0.197). All the afore-mentioned variables had a significant relationship with the third factor (similar units, liaison persons and training to extension workers). There was a positive correlation between the first factor with the variables of "collaboration of researcher with extension"; the "scientific position"; "effect of policies in determining research priorities"; and "subjective Norms". The forth factor (joint organizational framework) had also significant relationship with three variables, namely, "number of joint research projects", "subjective norms" and "the age of respondents.

Further examination of the data using stepwise multiple regression analysis, revealed that variables such as subjective norms, scientific position of respondents (negative correlation) and number of joint research projects, accounted for about 22 percent of the variance related to the attitude of respondents toward participation with extension workers is explained and, in total, had a higher correlation (R =0.586) with respondents' attitudes.

CONCLUSION

Findings have shown that the overall attitude of researchers towards collaboration

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with extension workers is positive. It also highlighted factors associated with the researchers' attitude towards collaboration with extension workers.

On the basis of factorial analysis conducted, the majority of attitudes were related to: 1) training of extension workers, existence of liaison staff between research and extension and 2) joint projects between research and extension workers (consisting of joint publication programs, participation in problem finding committees, meetings and joint visits and participation in research-extension projects). Therefore, it can be deduced that, contrary to popular opinion among non-researchers in Iran, the attitude of researchers regarding collaboration with extension is not necessarily an impediment to the creation and maintenance of appropriate communication and linkage between research and extension.

Despite the positive attitude of researchers, the degree of cooperation and collaboration of researchers with extension workers was found to be at a very low level. Therefore, researchers have little experience in this field. In addition, it seems that lack of an overall strong relationship between attitudes and current behavior as well as weak collaboration is related to other factors that need to be studied further. Maximum experience by researchers of participatory activities with extension workers is related to participation in meetings of AREEO Councils and in on-farm research-extension projects. Moreover, findings have shown that the degree of acquaintance of researchers with extension is at a low level. The maximum acquaintance point of researchers about the extension science/profession has been based on the index of total number of units of course work passed about extension and rural sociology in universities or in-service training. Therefore, it could be concluded that the degree of experience of researchers of and their familiarity with extension workers low and is exposed to a less extent to intentional and non-intentional training in this connection.

Findings have shown that agricultural researchers do not regularly acquire ideas and priorities about their research problems/topics from extension workers. Major sources of information regarding their research priorities was to a great extent obtained from journals, magazines and other research and experiences. The policy of AREEO also played an important role in setting research priorities. Because the research projects are ultimately approved at the mother/national institutes on the basis of national research priorities, researchers do not often have enough power to involve local interests.

Existence of positive correlations between participation in in-service training, seminars and Conventions pertaining to extension and development with attitudes of researchers shows there has been a consideration to the linkage between extension and research in this situation. Lack of a correlation between extension and rural sociology courses passed in universities and study of extension articles regarding the relationship between research and extension with the attitude of researchers, indicates the weak nature of the relationship between research and extension regarding the subject of the study.

The existence of a significant relationship between the collaboration and cooperation of researchers with extension workers and the attitude of researchers, indicates that researchers possess more positive attitudes for cooperation. This finding confirms the theory of Festinger and Kelly (1951) and Fishbein and Ajzen (1975 and 1980) regarding the relationship of experience with attitude. The researchers, who participated to a greater extent in the execution of on-farm research-extension projects and in the preparation of these projects from the point of view of extension workers had more positive attitudes. It is necessary to explain that many of the researchers have either not participated in the execution of research-extension projects or have only had partial participation, in such a way that the only project was prepared and its execution was placed at the disposal of extension, the reasons for which

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could be counted. It appears that the reason for the lack of relationship of tendency and other additional collaborative activities could be attributed to low intensity of cooperation.

Existence of a relationship between attitude and subjective Norms shows that the concept and behavior of researchers is subject to the role of thoughts of colleagues and their managers. These findings confirmed the theories of Fishbein and Ajzen (1975).

More experienced researchers showed a more positive attitude for a participatory approach. Researchers had a more positive attitude towards training to extension workers, liaison persons and joint units as participation strategies. More experienced researchers also showed a more positive attitude under the joint organization framework. Also, researchers holding higher managerial positions had a more positive attitude towards participation. These observations are consistent with one of the important conditions identified by researchers during the interviews as essential for enhanced collaboration between researchers and extension workers. They refered to the high level of competency of the agricultural research-extension systems, particularly human resources of these systems.

The findings showed that researchers who were more influenced by the policies of Ministry of Agriculture and AREEO had a more positive attitude to wards participation. These findings correlated with the statements of chair holders and general directors, which were presented in 1997 and 1998 regarding the relationship of research with extension. The majority of their statements dealt with functional linkage: joint programs, joint units, liaison personnel and training of extension workers.

Based on the findings and conclusions made, the following recommendations can be stated. First, we must promote the importance of collaboration through training. Specific strategies for accomplishing this objective should include the following.

1. Organizing seminars, workshops and in-service training based on participatory models for researchers and extension workers. With due attention to the fact that the behavior and concepts of researchers are influenced by their co-workers and managers. It is better that all persons should participate in those meetings.

2. Acquainting future agricultural researchers and experts, as much as possible, with extension, rural society and participatory models in the contents of lessons such as agricultural education and extension and rural sociology for all students in the agricultural field during the course of their studies. At present, many agricultural fields do not have these subjects in their educational programs.

Second, we need to pay due attention to those participatory activities, which the researchers identified as high priority such as: training of extension staff, joint publication programs, and utilization of liaison persons and experts specializing in extension, participation in problem diagnosis committees. Third, AREEO, in addition to paying attention to national/ mother research institutes as approving authorities for research projects, should proceed in the direction of decentralization in a manner that enables researchers to determine their research poriri-ties with due attention paid to the actual needs identified by local agricultural communities and extension workers. Fourth, in order to strengthen the attitude of researchers, it is strategically important to pay attention to and work with persons who have a higher scientific position.

Finally, we must work diligently and relentlessly to remove or mitigate the many obstacles to a better linkage between research and extension. To deal with such impediments effectively, we must first understand them better by future detailed studies. It appears that execution of the studies mentioned below would help enlighten many issues.

1. Examination of the attitude of extension workers towards participation with agricultural researchers.

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2. Quantitative and qualitative evaluation of present levels of cooperation between researchers and extension workers.

Analysis of sub-systems of research and extension and examining their external and internal efficiency. In this regard the important questions concern organizational structure, management and monitoring, quantitative and qualitative appraisal of personnel, budget, directions, incentives and evaluation regulations etc.

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ارتباط تحقیقات کشاورزی با ترویج: نگرش محققان کشاورزی ایران نسبت به مشارکت با کارکنان ترویج

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چکیده

این مطالعه نگرش محققان کشاورزی ایران درباره مشارکت با کارکنان ترویج و متغیرهای مرتبط با نگرش آنان را بررسی می‌کند. داده‌ها با استفاده از پرسشنامه، در مراکز تحقیقات کشاورزی چهارمحال و بختیاری، اصفهان، صفی آباد و خوزستان در سال 1998 بدست آمده‌اند. یافته‌های حاصل نشان می دهد که نگرش محققان نسبت به مشارکت با کارکنان ترویج در مجموع مثبت بوده، اگرچه مشارکت واقعی محققان با کارکنان ترویج در سطح پایینی می باشد. بنابراین، به نظر می رسد که به طور کلی، عدم ارتباط قوی نگرشها با رفتار کنونی ایشان و مشارکت ضعیف آنان به عوامل دیگری مانند مدیریت مشارکت یا عوامل داخلی در هر زیرسیستم ترویج یا تحقیق و غیره، مربوط می شود که نیاز به مطالعه بیشتری دارند. در این میان مشخص شده است که عوامل زیر(ویژگی‌های محققان کشاورزی) همبستگی (رابطه) مثبتی با نگرش آنها نسبت به مشارکت با کارکنان ترویج دارد: تجربه تحقیقاتی بیشتر، ارتباط و تعامل بیشتر با کارکنان ترویج، موقعیت علمی پایینتر، دارابودن موقعیت مدیریتی بالاتر، مشارکت بیشتر در سمینارها و گردهمایی های مرتبط با ترویج و تاثیر (تفکر) همکاران و مدیران.

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