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Some Personal and Socio-Economic Factors Associated with the Adoption of Recommended Agricultural Practices in Rural Egypt

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ABSTRACT

This study attempts to show the relationship of the adoption of five extension recommended farm practices with six selected personal and socio-economic characteristics pertaining to the farm operators in an Egyptian rural community. Among the farm operators who grew rice in Sylla village 266 farmers were randomly selected for this study. A practice adoption score was constructed as the dependent variable. The six independent variables used in this study were: age, farm work experience, family size, educational level, farm size, and level of living. Three control variables were introduced in the analysis of the relationship between the variables. The Kendall's Tau was used to measure the degree of association. For the most part, the selected personal and socio-economic variables were associated with practice adoption. However, age of farm operators was not significantly related to practice adoption.

INTRODUCTION

Accounting for the dynamics of social and technological change and the diffusion of innovations is one of the generic problems of social sciences that have received systematic attention (11). Development of new knowledge, ideas, practices or innovations is not enough; they must be diffused and applied in actual situations.

In agriculture, the study of diffusion has helped to understand the time lag between scientific discovery and actual use of new ideas and practices in farming. A number of research studies of diffusion and adoption of recommended agricultural practices have been conducted predominantly in the United States, primarily by rural sociologists (19). However, very few farm practices adoption studies have been conducted in the developing countries including Egypt.

In Egypt, one of the most important national and agricultural policies and programs has been the rural development program through agricultural extension services. Therefore, scientific understanding of the diffusion and adoption process of recommended

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agricultural practices in rural communities is needed to plan and execute successful rural development programs in Egypt.

Probably the most important approach to scientific understanding of agricultural practice adoption has been to determine the association of various factors with the adoption behaviour of farmers. Those research findings have been utilized with practical implications for action programs in the promotion of improvements in agriculture. They have also helped to contribute to the theory of technological and social change in general.

OBJECTIVES AND METHODOLOGY

The problem

It has been generally established that introduction and adoption of new agricultural practices is a matter of technological change affected by many factors. These factors are personal, familial, cultural, social, and economical in nature. Many researchers have summarized in various ways research findings on factors associated with agricultural practice adoption (2,4,20,27), although distinction of these factors is not easy and clear-cut (13,20).

Some farmers adopt new farm ideas and practices more quickly than others, and this relates in part to the individual farmer himself and to his socio-economic status. Individual or personal factors relating to adoption of agricultural practices may include age, farm work experience, family size and others. Socio-economic factors may include education, size of farm, tenure status, farm income and level of living.

It has been generalized that older farmers seem to be somewhat less inclined to adopt new farm practices than younger ones. While there does not seem to be unanimous support for this generalization from the available research studies, some found no significant relationship between age and practice adoption, and still others found that age was associated with innovativeness (13,20). Hess and Miller (8); Marsh and Coleman (15); Wilkening *et al.* (28) found that there was no significant relationship between age and adoption of improved farm practices. Rahudkar (18) found that age was negatively and significantly related to the adoption of improved farm practices, while Tajima (26) reported that there was a positive and significant correlation.

There seems to be few research studies available regarding the relationship between farm work experience or years of farming and adoption of improved practices. Marsh and Coleman (15) reported that farm operators working years in farming was not significantly associated with the adoption of the majority of the farm practices studied. Hoffer and Stagland (9) and Sheppard (21) found that years in farming was negatively and significantly related to practice adoption.

Not many research studies seem to be available relevant to the relationship between family size and practice adoption. However, Lionberger (13) generalized from many research studies that family members often serve as consultants in decisions to adopt new farm and home practices. Abell (1) in four rural areas of New York found that families with children tend to have higher adoption scores on homemaking practices than those without. Benvenuti (3) found in the Netherlands that family size was positively and significantly associated with the adoption of new practices.

Many researchers including Lionberger (13); Rahim (17); Singh (23) found that the educational level of farmers has been positively associated with the adoption of recommended practices. However, Wilkening *et al.* (28) and Maffei (14) found that

farmers' educational level was not significantly correlated with the adoption of improved practices. They pointed out the differences in educational level were not great in the area studied, and the differences which existed apparently did not materially affect the use of information sources or the motivation to adopt improved practices.

Size of farm has been nearly always positively related to the adoption of new farm practices. Para-Sandoval (16); Lindstrom (12); Rogers (20) found that early adopters owned large farms than late adopters.

A positive correlation generally has been found between adoption of recommended farm practices and level of living of farm operators. Copp (5); Dosgupta (6); Sizer and Porter (24); Steele (25) found that level of living was positively and significantly associated with practice adoption. However, Wilkening *et al.* (28) found in an Australian study that level of living was associated with the adoption of only one of the eleven practices to a significant degree.

Objectives

Many of the factors found to be related to the adoption of farm innovations or practices may not themselves be subject to control or manipulation. These can be taken into account when planning action programs for rural development. Other such factors may be subject to direct influence, thereby facilitating an action program aimed at promoting agricultural farm practices.

In this study of factors associated with the adoption of recommended agricultural practices in rural Egypt, only selected personal and socio-economic variables were considered. They were: age, farm work experience, family size, educational level, farm size, and level of living. Specifically, the objectives of this study were to determine some personal and socio-economic characteristics of farmers in rural Egypt, and to test the association between these variables and adoption of recommended agricultural practices.

Scope and method

Data for this study were obtained from interview schedules collected in Sylla village in Fayoum Province. The interview schedule consisted of five major sections. They were: (1) background information on farm operators and farm operation, (2) adoption of agricultural practices, (3) sources of information on farming, (4) farm operators' social participation, and (5) farm operators' value orientation.

Among the many farm operators in Sylla village, only those farmers who grew rice the year before the collection of data were considered. A random sample of 266 farm operators were finally selected for interviewing.

Five extension recommended agricultural practices were selected in this study in order to derive a measure of farm operators' innovativeness. They were: (1) use of recommended seed variety of rice (Nahda), (2) application of recommended ammonuim sulfate, (3) transplanting after six weeks, (4) chemical control of rice-blast, and (5) use of flooding irrigation.

An adoption score was constructed based on information on adoption or non-adoption of these extension practices. This measure of practice adoption was used as the dependent variable. Six personal and socio-economic characteristics of farm operators were used in this study as independent variables.

The relationship between variables was explored by cross-tabulating the dependent

with the independent variables using contingency tables. Three control variables: age, educational level, and farm size were introduced in the analysis of the relationship between variables. The Kendall's Tau correlation (22) was used in the analysis of the relationship to indicate the degree of association. The significance test at the .05 level was used as a criterion for judgment of the reliability of the association.

The dependent variable

A practice adoption score was obtained for each of the 266 farm operators as a measure of adoption of the five recommended agricultural practices. Highest percentage (92%) of farmers adopted the practice of using recommended seed variety of rice (Nahda), while chemical control of riceblast showed the lowest percentage of adoption (16%).

Corrected item-total biserial correlations ($_ib_{ir}$) (7) were calculated in order to determine the reliability of each practice as part of the adoption score. It was found that all of the corrected item-total biserial correlations were statistically significant at the .05 or .01 level (Table 1).

Table 1 Number and percentage of farm operators and corrected biserial correlations for five recommended agricultural practices

Practice	Farm operators Number (N)	Per cent (%)	Biserial correlations $_ib_{ir}$	P
Use of recommended seed variety of rice (Nahda)	246	92	.25	.01
Application of ammonium sulfate	181	68	.28	.01
Transplanting after six weeks	131	49	.27	.01
Use of flooding irrigation	117	44	.30	.01
Chemical control of rice-plast	43	16	.12	.05

The total score on practice adoption of each of the farm operators range from zero to five points. An inspection of the data shows that the adoption score skewed to the right (Table 2). The farm operators were grouped into two categories according to their

Table 2 Number and percentage of farm operators according to practice adoption score

Practice adoption score	Number (N)	Per cent (%)
0	6	2
1	20	8
2	46	17
3	54	20
4	64	24
5	76	29
	Total 266	100

practice adoption score. One hundred and twenty-six farm operators (47%) had a low level of practice adoption (0–3 points), while one hundred and forty farm operators (53%) had a high level of practice adoption (4–5 points).

Personal variables

The three personal variables selected in the present study were: (1) age, (2) farm work experience, and (3) family size.

Age: the 266 farm operators ranged in age from 18 to 66 years old. The mean age was approximately 44 years. The modal age was 47 years, and the median age was 42.5 years. The farm operators were grouped into three categories according to their age: (1) 39 years or less, (2) 40 to 49 years, and (3) 50 years and over (Table 3).

Table 3 Number and percentage of farm operators according to personal variables

Variable	Number (N)	Per cent (%)
Age		
39 years or less	95	35
40 to 49 years	84	32
50 years or more	87	33
Total	266	100
Farm work experience		
19 years or less	123	46
20 years or more	143	54
Total	266	100
Family size		
6 persons or less	119	54
7 persons	40	15
8 persons or more	107	40
Total	266	100

Farm work experience: farm operators' working years in farming was obtained in terms of years engaged in farming as a major undertaking in life. The 266 farm operators range in farm work experience from one to fifty-one years. The mean farm work experience was approximately 22 years, the modal was 30 years, and the median was 20 years. The farm operators were grouped into two categories according to number of years in farming: (1) 19 years of less, and (2) 20 years of more (Table 3).

Family size: the farm operators range in family size from two to 18 persons. The mean family size was approximately seven persons. The modal family size was eight persons, and the median family size was seven persons. The farm operators were grouped into three categories according to their family size: (1) six persons or less, (2) seven persons, and (3) eight persons or more (Table 3).

Socio-economic variables

The three socio-economic variables selected for the present study were: (1) education, (2) farm size, and (3) level of living.

Education: educational attainment was obtained in terms of years in school completed. The farm operators range in educational attainment from zero to 13 years. The mean education was approximately 4.3 years, and the modal education was six years. The farm operators were grouped into four categories according to years in school completed: (1) none, (2) one to five years, (3) six years, and (4) seven years and more (Table 4).

Table 4 Number and percentage of farm operators according to socio-economic variables

Variable	Number (N)	Per cent (%)
Education		
None	92	35
1 to 5 years	34	13
6 years	96	36
7 years or more	44	16
Total	266	100
Farm size		
Less than 2 feddans	56	21
2 to less than 5 feddans	82	31
5 to less than 10 feddans	100	38
10 feddans or more	28	10
Total	266	100
Level of living		
Low	96	36
Medium	74	28
High	96	36
Total	266	100

Farm size: the mean farm size under cultivation of the 266 farm operators was approximately 2.75 feddans (one feddan = 4200 m^2). Based on the farm size under cultivation farm operators were grouped into four categories: (1) less than two feddans, (2) two to less than five feddans, (3) five to less than 10 feddans, and (4) ten feddans and more (Table 4).

Level of living: farm operators' level of living was obtained in terms of a socio-economic status scale. Items included in the final scale was 13 in all, consisting primarily of household goods. The scale reliability in terms of the Hoyt reliability (10) was .85. The constructed socio-economic status scale range in score from zero to 13 points. The farm operators were grouped into three categories according to their socio-economic status scale score: (1) low (0–5 points), (2) medium (6–9 points), and (3) high (10–13 points) (Table 4).

THE FINDINGS

In analyzing the relationship between adoption of the recommended agricultural practices and the selected personal and socio-economic variables specific hypotheses are set up initially to explore the relationship between the variables, then it is determined whether this relationship is affected by any of the three control variables: age, educational level, and farm size.

Hypothesis I. Age of the farm operators is negatively associated with practice adoption

Data in Table 5 indicate that there is no significant relationship between practice adoption and age of the farm operators. When controlling for education and farm size respectively, there is a positive relationship between age and practice adoption for the less educated farm operators (Tau = .18). However, farm size does not affect the relationship (Table 6).

Table 5 Percentage distribution of farm operators according to level of practice adoption and selected personal and socio-economic variables

Personal and socio-economic variables	Number (N)	Level of practice adoption Low	High	Per cent (%)	Tau	P
Age	—	—	—	—	⁻.03	N.S.
50 years and more	87	41	59	100		
40 to 49 years	84	55	45	100		
39 years or less	95	38	62	100		
Farm work experience	—	—	—	—	⁻.10	.01
20 years and more	143	48	52	100		
19 years or less	123	41	59	100		
Family size	—	—	—	—	.15	.001
8 persons and more	107	35	65	100		
7 persons	40	50	50	100		
6 persons or less	119	51	49	100		
Educational level	—	—	—	—	.20	.001
7 years or more	44	23	77	100		
6 years	96	40	60	100		
1 to 5 years	34	62	38	100		
None	92	53	47	100		
Farm size	—	—	—	—	.23	.001
10 feddans or more	28	18	82	100		
9.99 to 5 feddans	100	38	62	100		
4.99 to 2 feddans	82	50	50	100		
1.99 feddans or less	56	61	39	100		
Level of living	—	—	—	—	.24	.001
High	96	30	70	100		
Medium	74	43	57	100		
Low	96	59	41	100		

Hypothesis II. Farm work experience of the farm operators is negatively associated with practice adoption

Data in Table 5 indicate that there is a negative and significant, but low relationship between farm work experience and practice adoption (Tau = ⁻.10). When age, educa-

Table 6 Relationship between selected personal and socio-economic variables and level of practice adoption controlling for age, education, and farm size

Personal and socio-economic variables	Age (Years)			
	39 or less		40 and more	
	Tau	*P*	*Tau*	*P*
Farm work experience	⁻.19	.01	.06	N.S.
Family size	.25	.001	.11	.05
Educational level	.30	.001	.11	.05
Farm size	.19	.001	.25	.001
Level of living	.24	.001	.23	.001
Personal and socio-economic variables	**Education (Years)**			
	5 or less		6 or more	
	Tau	*P*	*Tau*	*P*
Age	.18	.01	⁻.04	N.S.
Farm work experience	.10	.05	⁻.01	N.S.
Family size	.00	N.S.	.25	.001
Farm size	.22	.001	.18	.01
Level of living	.16	.01	.18	.01
Personal and socio-economic variables	**Farm size (Feddans)**			
	less than 5		5 and more	
	Tau	*P*	*Tau*	*P*
Age	.00	N.S.	−.07	N.S.
Farm work experience	.03	N.S.	−.20	.001
Family size	.01	N.S.	.16	.01
Educational level	.14	.01	.19	.001
Level of living	.08	N.S.	.28	.001

tion, and farm size are controlled respectively, the relationship increases for younger farm operators (Tau = ⁻.19) and for those who operate large farms (Tau = ⁻.20). It is positive and significant in the case of less educated farm operators (Tau = .10). The relationship disappears for older farm operators, who are less educated, and who operate smaller farms (Table 6).

Hypothesis III. Family size of farm operators is positively associated with practice adoption

Data in Table 5 indicate that there is a positive and significant relationship between practice adoption and family size, although it is low (Tau = .15). When age, education, and farm size are controlled respectively, the positive and significant relationship increases for those who are younger (Tau = .25) and who are more educated farm operators (Tau = .25), but it does not change for those who operate large farms. The relationship decreased for the older farm operators (Tau = .11), while it disappears for those who are less educated and who operate smaller farms (Table 6).

Hypothesis IV. Formal educational level of farm operators is positively associated with practice adoption

Data in Table 5 indicate the existence of a positive and significant relationship between practice adoption and educational level. The relationship is moderately low (Tau = .20). When age is controlled the relationship increases for the younger farm operators (Tau = .30), while it decreases for the older farm operators (Tau = .11). This implies that education tends to enable younger farm operators to adopt more farm practices. The relationship remains significant when farm size is controlled, although it decreases somewhat (Tau = .14) in the case of smaller farm operators.

Hypothesis V. Farm size is positively associated with practice adoption

The findings in Table 5 show a positive and significant relationship between practice adoption and farm size (Tau = .23). When age and education are controlled respectively, the relationship is not affected (Table 6).

Hypothesis VI. Level of living of farm operators is positively associated with practice adoption

Data in Table 5 indicate the existence of a positive and significant relationship between practice adoption and level of living. The relationship is moderately low (Tau = .24). When age is controlled the relationship is not affected. The relationship decreases for both categories of farm operators when educational level is controlled (Table 6). On the contrary, when farm size is controlled the significant relationship between practice adoption and level of living disappears for farm operators with smaller farms, and increases for larger farm operators (Tau = .28).

SUMMARY AND CONCLUSIONS

The present study has revealed that there is no significant relationship between age and adoption of recommended agricultural practices. Therefore, the hypothesis that age of farm operators is negatively associated with practice adoption is not supported. On the contrary, the relationship between age and practice adoption is positive for those farm operators who have less education.

There is a negative and significant association between farm work experience and practice adoption, although the association is low. The negative association increases for farm operators who are younger and who have larger farms. The relationship is positive for those farm operators with less education, although it is a low one.

The hypothesis that family size is positively associated with practice adoption is supported. The positive and significant relationship increases for farm operators who are younger and who are more educated, and it disappears in the case of those who are less educated and who operate smaller farms.

There is a positive and significant association between formal education and practice adoption. The relationship is affected somewhat by age and farm size. For the younger farm operators the relationship increases but it decreases for the smaller farm operators.

The hypothesis that level of living is positively associated with practice adoption is supported. When education is controlled, the relationship is decreased. The relationship increases for larger farm operators, while it disappears in the case of smaller farm operators.

It is found that farm size is positively and significantly associated with practice adoption. None of the control variables affects the relationship.

The following conclusions are based on the findings of this study:

1. For the most part, the selected personal variables are associated with practice adoption. However, age of the farm operators in the selected village is not significantly related to practice adoption, although many other research studies in other countries show that there is a negative relationship between the two variables.
2. Since farm work experience in terms of working years in farming is significantly associated with practice adoption in a negative direction, it may be concluded that years of experience in farming is more closely associated with innovativeness than is age. However, the use of different categorization of farm operators' age might have changed its association with practice adoption.
3. Socio-economic variables considered in this study are all positively associated with practice adoption. The three measures of socio-economic status maintain a consistent and moderately low relationship with practice adoption.

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العلاقة بين بعض العوامل الشخصية والاقتصادية الاجتماعية وبين تبني الممارسات الزراعية الموصى باستخدامها في الريف المصرى

محمـــد جمال الدين راشـــد

المستخلص

تتأثر درجة تبنى الزراع للتوصيات الارشادية المتعلقة بالممارسات الزراعية بعدد كبير من العوامل التى تتباين في طبيعتها ودرجة تأثرها . وقد استهدف هذا البحث دراسة للعلاقة بين خمس توصيات إرشادية (كمتغيرات تابعة) وبين ست سمات شخصية واقتصادية واجتماعية للزراع في الريف المصري (كمتغيرات مستقلة) . وقد أجريت الدراسة على عينة حجمها ٢٦٦ فرداً أختيرت من بين زراع الارز في قرية سيلا بمحافظة الفيوم .

وقد مثل العمر ، والخبرة في العمل الزراعى ، وحجم العائلة السمات الشخصية ومثل الحالة التعليمية ، وحجم الحيازة ، ومستوي المعيشة السمات الاقتصادية الاجتماعية . كما استخدم مقياس كمي لتمثيل درجة التبنى للتوصيات الارشادية .

وتتلخص نتائج هذا البحث في الآتي :

١) ترتبط السمات الشخصية في مجموعها بتبنى التوصيات الارشادية بدون وجود ارتباط ذي دلالة احصائية بين متغير العمر وبين تبنى التوصيات .

٢) هناك ارتباط سالب ذو دلالة احصائية بين الخبرة في العمل الزراعي وبين تبنى التوصيات الارشادية يمكن الاستدلال منه على أن عدد سنوات الخبرة بالعمل الزراعى اكثر ارتباط بالتجديد والابتكار في الممارسات الزراعية وذلك عند المقارنة بالعمر .

٣) هناك ارتباط موجب بين السمات الإقتصادية الاجتماعية موضع الدراسة وبين تبنى التوصيات الارشادية . وقد ظهر اتفاق فى هذه العلاقة فى كل متغيرات السمات الاقتصادية الاجتماعية الثلاث وأن كانت درجة هذه العلاقة منخفضة نسبيا .