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Direct and Indirect Effects of Characteristics of FIG Members on their Knowledge of FIG under ATMA Project

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A B S T R A C T

The present study was carried out in Anand district of Gujarat state to access the direct and indirect effects of characteristics of FIG members on knowledge of FIG under ATMA Project. A total of 200 farmers who are the member of FIG under ATMA were selected for the study. A total of 22 characteristics of the respondent were considered in the study. The data was collected directly from the respondents through personal interview method with the help of structured schedule. The Direct and Indirect effect of these variables on their knowledge of FIG under ATMA Project was calculated with the help of path analysis. It is evident from the results of the path analyses that the experience of FIG was the key variable in exerting direct and substantial effect on knowledge about FIG, whereas social participation was the major variable in determination of level of knowledge through positive indirect effect.

Introduction

Extension system has changed in India after the implementation of ATMA scheme. Agriculture Technology Management Agency (ATMA) is a district level registered society that works for the district's sustainable agricultural development with various agriculture related institutions. The new institutional arrangement focused on bottom up approach in planning and decision making (Reddy *et al.*, 2004). Farmers are now participating in planning as well as implementation of extension and research strategies at district level. Training and capacity building is integral part of ATMA scheme and many farmers and FIGs/SHGs were provided training, demonstrations and exposure visit on improved agricultural technologies and new agri-enterprises. Farmers Interest Group forming is an important strategy for extension services. Some farmers who are more innovative than others try to adopt new technologies and start new enterprises after getting trained in a particular aspect.The structure and organization of the FIGs were different from the traditional cooperative institutions and their

management. The various activities were carried out for awareness generation and knowledge building about the 'Farmers Interest Groups (FIGs)' and utility of these groups to the farmers. The direct and indirect relationship that exists among the variables will help us to find out the significant path which effectively related with the knowledge level of member farmers.

Materials and Methods

The present study was carried out in Anand district of Gujarat state. Two talukas, namely, Anand and Umreth, were purposively selected for the study, where a good number of farmer interest groups were available. The list of animal husbandry based FIGs working in Anand district had been collected from the Project Director, ATMA, Anand.

From the selected two talukas, there are total 54 animal husbandry based FIGs in Anand taluka and total 55 animal husbandry based FIGs in Umreth taluka. Atotal of 40 FIGs were selected by proportionately random sampling, 20 FIGs from Anand taluka and 20 FIGs from Umreth taluka were selected by lottery method of sampling. Then after, 5 farmers were randomly selected from each of the selected FIG.

Thus all 200 farmers who are the member of FIG were selected for the study. A total of 22 characteristics of the respondents were considered in the study which were age, education, experience in farming, experience of FIG, social participation extension contact, mass media exposure, training received, basic knowledge of Soil Health Card, Use of Kisan Call Centre, use of ICT tools, Kisan Credit card possession, size of land holding, cropping intensity, Annual income, numbers of animal possession, innovativeness, cohesiveness, economic motivation, scientific orientation, risk orientation and achievement motivation. Pre-testing out of an interview schedule becomes intended to evaluate whether the questions included within the questionnaire were understandable to the respondents or not. The interview schedule was pre-tested with 20 non-sample farmers attending Farmer Interest Group and necessary modifications were incorporated in the final draft of an instrument for data collection. The respondents were interviewed personally at their home or work place.

Path analysis is a technique that aims at determining the direct and indirect effects among number of variables and thereby helps to a quantitative interpretation to the interrelationships within a known or an assumed casual system that exist in some specific population. The basic theorem of path analysis states that the zero order correlation between any two variables is equal to the sum of the products of the paths and correlations between all the variables in the system. In this technique the direct and indirect effects are measured by a quantity (standardized partial regression) called the path coefficient. A path coefficient is an absolute number without any physical unit, whatever the actual units of measurement for the variables.

It indicates the extent to which the variance in a dependent variable is determined by the variance of the independent variable. It also has direction (Li, 1965 and Pine, 1977).

Path analysis is a method employed to determine whether or not a multivariate set of non-experimental data fits well with a particular (*a priori*) causal model (Wright, 1934). A path analysis can be worked out as a hierarchical (sequential) multiple regression analysis conducted for testing the significance of relationship in a hypothetical causal model.

The Direct and Indirect effects of these variables on their knowledge of FIG under ATMA Project were calculated with the help of path analysis (Wright, 1921). Path co-efficient technique is an extension of the technique of standard partial regression co-efficient. Path effects were obtain by solving the simultaneous equations set up for the purpose using the correlation matrix considering one variable 1 to be influencing other variable '1' the simultaneous equation would be:

$$ryx_i = \rho yx_i + \sum_{i=1}^{n} rx_i x_j x \rho yx_j$$

For i = 1, 2, 3…….n

Where,

ryx_i = Is the correlation co-efficient of x_i with y

ρyx_i = Is the direct effect

$\sum_{i=1}^{n} rx_i x_j x \rho yx_j$ = Is indirect effect of independent variable to dependent variable via another independent variable.

Results and Discussion

The correlation co-efficient values (r) for personal, socio-communicational, economical and psychological characteristic of FIG farmers with their knowledge about FIG were found to be significant in case of 18 variables as mentioned earlier. The data thus, indicate that observed relationships between the dependent and independent variables were only partially absolute, partially relative and a partial relationship was a contribution made by other variables exercising their influence jointly.

It is therefore necessary to study the influence of one variable on other variable both directly as well as through other variables presented in the situation. Hence, the independent variables were subjected to path analysis. The result of path analysis is presented in Table 1.

Direct effect

The results of path analysis presented in Table 1 indicate that experience of FIG had exerted highest positive direct effect (0.4081) on knowledge of FIG, followed by innovativeness (0.2115), achievement motivation (0.1683), cohesiveness (0.1284), training received (0.1145), risk orientation (0.0863), age (0.0844), cropping intensity (0.0675), education (0.0368), extension contact (0.0335), social participation (0.0252), economic motivation (0.0241), basic knowledge of Soil Health Card (0.0210) and use of Kisan Call Centre (0.0137).

It was further observed that eight variables exercised the negative direct effect on knowledge of FIG. Scientific orientation of the FIG member farmers excreted highest negative direct effect (-0.0917) on knowledge about FIG, followed by mass media exposure (-0.0901), farming experience (-0.0828), annual income (-0.0583), availability of ICT tools (-0.0303), Kisan Credit Card possession (-0.0169), land holding (-0.028) and numbers of animal possession (0.0013).

Total indirect effect

The data revealed that maximum positive indirect effect was exerted by social participation (0.6368) followed by availability of ICT tools (0.6203), cohesiveness (0.5946), achievement motivation (0.5867) and risk orientation (0.5717) through experience of FIG and innovativeness, innovativeness (0.5315) and training received (0.5225) through experience of FIG and achievement motivation, scientific orientation (0.4847) through experience of FIG and innovativeness, experience of FIG (0.4559) through innovativeness and achievement motivation, extension contact (0.4345), mass media exposure (0.4171) and annual income (0.2593) through experience of FIG and innovativeness, cropping intensity (0.2165) through experience of FIG and training received, education (0.2102) through experience of FIG and innovativeness, land holding (0.1838) through experience of FIG and annual income, use of Kisan Call Centre (0.1763) and numbers of animal possession (0.1763) through experience of FIG and innovativeness, economic motivation (0.1449) through experience of FIG and achievement motivation, basic knowledge of Soil Health Card (0.114) through experience of FIG and innovativeness and farming experience (0.0168) through age and experience of FIG.

Table.1 Direct and indirect effect of profile of FIG farmers on knowledge of FIG n=200

No	Variables	Direct effect	Total indirect effect	Substantial indirect effect through	
				1	2
1	Age	0.0844	-0.1304	-0.0653(X_3)	-0.0287(X_4)
2	Education	0.0368	0.2102	0.1116(X_4)	0.0635(X_{17})
3	Experience in farming	-0.0828	0.0168	0.0666(X_1)	-0.0391(X_4)
4	Experience of FIG	0.4081	0.4559	0.1531(X_{17})	0.1228(X_{22})
5	Social participation	0.0252	0.6368	0.2755(X_4)	0.1355(X_{17})
6	Extension contact	0.0335	0.4345	0.2121(X_4)	0.1001(X_{17})
7	Mass media exposure	-0.0901	0.4171	0.1601(X_4)	0.0887(X_{17})
8	Training received	0.1145	0.5225	0.2634(X_4)	0.1079(X_{22})
9	Basic Knowledge of Soil Health Card	0.0210	0.114	0.0619(X_4)	0.0324(X_{17})
10	Use of Kisan Call Centre	0.0137	0.1763	0.0955(X_4)	0.0705(X_{17})
11	Availability of ICT tools	-0.0303	0.6203	0.2469(X_4)	0.1317(X_{17})
12	Kisan Credit Card possession	-0.0169	-0.0521	-0.0200(X_7)	-0.0185(X_{15})
13	Size of land holding	-0.0028	0.1838	0.0871(X_4)	-0.0436(X_{15})
14	Cropping intensity	0.0675	0.2165	0.0914(X_4)	0.0311(X_8)
15	Annual income	-0.0583	0.2593	0.1048(X_4)	0.0519(X_{17})
16	Numbers of animal possession	-0.0013	0.1763	0.0865(X_4)	0.0497(X_{17})
17	Innovativeness	0.2115	0.5315	0.2955(X_4)	0.1099(X_{22})
18	Cohesiveness	0.1284	0.5946	0.2902(X_4)	0.1178(X_{17})
19	Economic motivation	0.0241	0.1449	0.0568(X_4)	0.0514(X_{22})
20	Scientific orientation	-0.0917	0.4847	0.1962(X_4)	0.1033(X_{17})
21	Risk orientation	0.0863	0.5717	0.2678(X_4)	0.1267(X_{17})
22	Achievement motivation	0.1683	0.5867	0.2977(X_4)	0.1380(X_{17})

Fig.1

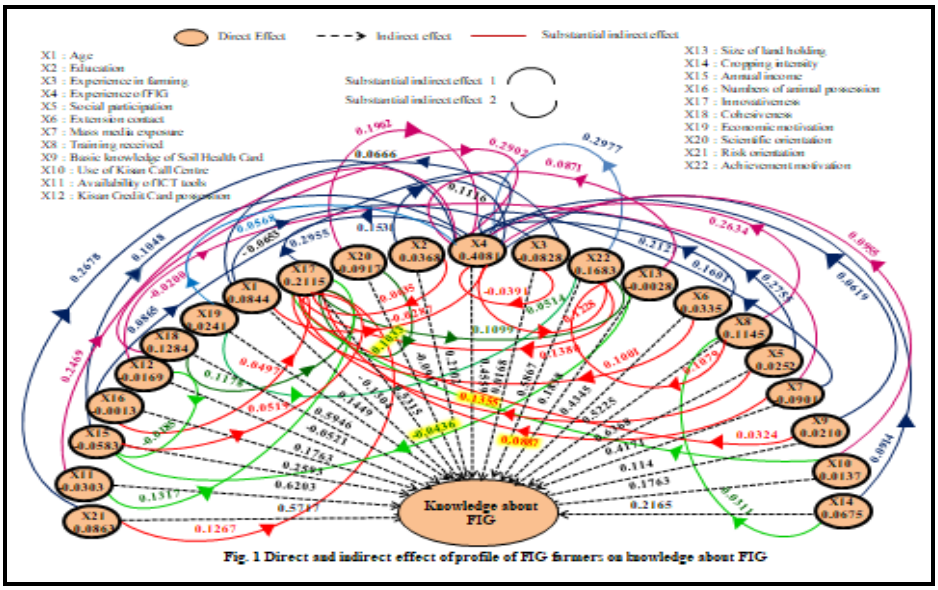

Fig. 1 Direct and indirect effect of profile of FIG farmers on knowledge about FIG

As far as indirect negative effect is concerned, age (-0.1304) had exerted highest indirect effect on knowledge about FIG through experience of farming and experience of FIG followed by Kisan Credit Card possession (-0.0521) through mass media exposure and annual income.

Substantial indirect effect

Out of total 44 substantial indirect effects, twenty substantial indirect effects routed through experience of FIG, fourteen through innovativeness, four through achievement motivation, two through annual income, one each through experience of farming, age, mass media exposure and training received.

Concluding the findings it can be said that Experience of FIG was the key variable in exerting direct and substantial effect on knowledge about FIG, whereas social participation was the major variable in determination of level of knowledge through positive indirect effect.

The variables which were found significant influence on knowledge about FIG must be consider while planning any programme of planed communication related to FIG.

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