

Original Research Article

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## Direct and Indirect Effects of Characteristics of FIG Members on their Extent of Adoption of Activities of FIG under ATMA Project

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### ABSTRACT

#### Keywords

Farmers Interest Group, Path analysis, Direct and Indirect effect, Relative Importance, ATMA

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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 their extent of adoption of activities 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 their extent of adoption of activities 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 extent of adoption of activities of FIG whereas innovativeness was the major variable in determination of adoption level of FIG through positive indirect effect. The five relative independent variables viz., mass media exposure, experience of FIG, scientific orientation, education and basic knowledge of Soil Health Card jointly explained 51.30 per cent variation in predicting extent of adoption of activities of FIG by the farmers.

### Introduction

Indian farmer is the center of focus for development in the model and through an organized effort, farmers has a say in planning and implementation of the development process. Representation is provided to farmers at the village level through Farmers Interest Groups (FIGs) (Gaikwad, 2019). Farmer Interest Groups are participatory platforms for improving decision making capacity and stimulating local innovation for sustainable agriculture (Khadda *et al.*, 2021). The creation of the Farmers Interest

Group (FIGs) in all the district blocks and villages with the assistance of public organizations, private organizations, NGOs, Para Extension Workers and private input dealers is one of ATMA's main goals. If small farmers are encouraged properly to coordinate train and direct groups, they can achieve enormous development goals that would ultimately make the community self-reliant and self-sufficient. The FIG is an independent, self-managed, farmers group with a shared goal and interest.

Through pooling their existing resources, having

better access to other resources and sharing the resulting benefits, the participants work together to achieve one common goal.

Farmer group have added bonus of developing social cohesion and confidence building within the farmers for production and fixing the price for their produce. When the farmers are facilitated to organize groups, trained and guided properly, they can attain tremendous development goal which would eventually make the group self-reliant and self-sufficient.

The establishment of Farmer Interest Groups (FIGs) and farmer's federation helps in gaining the confidence of farmers in the agriculture sector (Singh and Srinivasan, 1998). 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. Path analysis is an extension of the regression model. In a path analysis model from the correlation matrix, two or more casual models are compared. The path model has two types of effects. The first is the direct effect, and the second is the indirect effect.

In this study we can see the direct and indirect effect of profile of FIG farmer on their extent of adoption of activities of FIG. 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 extent of adoption of activities of FIG by the member farmers. By conducting a path analysis, we can understand the causal relationships between different characteristic of FIG member farmers with their extent of adoption of activities of FIG.

## **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.

A total 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 adoption of activities 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:

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

For i = 1, 2, 3.....n

Where,

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

$\rho yx_i$  = Is the direct effect

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

## Results and Discussion

The correlation coefficient values (r) for personal, socio- communicational, economical and psychological characteristic of FIG member farmers with their extent of adoption of activities of FIG were found to be significant in case of 19 variables as mentioned earlier.

The data thus, indicated 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.indicates that experience of FIG had exerted highest positive direct effect (0.3415) on extent of adoption of activities of FIG followed by mass media exposure (0.1863), risk orientation (0.1806), education (0.1746), farming experience (0.1440), scientific orientation (0.1327), annual income (0.1312), extension contact (0.0658), achievement motivation (0.0622), economic motivation (0.0604), social participation (0.0497), use of Kisan Call Centre (0.0449) and Kisan Credit Card possession (0.0066).

It was further observed that nine variables exercised the negative direct effect on extent of adoption of

activities of FIG. Age of the FIG member farmers exerted highest negative direct effect (-0.1984) on extent of adoption of activities of FIG followed by cropping intensity (-0.1357), basic knowledge of Soil Health Card (-0.1181), innovativeness (-0.1154), cohesiveness (-0.0823), numbers of animal possession (-0.0639), size of land holding (-0.0403), availability of ICT tools (-0.0399) and training received (-0.0351).

**Total indirect effect**

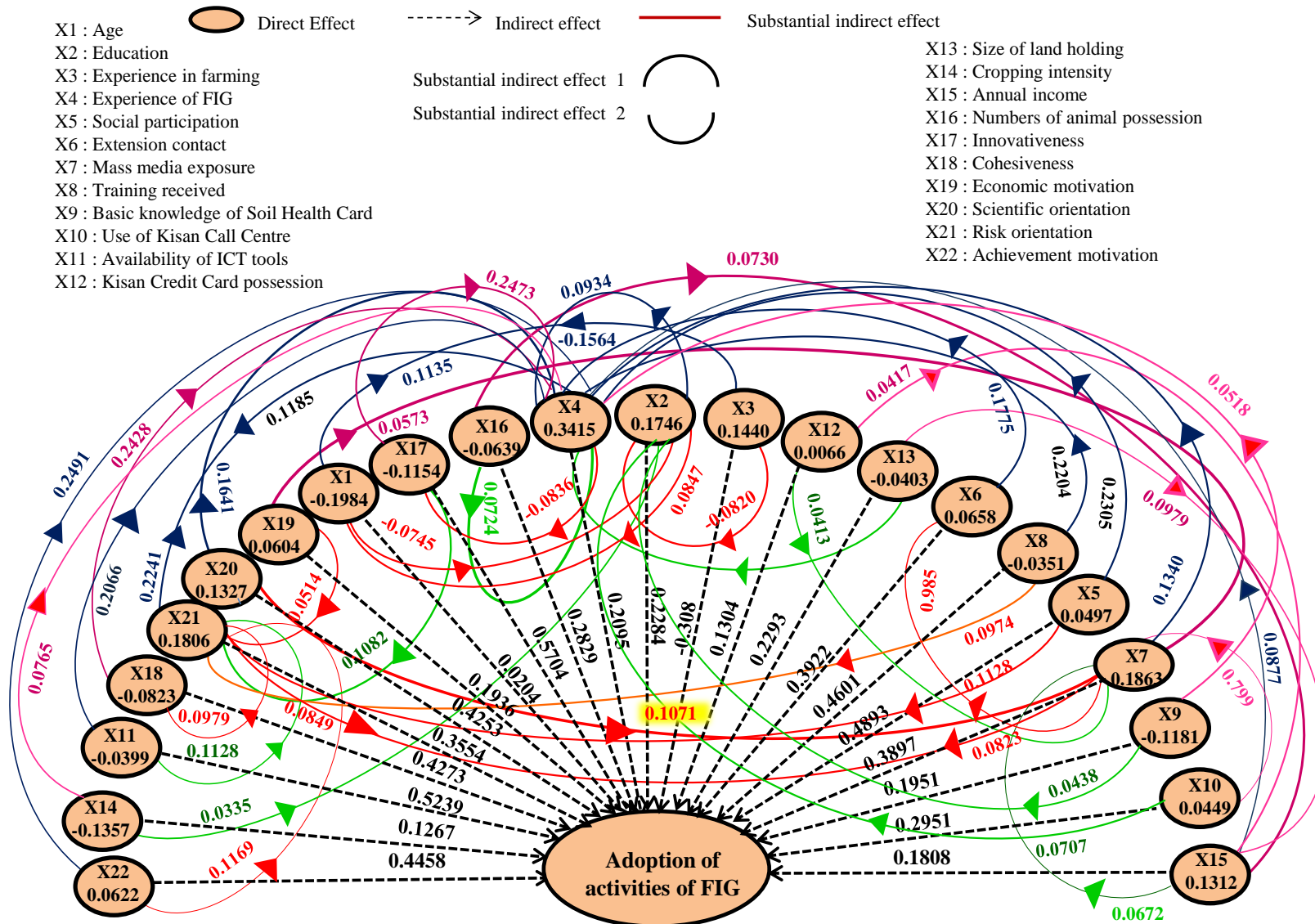
The data revealed that maximum positive indirect effect was exerted by innovativeness (0.5704), followed by availability of ICT tools (0.5239), social participation (0.4893), training received (0.4601), achievement motivation (0.4458) and cohesiveness (0.4273) through experience of FIG and risk orientation, scientific orientation (0.4253) and extension contact (0.3922) through experience of FIG and mass media exposure, mass media exposure

(0.3897) through experience of FIG and risk orientation, risk orientation (0.3554) through experience of FIG and mass media exposure, use of Kisan Call Centre (0.2951) through experience of FIG, mass media exposure and education, numbers of animal possession (0.2829) and size of land holding (0.2293) through annual income and experience of FIG), education (0.2284) through experience of FIG and age, experience of FIG (0.2095) through risk orientation and innovativeness, basic knowledge of SHC (0.1951) through experience of FIG and education, economic motivation (0.1936) through mass media exposure and risk orientation, annual income (0.1808) through experience of FIG and mass media exposure, Kisan Credit Card possession (0.0.1304) through annual income and mass media exposure, cropping intensity (0.1267) through experience of FIG and education and age (0.0204) through experience of farming and education.

**Table.1** Direct and indirect effect of profile of FIG farmers on extent of adoption of activities of FIG n=200

No	Variables	Direct effect	Total indirect effect	Substantial indirect effect through	
				1	2
1	Age	-0.1984	0.0204	0.1135(X <sub>3</sub> )	-0.0745(X <sub>2</sub> )
2	Education	0.1746	0.2284	0.0934(X <sub>4</sub> )	0.0847(X <sub>1</sub> )
3	Experience in farming	0.1440	-0.308	-0.1564(X <sub>1</sub> )	-0.0820(X <sub>2</sub> )
4	Experience of FIG	0.3415	0.2095	0.1185(X <sub>21</sub> )	-0.0836(X <sub>17</sub> )
5	Social participation	0.0497	0.4893	0.2305(X <sub>4</sub> )	0.1128(X <sub>21</sub> )
6	Extension contact	0.0658	0.3922	0.1775(X <sub>4</sub> )	0.0985(X <sub>7</sub> )
7	Mass media exposure	0.1863	0.3897	0.1340(X <sub>4</sub> )	0.0823(X <sub>21</sub> )
8	Training received	-0.0351	0.4601	0.2204(X <sub>4</sub> )	0.0974(X <sub>21</sub> )
9	Basic Knowledge of Soil Health Card	-0.1181	0.1951	0.0518(X <sub>4</sub> )	0.0438(X <sub>2</sub> )
10	Use of Kisan Call Centre	0.0449	0.2951	0.799(X <sub>7</sub> )	0.0707(X <sub>2</sub> )
11	Availability of ICT tools	-0.0399	0.5239	0.2066(X <sub>4</sub> )	0.1128(X <sub>21</sub> )
12	Kisan Credit Card possession	0.0066	0.1304	0.0417(X <sub>15</sub> )	0.0413(X <sub>7</sub> )
13	Size of land holding	-0.0403	0.2293	0.0979(X <sub>15</sub> )	0.0729(X <sub>4</sub> )
14	Cropping intensity	-0.1357	0.1267	0.0765(X <sub>4</sub> )	0.0335(X <sub>2</sub> )
15	Annual income	0.1312	0.1808	0.0877(X <sub>4</sub> )	0.0672(X <sub>7</sub> )
16	Numbers of animal possession	-0.0639	0.2829	0.0730(X <sub>15</sub> )	0.0724(X <sub>4</sub> )
17	Innovativeness	-0.1154	0.5704	0.2473(X <sub>4</sub> )	0.1082(X <sub>21</sub> )
18	Cohesiveness	-0.0823	0.4273	0.2428(X <sub>4</sub> )	0.0979(X <sub>21</sub> )
19	Economic motivation	0.0604	0.1936	0.0573(X <sub>7</sub> )	0.0514(X <sub>21</sub> )
20	Scientific orientation	0.1327	0.4253	0.1641(X <sub>4</sub> )	0.1071(X <sub>7</sub> )
21	Risk orientation	0.1806	0.3554	0.2241(X <sub>4</sub> )	0.0849(X <sub>7</sub> )
22	Achievement motivation	0.0622	0.4458	0.2491(X <sub>4</sub> )	0.1169(X <sub>21</sub> )

Fig.1 Direct and indirect effect of profile of FIG farmers on adoption of activities of FIG



As far as indirect negative effect is concerned, experience of farming (-0.308) had exerted highest indirect effect on extent of adoption of activities of FIG through age and education.

### **Substantial indirect effect**

Out of total 44 substantial indirect effects, seventeen substantial indirect effects were routed through experience of FIG, nine through risk orientation, seven routed mass media exposure, five through education, three through annual income and two through age, one through experience in farming.

To illustrate the results, it can be stated that experience of FIG was the key variable in exerting direct and substantial effect on extent of adoption of activities of FIG whereas innovativeness was the major variable in determination of adoption level of FIG through positive indirect effect.

Concluding the findings it can be said that Experience of FIG was the key variable in exerting direct and substantial effect on extent of adoption of activities of FIG whereas innovativeness was the major variable in determination of adoption level of FIG through positive indirect effect.

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

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