

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 3; March 2026; Page No. 112-114

Received: 05-01-2026
Accepted: 12-02-2026

Indexed Journal
Peer Reviewed Journal

Direct and indirect effect between characteristics of the farmers and their utility perception towards integrated farming system

¹PN Radadiya, ²PC Patel and ³RA Solanki

¹Ph.D. Student, Department of Agricultural Extension and Communication, B. A. College of Agriculture, AAU, Anand, Gujarat, India

²Associate Extension Educationist, DoEE, AAU, Anand, Gujarat, India

³M.Sc. Scholar, B. A. College of Agriculture, AAU, Anand, Gujarat, India

DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i3b.3333>

Corresponding Author: PN Radadiya

Abstract

The investigation was carried out in Anand district of Gujarat in India. Anand district and its four talukas viz. Anand, Ankla, Borsad and Khambhat were selected purposively for the study and 120 farmers from those talukas were selected randomly for the study. A total of fifteen variables were studied using path analysis. The study revealed that extension participation had exerted a maximum direct positive effect and substantial effect on utility perception towards Integrated Farming System, annual income had the maximum total indirect effect on utility perception of the farmers towards Integrated Farming System.

Keywords: Integrated farming system, path analysis, utility perception, direct-indirect effect

Introduction

In India, marginal and small farmers face several issues such as low yield, poor income, limited technology use and resource inefficiency. Integrated Farming System (IFS) provides a holistic solution by integrating crops with poultry, fisheries, livestock, fruits, vegetables, floriculture and beekeeping. This diversification improves land use, boosts income and reduces the risk of crop failure. IFS promotes the recycling of farm resources such as manure, reduces input costs and enhances soil fertility and water conservation. Endorsed by the Ministry of Agriculture and Farmers' Welfare, IFS contributes to environmental sustainability and offers a practical model for addressing the gaps left by the Doubling Farmers' Income initiative (Anonymous, 2017) ^[1].

Objective

To study the direct and indirect effect between characteristics of the farmers and their utility perception towards Integrated Farming System

Methodology

The study followed a Positivist research philosophy, emphasizing objectivity and quantifiable measurement of direct and indirect effect between characteristics of the farmers and their utility perception towards Integrated Farming System (IFS). A deductive research approach was adopted to test them through empirical data. The Quantitative methodological choice was employed using a

Survey research strategy to collect data from farmers across selected talukas. The study was cross-sectional, conducted in Anand district of Gujarat during 2025. Anand district (22.3299° N, 72.6151° E) was purposively selected as it represents a progressive agricultural region where Integrated Farming System models are actively promoted by Anand Agricultural University. From four talukas viz., Anand, Ankla, Borsad and Khambhat with 120 farmers practicing IFS were chosen using simple random sampling.

An Ex-post-facto (Kerlinger, 1976) ^[2] research design was used since the variables had already occurred. Primary data were collected through a structured interview schedule and analysed using Microsoft Excel (MS 365) and SPSS (version 16.0).

Path coefficient technique is the ratio of the standard deviation of the effect due to a given cause of the total standard deviation of the effect. Path effects were obtained by solving simultaneous equations set up for the purpose using the correlation matrix. Considering X₁ as independent variable to be influencing the dependent variable Y the entrepreneurial competence.

Path analysis

Path co-efficient technique is an extension of the technique of standard partial regression co-efficient. Path effects were obtained by solving the simultaneous equations set up for the purpose using the correlation matrix considering one variable X₁ to be influencing other variable 'Y' the simultaneous equation would be:

$$r_{yxi} = P_{yxi} + \sum_{i,j=1}^n r_{xixj} \times p_{yxi}$$

For $i = 1, 2, 3, \dots, n$

For $j = 1, 2, 3, \dots, n$

Where,

r_{yxi} = Correlation coefficient between X_i with Y

P_{yxi} = Direct effect of X_i variable on Y variable

$\sum_{i,j=1}^n r_{xixj} \times p_{yxi}$ = Indirect effect of independent variable on dependent variable via another independent variable.

Results and Discussion

Path analysis was performed on each of the fifteen variables. According to the statistics, there was only a partial absolute and partial relative link between the variables. A partial relationship was the result of multiple variables working together to exert their influence. Table 1 displays the outcome of the path analysis and therefore, it is essential to investigate how one variable affects another, both directly and indirectly other factors that are present in the scenario.

Table 1: Direct and indirect effect between characteristics of the farmers and their utility perception towards Integrated Farming System ($n = 120$)

Sr. no.	Variables	Direct effect	Indirect effect	Substantial indirect effect through	
				1	2
X1	Age	-0.074	0.059	0.150 (X8)	0.044 (X4)
X2	Education	0.213	0.195	0.047 (X5)	0.037 (X7)
X3	Size of family	-0.117	-0.065	0.048 (X4)	0.031 (X7)
X4	Experience in IFS	0.210	0.239	0.079 (X7)	0.046 (X8)
X5	Annual income	0.248	0.448	0.043 (X8)	0.041 (X2)
X6	Land Holding	0.297	0.296	0.062 (X15)	0.047 (X10)
X7	Social participation	0.245	0.183	0.068 (X4)	0.043 (X6)
X8	Extension participation	0.321	0.213	0.049 (X10)	0.033 (X5)
X9	Agri mass media exposure	0.204	0.284	0.052 (X12)	0.045 (X8)
X10	Economic motivation	0.276	0.232	0.057 (X8)	0.050 (X6)
X11	Market orientation	0.243	0.084	0.028 (X12)	0.026 (X7)
X12	Credit orientation	0.227	0.257	0.054 (X14)	0.047 (X9)
X13	Scientific orientation	0.201	0.150	0.042 (X10)	0.034 (X5)
X14	Management orientation	0.254	0.243	0.054 (X6)	0.049 (X12)
X15	Attitude towards IFS	0.303	0.070	0.061 (X6)	0.033 (X10)

Direct effect

The data in table 28 revealed that extension participation (0.321) had exerted maximum direct positive effect to determine utility perception of farmers towards Integrated Farming System followed by attitude towards IFS (0.303), land holding (0.297), economic motivation (0.276), management orientation (0.254), annual income (0.248), social participation (0.245), market orientation (0.243), credit orientation (0.227), education (0.213), experience in IFS (0.210), agri mass media exposure (0.204) and scientific orientation (0.201).

It can be concluded that psychological variables and experience in IFS were the key variables contributing the maximum positive direct effect on utility perception towards Integrated Farming System while size of family and age had contributed negative direct effect. The outcome of the study is in conformity with the findings of Patel *et al.* (2023) [3], Madhuprasad *et al.* (2024) [4] and Singh *et al.* (2025) [5].

Total indirect effect

So far, total indirect effect is concerned; 14 variables had positive total indirect effect except Size of family. Further, it can be observed that annual income (0.448) had maximum total indirect effect through extension participation (0.043) and education (0.041), land holding (0.296) through attitude towards IFS (0.062) and economic motivation (0.047) followed by agri mass media exposure (0.284) through credit orientation (0.052) and extension participation (0.045), credit orientation (0.257) through management orientation (0.054) and agri mass media exposure (0.047), management orientation (0.243) through land holding

(0.054) and credit orientation (0.049), Experience in IFS (0.239) through social participation (0.079) and extension participation (0.046), economic motivation (0.232) through extension participation (0.057) and land holding (0.050), extension participation (0.213) through economic motivation (0.057) and land holding (0.033), education (0.195) through annual income (0.047) and social participation (0.037), social participation (0.183) through experience in IFS (0.068) and land holding (0.043), scientific orientation (0.150) through economic motivation (0.042) and land holding (0.034), market orientation (0.084) through credit orientation (0.028) and social participation (0.026), attitude towards IFS (0.070) through land holding (0.061) and economic motivation (0.033), age (0.059) through extension participation (0.150) and experience in IFS (0.044), where size of family (-0.065) through experience in IFS (0.048) and social participation (0.031).

Substantial indirect effect

Data further revealed that out of 30 substantial indirect effects, five each routed through extension participation, four each routed through economic motivation, land holding, social participation and credit orientation, three each routed through experience in IFS and annual income, two each routed through attitude towards IFS and one each routed through education.

It could be concluded that extension participation had exerted highest direct as well as substantial indirect effect, where annual income had exerted highest indirect effect on utility perception of farmers towards Integrated Farming System.

Conclusion

The correlation matrix for fifteen variables was used to solve simultaneous equations created specifically for the purpose of obtaining path effects. The extension participation had exerted a maximum direct positive effect on utility perception of the farmers towards integrated Farming System (0.365), while negative direct effect on age (-0.074) in the study. It can be said that extension participation exerted the highest direct effect and extension participation itself also had exerted the highest substantial effect and annual income exerted the maximum total indirect effect on utility perception of the farmers towards Integrated Farming System.

Acknowledgement

I extend my heartfelt appreciation to those individuals and institutions whose assistance and direction have been important in the accomplishment of this research work.

Conflict of Interest

All authors declare that they have no conflict of interest

References

1. Anonymous. National Institution for Transforming India. Ministry of Agriculture and Farmers' Welfare, Government of India. New Delhi; 2017.
2. Kerlinger FN. Foundation of behavioural research. New Delhi: Sur Pub; 1976. p. 129.
3. Patel PC, Patel JK, Macwan JD. Direct and indirect effect between antecedent characteristics of inland fish farmers and their entrepreneurial competence. *Guj J Ext Edu.* 2023;36(1):65-67.
4. Madhuprasad VL, Ravindra U, Harshitha D. Livelihood security of scheduled caste farmers through integrated farming system. *Guj J Ext Edu.* 2024;31(1):170-177.
5. Singh S, Riar ST, Walia SS. Present status of integrated farming system in Patiala. *Guj J Ext Edu.* 2025;39(1):115-122.