

Elements controlling the adoption level of farmers regarding bio-fertilizer applications

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Abstract

Sugarcane is the main source of sugar in Asia and Europe. Sugarcane is grown primarily in the tropical and sub tropical zones of the southern hemisphere. Sugarcane is the raw material for the production of white sugar, jaggery (gur) and khandsari. It is also used for chewing and extraction of juice for beverage purpose. But presently, sugarcane cultivation is in crisis. Cane growers are now facing innumerable problems in sugarcane cultivation. With low yields, varietal degeneration, high input costs, incidence of diseases and pests, soil degradation, salinity, water logging and drought, the area under sugarcane is gradually shrinking. Also water is a major constraint, limiting the production. It is an imperative need for the cane growers to reduce traditional method of cane cultivation and adopt high yield practices with a view to increase their annual income. 'Sustainable Sugarcane Initiative' (SSI) is clearly the foremost option available right now to address many of these problems. The Sustainable Sugarcane Initiative (SSI) is an innovative set of agronomic practices that involves using less chipped buds, raising seedlings in a nursery, and following new planting methods, with wider plant spacing, and better water and nutrient management to increase the cane yields significantly.

The zero-order correlation co-efficient and linear multiple regression analysis were employed to study the relationship and contribution of characteristics with adoption level in SSI practices. The study was taken up in the sugarcane predominant district of Cuddalore in Tamil Nadu State (India) with a sample size of one hundred and twenty growers selected based on the random sampling method. The findings revealed that out of fifteen independent variables only five variables were found to be positive and significant relationship with adoption level in both correlation and regression analysis.

Keywords: SSI, cane growers, adoption level

Introduction

Sugarcane (*Saccharum officinarum* L.) is the main sources of sugar in India and holds a prominent position as a cash crop. India is the world's largest consumer and the second largest producer of sugar, topped only by Brazil. Nearly 2.8 lakh farmers have been cultivating sugarcane in the vast area of 4.4 lakh acres and over 11 crores people are directly or indirectly dependent on the sugar industry in the country. Sugarcane is one of the important commercial crops of India, grown in an area of 3.93 m.ha with annual production of 170 M.T. Sugarcane productivity in India is around 67 t/ha. It is one of the most important food-cum-cash crops grown in the country, providing employment to a larger number of people, in addition to earning considerable foreign exchange.

Now a day, the sugarcane cultivation is in crisis. Cane growers are now facing innumerable problems in sugarcane cultivation. With low yields, varietal degeneration, high input costs, incidence of diseases and pests, soil degradation, salinity, water logging and drought, the area under sugarcane is gradually shrinking. Also water is a major constraint, limiting the production. It is an imperative need for the cane growers to reduce traditional method of cane cultivation and adopt high yield practices with a view to increase their annual income. 'Sustainable Sugarcane Initiative' (SSI) is clearly the foremost option available right now to address many of these problems. It aims at providing practical options to the farmers in improving the productivity of land, water and labour, all at the same time. SSI is also expected to reduce the overall pressure on water resources and contribute to recovery of ecosystems.

Sustainable Sugarcane Initiative is an innovative method of sugarcane production using less seeds, less water and optimum utilization of fertilizers and land to achieve more yields.

The personal, socio-economic and psychological characteristics of the cane growers may play a role in determining their adoption level on recommended SSI practices. Keeping this in view, the present study has been made to know the relationship and contribution of characteristics with adoption level in SSI practices.

Methodology

The present study was taken up among the cane growers in the area of Cuddalore district. Totally 120 registered SSI growers under MRK Co-op Sugar Mill, EID Parry Sugars (P) Ltd and Ambiga Sugars (P) Ltd were selected from all the eight taluks of the district by proportionate random sampling method. The data were collected from the respondents with the help of well structured and pre tested interview schedule. Fifteen variables, viz., age, educational status, occupational status, annual income, farm size, experience in sugarcane cultivation, social participation, extension agency contact, mass media exposure, innovativeness, risk orientation, scientific orientation, economic motivation, training undergone and decision making pattern and an dependent variable knowledge were included in the study.

The statistical tools used in the study were percentage analysis, zero order correlation and multiple regression analysis.

Results and discussion

The results of the association of the characteristic with adoption level of SSI practices are being presented in subsequent tables.

Relationship between personal social-economic and psychological characteristics of respondents and their adoption level of SSI practices

The characteristics of respondents play a role in determining their adoption level of recommended SSI practices. The zero-order correlation co-efficient (r) and linear multiple regression analysis were employed to study the relationship and contribution of characteristics with adoption level in SSI practices and the results are presented in Table 1.

Table 1: Relationship between personal, social-economic and psychological characteristics of respondents and their adoption level (n=120)

Variable No.	Independent Variables	Correlation co efficient 'r' value
X ₁	Age	0.107NS
X ₂	Educational status	0.139*
X ₃	Occupational status	0.092NS
X ₄	Annual income	0.053NS
X ₅	Farm size	0.031NS
X ₆	Experience in sugarcane cultivation	0.122*
X ₇	Social participation	0.038NS
X ₈	Extension agency contact	0.263**
X ₉	Mass media exposure	0.133*
X ₁₀	Innovativeness	0.038NS
X ₁₁	Risk orientation	0.062NS
X ₁₂	Scientific orientation	0.023NS
X ₁₃	Economic motivation	0.068NS
X ₁₄	Training undergone	0.288**
X ₁₅	Decision making pattern	0.063NS

** - Significant at 1% level

* - Significant at 5 % level

NS – Non-significant

The results of correlation analysis in Table 1 showed that out of fifteen independent variables studied viz., educational status, experience in sugarcane cultivation, extension agency contact, mass media exposure and training undergone had shown positive and significant relationship with adoption behaviour of the respondents. Among the significant variables, extension agency contact and training undergone were found to be significant at one per cent level of probability whereas the remaining variables viz., educational status, experience in sugarcane cultivation and mass media exposure were significant at five per cent level of probability.

Educational status was found to have positive and significant relationship with the adoption behaviour of respondents. Obviously, educated respondents develop a positive attitude towards every possible source of knowledge and it leads to increased adoption. This finding is in conformity with the findings of Rajivgandhi (2010).

Positive and significant relationship was found to exist between experience in sugarcane cultivation and adoption at 0.05 per cent level of probability. This might be due to the reason that farming experience would have influenced the respondents to looking forward to new technologies to adopt in order to increase their profit. This derives support from the findings of Jayasankar (2011).

Extension agency contact showed a positive and highly significant relationship at 0.01 per cent level of probability.

To gain knowledge about a technology, one has to expose himself to different experiences provided by various extension sources. Hence, the extension agency contact would have shown positive and significant association with adoption. This finding is in agreement with the findings of Santhi (2006).

The correlation co-efficient between mass media exposure and adoption behaviour showed a positive and significant relationship. This implied that mass media exposure had got direct influence on the extent of adoption of SSI practices. Farmers with high mass media exposure would have acquired more knowledge about the latest technologies and would have evinced interest for higher level of adoption. Hence, a positive relationship had shown. This finding was in accordance with that of Jayasankar (2011).

Training undergone had showed a positive relationship with adoption behavior at 0.01 per cent level of probability. Respondents who attended the training programmes will definitely gather information on new technologies and would have enthused them to adopt technologies. This finding is in line with findings Prasanthakumar (2007).

Contribution of personal, social-economic and psychological characteristics of respondents towards their adoption level of SSI practices

In order to find out which of the independent variables explained the variation in the dependent variables and also to know the extent of contribution made by these variables, multiple regression analysis was carried out and the results are presented in this section.

The results of multiple regression analysis of the characteristics with adoption behaviour are presented in Table 2.

Table 2: Contribution of personal, social-economic and psychological characteristics of respondents towards their adoption level (n=120)

Variable No.	Impendent Variables	Regression co-efficient	Standard error	't' value
X ₁	Age	1.487	1.321	1.126NS
X ₂	Educational status	0.624	0.289	2.546**
X ₃	Occupational status	-0.406	0.352	-1.147NS
X ₄	Annual income	0.606	0.438	1.283NS
X ₅	Farm size	1.019	0.966	1.157NS
X ₆	Experience in sugarcane cultivation	0.511	0.319	1.644*
X ₇	Social participation	-1.006	0.807	1.259NS
X ₈	Extension agency contact	0.246	0.102	2.568**
X ₉	Mass media exposure	0.912	0.514	1.769*
X ₁₀	Innovativeness	0.526	0.424	1.221NS
X ₁₁	Risk orientation	0.226	0.212	1.049NS
X ₁₂	Scientific orientation	0.706	0.638	1.183NS
X ₁₃	Economic motivation	0.919	0.866	1.144NS
X ₁₄	Training undergone	2.012	1.070	1.805*
X ₁₅	Decision making pattern	0.726	0.592	1.226NS

R² = 0.510

F = 7.230**

** - Significant at 1% level

* - Significant at 5 % level

NS – Non-significant

It could be observed from the Table 2 exhibited that the R² value was 0.510 which implied that 51.00 per cent variation in the independent variables included in the study. Since the 'F' value 7.230 was found to be significant at 0.01 per cent level of probability. The prediction equation was fitted for adoption level of the respondents as given below. There

existed a linear functional contribution between the independent variables and adoption levels. The prediction equation for the respondents is as follows

$$Y = 9.108 + 1.487(X_1) + 0.624(X_2) - 0.406(X_3) + 0.606(X_4) + 1.019(X_5) + 0.511(X_6) - 1.006(X_7) + 0.246(X_8) + 0.912(X_9) + 0.526(X_{10}) + 0.226(X_{11}) + 0.706(X_{12}) + 0.919(X_{13}) + 2.012(X_{14}) + 0.726(X_{15})$$

It could be seen from the equation that the regression coefficient of variables viz., educational status (X_2) and extension agency contact (X_8) was found to be positive and significantly contributed towards the adoption level of cane growers about SSI practices at 0.01 per cent level of probability. The regression co-efficient of variables viz., experience in sugarcane cultivation (X_6), mass media exposure (X_9) and training undergone (X_{14}) were found to be positive and had significant contribution towards the adoption level of the respondents at 0.05 per cent level of probability.

The analysis revealed as *ceteris paribus* as one unit increase in educational status (X_2) extension agency contact (X_8) and would increase the adoption by 2.546 and 2.568 units, respectively. Experience in sugarcane cultivation (X_6), mass media exposure (X_9) and training undergone (X_{14}) would increase the adoption by 1.644, 1.769 and 1.805 respectively.

It could be inferred that, the adoption level of SSI practices could positively be influenced by the variables viz., educational status (X_2), experience in sugarcane cultivation (X_6), extension agency contact (X_8), mass media exposure (X_9) and training undergone (X_{14}). The results of multiple regression in the case of remaining ten variables were not found to be significant.

Conclusion

The variables, viz., educational status, experience in sugarcane cultivation, extension agency contact, mass media exposure and training undergone had shown positive and significant relationship with adoption behaviour of the respondents. Similarly the same variables showed positive and significant contribution towards adoption level of the respondents. Other than these variables such as age, occupational status, annual income, farm size, social participation, innovativeness, risk orientation, scientific orientation, economic motivation, decision making pattern belonged to non-significant.

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