

DETERMINATION OF INDEPENDENT VARIABLES ON EXTENT OF TECHNO-ECONOMIC CHANGE OCCURRED IN TRIBAL AREA OF SOUTH GUJARAT

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ABSTRACT

Rogers (1983) stated that the increased farm production and higher income were consequent variables. For this study the resultant changes occurred due to adoption of watershed management technology in the form of techno-economic change have been taken into account as consequences of watershed development project. 'Ex-post-facto' research design was used. The extent of techno-economic change was found to be predicted by four independent variables such as annual income, irrigation potentiality, area under contour bunding and knowledge about watershed management technology, which had together contributed to 72.63 per cent of the total variation in predicting the techno-economic change. The order of contribution of these four independent variables ranked from the highest to the lowest based on the values of standard partial b' was : Annual income, Knowledge about watershed management, Irrigation potentiality and Area under contour bunding. The R² further indicated that the variable annual income alone contributed to 67.11 per cent variation in the extent of techno-economic change.

INTRODUCTION

In National Watershed Development Project, the economic development of the farmers has been centered on increased agricultural production through introduction of improved watershed management technology coupled with generating the employment with a view to stopping deterioration of environment which effects production of food, fuel, fodder and ultimately all living organism including animals and human beings. Major four components viz., land development, irrigation development, crop production measures and improved implements of watershed management technology were included in the study.

METHODOLOGY

The present study was carried out in Valsad and Navsari districts of South Gujarat. 'Ex-post-facto' research design was used for the study. One

watershed project from each district was selected randomly by lottery method. A proportionate random sampling was used to select the respondents according to their size of land holding categories i.e. marginal, small and big farmers. Thus, total sample farmers for this study were 150 from seven villages fall under two projects. The techno-economic change was measured in terms of eight aspects namely; (1) Change in area under field crops (2) Change in area under irrigation (3) Change in use of improved varieties (3) Change in improved varieties (4) Change in crop production (5) Change in machinery and agricultural implements (6) Change in area under fruit tree cultivation (7) Change in area under fruit tree cultivation (8) Change in annual income from agriculture.

In stepwise regression method, the regression was started with regression of Y and Y₁,...,Y_n taken singly, the variable regression giving the greatest

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reduction in sum of square of Y is first selected. Then the bivariate regression in which X_1 appeared was worked out. The variate which gives the greatest additional reduction in sum of squares after fitting Y_1 was selected. All the trivariate regression that include both X_1 and X_2 were computed. The analysis was continued till the last variate whose

additional contribution was the least of all variates.

FINDINGS

Stepwise multiple regression analysis with 14 independent variables and extent of techno-economic change as dependent variable was carried out. The findings are presented in Table 1 and 2.

Table 1: Stepwise multiple regression analysis of independent variables and extent of techno-economic change

Sr No.	Independent variables	Partial regression coefficient (b)	't' value	Standard error of regression coefficient (Se of b)	'F' value	Standard partial regression coefficient b'	Rank
1	Annual income (X_4)	3.0282	12.083**	0.2506	146.005**	0.6720	I
2	Irrigation potentiality (X_6)	0.6315	2.354*	0.2682	5.544*	0.1299	III
3	Area under contour bunding (X_8)	0.9450	1.952	0.4840	3.811	0.0919	IV
4	Knowledge about watershed management technology (X_9)	5.5011	2.847**	1.9316	8.111**	0.1474	II

* = Significant at 0.05 level of probability

R = 0.8522

** = Significant at 0.01 level of probability

R² = 0.7263**

Data in Table 1 indicate that out of 14 independent variables, four variables namely; annual income, irrigation potentiality, area under contour bunding and knowledge about watershed management technology were accounting influence on the extent of techno-economic change. All the four independent variables together accounted 72.63 per cent of variation as indicated by R² value for extent of techno-economic change. R² value was found to be significant at 0.01 level of probability.

The partial b values of these variables were converted into standard partial b' values. The 't' values of partial b were observed to be significant at 0.01 level of probability for two variables namely; annual income and knowledge about watershed management technology. While the 't' values of partial b of irrigation potentiality and area under

contour bunding were found to be significant at 0.05 level of probability and non-significant respectively.

According to higher beta values (b'), the rank order for annual income was first, knowledge about watershed management technology was second, irrigation potentiality third and area under contour bunding fourth as per their effect on techno-economic change. It is, therefore, indicative that the relative importance of the annual income was more than other three variables.

It is obvious from the data in Table 2 that the variable annual income alone contributed to 67.11 per cent variation on the techno-economic change, followed by annual income + knowledge about watershed management technology accounted for 70.02 per cent, the earlier two variables +

irrigation potentiality accounted for 71.91 per cent, the earlier three variables + area under contour bunding accounted for 72.63 per cent variation in techno-economic change.

Table 2: Stepwise variation accounted by four independent variables on extent of techno-economic change

Sr	Variable included	Multiple regression coefficient 'R'	Coefficient of multiple determination 'R ² '	Total variation accounted (%)
1	Annual income (X ₄)	0.8182	0.6711	67.11
2	X ₄ + Knowledge about watershed management technology (X ₉)	0.8368	0.7002	70.02
3	X ₄ + X ₉ + Irrigation potentiality (X ₆)	0.8480	0.7191	71.91
4	X ₄ + X ₉ + X ₆ + Area under contour bunding (X ₈)	0.8522	0.7263	72.63

FINDINGS

The discussion leads to conclude that out of fourteen fitted independent variables, four variables, viz. annual income, irrigation potentiality, area under contour bunding and knowledge about the watershed management technology accounted 72.63 per cent variation in the extent of techno-economic change. The order of contribution of these four variables from the highest to the lowest based on the values of standard partial b' was annual income, knowledge about the watershed management technology, irrigation potentiality and area under contour bunding. The variable annual income alone contributed to 67.11 per cent of total variation in the extent of techno-economic change.

IMPLICATIONS

The variable annual income alone contributed significantly to the prediction of the extent of techno-economic change. It, therefore, implies that the farmers of watershed area should be encouraged by the project implementing authority to start some subsidiary occupations like; dairy, poultry keeping, bee keeping, sericulture,

mushroom cultivation etc. for increasing their annual income. This may help in solving the unemployment problem in tribal area and will lead to contribute to the input use behaviour in farming.

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