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Determination of Factors Affecting Cauliflower Yield in Punjab, Pakistan

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ABSTRACT

Data gathered from two villages of Sargodha district were analyzed to identify various factors enhancing cauliflower yield. The results indicate that the most important inputs are irrigation, farmyard manure and fertilizer nutrients. It was also learnt that further increase in the use of these inputs could substantially improve the crop output. Education and farming experience of the farmers are of great significance for the concerns of the policy makers, since the effect of these variables was estimated significant.

Key Words: Cauliflower; Farmers; Factors; Production function; Punjab; Yield

INTRODUCTION

The numbers of small farms are increasing over time mainly due to division and subdivision and sale and resale of farms. These small farms are inefficient for growing crops such as wheat, cotton, sugarcane and rice, since a lot of money resource is prerequisite for growing these crops. While small farmers are lacking basic technologies and adequate funds. On the other hand, landless labour class is abundant in the rural areas. With such circumstances, crops that are short duration and fetch high returns are suitable for such farms. Such crops are vegetables that not only give high returns but they are also a cheap source of essential nutrients. In Pakistan, vegetable cultivation is limited to vicinity of cities and comprises 1 and 2% of total cropped area, respectively in Pakistan and Punjab (Government of Punjab, 2002) as compared to 15% in Taiwan (Ali, 2000). This indicates low availability of vegetables to consumers.

Since, vegetable production is labour intensive enterprise; it could engage landless and unskilled labour force in the rural areas. Studies indicate that vegetable cultivation creates more employment opportunities than that of growing other crops such as cereals (AVRDC 2001; Bakhsh & Ashfaq, 2004). Also, vegetable production fetches higher returns than other crops such as cereals. IFPRI (1998), AVRDC (2001), Ahmad *et al.* (2003a, b, c) and Bakhsh (2002) concluded that vegetable cultivation is highly remunerative practice as returns per kg and per day are too much high.

Cauliflower is one of the most cultivated vegetables in the Punjab. Its crop management is labour intensive technique requiring a lot of permanent and casual hired labour particularly during weeding, hoeing and harvesting. However, little research effort is carried out to identify various factors affecting cauliflower yield. This is ignored because of the fact that it occupies a small percentage of total cropped area in Punjab province.

One of the ways helping small farmers is to provide information regarding various input uses that contribute substantially towards higher yield of cauliflower. It, thus, renders unavoidable that the inputs, which have great significance in the production of cauliflower, should be worked out, so as to suggest best production packages. The present research was designed to ascertain various inputs and socioeconomic characteristics that could increase cauliflower yield.

METHODOLOGY

The present study was conducted in the surrounding of Sargodha for the year 2003-04. A total of 35 respondents of cauliflower growers were interviewed from two villages by using purposive sampling technique. Data collected from the respondents were used to estimate various factors influencing the cauliflower yield. For this purpose, a Cobb Douglas type production function was employed. Seed rate was not included in the model, since variation was not found significantly different among the individual farmers. The inputs used in the analysis were taken on the per acre basis.

Log linear form of production function[1] is detailed below:

Where

LnYLD= Natural logarithm of yield per acre in kg
LnLAGE= Natural logarithm of age of the respondent in years
LnFEXP= Natural logarithm of farming experience of the respondents in years
LnEDUC = Natural logarithm of schooling years of the respondents

[1] $LnYLD = C + b_1LnAGE + b_2LnFEXP + b_3LnEDUC + b_4FMLYSZ + b_5LnLP + b_6LnFYM + b_7LnIRR + b_8LnPPM + b_9LnNP + U$

LnFMLYSZ= Natural logarithm of family size of the respondents
LnLP= Natural logarithm of number of tractor hours used for land preparation
LnFYM= Natural logarithm of farmyard manure in trolleys
LnIRR= Natural logarithm of number of irrigations
LnPPM= Natural logarithm of Plant protection measures in Rs
LnNP= Natural logarithm of nitrogen and phosphorus in kg
U = Random error term independently and identically distributed with zero mean and constant variance
C and b_i are coefficients of the parameters

RESULTS AND DISCUSSION

A Cobb Douglas type production function was used to determine various factors contributing towards higher yield per acre. A total of nine variables were included in the model. Out of these nine variables, two were statistically significant at 1% probability level, three at 5%, one at 10% and other three statistically non-significant. R^2 was found to be 0.68 indicating that the aforementioned variables were affecting cauliflower yield by 68%. Results are given in the Table I.

Table I. The Production Function Estimates of Cauliflower

Variables	Coefficients	Standard error	t-value	Significance
Constant	7.650	0.99	7.66	0.00
LnAGE	-0.08	0.15	-0.55	0.58
LnFEXP	0.08	0.04	7.67	0.00
LnEDUC	0.05	0.02	2.40	0.02
LnFMLYSZ	0.04	0.09	1.67	0.10
LnLP	0.11	0.08	-0.55	0.58
LnFYM	0.19	0.04	2.40	0.02
LnIRR	0.24	0.14	1.99	0.05
LnPPM	-0.20	0.10	1.34	0.19
LnNP	0.14	0.04	5.36	0.00

Dependent variable: logarithm of Yield in kg
R^2 = 0.68 F value = 13.99 Number of observation = 35

The coefficient of age of the respondents (LnAGE), although statistically non-significant, point out that 1% increase in the age of the respondent would negatively affect the cauliflower yield while keeping other variables constant. This is due to the fact that the working efficiency of aged people decline over time. However, the coefficient of farming experience of the respondent (LnFEXP) was positive and significant at 1% probability level. As the farming experience of the cauliflower growers increases with the passage of time, they become more efficient in resource management because individuals learn through experience. Family size was included in the analysis to determine its impact on the cauliflower yield. Its coefficient, although positive, was statistically non-significant at 5% probability level. However, it was significant at 10% level of significance. Cauliflower growing practice requires more labour force for various farm management practices such as sowing, weeding, thinning, application of inputs and harvesting. The vegetable growers with large family size have advantage of availability of labour force over others whose family size is small.

Education is one of the most important factors that could improve yield of any crop substantially. In the case of this study, it was learnt that its coefficient was positive and statistically significant indicating that a 1% increase in the number of schooling years could increase the yield of cauliflower growers by 0.05%. Results of the current study support those reported earlier (Raza & Ramachandran, 1990; Lin, 1991; Tilak, 1992).

Land preparation variable has a positive coefficient but it is non-significant. Irrigation application has a significant impact on the cauliflower yield. A 1% rise in the irrigation application could result a 0.24% increase in the yield of cauliflower.

Effects of farmyard manure and inorganic nutrients such nitrogen and phosphorus were substantial on the cauliflower yield. The statistics indicate that if application of farmyard manure is increased by 1%, this additional farmyard manure would result a rise of yield by 0.19%. Similarly, combine effect of nitrogen and phosphorus is 0.14% if these inorganic nutrients are increased jointly by 1%.

The coefficient of plant protection measure was negative indicating that 1% more application of plant protection measure would decline the yield by 0.20%. It could be because of intensive use of pesticide on the cauliflower crop without consulting any expert and department of agriculture.

CONCLUSIONS

Farmyard manure, irrigation and fertilizer nutrients such as nitrogen and phosphorus are important factors contributing towards higher yield of cauliflower. The coefficients of these variables point out that additional use of the above mentioned variables can further enhance output of cauliflower if and only if these variables are used according to the recommendation given by the department of agriculture, Punjab.

Socioeconomic characteristics such as farming experience, education and family size of the respondents have significant impact on the cauliflower yield. There is a dire need to arrange training programs and workshops on vegetable production. Such trainings and programs should emphasize on new production techniques and technologies relevant to vegetables.

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