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Resource productivity and resource use efficiency in *mrugbahar* sweet orange production

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ABSTRACT

Sweet orange (*Citrus sinensis* Osbeck) is one of the important fruit crops in India. Investigation was carried out in Nanded district of Maharashtra specially on mrugabahar season of sweet orange. The data pertained to the year 2007-08. The study was conducted to know resource productivity, resource use efficiency and optimum resource use in mrugabahar sweet orange production. Cobb-Douglas production function was fitted to the data. The results revealed that the partial regression coefficients of manure (0.126), irrigation (0.124), machine labour (0.048) and hired human labour (0.092) were positive and significant. It revealed that these resources when increased by one per cent each, that led to increase the production of sweet orange by 0.126, 0.124, 0.048 and 0.092 per cent, respectively. With regard to optimum resource use it was observed that optimum use of manure was300.34 quintals followed by irrigation (11823.26 m^3), hired human labour (109.65 man days), machine labour (16.95 hours) and potash (125.91 kg).

Key words : Production, Productivity, Optimum, Marginal, Regression

INTRODUCTION

Production of sweet orange can be taken in two seasons which are designated as *mrugbahar* and *ambebahar* sweet orange. In *mrugbahar* water stretch treatment is given to the garden in the month of April-May. The flowering is occurring in the month of June-July and harvesting can be completed in the month of February-March. On the contrary, in *ambebahar* water stretch treatment is given to the garden in the month of November-December. The flowering is occurring in the month of January-February. Harvesting is done in the month of September-October. Thus *mrugbahar* is more important because of high price for producer and more sweetness of fruit for consumer. In the production of *mrugbahar* sweet orange, water resource is very important. Similarly, human labour, bullock labour, area of garden, fertilizer are also playing vital role in sweet orange production. Hiremath *et al.* (1994) studied resource use efficiency in lime orchards in Bijapur district of Karnataka. The Cobb-Douglas type of production function was used for studying the resource productivities. Similarly, there is need to know the marginal productivity and efficiency of rupee spent on the sweet orange production. By keeping in view, the present study has been undertaken.

MATERIALS AND METHODS

Study was conducted in Nanded district of Maharashtra state. The total sample consisted with 50 *mrugbahar* sweet orange cultivators spread over ten villages, of Nanded tehsil. From each village five *mrugbahar* sweet orange growers were selected. The Cobb- Douglas type of production function was fitted to evaluate the resource use efficiency in *mrugbahar* sweet orange garden. The form of production function was as follows.

$$Y = ax_1^{b1} .x_2^{b2}.....x_n^{bn} .e^u$$

$$Y = ax_1^{b1}.x_2^{b2}.x_3^{b3}.x_4^{b4}.x_5^{b5}.x_6^{b6}.x_7^{b7}.x_8^{b8}\ x_9^{b9}.x_{10}^{b10}$$

Where, Y =Yield of sweet orange (q/garden), a = Intercept of production function, b_i = regression coefficients of the respective resource variable (i = 1, 2, 3, …. 5), X_1 = area of sweet orange garden (ha/garden), X_2 = hired human labour (man days/garden), X_3 = bullock labour (pair days/garden), X_4 = machine labour (hours/ garden), X_5 = manures (q/garden), X_6 = nitrogen (kg/ garden), X_7 = phosphorus (kg/garden), X_8 = potash (kg/ garden), X_9 = irrigation (m^3/garden), X_{10} = family human labour (man day / garden). The function was transformed into log linear form as follows.

$$\text{Log } Y = \log_a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + b_6 \log x_6 + b_7 \log x_7 + b_8 \log x_8 + b_9 \log x_9 + b_{10} \log x_{10}$$

Cobb-Douglas production function allows either constant, increasing or decreasing marginal productivity. The MP equation is MP=bY/ X where b is partial regression coefficient of particular independent variable. X=geometric mean of particular independent variable. Y=Geometric mean of dependent variable. MVP of various input worked out by the formula; $MVP = b_i Y Py /X$, Where, b_i = partial regression coefficient of particular independent variable, X = geometric mean of particular

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