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Original Research Article

Resource Use Efficiency of Gram Cultivation in Gonda District of U.P.

Madhusoodan Singh[1], K. K. Singh[2*], G. P. Singh[3], R. A. Singh[4], Santosh Tripathi[5] and Vinod Singh[6]

[1]M.Sc (Ag) Agril. Eco., N.D.U.A.T., Faizabad (U.P.), India
[2](Agril. Eco.), ZARSS, Baribagh, Ghazipur, N.D.U.A.T., Faizabad, India
[3]Department of Agril. Eco., N.D.U.A.T., Faizabad, India
[4]Department of Agril. Eco., D.R. Office, N.D.U.A.T., Faizabad, India
[5]Regional Manager, Khetan Chemicals and fertilizers Ltd., Bihar, India
[6]J.R.A., ZARSS, Baribagh, Ghazipur, N.D.U.A.T., Faizabad, India
**Corresponding author*

Keywords

Cobb-Douglas production ,Efficiency Gram Cultivation

A B S T R A C T

Gram is one of the important pulse crop of India. India is the largest producer of Gram. The production of cereals increased by 460 per cent since 1950-51, but the production of pulses in country has increased only 178 per cent. There is acute shortage of pulses in the country. The prices have increased considerably and the consumer is hard hit to the pulse requirement. India alone covers nearly 52.5 per cent of the world acreage and production of crop. It is used for human consumption, as well as, for feeling to animals. The study is based on 100 respondents of various size-groups Vz3, marginal, small and medium. Multistage stratified proportionate random sampling procedure was applied for selection of respondents. Cobb- Douglass production function was applied for estimating resource use efficiency of gram cultivation. Objective of the study is to workout resource use efficiency of Gram cultivation. The study indicates diminishing return to scales as sum of elasticities were deserved less than unity in case of all categories of forms. The included factors in functional analysis viz X1, X2, X3, X4 and X5 representing per ha. Value of seed, manures and fertilizers, irrigation cast, human labour and plant protection, respectively. High value of R2 (Coefficient of multiple determination) ranging from 0.93 to 0.96 was observed, which explaining that 93 to 96 per cent variation in yield of gram crop is explained by included factor in the study area. MVPC (Marginal Value Productivity) of all included factors were found more than unity, explaining that there is further scope of investment on this factors to realizing optimum production. It is inferred that gram cultivation is suitable for upgrading food security mission of India.

Introduction

India is the largest producer of pulses in the world with 25 per cent share in the global production. Chickpea, pigeon pea, mung bean, urd bean, lentil and field pea are important pulse crop contributing 39 per cent, 21 per cent, 11 per cent, 10 per cent, 7 per cent and 5 per cent of total pulse production in the country. (Hindu survey of Agriculture, 2009). In India, the total food production in 2013-14 was about 257.4 million tones out of which only 19.3 million tones was contributed by pulses. The production of cereals increase by 460 per cent since 1950-51 but the production of pulses in the country has increased only 178 per cent. There is acute shortage of pulses in the country.

Gram, commonly known as “Chickpea” or ‘Bengal gram’ is the most important pulse crop of India. India alone covers nearly 52.5 per cent of the world acreage and production of gram. Chickpea occupies about 38 per

cent of area under pulses and contributes about 50 per cent of total pulse production of India. It is eaten both whole fried or boiled and salted, or more generally in the form of the split pulse which is cooked and eaten.

The study is based on 100 respondents. Multistage stratified random sampling producer was applied for selection of respondents. Cobb-Douglas production function was applied for estimating the resource use efficiency. The study pertains to agricultural year 2014-15. Objective of present research work is to work out resource use efficiency of gram cultivation in Gonda distt of U.P. This study seems to helpful in uplifting the level of food security mission of India.

Materials and Methods

Gonad district of Uttar Pradesh was selected purposively to avoid the operational inconvenience of the investigator. A list of all 18 block of the Gonda district of U.P. was prepared and arranged in ascending order of area under gram cultivation. The block, namely, Nawabganj enjoyed highest acreage under gram was purposively selected. A list of villages growing gram was prepared from selected block and five villages were randomly selected for study.

A list of all gram growers of each selected village was prepared along with their size of holding. The cultivators were stratified into 3 categories, marginal (below 1 ha), small (1 to 2 ha) and medium (2-4 ha). Finally 100 farmers were selected randomly according to their proportion under various categories. The primary data were collected by survey method through personal interview technique with the use of pre structured and pre tasted schedule while secondary data were collected from journals, reports and records of district and block headquarter. The study covers the agriculture area 2014-15. Cobb-Douglas production function was applied for estimating resource use efficiency of various resources used in production of gram in the study area.

Results and Discussion

The Cobb-Douglas production function was applied to find out the efficiency of various resources used in the production of gram. Resources use efficiency estimates are presented in Table-1. It is evident from the table that magnitude of sum of the elasticity or return to scale was found less than unity on various size group of forms. This indicate that production of gram is characterized by diminishing return to scale in the study area. This functional analysis also revealed that included factors explains more than 90 per cent variation in yield on different size group of farms in the study area. High value of estimated R^2 (Coefficient of multiple determination) ranges from 0.93 to 0.95 explains that 93 to 96 per cent variation in yield of gram cultivation is explained by five included factors Viz X_1, X_2, X_3, X_4 and X_5 representing per ha value of seed, manures and fertilizers, irrigation charges, value of human labour and plant protection measure, respectively in the study area. This justified that selection of included factors for function analysis is well done by the investigators.

Table-2 reflects the MVP (marginal value productivity) of included factors in the functional analysis of gram cultivation. It is clear from the table that value of MVP of X_1, X_2, X_3 X_5 factors were more than unity in case of marginal, small and medium farms, indicating that there is further scope of investment on these factors to optimize their application for realizing optimum return, x_4 factors gives the mixed trend of MVP. Less than unity value of MVP explains that excessive application of that factors was practiced.

Table.1 Resource use efficiency estimator of gram on different size of sample farms in the Study area

Size group of sample farms (ha)	Production elasticities					Sum of elasticities	R^2
	X_1	X_2	X_3	X_4	X_5		
Marginal	0.1921779 (0.0431015)	0.3254295 (0.0291876)	0.1963866 (0.0776828)	0.0096315 (0.0151156)	0.1274335 (0.027649)	0.8510591	0.9377083
Small	0.2129838 (0.066461)	0.2687102 (0.0406391)	0.1843513 (0.2034531)	0.125412 (0.1102651)	0.091676 (0.0381317)	0.8831333	0.9608139
Medium	0.2240608 (0.088851)	0.3395642 (0.0656621)	0.1838429 (0.0759404)	0.0038022 (0.0338425)	0.1493141 (0.0603214)	0.9005842	0.9438462

(Note: Figures in parenthesis denotes standard error of respective variables); X_1, X_2, X_3, X_4 and X_5 denotes for seed, manure and fertilizer, irrigation charges and human labour and plant protection cost respective.

Table.2 Marginal value productivity (MVP) of included factors in Production process of gram crop

Size group of farms	MPV				
	X_1	X_2	X_3	X_4	X_5
Marginal	1.4813	23.1945	6.3295	0.3606	16.2747
Small	1.5324	10.6291	4.2543	4.0474	12.6892
Medium	10.6731	9.2371	3.8320	0.1870	30.9548

Gram is an important pulse crop of India. The Study is based on 100 respondents of various size group of farms falling under Gonda district of U.P. Respondents were selected by multistage stratified proportionate random sampling procedure. Cobb-Douglas production function was applied for estimating resource use efficiency of Gram Cultivation in the study area.

The resources used for functional analysis were X_1-per ha. Seat cast, X_2-per ha. manure and fertilizer cast, X_3-per ha. Irrigation charges, X_4 per ha. Human labour cost & X_5 per ha. Plant protection cost.

The functional analysis is characterized by diminishing return to scale. High value of R^2 (0.93 to 0.96) indicates that factors are jointly explaining 93 to 96 per cent variation in yield. MVP of X_1, X_2, X_3 & X_5 were observed more than unity which indicates that there is further scope of investment of these factors to attain optimum allocation of these resources, as well as, optimum level of production of Gram in the study area.

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