

A STUDY ON ECONOMIC ANALYSIS OF MUSTARD CROP IN RAJASTHAN

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(Received : August, 2013 : Revised : September, 2013; Accepted : October, 2013)

Abstract

The study was conducted in Alwar district of zone IIIb (flood prone eastern plain) of Rajasthan state with the objective to review the growth rate in area and productivity of mustard, to compute the cost and returns of mustard production and find out the gap between recommended and actual use of input and yield of mustard. The primary data were collected from randomly selected 120 mustard growers of Alwar district. The growth rate of mustard in both cases of area and productivity was found negative for a period of time (2001-2011) for Alwar district, zone IIIb and Rajasthan state as a whole. The per hectare cost of cultivation was calculated Rs. 30615/- and benefit- cost ratio was estimated 1: 2.67 and 1: 1.92 as per variable and total costs respectively. It was concluded on the basis of yield gap that actual yield was less as compared to potential yield of recommended inputs viz. 29.4 percent per hectare.

Key words

Mustard Crop, Economics Analysis

Introduction

India ranks second in area and fourth in world's production of oilseeds. Rapeseed-mustard contributes 26.1 percent and 29.1 percent of the total area and production of the country, respectively. Rajasthan ranks first in area of rapeseed-mustard. The important state producing oil seeds are Gujarat, A.P., M.P., Maharashtra, Karnataka, U.P. and Rajasthan of the different oil seed contributing to the oilseed basket, 50% comes from groundnut, rapeseed-mustard account 25% sesame 16% safflower 5% and niger 4%. In north India mustard is an important oil seed crop. The groundnut occupies first place than mustard according to area and production. Rajasthan state ranks first both area and production of mustard crops among all states of India. The production of mustard in the state 38.84 lac tones from an area of 24.89

lac hectare during 2010-11 (Anonymus, 2012). For increasing the production of mustard seed, fertilizer plant protection measures and irrigation play an important role. Among these inputs fertilizer input has special place because its use can be augmented easily owing to farmers awareness of its advantages in other crops. In Rajasthan state, zone IIIb "Flood prone Eastern Plain occupies 742012 hectare area of mustard whereas the Alwar district alone covers 252730 hectare area under mustard crop. Recorded production of mustard was 12.54 and 4.26 lac tones in Flood Prone Eastern Plain Zone III b and Alwar district respectively during year 2010-11 (Table-1). Mustard crop is grown during *rabi* season as both irrigated and rainfed condition. The production of mustard crop in Rajasthan vary every year due to a number of factors viz., seasonal conditions, area under crop, level of inputs used price of mustard, etc. The yield price of mustard and price of inputs play an important role in enhancing mustard cultivation.

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Published by Indian Society of Genetics, Biotechnology Research and Development, 5, E Biotech Bhawan, Nikhil Estate, Mugalia Road, Shastripuram, Sikandra, Agra 282007

Online management by www.isgbrd.co.in

Keeping in view the deficit of oilseed production in the country and the role of mustard in agricultural industrial economy of the state, the present study “A study on economic analysis of mustard crop in Rajasthan” was aimed to work out the profitability.

1. To review the growth rate of area and productivity of mustard crop in Alwar.
2. To compute the cost returns and profitability of mustard crop.
3. To find out the gap between recommend and actual use of inputs and yield of mustard crop.

Methodology

The secondary data were used to fulfill the first objective of the study and for the second objective the primary data were utilized. For third objective, secondary as well as primary data were used. A simple random sampling technique was used. Ramgarh and Rajgarh tehsil of Alwar district were selected randomly. Six villages of these tehsils i.e. Niwali, Baramada, Chandigarh from Ramgarh and Dhigawada, Palwa and Gorkhpura of Rajgarh tehsil were selected by random sampling technique. Twenty mustard growers were selected randomly from each selected village irrespective of size group, making 120 farmers for study. The required primary data regarding the cost of cultivation of mustard were collected by survey method from selected farmers. For collection of data structural pre tested schedule was utilize. The data pertaining to mustard crop for *rabi* season, 2012-13 was recorded. Secondary data were used from vital agriculture statistic 2001-02 to 2010-11 and agriculture department of Alwar district of the Government of Rajasthan. Analytical techniques were used in study. Tabular analysis were used for calculating the cost and returns structure of the mustard crop, compound growth rate analysis was employed to measure the change in area and productivity of mustard crop. The compound growth rate of area and productivity of the mustard was computed by the following method as suggested by Acharya and Madhani (1988):

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Compound Growth Rate (CGR) =

$$\hat{\beta}^* = \frac{\sum Y^*t - \frac{(\sum Y^*)(\sum t^*)}{n}}{\sum t^2 - \frac{(\sum t)^2}{n}}$$

Where,

Y= Dependant Variable i.e. Area, Productivity.

t= Period (Serial numbers).

n= Total numbers of years.

C.Gr.Rate= Antilog of $\hat{\beta}^* - 1$

In percentage CGR = [(Antilog of $\hat{\beta}^* - 1$)] x 100

(Compound Growth Rate was estimated by taking the antilog of and subtracting one from this value. The value thus, get was multiplied by hundred to get the percentage per year growth rate).

Input gap analysis

The input / yield gap was estimated by subtracting the actual amount of input / yield used by farmers from the recommended dose of input / yield.

Fertilizer gap =

$$\frac{\text{Recommended dose of input} - \text{Actual used input}}{\text{Actual used input}} \times 100$$

Fertilizer gap =

$$\frac{\text{Yield of mustard production due to recommended technology} - \text{Actual yield at farmers}}{\text{Actual yield at farmers field}} \times 100$$

Result and discussion

Rapeseed-mustard occupies an important role among the nine major oilseed crops grown in Rajasthan, viz., Groundnut, rapeseed –mustard, sesame, linseed, castor, niger, safflower, soyabean and sunflower. Rajasthan is not only an important rapeseed-mustard producing state, contributing major share (i.e. 32.4%) of India's total production under this crop. Although the rapeseed-mustard is grown all over the state, important rapeseed-mustard growing districts of Rajasthan are Alwar, Bharatpur, Sawai Madhopur, Pali, Jalor and Sriganganagar. The area and productivity of mustard in the state, the zone III b and

Alwar district over a span of ten years (2001-02 to 2010-11) in given table-1. The Rajasthan state is divided into nine agro-climatic zones accordingly to NARP. The Flood Prone Eastern Plain Zone III b is one of them. The Alwar, Bharatpur, Dholpur, Sawai Madhopur and Karauli districts are included in this zone.

Growth rate

The compound growth rate of area and productivity of mustard crop in Rajasthan zone III b and Alwar district was estimated over a span of ten years (2001-02 to 2010-11) and presented in table-2. During 2001-02 to 2010-11 the trend in growth rate of area and productivity was negative. The growth rate of area was estimated (-) 2.15, (-) 2.61 and (-) 4.65 percent in case of Alwar, zone III b and state, respectively. Compound growth rate of productivity of mustard crop was calculated (-) 4.83 (Alwar), (-) 4.19 (zone III b) and (-) 2.68 percent. The area and growth rate of mustard is also reported Chauhan (2013) in a declining trend. The results are in line with studies conducted by Singh *et al.* (1995) in Uttar Pradesh.

Reasons for decline the area and productivity of mustard

A huge gap exists between the existing potential and realized yields of mustard crop in the country. Reduced crop yields can be attributed to the non-congenial weather conditions that prevail during the crop season. High temperatures prevailing during sowing time affect the germination and seedling stand right from the beginning, therefore, the need of thermo-insensitive varieties is much realized. The strategy for better crop management by applying FYM and balanced fertilizers to improve organic matter is yet required. Plant protection measures for the management of diseases like white rust, *Alternaria* blight, stem rot and insect like mustard aphid need proper and timely applications. The crop suffer frost injury and high yielding frost resistant varieties need to be explored. These might be some limiting factors for increase in area and productivity under mustard.

Costs and Returns of mustard crop

Cost of cultivation with existing practices of farmer in Alwar district of Rajasthan is given in table-3. The total cost (VC + FC) involved in mustard crop was Rs. 30,615/-. The total variable and fixed cost incurred were Rs. 22,082/- and Rs. 8,533/- per hectare, respectively. The important items of cost were human labour (34.30%) followed by rental value of land (24.50%), mechanic labour (12.58%) irrigation charges (9.8%), interest on VC and FC (3.44, 1.5%) and farm yard manure (2.94%). The highest cost incurred in human labour may be due to intensive use of labour required inter-culture, irrigation and harvesting operations. The agricultural land of Alwar district comparative fertile and high cost of land due to NCR. There was no use of draft animals in cultivation due to high mechanization. Fertilization in mustard crop shared 5.64% of total cost. The lowest costs were incurred in plant protection, depreciation on minor implement and land revenue i.e. 2.45, 1.63 and 0.16 percent of total cost. On an investment of Rs. 30,615/- per hectare in mustard crop, 17.0 quintal yield per hectare was harvested. The harvested yield was higher than the average yield of Alwar district (1686 kg/ha), (1691 kg/ha) and Rajasthan state (809 kg/ha). This was due to the adoption of latest technologies by the cultivators, viz., the use of high yielding varieties, timely irrigations, optimized use of manure and fertilizers and adoption of proper plant protection measures. The minimum support price (2012-13) of mustard crop Rs. 3000/- per quintal and local price of straw (Rs. 225/- per quintal) used to calculate the gross income. The gross and net income were calculated Rs. 58,875/- and 28,260/- per hectare, respectively. The net return per rupee or benefit cost ratio as per variable cost and total cost were computed 1:2.67 and 1:1.92, respectively. The per quintal cost was calculated Rs. 1800/- per quintal.

Gap analysis for fertilizer and yield

This section deals with the gap between recommended dose of input and actual use of inputs

and yield difference between potential yield by use of recommended input and actual harvested average yield on farm field. The vast gap exists between the actual yield obtained at farmers' field and yield got at the Agricultural Research Station in spite of advancement in agriculture technologies to attain higher yield. Data in table 4 reveals that the zinc sulphate (-100%), sulphur (-62.5%), phosphorus (-62.5%), nitrogen (-37.5%) and farm yard manure (-70%) per hectare were used below the recommended doses. On the basis of yield gap analysis it could be remarked that actual yield was less as compared to potential yield of recommended inputs viz., 29.4%

per hectare.

Conclusion and Policy implications

The compound growth rate of mustard crop in both cases of area and productivity was found negative in Alwar district, zone IIIb and the state. The per hectare cost of cultivation was computed Rs. 30615/- . It harvested 17.0 q /ha seed yield which was higher than the average yield of Alwar district, zone IIIb and the state. Rs. 58875/- and Rs. 28260/- per hectare gross and net income were estimated respectively. Benefit- cost ratio was estimated 1: 2.67 and 1: 1.92 as per variable and total cost, respectively.

Table 1. Area and productivity of mustard crop

Year	Area (ha)			Productivity (kg/ha)			Rainfall (mm)
	Alwar	Zone III b	Raj. state	Alwar	Zone III b	Raj. State	
2001-02	216820	639121	1760185	1274	1148	1084	567
2002-03	18966	497304	1191566	762	919	989	235
2003-04	220253	659509	2062722	1530	1400	1306	834
2004-05	291956	921022	3286659	1251	1222	1174	532
2005-06	289249	929438	3558679	1055	1209	1232	725
2006-07	256504	803017	3099570	1390	1297	1215	520
2007-08	234517	697605	2458197	1219	1171	957	604
2008-09	269865	825214	2738014	1661	1482	1266	947
2009-10	251375	751158	2212339	1563	1484	1316	511
2010-11	252730	742012	2489906	1686	1691	1560	809

Source: Vital Agriculture Statistics 2001-02 to 2010-11, Directorate of Agriculture, Rajasthan.

Table 2. Compound growth rate of mustard crop (%) 2001-02 to 2010-11

Item	Alwar	Zone III b	Rajasthan state
Area	(-) 2.15	(-) 2.61	(-) 4.65
Productivity	(-) 4.83	(-) 4.19	(-) 2.68

S.	Particulars	Unit	Quantity	Rate	Value	% TO-TC
1.	Human labour	Day	60	Rs. 5/day	10500	34.30
2.	Machine labour	-	-		3850	12.58
3.	Material used					
	i.FYM	q	30	Rs. 30/q	900	2.94
	ii.Seed	kg	5	60/kg	300	0.97
	iii.Fertilizer / chemicals					
	Nitrogen	kg	50	14/kg	700	2.28
	Phosphorus	kg	15	18.64/kg	280	0.91
	Sulphur	kg	15	50/kg	750	2.45
	Plant protection	-	-	-	750	2.45
4.	Irrigation charges	hrs	40	75/hr	3000	9.80
5.	Interest on working capital @ 10% for 6 months	-	-	-	1052	3.44
	Total variable cost				22082	72.12
	i.Land revenue			50/ha	50	0.16
	ii.Rental value of land for 6 months			7500/ha	7500	24.50
	iii.Depreciation on minor implements			Approx.	500	1.63
	iv.Interest on TFC @ 12% for 6 months			483		1.57
6.	Total fixed cost				8533	27.87
7.	Total cost = (TVC + TFC)				30615	99.99
	Returns					
	Grain yield	q/ha	17			
	Straw yield	q/ha	35			
	Value of yield on MSP	Rs./q	3000		51000	
	Value of straw	Rs./ha	225		7875	
	Gross income	Rs./ha			58875	
	Net income (GI-TC)	Rs./ha			28260	
	Benefit cost ratio					
	i.As per V.C.				1:2.67	
	ii.As per T.C.				1:1.92	
	Cost of production	Rs./q			1800	

Table 4. Gap analysis of mustard crop

Sr.	Item	Recommended dose	Existing dose / actual use	Gap
1.	Seed (kg/ha)	4-5	05	
2.	Nitrogen (kg/ha)	80	50	(37.5) 50 kg
3.	Phosphorus (kg/ha)	40	15	(62.5) 25 kg
4.	Sulphur (kg/ha)	40	15	(62.5) 25 kg
5.	Zinc sulphate (Zn) (kg/ha)	20	NIL	-(100) -20kg
6.	Seed treatment	Yes	NIL	-(100)
7.	Soil treatment	Yes	30	-(100)
8.	FYM (q/ha)	100	17	-(70) 70
9.	Yield (q/ha)	22	05	(29.4) 5

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