Economic Attributes of Inputs on Yield of Mustard (*Brassica juncea* L.)

Suresh S. Tomar and D. S. Gautam

Jawaharlal Nehru Krishi Vishwa Vidyalaya,
Zonal Agricultural Research Station,
Morena 476 001 (M. P.), India

Contribution of inputs in different levels of productivity is one of the established facts in crop production but the extent of variation in contribution of input varies according to agroclimatic situations. Mustard is one of the predominent crops in cropping system of Chambal division. No information is available on contribution of different factors of production on yield and economics of mustard (*Brassica juncea* (L) Czernj & Coss). Therefore, an experiment was conducted to work out the per cent contribution of different inputs.

Field experiment was laid out at JNKVV-Zonal Agricultural Research Station, Morena (M.P.) during *rabi* season of 1982- 83 on sandy loam soil. The soil had 7.6 pH and available N, P_2O_5 and K_2O content was in the order of 200-20, 22.00 and 400 kg/ha, respectively. Total rainfall received during the crop season (Oct. 1982-Feb. '93) was 53.4 mm. There were eight different treatments, viz., T_1 = control (without fertilizer, irrigation and plant protection), $T_2 = T_1$ + Fertilizer (75 kg N + 40 kg P_2O_5 + 20 kg K_2O/ha, $T_3 = T_1$ + irrigation only (once at pre-flowering stage), $T_4 = T_1$ + plant protection (seed treatment with thiram, one spray of metasystox + Dithane M-45 and second of Dimecron), $T_5 = T_1$ + Fertilizer + Irrigation, $T_6 = T_1$ + Fertilizer + Plant protection, $T_7 = T_1$ + Irrigation + Plant protection and $T_8 = T_1$ + Fertilizer + Irrigation + Plant protection.

The above eight treatments were tried in Randomized Block Design with four replications having a net plot size of 12 square meter. The Varuna (T-59) variety of mustard was sown on 22nd October, 1982 and harvested from 20-26th Feb. 1983. Data on main yield attributes and yield were recorded. Economics was calculated on the basis of marginal cost concept and rate of return.

Yield and its attributes

Data presented in Table 1 show that differences due to treatments were significant for number of primary branches/plant, siliqua/plant, seeds/siliqua, Test weight and seed yield kg/ha. Appreciable treatment differences were also noted in case of secondary branches. The highest seed yield of 1104 kg/ha was recorded by treatment T_8 (Fertilizer + irrigation + plant protection) which was significantly superior to all other treatments

TABLE 1

Plant stand, yield attributes and yield as influenced by different treatments.

Treatments	Plant stand\ net plot	No. of branches plant		No.of siliqua/ plant	No. of seeds/ siliqua	Test weight (g)	Seed yield (kg/ha)	Per cent contribution over control
		primary	secondary					
T_1	191	3.30	2.95	114.25	12.15	4.46	364	—
T_2	203	3.60	4.40	146.55	13.36	4.90	812	123.8
T_3	221	3.67	3.75	126.85	12.20	4.73	427	17.34
T_4	223	3.55	3.50	126.00	12.29	4.82	527	43.13
T_5	219	3.65	4.80	139.45	13.31	4.87	771	111.81
T_6	224	3.35	4.95	149.60	13.40	4.95	1010	177.47
T_7	191	4.20	3.85	121.05	12.29	4.91	572	57.14
T_8	205	4.60	5.00	162.30	13.46	4.98	1104	203.30
S. Em ±	20.30	0.27	1.04	10.81	0.31	0.12	75.8	
C. D. (5 %)	N.S.	0.79	N.S.	31.58	0.95	0.37	222.1	

TABLE 2

Production cost of mustard cultivation under different treatments (yield q/ha, cost and return Rs/ha).

Treat-ments	Yield		Total return	Cost		Total (TC)	Net return	Additional		Marginal cost/kg (YC/Q)	Rate of return (%)
	Seed	Stover		Fixed	Variable			Yield (Q)	Cost (VC)		
T_1	3.64	11.65	1479.12	519.47	575.00	1094.47	348.65	—	—	—	35.14
T_2	8.12	22.50	3304.25	536.46	1390.41	2066.87	1237.38	4.48	972.40	2.17	37.44
T_3	4.27	13.24	1741.10	522.31	711.00	1233.31	507.78	0.63	136.00	2.15	41.17
T_4	5.21	15.89	2123.72	526.71	922.50	1449.22	674.5	1.57	354.75	2.25	46.57
T_5	7.71	23.13	3141.82	538.67	1496.41	2175.00	966.82	4.07	1080.53	2.65	44.44
T_6	10.10	30.30	4115.75	546.83	1887.91	2434.74	1681.00	6.46	1340.27	2.07	69.04
T_7	5.72	17.73	2328.32	528.92	1028.50	1557.42	770.89	2.08	462.95	2.22	49.49
T_8	11.04	32.89	4738.22	549.04	1993.91	2542.95	2195.27	7.40	1448.48	1.81	86.32

Note : Average cost of mustard seed @ Rs. 400/- and stover @ Rs. 2.50 per quintal at that time.

except (T_6) Fertilizer + plant protection (1010 kg/ha). Control yielded only 364 kg/ha. Anonymous (1983) also reported similar results.

The contribution of fertilizer on seed yield was to the tune of 123.08%, of irrigation 17.34%, of plant protection 43.13%, of fertilizer + irrigation 111.81% of fertilizer + plant protection 177.47%, of irrigation + plant protection 57.14% and combination of fertilizer + irrigation + plant protection 203.30%. These results are in close confirmity with observations made by Saini (1984).

Economics

Least cost input-output combination is climate criteria for selecting the best input-output combination for productivity and return. Additional productivity and cost per hectare of different inputs were worked out for calculating the marginal cost and per cent rate of return (Table 2). Net return per hectare of irrigation + fertilizer + plant protection combination was highest among all combination of input i.e. Rs. 2195.27. Fertilizer and irrigation input combination i.e. Rs. 1681 per hectare ranked second. Additional productivity per hectare of most of the other treatments were found comparatively low. The pattern of additional cost was almost same. On the basis of marginal cost analysis and per cent rate of return, further determine that lowest cost of marginal productivity was occured in combination of irrigation + plant protection + fertilizer i.e. Rs. 1.81 per kg and highest ranked in combination of fertilizer + plant protection i.e. Rs. 2.65 per kg. More or less same pattern was observed in per cent rate of return. Almost similar results in oilseed crop with respective inputs were reported elsewhere (Anonymous, 1989).

(Received on 18th May, 1994)

REFERENCES

Anonymous (1989). Contribution of different factor of production on yield of mustard. Progress report of XXXV Ann. Rabi oilseeds workshop of Rapeseed-Mustard for the year 1988-89. Directorate of Hyderabad : A-18.

Anonymous (1983). Response of mustard to different input component. Consolidated progress report of scheme on Intensification of Research and Training in Pulses and Oilseed crops for Command Area from 1979-83 JNKVV, Zonal Agril. Res. Station, Gwalior and RARS, Morena : 28-29.

Saini, J. S (1984). Agronomic consideration for raising oilseeds production under irrigated conditions. Research and Dev. Strategies for oilseeds production in India : 155-165.