

Production Potential of Wheat, Mustard and Gram under resource Constraints.

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A field trial was conducted for two consecutive *rabi* seasons during 1977-78 and 1978-79 at Agriculture Research Farm (Borwat) Banswara, Rajasthan, to study the production potential of wheat; mustard and gram with inputs like fertilizer and irrigation in limited supply. Results indicated that neither irrigation nor fertilizer levels caused any significant variation in grain yield of mustard and gram during both the years. In the case of wheat similar result was obtained during 1977-78 but in 1978-79 it decreased when fertilizer dose was reduced

In southern Rajasthan irrigation resources are rather limited, particularly in droughty years. Studies on limited irrigation to *rabi* crops are rather few. With the introduction of high yielding varieties of different crops, farmers are switching over to these varieties. In farmers field, these varieties do not yield as expected since farmers do not apply enough fertilizers and irrigation. This investigation was, therefore, taken up to find out the production potential of wheat, mustard and gram when the inputs, fertilizers and irrigation are supplied in limited quantity.

MATERIALS AND METHODS

A field experiment was conducted at Agriculture Research Farm (Borwat) Banswara with wheat (K. Sona) Mustard (T₅₉) and Gram (R.S.-10) during *rabi* 1977-78 and 1978-79, in a split plot design. The three crops (Wheat, Mustard and Gram) with 2 levels of irrigation (at opti-

mum and reduced levels were kept in main plots and in sub plots 4 levels of fertilizer applications viz. 100%, 75%, 50%, and 25% of the recommended dose for the respective crops were kept. Recommended fertilizer dose are 120-60-30, 40-40-30 and 20-60-30 Kg N, P₂O₅ and K₂O/ha for wheat, mustard and gram, respectively. Optimum number of irrigation is 6, 3 and 3 and reduced level is 3, 2 and 2 for wheat mustard and gram, respectively (including the sowing irrigation)

Soil of experimental plot was clay loam with sub angular blocky structure. Its PH was 7.8 and E. C. 0.4 m.mhos/c.m at 25°C and Organic carbon content 0.6%. Clay content was in the range of 40 to 45% C.E.C. varied from 50 to 60 meq/100g soil.

All the three crops were sown on 22.11.77 and harvested by the end of march 1978 during the first year and in the next year the crops sown on 30.11.78 and harvested on 30.3.79.

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RESULTS AND DISCUSSION

The data on the yield of grain recorded during the two years are presented in Table

TABLE : Effect of irrigation and fertilizer levels on grain yield of wheat, mustard and gram (q/ha).

Crop	Fertilizer level	Rabi, 1977-78		Rabi, 1978-79		Mean
		Optimum irrigation level	Minimum irrigation level	Optimum irrigation level	Minimum irrigation level	
1. Wheat	100%	55.83	47.50	35.00	31.50	42.46
	75%	46.66	47.66	35.00	29.00	39.58
	50%	47.50	43.66	34.50	29.50	38.79
	25%	38.83	41.33	31.00	28.00	34.79
	Mean	47.20	45.04	33.88	29.50	
	<i>Irrigation</i>	<i>Fertilizer</i>		<i>Irrigation</i>	<i>Fertilizer</i>	
S. E.	4.5952	3.6325	S. Em ±	1.0	0.76	
C. D. at 5%	N. S.	N. S.	C. D. at 5%	N. S.	2.35	
CV ₁ =	24.40%		CV ₁ =	10.90%		
CV ₂ =	13.64%		CV ₂ =	5.90%		
2. Mustard	100%	21.66	18.33	13.50	12.50	16.50
	75%	18.66	19.16	13.50	12.00	15.83
	50%	18.83	16.33	14.50	11.00	15.16
	25%	17.50	17.00	14.00	12.50	15.25
	Mean	19.16	17.71	13.88	12.00	
	<i>Irrigation</i>	<i>Fertilizer</i>		<i>Irrigation</i>	<i>Fertilizer</i>	
S. E.	1.7682	2.0894	S. Em ±	0.43	0.43	
C. D. at 5%	N. S.	N. S.	C. D. at 5%	N. S.	N. S.	
CV ₁ =	23.49%		CV ₁ =	11.55%		
CV ₂ =	19.62%		CV ₂ =	8.05%		
3. Gram	100%	37.33	34.33	31.50	30.00	33.29
	75%	32.33	35.33	28.00	30.50	31.54
	50%	35.66	34.33	29.50	30.50	32.50
	25%	37.33	32.00	30.50	30.00	32.45
	Mean	35.66	33.49	29.87	30.25	
	<i>Irrigation</i>	<i>Fertilizer</i>		<i>Irrigation</i>	<i>Fertilizer</i>	
S. E.	3.9754	1.8276	S. Em ±	2.64	0.75	
C. D. at 5%	N. S.	N. S.	C. D. at 5%	N. S.	N. S.	
CV ₁ =	27.95%		CV ₁ =	30.35%		
CV ₂ =	9.08%		CV ₂ =	6.10%		

The data of grain yield presented in table I reveal that neither irrigation level nor fertilizer schedules affected the yield of wheat, mustard and gram during 1977-78. In 1978-79 the different schedules of recommended dose of fertilizer are found to be significant for wheat only but levels of irrigations are non-significant. The grain yield of wheat decreased with reduction in the fertilizer schedule particularly at 25% of recommended dose. When 3 irrigations were given compared to optimum of 6 irrigations, the reduction in wheat yield was not substantial. In the case of mustard and gram neither irrigation nor fertilizer application made any significant effect on grain yield.

similar results were reported by Singh *et al.* (1977) for mustard.

Water use efficiency decreased with more frequent irrigations. The highest water use efficiency was under 3 irrigations (minimum) levels and this was due to comparatively lesser increase in grain yield with each additional irrigation.

REFERENCE

- SINGH, R. P., H. P. SINGH, H. S. DAWLAY, and K. C. SINGH 1977. Response of Brassicas to varying moisture initial soil profile saturation and fertility levels, *Indian J. Agron*, 22: 90-95.