

Sustainable yield of rainy-season oilseed crops in Satpura plateau zone of Madhya Pradesh

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Received: April 1993

New agricultural technology increased the production of oilseeds by 1.5–3.0 times in recent years. The higher productivity can be achieved with soil and water conservation, use of input-responsive varieties, moderate dose of fertilizer and pest control. All such practices guarantee sustained productivity over a wide range of environments in different years at the same location.

A field experiment was conducted during the rainy seasons of 1988–90 on farmers' fields to study sustainable yield of oilseed crops in soil ranging from low to medium in fertility. The soil texture varied from sandy clay to loamy clay and clayey. The available N was 200–240, P 6–12.5 and K 480–620 kg/ha, with pH 7.1–7.6. Oilseed crops, viz. soybean [*Glycine max* (L.) Merr.], sesame (*Sesamum indicum* L.), niger [*Guizotia abyssinica* (L.f.) Cass.], groundnut (*Arachis hypogaea* L.) and castor (*Ricinus communis* L.), were grown rainfed during the rainy season. Improved seeds of soybean varieties 'JS 72-44' and 'JS 75-46', sesame 'N 32' and 'JT 7', niger 'Ootacmund' and 'IGP 76', groundnut 'JL 24' and 'Gangapuri', castor 'Aruna' and '48-1' were tested. Seeds of all crops after inoculation (soybean and groundnut) and after treatment with fungicide were sown in June at the onset of monsoon except niger which was sown in second fortnight of July. Full fertilizer doses of N, P

and K @ 20, 26.2 and 16.66 kg/ha; 30, 13.1 and 8.3 kg/ha; 20, 8.73 and 0 kg/ha; 20, 26.2 and 16.16 kg/ha; and 40, 17.46 and 0 kg/ha respectively were applied for soybean, sesame, niger, groundnut and castor. In soybean and groundnut, fertilizer was dressed basal whereas in sesame and niger P and K were applied basal and nitrogen was given in 2 splits—two-thirds at sowing and one-third at 30 days after sowing in standing crop. In castor half dose of N was applied basal, one-fourth N at 30 days and the remaining at 60 days. Inter-culture operations and insect-control measures were undertaken as per the crop need. The control included *desi* varieties with less fertilizer dose and no insect-control measures. Soybean, groundnut, and sesame crops were harvested at maturity in October; niger in November; and castor in December. Yield data were statistically analysed (Singh *et al.*, 1990) for computation of sustainable-yield index.

A total of 846, 606 and 1,022 mm rains were recorded in 65, 41 and 55 days respectively during 1988, 1989 and 1990. The minimum yield was achieved in niger and the maximum in soybean compared with sesame (Table 1). Yields recorded in treatments were 2–3 times higher with high sustainable yield index than the control. The control yield showed minimum of 1.61 q/ha in niger and maximum of 16.15 q/ha in soy-

Table 1. Yield, standard deviation (SD), benefit : cost ratio and sustainable-yield index (SYI) of oilseed crops (mean data of 3 years)

Crop	Experimental field					Farmer's field (control)				
	Mean yield (q/ha)	Maximum yield (q/ha)	SD	SYI	Benefit : cost ratio	Mean yield (q/ha)	Maximum yield (q/ha)	SD	SYI	Benefit : cost ratio
Sesame	4.77	4.97	0.25	0.91	3.79	2.10	2.25	0.13	0.87	2.06
Niger	4.63	5.74	0.96	0.64	3.96	1.61	2.11	0.43	0.56	2.36
Groundnut	14.56	15.15	0.54	0.92	3.46	12.96	13.55	0.59	0.91	3.34
Castor	16.21	17.42	1.06	0.87	3.98	6.52	7.12	0.55	0.84	3.26
Soybean	21.37	25.71	3.86	0.68	4.26	14.76	16.15	1.29	0.83	3.83

Price (Rs/q) : Sesame, 1,050; castor, 500; soybean, 700; niger, 900; groundnut, 800

bean grown in were less affected than that of control.

The sustainable-yield index in the treatments was 0.64–0.72. It was 0.91 in sesame, which reduced to 0.87 in the control, thereby indicating that the minimum guaranteed yield would be more than 91% of potential yield (4.97 q/ha). Similar results were obtained with niger, groundnut, castor and soybean which showed higher values of index (0.64, 0.92, 0.87 and 0.68 respectively) over the control. This indicates that minimum guaranteed yield would be more than 64, 92, 87 and 68% of potential yields (5.74, 15.15, 17.42 and 25.71 q/ha) in these crops. The values

of sustainable-yield index with groundnut in treatment and the control were however at par (0.92 and 0.91).

Benefit : cost ratio was higher with treatments in all the crops than the control. Soybean showed highest ratio of 4.26 over the rest of the crops in treatments and the control (3.83). The lowest ratio of 3.76 was noticed with groundnut in treatment and 2.06 with sesame in the control.

REFERENCE

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