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Short Communication

Technological Gap in Cumin (*Cyminum cumin* L.) Production Technology in Arid Zone of Rajasthan

Bhagwan Singh
Central Arid Zone Research Institute, Jodhpur 342 003, India

Cumin (*Cyminum cumin* L.), an important spice crop of Rajasthan, occupies about 3.81 lakh ha area with total production of 1.45 lakh tones. The average productivity of cumin is very low (380 kg ha^{-1}) in the state. Low adoption of improved technologies is the major reason for poor productivity of cumin in the state. The present study was conducted to find out the relationship between socio-economic characteristics of the farmers and technological gap in cumin production technology.

The study was conducted in Jodhpur, Pali, Bikaner and Jaisalmer districts of Rajasthan. Two Panchayat Samities, from each district namely, Bilada and Osian from Jodhpur district, Rohet and Jetaran from Pali district, Nokha and Lunkaransar from Bikaner district and Pokharan and Jaisalmer from Jaisalmer District, were selected randomly. From each Panchayat Samiti one village and from each village 15 cumin growing farmers were randomly selected and thus the total sample size was 120. The data were collected through structured interview schedules.

For studying the technological gap, 11 important cultivation practices i.e., high yielding varieties, seed rate, seed treatment, time of sowing, method of sowing, spacing, application of nitrogenous fertilizers, application of phosphatic fertilizers, use of weedicides, irrigation and plant protection measures were considered. Sixteen independent variables namely age, education, caste, occupation, land holding, irrigation facilities, type of family, size of family, farming experience, annual income, extension contact, sources of information, economic motivation, scientific orientation, risk orientation and knowledge were computed for correlation coefficient in order to find out their relationship with the dependent variable, technological gap.

The term technological gap refers to the gap between the recommended package of practices and practices actually adopted in farming and was measured with the help of technological gap index (TGI):

$$TGI = \frac{R-A}{R} \times 100$$

where, R – recommended technology, and A - technology actually adopted by the farmers.

The majority (64.4%) of the farmers was in the age group of 31 to 50 years, illiterate (67.5%), belonged to backward caste (68.3%), dependent on farming or agriculture as main source of income (91.6%). Majority (85.8%) of the farmers

Table 1. Practice wise technological gap in cumin production technology

Technology	Technological gap (%)		
	Low (upto 33.3%)	Medium (33.3 to 66.6%)	High (above 66.6%)
Seed technology			
HYV seed in terms of area	4 (3.3)	7 (5.8)	109 (90.8)
Seed rate	70 (58.3)	30 (25.0)	20 (16.6)
Seed treatment	2 (1.6)	8 (6.6)	110 (91.6)
Spacing	7 (5.8)	10 (8.3)	103 (85.8)
Time of sowing	65 (54.1)	39 (32.5)	16 (13.3)
Method of sowing	1 (0.8)	2 (1.6)	117 (97.5)
Fertilizer technology			
Nitrogenous fertilizer			
Dose ha^{-1}	17 (14.1)	83 (69.1)	20 (16.6)
Method of application	26 (21.6)	30 (25.0)	64 (53.3)
Time of application	73 (60.8)	25 (20.8)	22 (18.3)
Phosphatic fertilizer			
Dose ha^{-1}	34 (28.3)	58 (48.3)	28 (23.3)
Method of application	70 (58.3)	45 (37.5)	5 (4.1)
Time of application	81 (67.5)	28 (23.3)	11 (9.1)
Plant protection			
Plant protection chemicals	4 (3.3)	6 (5.0)	110 (91.6)
Weedicides	6 (5.0)	16 (13.3)	98 (81.6)
Irrigation technology	68 (56.6)	43 (35.8)	9 (7.5)

Figures in parenthesis indicate percentage.

had no irrigation facility and were residing in the single family (56.6%). Majority (62.5%) of the farmers had 6-10 members in their family. Regarding farming experiences, majority (65.8%) of the farmers had 11 to 20 years experience. In case of annual income, 16.6% farmers had annual income below Rs. 25,000/-, 42.5% had income between Rs. 25,000-50,000/- and 40.8% had income above Rs. 50,000/-. A majority (61.6%) of the farmers was having low extension contact; medium sources of communication (87.5%), high economic motivation (75.8%), high scientific orientation (76.6%) and high-risk orientation (74.1%).

The farmers' responses were categorized into low (upto 33.3%), medium (33.3 to 66.6%) and high (above 66.6%) technological gap (Table 1). A majority (90.8%) of the respondents was in high technological gap regarding cultivation of high yielding varieties of cumin. Singh (2005) also reported that the adoption of improved varieties is very low. Large gap in improved varieties might be due to the non-availability of seed of improved varieties at proper time and lack of knowledge. In case of seed rate, 58.3% respondents were found in low technological gap category. With respect to seed treatment, a majority (91.6%) of the respondents was found to be in

high technological gap category. Similar findings were also reported by Singh *et al.* (1996) perhaps due to lack of knowledge regarding seed treatment. In case of spacing, a majority (85.8%) respondents were in high technological gap. With regard to method of sowing, a majority (97.5%) of respondents was in high technological gap category (Table 1). Possible reason may be due to lack of suitable implements for sowing.

Table 1 further indicates that majority (69.1%) of the respondents was in medium technological gap with regards to dose of nitrogenous fertilizers. However, regarding time and method of nitrogen fertilizer application, 53.3 and 60.8% respondents were in high and low technological gap category, respectively. Bangarva (1990) observed a maximum technological gap in application of recommended nitrogenous fertilizer in wheat production technology. In case of phosphatic fertilizers, 48.3% respondents were in medium technological gap category followed by 28.3 in low and 33.3% in high technological gap, respectively, in terms of dose of phosphatic fertilizer application; with respect to method and time of application, a majority (58.3 and 67.5%, respectively) was under low gap category. The reason for low adoption may be due to lack of knowledge.

Table 2. Distribution of farmers according to their overall technological gap in cumin production technology

Technological gap	Frequency	Percentage
Low technological gap	21	17.5
Medium technological gap	75	62.5
High technological gap	24	20.0
Total	120	100.0

A majority (91.6%) of respondents was in high technological gap category with regard to plant protection measures. Singh *et al.* (1996) and Bhangarva *et al.* (1993) also reported that majority of the farmers had high technological gap in use of plant protection chemicals. This might be due to lack of knowledge and high cost of plant protection chemicals and equipments. A majority (81.6%) of the respondents had technological gap in weedicide application also. High gap may be due to lack of knowledge and high cost of weedicides. In case of irrigation a majority (56.6%) of the respondents was in low gap category (Table 1).

The overall 62.5% farmers were in medium technological gap, whereas rest 20.0 and 17.5% were in high and low technological gap category, respectively. Similar findings were also reported by Prasad and Pal (1991), Nikhade *et al.* (1997) and Singh and Chauhan (2000-01).

Analysis of socio-economic characteristics and technological gap indicated that age and farming experience of the farmers were positively and significantly co-related with technological gap while education, occupation, irrigation facilities, sources of information and knowledge of the farmers were found to be negatively and significantly correlated with technological gap in cumin production technology (Table 3). Bhoite and Thorat (1984) found positive and significant correlation between age and technological gap. Bhati (2002) observed negative and significant correlation between education and knowledge with technological gap. Singh (2003) found negative and significant correlation between education and

Table 3. Correlation between socio-economic characteristics of the respondents and technological gap in cumin production technology

Socio-economic characteristics	Correlation coefficient (r)
Age	0.19824*
Education	-0.21480*
Caste	-0.00492^{NS}
Occupation	-0.25328*
Land holding	-0.04109^{NS}
Irrigation facilities	-0.21349*
Type of family	0.06232^{NS}
Size of family	0.02304^{NS}
Farming experiences	0.20208*
Annual income	0.06269^{NS}
Extension contact	-0.01284^{NS}
Sources of information	-0.22119*
Economic motivation	-0.16415^{NS}
Scientific orientation	-0.16279^{NS}
Risk orientation	-0.04953^{NS}
Knowledge	-0.73881**

N.S.= Non-significant, * -Significant at 5% level, and **- Significant at 1% level.

infrastructure facilities with technological gap while positive and significant correlation between age and technological gap.

Other variables like, caste, land holding, type of family, size of family, annual income, extension contact, economic motivation, scientific motivation and risk orientation of the farmers had non-significant relationship with technological gap. It clearly indicated that these variables did not have any impact on technological gap (Table 3).

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