Extent of Technological gap and its Relationship with Situational, Personal, Socio-economic, Psychological and Communication Characteristics of Safflower Growers

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ABSTRACT

This research study was undertaken in Daskroi taluka of Ahmedabad district of Gujarat under ex-post facto research design. A sample of 120 safflower growers representing 10 villages of Daskroi taluka was drawn by using purposively random sampling technique. The results of the study indicated that the technological gap was found high in water management, seed treatment, plant protection measures, sowing time, weeding and interculturing, spacing, preparatory tillage and fertilizer application. While, low technological gap was observed in seed rate and harvesting. The 'Zero' gap was observed in the case of recommended variety. The overall technological gap of the respondents in respect of safflower technology was found about 34 per cent. The independent variables viz. cropping intensity, infrastructural experience, education, social participation, farm size, nature of irrigation, socio-economic status, economic motivation, innovativeness, knowledge about safflower technology, attitude towards safflower technology, source of information and extension participation were found statistically significant and negatively correlated with technological gap, whereas, 'age' didn't show any relationship with technological gap. Also, among all the independent variables, Knowledge, infrastructural experience, and extension participation were the crucial factors affecting directly and negatively to the technological gap of safflower growers.

Key words : *Infrastructural experience; Social participation; Economic motivation; Innovativeness,*

The traditional oilseeds crops like groundnut, sesamum and mustard are unable to meet the increasing demand of edible oil for one or the other reasons. Safflower however is adapted to a wide range of soil and climatic conditions, being a deep rooted, salt resistant and drought tolerance crop fits very well as an economy crop in many problematic soil areas. In middle Gujarat, after harvesting of kharif paddy, farmers can grow safflower as a rabi crop, which is more remunerative as compared to other rabi pulse crops on reserve soil moisture. In spite of this, there still exists a big gap between available recommended safflower technology and its adoption in safflower cultivation. It is visualize that the adoption of recommended practices of safflower by the farmers is influenced by some traits of the safflower growers. Very few efforts have been made to critically assess the technological gaps and constraints involved in safflower cultivation. Keeping this in view, the present study was designed with the following objectives;

(1) To determine the average technological gap among the farmers with respect to recommended safflower production technology.

(2) To ascertain the relationship of situational, personal, socio-economic and psychological traits of safflower growers and the technological gap.

(3) To find out the direct, indirect and substantial effect of situational, personal, socio-economic and psychological characteristics of safflower growers on technological gap.

METHODOLOGY

Out of seven talukas of Ahmedabad district, the present study was conducted in Daskroi taluka which is having highest area (on an average 6406 hectares) under safflower cultivation was purposively selected.

10 villages having good numbers of safflower growers were randomly selected from the daskroi taluka for the purpose. 12 safflower growers were randomly selected from each selected villages making a sample of 120 safflower growers. Thus, purposively random sampling procedure was used to constitute the sample. The sample size was decided on the basis of coefficient of variability existing in the population by carrying out the pilot study. A well-structured, pre-tested interview schedule was prepared in view of the objectives of the study and data were collected by personal interview of selected safflower growers. Eleven recommended safflower cultivation were identified to know the technological gap. The technological gap index in each of the practices as well as overall technological gap of each respondent was calculated with the help of formula developed by *Dudey et. al (1981)*. Zero order correlation was used to measure the estimating association between various traits and technological gap in adoption of safflower technology. Path coefficient was used to study the influence of independent variables on the dependent variables, both directly as well as through other variables present in the environment.

RESULT S AND DISCUSSION:

1. *Average Technological gap:* The data regarding average technological gap in different practices of safflower cultivation are summarized in Table 1.

Table 1. Average technological gaps in different components of safflower technology (N= 120)

S. No.	Different components of safflower technology	Average tech. gap	Rank
1	Preparatory tillage	26.70	VII
2	Recommended varieties	00.00	XI
3	Sowing time	51.67	IV
4	Seed rate	4.17	IX
5	Seed treatment	65.46	II
6	Crop geometry/ spacing	35.83	VI
7	Fertilizer application	20.00	VIII
8	Water management	100.00	I
9	Weeding and interculturing	43.06	V
10	Plant protection measures	51.83	III
11	Harvesting	1.67	X
	Overall gap	33.45	

A perusal of Table 1 revealed that the average technological gap was found varies from component to component and could be ranged from 1.67 per cent to cent per cent. The maximum gap was observed in water management (100 per cent) followed by seed treatment (65.46 per cent), plant protection measures (51.83 per cent), sowing time (51.67 per cent), weeding and interculturing (43.06 per cent), crop geometry/spacing (35.83 per cent), preparatory tillage (26.70 per cent), fertilizer application (20.00 per cent). Whereas, the minimum average gap was observed in seed rate (4.17 per cent) followed by harvesting (1.67 per cent). It could be further inferred that there was a high (above 66 per cent) technological gap in water management and seed treatment. There was a medium technological gap (between 33 to 66 per cent) in plant protection measures, sowing time, weeding and interculturing and Crop geometry/ spacing. While a low technological gap (Below 33 per cent) was observed in preparatory tillage, fertilizer application, seed rate and harvesting and no technological gap was found in recommended varieties in adoption of safflower technology.

Due to black and saline soil condition of the study area and farmer's ignorance were the probable reasons for non adoption of any water management practices. Hence, most of the farmers take safflower as an unirrigated crop. The possible explanation for high technological gap in seed treatment was lack of knowledge about seed treatment on the part of farmers. The probable reasons for about half of the technological gap in plant protection measures were shortage of skill labours, lack of knowledge and technical guidance about efficient use of pesticides and unavailability of quality pesticides. About half of the safflower growers had not sown timely because of cultivation of late maturing paddy varieties like Kamod and Basmati in kharif and unavailability of labours. The probable reasons for medium technological gap in weeding and interculturing practice were shortage of labours and bullock power, and also because of spiny nature of crop, weeding is difficult. So most of the safflower growers do not adopt second weeding (after 30 days of sowing) and interculturing in safflower cultivation. The overall technological gap against recommended production technology was found to be 33.45 per cent.

The finding was similar to the findings reported by *Deshmukh (1989) and Shriballabh et. al.(1991)*.

2. *Relationship of situational, personal, socio-economic, psychological and communication characteristics of safflower growers and technological gap:* The data on cause and effect relationship between technological gap and selected 14 situational, personal, socio-economic, psychological and communication characteristics of safflower growers are presented in Table 2.

Table 2. Relationship between technological gap and independent variables.

S. No.	Independent variables	Zero order correlation coefficient ('r' value)
A.	*Situational Variables*	
1	Cropping intensity	-0. 51661 **
2	Infrastructural experience	-0. 58451 **
B.	*Personal Variables*	
3	Age	-0. 00599 N.S.
4	Education	-0. 27254 **
C.	Socio-economic Variables	
5	Social participation	-0. 23004 *
6	Farm Size	-0. 46473 **
7	Nature of irrigation	-0. 44899 **
8	Socio – economic status	-0. 57862 **
D.	*Psychological Variables*	
9	Economic motivation	-0. 36779 **
10	Innovativeness	-0. 60956 **
11	Knowledge about safflower technology	-0. 76976 **
12	Attitude towards safflower technology	-0. 40691 **
E.	*Communication Variables*	
13	Sources of information	-0. 33507 **
14	Extension participation	-0. 62277 **

N.S. = Non-Significant at 5 per cent level.
d. f. = 118
* = Significant at 5 per cant level.
** = Significant at 1 per cent level.

It is clear from the Table 2 that out of 14 independent variables, 13 variables were observed to be negatively and significantly related to technological gap in adoption of safflower technology.

2.1. *Relationship of situational variables with technological gap:* It could be seen from the Table 2 that cropping intensity and infrastructural experience were found negative but they had significant relationship with the technological gap having "r" value -0.51661 and -0.58451 respectively. It indicates that as the cropping intensity and infrastructural experience increases, the technological gap decreases in adoption of safflower technology.

The probable reason is that increase in cropping intensity is normally accompanied by increase in farm size, irrigation facilities, good economic motivation and socio-economic status and so there is a possibility of decreasing technological gap.

2.2. *Relationship of personal variables with technological gap:* Data presented in table 2 revealed that out of two personal variables education was found significant relationship with technological gap having "r" value -0.27254. It means education level of the safflower growers' increases, the technological gap decrease in adoption of safflower technology.

The variable 'age' was failed to establish any significant relationship with technological gap.

The education opens the faculty of thoughts and knowledge for an individual which in turn helps individual to take rational decisions. They use education to get themselves more exposed to scientific farming, have more efficiency and more interest which resulted in high adoption. Social participation might have contributed towards formulation of favourable attitude and use, reflecting in lowering down the technological gap.

2.3. *Relationship of socio-economic variables with technological gap:* A perusal of table 2 revealed that three variables viz. farm size (r = -0.46473), nature of irrigation (r= -0.44899) and socio-economic status (r= -0.57862) at 5 per cent level and one social participation (r = -0.23004 at 1 per cent level) had negative and significant correlation with technological gap indicated that as the farm size, nature of irrigation, socio-economic status and social participation of safflower growers' increases, the technological gap in adoption of safflower technology decreases. Socio-economic status of farmers enhances his extent of adoption of various innovative technologies resulting in automatic reduction in technological gap.

2.4. *Relationship of psychological variables with technological gap:* It is clear from the Table 2 that four psychological variable like economic motivation, innovativeness, knowledge about safflower technology and attitude towards safflower technology were found negative and significant relationship with the technological gap having their "r" value -0.36779, -0.60956, -0.76976 and -0.40691 respectively. It means

economic motivation, innovativeness, knowledge about safflower technology and attitude towards safflower technology of the farmers' increases, the technological gap in adoption of safflower technology decreases. The farmers, who were predisposed to rational values like economic motivation and innovativeness, easily invest the costly inputs and also possess high risk bearing capacity.

2.5. *Relationship of communication variables with technological gap:* It is obvious from the Table 2 that two communication variables viz. source of information (r= -0.33507) and extension participation (r= -0.62277) were found negative and significant correlated with technological gap in adoption of safflower technology. It indicates that source of information and extension participation of safflower growers' increases, the technological gap decreases in adoption of safflower technology. The use of various communication sources and thereby it motivates to adopt technology, which in turn lowers down the technological gap. These findings were in line of findings reported by *Patel (1994) and Vora (1993).*

3. *Direct, indirect and substantial effect of independent variables (characteristics of safflower growers) on technological gap :* The relationship revealed by correlation studies may undergo change in different situations, where some of the independent variables may not exist in environment or they may be latent. The correlation coefficients (r) were found to be significant in respect of 13 independent variables with technological gap in adoption of safflower technology.

Thus, the data indicated that the observed relationship between the dependent and independent variables was only partially absolute and partially relative and a portion of observed relationship was the contribution made by the other independent variables through which the independent variables exercised their influence jointly. It is, therefore, the data, was reset and computed for path analysis. The path coefficient has been presented in Table 3.

3.1. *Direct effect:* Out of 13 independent variables tried, all the independent variables have exerted negative direct effect on technological gap in adoption of recommended safflower technology. The highest direct negative influence on technological gap in adoption of safflower technology was exerted by knowledge about safflower technology (-0.2916), followed by infrastructural experience (-0.1948), extension participation (-0.1868), education (-0.1187), cropping intensity (-0.1150) and nature of irrigation (-0.1047). A considerable direct negative effect was also exercised by social participation (-0.0813), innovativeness (-0.0800), attitude towards safflower technology (-0.0662 and economic motivation (0.0418), while, the impact of

Table 3. Path coefficient showing the direct, total indirect and substantial indirect effects of independent variables on technological gap.

S. No.	Independent variables	Direct effect	Total indirect effect	Substantial Indirect effect	
				1st	2nd
1.	Cropping intensity	-0.1150	-0.4016	-0.1238 (X11)	-0.0729 (X2)
2.	Infrastructural experience	-0.1948	-0.3896	-0.1447 (X11)	-0.0694 (X14)
3.	Education	-0.1187	-0.1537	0.0010 (X13)	-0.0843 (X11)
4.	Social participation	-0.0813	-0.1469	0.0027 (X6)	-0.0499 (X11)
5.	Farm size	-0.0264	-0.4383	0.0083 (X5)	-0.1638 (X11)
6.	Nature of irrigation	-0.1047	-0.3444	-0.1263 (X11)	-0.0544 (X2)
7.	Socio-economic status	-0.0324	-0.5461	-0.1783 (X11)	-0.0881 (X14)
8.	Economic motivation	-0.0418	-0.3259	-0.1142 (X11)	-0.0573 (X14)
9.	Innovativeness	-0.0800	-0.5297	-0.1778 (X11)	-0.1011 (X14)
10.	Knowledge of safflower technology.	-0.2916	-0.0478	-0.1142 (X14)	-0.0967 (X2)
11.	Attitude towards safflower technology	-0.0662	-0.3406	-0.0953 (X11)	-0.0660 (X2)
12.	Sources of information	-0.0119	-0.3236	0.0101 (X4)	-0.0763 (X11)
13.	Extension participation	-0.1868	-0.4359	-0.1784 (X11)	-0.0724 (X2)

$R^2 = 0.7387$ $PX^2 = 0.2613$ Residual = 0.5112

other attributes like socio-economic status, farm size and sources of information was observed to be comparatively less. Form this; it was observed that knowledge about safflower technology exerted largest direct and negative effect, followed by infrastructural experience, extension participation, education, cropping intensity and nature of irrigation.

3.2. *Total indirect effect :* The highest negative total indirect effect on technological gap in adoption of safflower technology was exercised by socio-economic status (-0.5461), followed by innovativeness (-0.5297), knowledge about safflower technology (-0.478). Farm size (-0.4383), extension participation (-0.4359) and cropping intensity (-0.4016). Other variables exercising total indirect negative effect on technological gap in adoption of safflower technology were in the following order: infrastructural experience (-0.3896), nature of irrigation (-0.3444), attitude towards safflower technology (-0.3406), economic motivation (-0.3259), source of information (-0.3236), education (-0.1537) and social participation (-0.1469). So far as total indirect effect is concerned, socio-economic status exerted maximum total negative effect, followed by innovativeness, knowledge about safflower technology, farm size, extension participation and cropping intensity. Thus it was obvious that the variables which did not show much direct impact on technological gap in adoption of safflower technology playing an important role indirectly.

3.3. *Substantial indirect effect :* The first highest substantial positive indirect effect on technological gap in adoption of safflower technology was exercised by source of information (0.0101) through education. The other first substantial positive effect was exerted by farm size (0.0083) channel through social participation followed by social participation (0.0027) through farm size and education (0.0010) channel through source of information attribute. The first highest substantial negative effect on technological gap in adoption of safflower technology was exerted in order of sequence through the same variable (knowledge) were extension participation (-0.1784), socio-economic status (-0.1783), innovativeness (-0.1778), infrastructural experience (-0.1447), nature of irrigation (-0.1263) and economic motivation (-0.1142).

The second largest substantial indirect negative effect was exerted by variables; farm size (-0.1638) through knowledge about safflower technology, followed by innovativeness (-0.1011), knowledge about safflower technology (-0.0967), socio-economic status (-0.0881) and education (-0.0843).

So far as substantial indirect effect is concerned, the first highest substantial positive indirect effect on technological gap was exerted by source of information through education followed by farm size through social participation. The first highest substantial negative effect on technological gap was exerted through the same variable (knowledge) in the following order: extension participation, socio-economic status, innovativeness, infrastructural experience and nature of irrigation, whereas second largest substantial negative indirect effect was exerted by farm size, innovativeness and knowledge about safflower technology.

In general, it can be concluded that the knowledge about safflower technology, infrastructural experience and extension participation were the most important variables effecting directly and negatively on the technological gap in adoption of safflower technology as well as providing a channel of indirect negative effect on technological gap for a majority of variables. Hence, the knowledge, infrastructural experience and extension participation are crucial variables.

Previous observations also proved that higher knowledge, high infrastructural experience and more extension participation lead to effective adoption of technology by the farmers. The knowledge, infrastructural experience and extension participation are the means for filling up the technological gap and attainment of objective. Lacking of these factors farmers can not adopt technology efficiently. These might be reasons for identifying these as crucial variables in this study.

CONCLUSION

The average technological gap in different components ranged from ‘1.67’ per cent to ‘100’ per cent. The minimum average gap was observed in harvesting (1.67 per cent), whereas maximum average technological gap was observed in water management, followed by seed treatment, plant protection measures, sowing time, weeding and interculturing, spacing,

preparatory tillage, fertilizers application and seed rate, while 'zero' gap was observed in recommended variety. The overall gap against recommended technology was 33.45 per cent.

Out of 14 independent variables, 13 variables namely, cropping intensity, infrastructural experience, education, social participation, farm size, nature of irrigation, socio-economic status, economic motivation, innovativeness, knowledge about safflower technology, attitude towards safflower technology, source of information and extension participation were found negatively and significantly related with technological gap indicating that any increase in these was found to decrease technological gap whereas, age did not show any significant relationship with technological gap indicating that there was no significant influence of age on technological gap in adoption of safflower technology.

Path analysis has shown that knowledge about safflower technology, infrastructural experience and extension participation exerted largest direct negative effects on technological gap in adoption of safflower technology. So far as total indirect effect was concerned, socio-economic status, innovativeness, knowledge, farm size and extension participation exerted maximum negative effect on technological gap. The variables namely knowledge, infrastructural experience and extension participation were also allowing to channelize largest indirect effects of other independent variables on technological gap. Hence, knowledge about safflower technology, infrastructural experience and extension participation are crucial variables.

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