General profile or general information of the mustard growers (B.F. and NB.F.) according to their selected personal characteristics

■ **S. R. Meena and G. S. Bangarva**

SUMMARY : The present investigation was conducted in Bharatpur region of Rajasthan State, India during the years 2014-15, 16-17. Thus present research study has been carried out total 250 mustard growers with the 125, beneficiary farmers and 125, non-beneficiary farmers regarding recommended mustard production technology in Bharatpur division. Bharatpur region was purposively selected for the present investigation due to the following reasons: Rajasthan is rank first amongst all the states of India in terms of both area and production of rapeseeds-mustard. Rajasthan state comprises of tenth regions. In Rajasthan, the rapeseeds and mustard crop is most popular oilseeds crops cultivated in this state, its grown on area of 25,32,330 hectares with an annual production of 32,57,987 tonnes and productivity of 1287 kg/ha. in the years 2015-16. Rapeseed-mustard is the most important oilseeds crops grown in *Rabi* season in Bharatpur region of Rajasthan. Bharatpur region occupies first rank in area, production and productivity of rapeseeds and mustard crop amongst the oilseeds crops in tenth regions of Rajasthan. It's mostly grown in five selected districts of Bharatpur division of Rajasthan. This region has covered 7,49,597 hectares of land. Whereas, an annual production of rapeseed and mustard crop is 10,07,502 tonnes which is very high 1344 kg/ha. as compared to average national productivity in years 2015-16. DRMR: Directorate of Rapeseed-Mustard Research Station is located in near at Sewar, Bharatpur region of Rajasthan state, in India. Therefore, DRMR, Sewar under Bharatpur region was purposively selected. Front line demonstrations (FLDs) are being laid out regularly by the DRMR scientists on the farmer's field to demonstrate the production potential of rapeseeds-mustard technologies. In this way 25, beneficiary farmers and 25, non-beneficiary farmers were selected from the list available at the each KVKs head quarter. Thus, total 50 mustard growers were selected from each KVK by used the simple random sampling technique through proportionate. In this way, all five KVKs of Bharatpur region were selected for the present investigation. From these obtained lists, 125 beneficiary farmers similarly, 125 non-beneficiary farmers were selected. Thus, total sample sizes were consisted of 250 mustard growers from the present research study. Responses were recorded in quantitative form through pre-structured interview schedule technique on the 250 selected mustard growers. The present study was undertaken in Bharatpur region of Rajasthan state, to know the general information/general profile of the mustard growers on a total sample size of 250 respondents. (125, B.F. and 125, NB.F.) regarding recommended mustard production technology. The study highlights that the maximum number, The majority 54 of beneficiary (43.20 %) and the majority 56 of non-beneficiary (44.80 %) were having other backward caste. The majority 47 of beneficiary (37.60 %) and the majorities 49 of non-beneficiary farmers (39.20 %) were belonged to middle age groups. The majority 21 of beneficiary (16.80 %) and the majority 44 of non-beneficiary (35.20 %) were indicate from middle level

Author for correspondence :

S.R. Meena
Department of Extension
Education, S.K.N. College
of Agriculture, Sri Karan
Narendra Agriculture
University, Jobner-Jaipur
(Rajasthan) India

See end of the article for
authors' affiliations

of education. The majority 42 of beneficiary (33.60 %) and the majority 12 of non-beneficiary (9.60 %) were reported from Secondary level of education. The majority 64 of beneficiary (51.20%) and majority 66 of non-beneficiary (52.80%) were belonged to medium size of land holding groups. The majority 64 of beneficiary (51.20 %) and the majority 66 of non-beneficiary (52.80 %) had from medium level of risk orientation category. The majority 64 of beneficiary (51.20 %) and the majority 60 of non-beneficiary (48.00 %) had from medium level of extension participation category. The majority 35 of beneficiary (28.00 %) and the majority 32 of non-beneficiary (25.60 %) had taken FLD on their field. The majority 56 of beneficiary (44.80 %) and the majority 60 of non-beneficiary (48.00 %) had medium level of economic motivation category. The majority 55 of beneficiary (44.00 %) and the majority 50 of non-beneficiary (40.00 %) had medium level of irrigation potentiality.

BACKGROUND AND OBJECTIVES

The Krishi Vigyan Kendra (KVKs)-Agriculture Science Centre's, New agricultural technologies dissemination through KVKs with FLDs and OFTs by the KVK's Staffs and DRMR Scientists were adopted by the mustard growers to a considerable extent which may be due to better and adequate infrastructure training and demonstration facilities. The krishi Vigyan Kendra (KVKs) provides a strong training support for bringing about production breakthrough in agriculture. Krishi Vigyan Kendras are functional in carrying out extension activities in accordance with government programme schedule and providing training support to raise the skill of the farmers which will help them to increase their farm productivity. Frontline demonstration (FLDs) is the long-term educational activity conducted by agricultural scientists in a systematic manner on farmers' field to show the worth of new practice/technology. It indicates FLDs and OFTs is proven extension intervention to demonstrate the production potential of improved technologies on farmers' field (Patil *et al.,* 2018).

Indian Council of Agricultural Research (ICAR) had established Krishi Vigyan Kendras (KVKs)-'Agriculture Science Centers' all over the India, is an institutional innovation for application of agricultural technologies at the farmer's field with the help of a multi-disciplinary team. The first KVK of the country was established in 1974 at erstwhile Pondicherry and initial mandate of KVKs was confined only to impart training. Krishi Vigyan Kendras (1974) actually originated as one of the four first line extension systems of ICAR that included National Demonstration (1964), Operational Research Projects (1974-75), and Lab to Land Programme (1979). As long as the need for close interaction between

farmers, extensionists and researchers in the participatory diagnosis of problems and location specific recommendations, emphasizing joint action and education rather than prescription has been increasingly felt, the Krishi Vigyan Kendra (KVK) network started spread enormously in the country. The immense policy reforms in the KVK mandates and its activities were brought about only after a thorough realization of the importance of micro-economic situation perspectives of technology suitability and its adoption. With a decision of establishing KVKs in all the rural districts of the country in X[th] five-year plans, the KVK revised mandate. There is a wide network of 690 KVKs in the country (ICAR, 2018). Therefore, the main mandate of the KVK is to plan and carry out on-farm trials (OFTs) to verify, test, validate and refine location 31 specific technologies developed by the National Agricultural Research System (NARS). The purpose is to have an appropriate technology which may be economically profitable, ecologically sustainable, technically feasible and culturally compatible. Another vital activity of KVK is to conduct the frontline demonstrations (FLDs) on flagship technologies developed by NARS on farmer's field (Kokate *et al.,* 2016). The frontline demonstration is a long-term educational activity conducted by the KVK scientists in a systematic manner on farmers' field under his close supervision to show the worthiness of technology. Besides, KVK are building capacity of different stakeholders on niche areas of agricultural and allied sciences and also acting as a knowledge and resource center at district level (Patil *et al.,* 2018).

The Indian Council of Agricultural Research (ICAR) is an autonomous organisation under the Department of Agricultural Research and Education (DARE), Ministry

of Agriculture and Farmers Welfare, Government of India. The Indian Council of Agricultural Research (ICAR) institutes, state agricultural universities (SAU) and Krishi Vigyan Kendras (KVK) were set up for meeting the emerging research and education challenges. The ICAR is the apex body mandated for co-ordinating, guiding and managing research and education in Agriculture, Horticulture, Fisheries and Animal sciences in the Country. For implementing its research policies and programmes, the ICAR has developed a strong network of 109 institutes, 78 all-India coordinated projects and 690 KVKs spread across the Country. There are 71 State Agriculture, Veterinary, Horticulture and Fishery Universities and 4 General Universities with agriculture faculty.

Agricultural Extension Division is one of the Subject Matter Divisions where the major activities are of Assessment and Demonstration of Technology/Products through a network of 690 Krishi Vigyan Kendras (KVKs). The Division of Agricultural Extension, ICAR, New Delhi is headed by Deputy Director General (Agricultural Extension) supported by 2 Assistant Director Generals. Krishi Vigyan Kendra (KVK) is an agricultural extension center in India. The name means "farm science center". Usually associated with a local agricultural university, these centers serve as the ultimate link between the Indian Council of Agricultural Research and farmers, and aim to apply agricultural research in a practical, localized setting. All KVKs fall under the jurisdiction of one of the 11 Agricultural Technology Application Research Institutes (ATARIs) throughout India.

Indian Council of Agricultural Research has developed a strong network of Krishi Vigyan Kendras (KVKs) in the country to disseminate agricultural technologies and an innovation which is one of the vital first line extension systems. As more and more KVKs are coming up, the KVK scientist has the great responsibility of creating the centre of excellence in the field of effective technology transfer. Because of its participatory approach, KVKs are getting more popularity among the rural masses especially through organized need based vocational training in the field of agriculture and allied sectors. Under the demonstration strategy, it organized front line demonstration in various crops to generate production data and feedback information. The aim of front line demonstration in general is to raise production, conduct field day, farmer's interaction and exhibition at demonstration site. The KVKs in India has emerged as a distinct organization and its advantage was greeted with great expectation especially on technology transfer front to set a pace of growth of farm productivity and thereby ensuring regeneration of entire farming community (Dobariya *et al.,*2018) .

India holds a significant share in world oilseed production. It is the second largest producer of groundnut after China and third largest producer of rapeseed after China and Canada. The area under major oilseeds' *viz.,* groundnut, sesamum, rapeseed and mustard, linseed, castor, soybean, cottonseed, sunflower, safflower and niger seed occupied 20 per cent net area sown. It must, however, be noted that the production of oilseeds has always fallen short of our demand and there has always been a need to import oilseeds or their products. The total oilseeds production in the country during 2016-17 was estimated at 35.40 million tons (MT). With limited scope of bringing additional area under oilseeds, an increase in oilseed production will have to come primarily from land saving to technologies highlighting. Further, there is a large-scale regional variation in the area, production and productivity of oilseeds in India. Few states like Haryana, Madhya Pradesh, Rajasthan and West Bengal increased their oilseed production both through area expansion and productivity improvement. The states like Maharashtra, Tamil Nadu and Himachal Pradesh can increase their oilseed output mainly through productivity improvement (Patil *et al.,*2018).

Crop description:

Rapeseed-mustard is a group of crops comprising rapeseed (toria, brown sarson and yellow sarson) cultivar of *Brassica campestris;* Indian mustard (*Brassica juncea*); black mustard (*Brassica nigra*) and taramira (*Eruca sativa*). Some exotic species of Brassicas like gobhi sarson (*B. napus*), Ethopian mustard or karan rai (*B. carinata*) and white mustard (*Sinapis alba*) have been brought into cultivation in India. The crops of rapeseed group are largely cross pollinated where as Indian mustard is largely self pollinated. Out of these cultivars Indian mustard fits well in cropping system of rainfed areas and accounts for >75 per cent of the total area under rapeseed-mustard cultivation in India. Other cultivars like brown sarson and yellow sarson are under cultivation over a limited area in the Eastern part of the

country including North-Easter states. Toria, a short duration crop is largely grown as a catch crop in tarai part of UP, Haryana, Assam and Odisha. Gobhi sarson is under cultivation over limited areas in HP, J and K and Punjab under irrigated ecologies.

Global scenario:

Rapeseed and mustard is widely grown in majority of continents with largest area of 8 million ha in Canada followed by China (7 million ha) and India (6 million ha). Majority of the countries grow rapeseed, whereas, India has largest area under mustard. The productivity of India is the lowest among the major rapeseed mustard growing countries. As against the World average of 2144 kg/ha, highest productivity of 3640 kg/ha of Europeon Union, the Indian average yield was only 1161 kg/ha during 2013-16. Longer crop duration and high carbon content in the soil are the major factors attributing to high productivity of rapeseed in Western part of the World.

National scenario:

Rapeseed-mustard is grown across the country, pre-dominantly in North, North-Western and North-Eastern region of the county over an area of about 6 million ha. Among 09 oilseeds, irrigated area under mustard has increased more rapidly from 10 per cent (1955-56) to 76 per cent (2012-13). The area coverage under mustard is largely depends on the late *Kharif* rains. Rajasthan, MP, Haryana, UP and West Bengal contributes >80 per cent of area and >85 per cent of production of mustard in India.

Potential states:

More than >85 per cent production of rapeseed-mustard comes from 05 states namely Rajasthan (48%), Haryana (12%), MP (10%), UP (9%) and West Bengal (7%). Fourty six districts of Rajasthan (22), MP (6), Haryana (5), UP (2), West Bengal (6), Gujarat (3) and Assam (2) contributes >70 per cent of total production of R and M in the country.

Scope for area expansion:

Approximately an area of about 8 million ha remain fallow during *Rabi* season in Eastern States like Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, West Bengal and Eastern Uttar Pradesh, after harvest of paddy. A number of short duration varities of mustard are now available,

which could be cultivated under rice fallows. A new scheme "Targeting rice fallow areas for cultivation of pulses and oilseeds" launched by the Ministry of Agriculture and Farmers Welfare from *Rabi* 2016-17 will help in utilization of rice fallow for mustard cultivation.

– R and M occupy second position after soybean in terms of production of oilseeds, but has first position in terms of vegetable oil (32%).

– Rapeseed comprising toria, brown sarson and yellow sarson are largely cross pollinated where as Indian mustard is largely self pollinated.

– Indian mustard with largests hare of 75 per cent is most climate resilient for rain fed /low irrigated/problem soils.

– Toria, a short duration crop is grown as a catch crop in tarai part of UP, Haryana and Eastern State.

– Other cultivars like brown sarson and yellow sarson are under cultivation over a limited area in the Eastern part of the country. Area under this group has recently gone up.

– Gobhi sarson is under cultivation over a limited areas in HP, Jammu and Kasmir Punjab under irrigated ecologies.

– High variation in oil content (31-46%) provides scope for oil based marketing.

Mustard (*Brassica jancea* L.) is second most important oilseeds crops after groundnut in India. India is the third largest producer of mustard crops where as Canada and China stands at first and second ranks. The rapeseeds-mustard production trends represent fluctuating scenario in India with all time higher production of 8.17 million tonnes from 6.69 million hectares during 2011-12 years. In India, rapeseeds-mustard is grown in diverse agro-climatic conditions ranging from north-eastern/north-western hills to down south under irrigated/rainfed, timely/late sown and mixed cropping. Indian mustard accounts for about 75-80 per cent of the 6.6 million hectares under these crops in the country during 2013-14.

Mustard (*Brassica juncea* L.) is an important *Rabi* season oilseed crop; belongs to family Cruciferae and genus Brassica. Mustard seed is the world's second leading source of vegetable oil, after soybean. It is also the second most leading source of protein meal in the world after soybean. It is mainly grown in northern part of India, Rajasthan is the largest producing state followed by Uttar Pradesh. Mustard crop required lower water

requirement (240–400 mm) for completing life cycle, therefore it is fits well for rain fed cropping system. Mustard seed contains average 34-43 per cent oil content and contributes for 32 per cent of total edible oil. The total production of this crop in India is 8.08 m tones with a productivity of 1420 kg/ha. In Rajasthan, rapeseed and mustard occupies prime place amongst all the oilseed crops grown in the state, occupying 6.5 m. hectares area, with production of 3.5 m tones and 1208 kg/ha average yield (Sodani *et al.,* 2017).

Indian mustard [*Brassica juncea* (L.) Czern and Coss.] is a premier oilseed crop which covers about 85-90 per cent of the total area under cultivation of *Brassica* crop. In Haryana, it is grown over an area of 0.54 million ha with production of 0.88 million tons and average yield of 1639 kg/ha during 2013-2014 Indian mustard [*Brassica jancea* (L.) Czern and Coss] is the major oilseeds crops grown in Rajasthan during *Rabi* season. In Rajasthan, the productivity of rapeseeds and mustard was 1266 kg/ha. during 2013-14 from 31.37 lack hectares area under cultivation and total production was 39.65 lack tonnes. The yields levels also have been variables from 954 kg/ha. to 1342 kg/ha. (2014) during the past five years. (S: DOA, Vital Agricultural Statistics, 2014 D-Pant Krishi Bhawan, Jaipur). In Rajasthan, rapeseeds and mustard is cultivated over an area of 24.33 lack hectares with the production of 28.78 lack tonnes and average yields are 1183 kg./ha.during the years 2014-15 (Anonymous, 2015).

Among the nine edible oilseeds crops in India, rapeseeds-mustard possesses a significant position. Rapeseeds-mustard group mainly consists of toria (*Brassica rapa*), raya (*Brassica juncea*) and gobhi sarson (*Brassica napus*). In India, it contributes nearly 80.00 per cent of the total *Rabi* oilseeds production. Area under rapeseeds-mustard is 6.34 million hectares with a production of 7.82 metric tonnes and productivity of 12.33 q/ha. DRMR in terms of rapeseeds-mustard productivity, global ranking of India is 28th (Bhardwaj, 2013). There is variation in the production and productivity of rapeseeds-mustard in different states (Anonymous, 2015a and b and Kumar *et al.,* 2016).

Rapeseed-mustard is second most important oil seeds crop after groundnut and known as queen of oilseeds crop due to unparallel productivity among oil seed crops. The availability of suitable high yielding varities as well as excellent knowledge about production technology are ascribed as main reasons for high productivity of mustard crop in Bharatpur Region during the year (2010-11). Bharatpur, eastern district of Rajasthan is the largest mustard growing division covering about 48 per cent of the total production of state. Indian mustard crop plays a vital role in improving economic status of the farming community of Bharatpur district. Since inception of Krishi Vigya Kendra (KVK), Kumher, it has initiated training, demonstration and other extension programme with an aim to increase acreage, production, and productivity of mustard crop in Bharatpur district (Singh and Kothari, 2013).

The Krishi Vigyan Kendras of Bharatpur region are engaged in promoting scientific agriculture in the area for more than a decade. It is therefore important to know as to how far KVK has been able to promote knowledge level and extent of adoption with regard to RMPT in respective area. Rapeseeds-mustard being major crops of *Rabi* season in Bharatpur region on adoption regarding recommended mustard production technology give sufficient evidence of success achieve by KVK.

DRMR: The Indian Council of Agricultural Research (ICAR) established the National Research Centre on Rapeseed-Mustard (NRCRM) on October 20, 1993, to carry out basic, strategic and applied research on rapeseed-mustard. Besides, generating basic knowledge and material, it also engages in developing ecologically sound and economically viable agro production and protection technologies. The Centre has also the responsibility to plan, co-ordinate and execute the research programmes through wide network of 22 main and sub-centres across the country, to augment the production and productivity of rapeseed-mustard.

DRMR: Directorate of Rapeseeds-Mustard Research Station is located in near at Sewar, Bharatpur Division of Rajasthan in India. Therefore, DRMR, Sewar under Bharatpur region was purposively selected for consider the research study in this area. Front line demonstrations (FLDs) are being laid out regularly through the DRMR Scientists on the farmer's field to demonstrate the production potential of rapeseeds-mustard technologies. Challenge before DRMR is to increase the level of sufficiency in edible oils consumption in changing foods habit of ever-growing population in the country with increase or achieved the potential yields cultivars through developing ecologically sound and economically variables agro production and protection technologies for different agro climatic conditions.

Thus, the results of such study will be useful for

state Department of Agriculture, Marketing Departments, State Agricultural Universities, Agricultural Research Stations, Krishi Vigyan Kendras as well as to the beneficiary farmers and non-beneficiary farmers to decide appropriate strategies and to make programmes for better production and to developed an economic environment for rapeseeds-mustard crops. Keeping in view of the above facts in to consideration, the present research study was undertaken to entitled "Impact of Krishi Vigyan Kendras on Adoption of Recommended Mustard Production Technology by the Mustard Growers in Bharatpur Region of Rajasthan State, India". To assess the object to find out the General Profile or General Information of the Mustard Growers (B.F. and NB.F.) according to their Selected Personal Characteristics.

RESOURCES AND METHODS

Selection of Krishi Vigyan Kendras:

The present investigation was conducted in five selected Krishi Vigyan Kendra's from Bharatpur Region of Rajasthan. Each Krishi Vigyan Kendra is located at each district head quarter. KVK Navgaon (Alwar), KVK Kumher (Bharatpur) and KVK Unella (Dholpur) are working under Directorate of Extension Education, Jobner. However, the administrative control of Sri Karan Narendra Agricultural University, Jobner, district-Jaipur, Rajasthan. KVK Kermoda (Sawai-madhopur) and KVK Hindoaun (Karoli) are working under Directorate of Extension Education, Kota. However, the administrative control of Agricultural University, Kota, Rajasthan. KVK Navgaon (Alwar), KVK Kumher (Bharatpur), KVK Unella (Dholpur) and KVK Hindoaun (Karoli) Districts come under Agro Climatic Zone III b of Rajasthan *i.e.* Flood Prone Eastern Plain Zone (III b). KVK Kermoda (Sawai-madhopur) district is situated in Agro-Climatic Zone V of Rajasthan.

Keeping the above facts in view, the present investigation an attempt has been made to measure the "Impact of Krishi Vigyan Kendras on Adoption of Recommended Mustard Production Technology by the Mustard Growers in Bharatpur Region of Rajasthan". Thus present research study has been conducted with the beneficiary and non-beneficiary regarding recommended mustard production technology in Bharatpur division. At present time, total numbers of 42 KVKs are going on operation in all the tenth regions of Rajasthan State. This research work has been carried

out, within five listed below KVKs purposively selected for the present research study from Bharatpur Region of Rajasthan *viz.,* Alwar, Bharatpur, Dholpur, Karouli and Sawai-madhopur Districts of Rajasthan.

Bharatpur Region was purposively selected for the present investigation due to the following reasons:

Rajasthan is rank first amongst all the states of India in terms of both area and production of rapeseeds-mustard. Rajasthan state comprises of tenth regions *viz.,* Jaipur, Sikar, Bharatpur, Bikaner, Sri-ganganagar, Jodhpur, Jalore, Kota, Udaipur and Bhilwara. In Rajasthan State, the rapeseeds and mustard crop is most popular oilseeds crops cultivated in Jaipur, Alwar, Bharatpur, Dholpur, Karouli, Sawai-madhopur, Sriganganagar, Jhunjhunu and Sikar districts. In this state, its grown on area of 25,32,330 hectares with an annual production of 32,57,987 tonnes and productivity of 1287 kg/ha in the years 2015-16.

Rapeseeds-mustard is the most important oilseeds crops grown in *Rabi* season in Bharatpur Region of Rajasthan. Bharatpur Region occupies first rank in area, production and productivity of rapeseeds and mustard crop amongst the oilseeds crops in tenth regions of Rajasthan. It's mostly grown in five selected districts of Bharatpur Division of Rajasthan. This region has covered 7,49,597 hectares of land. Whereas, an annual production of rapeseeds and mustard crop is 10,07,502 tonnes which is very high 1344 kg/ha as compared to average national productivity 2015-16. (Source: Rajasthan Agricultural Statistics at a Glance. Jaipur, Rajasthan 2015-16)

DRMR: Directorate of Rapeseeds-Mustard Research Station is located in near at Sewar, Bharatpur Region of Rajasthan in India. Therefore, DRMR, Sewar under Bharatpur Region was purposively selected. Front Line Demonstrations (FLDs) are being laid out regularly by the DRMR Scientists on the farmer's field to demonstrate the production potential of rapeseeds-mustard technologies. Thus, research study area was easily accessible to the investigator, he is bonafide resident of this region.

Limitation of time, money and available resources for this research study.

Selection of the respondents/mustard growers:

25, beneficiary farmers were selected from the list available at the each KVKs head quarter. Similarly, 25, non-beneficiary farmers were selected from the list available at the each KVKs head quarter. Thus, total numbers 50 mustard growers were selected from each

General profile or general information of the mustard growers (B.F. & NB.F.) according to their selected personal characteristics

Table A : Selection of Krishi Vigyan Kendras and rapeseeds-mustard growers from Bharatpur region of Rajasthan			
Selected division	Selected KVKs	No. of rapeseeds-mustard growers	
Bharatpur	Alwar	25	25
Region	Bharatpur	25	25
	Dholpur	25	25
	Karoli	25	25
	Sawai-madhopur	25	25
Total	5 KVKs	125	125

KVK by the simple random sampling technique. In this way all five KVKs were included in the present investigation.

25, beneficiary farmers who are getting benefits from the KVK were randomly selected from each of the selected KVKs. Similarly, equal numbers of the non-beneficiary farmers who are not getting benefits from the KVK were randomly selected from each of the selected KVKs.

From these obtained lists, 125, beneficiary farmers and 125, non-beneficiary farmers were selected, in this way total 250 sample sizes for the present research study by using simple random sampling technique through proportionate. Thus, total sample sizes were consisted of 250 mustard growers from present research study.

On the basis of specific objectives formed for the present research study, a suitable tool was developed. The data were collected through personal interview method by interview schedule. Collected data were classified, tabulated and statistically analyzed which led to the following salient findings. In order to test the validity of results various hypotheses were formulated and appropriate statistical tests were applied. The statistical tests applied were S.D., 'z' test, 't' test and rank correlation. The levels of significance for acceptance or rejection of hypotheses were 5 per cent and 1 per cent level of significant.

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

General profile of the (B.F. and NB.F.) according to their selected personal characteristics:

The data related to the general profile/general information among the beneficiary farmers and non-beneficiary farmers viz., type of family, size of family, caste, age, education level, size of land holding, social participation, risk orientation, extension participation, source of information utilized, economic motivation and irrigation potentiality are presented in this section. Thus, results have been presented in the following tables.

Type of family of the beneficiary farmers and non-beneficiary farmers:

The Table 1 shows that the total majority of farmers 134 (53.60 %) were belonged to joint type family. Further observed that the total majority of farmers 116 (46.40 %) were come from single type family, respectively.

The data reported in Table 1 indicates that about the majority 99 of the beneficiary farmers (79.20 %) and the majority 35 of non-beneficiary farmers (28.00 %) was belonged to joint type family. Further observed that the majority 26 of the beneficiary farmers (20.80 %) and the majority 90 of the non-beneficiary farmers (72.00 %) were come from single type family.

Size of family of the beneficiary farmers and non-beneficiary farmers:

The Table 2. shows that the total majority of farmers 167 (66.80 %) were belonged to large size of family. Further observed that the total majority of farmers 83 (33.20 %) were come from small size of family, respectively.

Table 1: Distribution of the mustard growers (B. F. and NB. F.) according to their type of family						(n=250)
Sr. No.	Type of family	Beneficiary (n=125)		Non-beneficiary (n=125)		Total
		F	%	F	%	F	%
1.	Single	26	20.80	90	72.00	116	46.40
2.	Joint	99	79.20	35	28.00	134	53.60
	Total	125	100.00	125	100.00	250	100.00

The data recorded in Table 2 indicates that about the majority 70 of the beneficiary farmers (56.00%) and the majority 97 of the non-beneficiary farmers (77.60%) were belonged to large size of family. Further observed that the majority 55 of the beneficiary farmers (44.00 %) and the majority 28 of the non-beneficiary farmers (22.40 %) were come from small size of family, respectively.

Caste of the beneficiary farmers and the non-beneficiary farmers:

The Table 3 shows that the total majority of farmers 110 (44.00 %) were having other backward caste. Further reported that the total majority of farmers 78 (31.20%) were having scheduled tribe caste in maximum portion. Further recorded that the total majority of farmers 30 (12.00%) were having scheduled caste. Further observed that the total majority of farmers 22 (8.80 %) were having general caste in medium portion. Further reveals that only the total majority of farmers 10 (4.00 %) were having special backward caste in minimum portion.

The data reported in Table 3 indicates that the majority 54 of the beneficiary farmers (43.20%) and the majority 56 of non-beneficiary farmers (44.80%) were having other backward caste. Further reported that the majority 44 of the beneficiary farmers (35.20%) and the majority 34 of non-beneficiary farmers (27.20%) were having scheduled tribe caste in maximum portion. Further recorded that the majority 10 of the beneficiary farmers (8.00%) and the majority 20 of non-beneficiary farmers (16.00%) were having scheduled caste. Further observed that the majority 12 of the beneficiary farmers (9.60 %) and the majority 10 of non-beneficiary farmers (8.00 %) were having general caste in medium portion. Further reveals that only the majority 5 of the beneficiary farmers (4.00 %) and the majority 5 of non-beneficiary farmers (4.00 %) were having special backward caste in minimum portion.

Age of the beneficiary farmers and non-beneficiary farmers:

The Table 4 shows that the total majority of farmers 96 (38.40 %) were belonged to middle age category *i.e.* between 36 to 48 years. Further reported that the total

Table 2: Distribution of the mustard growers (B. F. and NB. F.) according to their size of family						(n=250)
Sr. No.	Size of family	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Small (below 5 members)	55	44.00	28	22.40	83	33.20
2.	Large (above 5 members)	70	56.00	97	77.60	167	66.80
	Total	125	100.00	125	100.00	250	100.00

Table 3 : Distribution of the mustard growers (B. F. and NB. F.) according to their caste						(n=250)
Sr. No.	Caste	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Scheduled caste	10	8.00	20	16.00	30	12.00
2.	Scheduled tribe	44	35.20	34	27.20	78	31.20
3.	Other backward caste	54	43.20	56	44.80	110	44.00
4.	Special backward cast	5	4.00	5	4.00	10	4.00
5.	General caste	12	9.60	10	8.00	22	8.80
	Total	125	100.00	125	100.00	250	100.00

Table 4 : Distribution of the mustard growers (B. F. and NB. F.) according to their age						(n=250)
Sr. No.	Age category	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Young (upto 35 years)	45	36.00	44	35.20	89	35.60
2.	Middle (36 to 48 years)	47	37.60	49	39.20	96	38.40
3.	Old (48 years and above)	33	26.40	32	25.60	65	26.00
	Total	125	100.00	125	100.00	250	100.00
Mean-41.448		SD- 6.8442					

majority of farmers 89 (35.60 %) were under young age category *i.e.* upto 35 years. Further observed that the total majority of farmers 65 (26.00 %) were from old age category *i.e.* 45 years and above, respectively.

The data recorded in Table 4 indicates that about the majority 47 of the beneficiary farmers (37.60 %) and the majorities 49 of the non-beneficiary farmers (39.20 %) were belonged to middle age groups. Further reported that the other hand, the majority 45 of the beneficiary farmers (36.00%) and the majority 44 of non-beneficiary farmers (35.20 %) were belonged to young age groups. Further observed that the majority 33 of the beneficiary farmers (26.40 %) and the majority 32 of non-beneficiary farmers (25.60 %) were belonged to old age groups, respectively.

Education level of the beneficiary farmers and non-beneficiary farmers:

The data indicates in Table 5 shows that amongst the total majority of farmers 65 (26.00%) were found from middle level of education. While, the total majority of farmers 54 (21.60 %) were show from Secondary level of education. Further reported that the total majority of farmers 44 (17.60 %) were found from Primary level of education. While, the total majority of farmers 27 (10.80 %) were reported from Senior secondary level of education. Further recorded that the total majority of farmers 24 (9.60 %) were found from Literate level of education. While, the total majority of farmers 15 (6.00 %) were recorded from Graduate level of education. Further observed that the total majority of farmers 13 (5.20 %) were observed from Post graduate level of education. Further reveals that the total majority of farmers 8 (3.20 %) were found from Illiterate level of

education of the study sample.

The data reported in Table 5 shows that amongst the majority 21 of the beneficiary farmers (16.80%) and the majority 44 of non-beneficiary farmers (35.20 %) were indicate from middle level of education. Further reported that the majority 42 of the beneficiary farmers (33.60 %) and the majority 12 of non-beneficiary farmers (9.60 %) were reported from Secondary level of education. Further recorded that the majority 18 of the beneficiary farmers (14.40 %) and the majority 26 of non-beneficiary farmers (20.80%) were recorded from Primary level of education. Further observed that the majority 19 of the beneficiary farmers (15.20 %) and the majority 8 of non-beneficiary farmers (6.40 %) were observed from Senior secondary level of education. Further reveals that the majority 12 of the beneficiary farmers (9.70 %) and the majority 3 of non-beneficiary farmers (2.40 %) were reveal from Graduate level of education. On the other hand, the majority 7 of the beneficiary farmers (5.50%) and the majority 6 of non-beneficiary farmers (4.80 %) were found from Post graduate level of education. while, only 2 of the beneficiary farmers (1.60 %) and the majority 6 of non-beneficiary farmers (4.80 %) were found out from Illiterate level of education. Whereas, 4 of the beneficiary farmers (3.20 %) and the majority 20 of non-beneficiary farmers (16.00 %) were found from Literate level of education in sample size.

Size of land holding of the beneficiary farmers and non-beneficiary farmers:

The Table 6 shows that the total majority of farmers 130 (52.00 %) were belonged to middle size of land holding groups. *i.e.* between 2 to 5 hectares. Further

Table 5 : Distribution of the mustard growers (B. F. and NB. F.) according to their education level							(n=250)
Sr. No.	Educational level	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Illiterate	2	1.60	6	4.80	8	3.20
2.	Literate	4	3.20	20	16.00	24	9.60
3.	Primary level	18	14.40	26	20.80	44	17.60
4.	Middle level	21	16.80	44	35.20	65	26.00
5.	Secondary	42	33.60	12	9.60	54	21.60
6.	Senior secondary	19	15.20	8	6.40	27	10.80
7.	Graduate	12	9.70	3	2.40	15	6.00
8.	Post graduate	7	5.50	6	4.80	13	5.20
	Total	125	100.00	125	100.00	250	100.00

reported that the total majority of farmers 60 (24.00 %) were included to big size of land holding groups. Further recorded that the total majority of farmers 48 (19.20 %) were having under small size of land holding groups. Further observed that the total majority of farmers 12 (4.80 %) were belonged to marginal size of land holding groups, respectively.

The data recorded in Table 6 indicates that the majority 64 of the beneficiary farmers (51.20%) and the majority 66 of non-beneficiary farmers (52.80%) were belonged to medium size of land holding groups. Further reported that the majority 35 of the beneficiary farmers (28.00%) and the majority 25 of non-beneficiary farmers (20.00%) were included to big size of land holding groups. Further recorded that the majority 22 of the beneficiary farmers (17.60%) and the majority 26 of non-beneficiary farmers (20.80%) were having under small size of land holding groups. Further observed that the majority 4 of the beneficiary farmers (3.20 %) and the majority 8 of non-beneficiary farmers (6.40 %) were belonged to marginal size of land holding groups, respectively.

Social participation of the beneficiary farmers and non-beneficiary farmers:

The Table 7 shows that the total majority of farmers 90 (36.00%) were belonged to member of one organization groups. Further reported that the total majority of farmers 84 (33.60 %) were included to member of more than one organization groups. Further

recorded that the total majority of farmers 66 (26.40 **%)** were found from member of a local committee groups. Further observed that the total majority of farmers 10 (4.00 %) were belonged to office member/office bearer groups.

The data observed in Table 7 indicates that the majority 35 of the beneficiary farmers (28.00%) and the majority 55 of non-beneficiary farmers (44.00%) were found to be member of one organization groups. Further reported that the majority 46 of the beneficiary farmers (36.80%) and the majority 38 of non-beneficiary farmers (30.40%) were included to member of more than one organization groups. Further recorded that the majority 40 of the beneficiary farmers (32.00%) and the majority 26 of non-beneficiary farmers (20.80%) were found from member of a local committee groups. Further observed that the majority 4 of the beneficiary farmers (3.20 %) and the majority 6 of non-beneficiary farmers (4.80%) were belonged to office member/office bearer groups, respectively.

Risk orientation of the beneficiary farmers and non-beneficiary farmers:

The Table 8 shows that about the total majority of farmers 130 (52.00 %) had from medium level of risk orientation category. Further reported that the total majority of farmers 72 (28.80 %) had fall under low risk orientation category. Further observed that only the total majority of farmers 48 (19.20 %) were belonged to high

Table 6 : Distribution of the (B. F. and NB. F.) according to their size of land holding (n=250)

Sr. No.	Size of land holding	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Marginal (less than 1 ha.)	4	3.20	8	6.40	12	4.80
2.	Small (1-2 ha.)	22	17.60	26	20.80	48	19.20
3.	Medium (2-5 ha.)	64	51.20	66	52.80	130	52.00
4.	Big (more than 5 ha)	35	28.00	25	20.00	60	24.00
	Total	125	100.00	125	100.00	250	100.00

Table 7: Distribution of the (B. F. and NB. F.) according to their social participation (n=125)

Sr. No.	Social participation	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Member of one organization	35	28.00	55	44.00	90	36.00
2.	Member of more than one organization	46	36.80	38	30.40	84	33.60
3.	Member of a local committee	40	32.00	26	20.80	66	26.40
4.	Office member/ Office bearer	4	3.20	6	4.80	10	4.00
	Total	125	100.00	125	100.00	250	100.00

level of risk orientation category.

The data indicates in Table 8 shows that about the majority 64 of the beneficiary farmers (51.20 %) and the majority 66 of non-beneficiary farmers (52.80 %) had from medium level of risk orientation category. Further reported that the majority 35 of the beneficiary farmers (28.00 %) and the majority 37 of non-beneficiary farmers (29.60 %) had fall under low risk orientation category. Further observed that only the majority 26 of the beneficiary farmers (20.80 %) and the majority 22 of non-beneficiary farmers (17.80 %) were belonged to high level of risk orientation category.

Extension participation of the beneficiary farmers and non-beneficiary farmers:

The Table 9 reveals that about the total majority of farmers 124 (49.60 %) had from medium level of extension participation category. Further reported that the total majority of farmers 73 (29.20 %) had fall under low level of extension participation category. Further observed that the total majority of farmers 53 (21.20 %) were belonged to high level of extension participation category.

The data reported in Table 9 indicates that about the majority 64 of the beneficiary farmers (51.20 %) and the majority 60 of non-beneficiary farmers (48.00 %) had from medium level of extension participation category. Further reported that the majority 35 of the beneficiary farmers (28.00 %) and the majority 38 of non-beneficiary farmers (30.40 %) had fall under low

level of extension participation category. Further observed that only the majority 26 of the beneficiary farmers (20.80 %) and the majority 27 of non-beneficiary farmers (21.60 %) were belonged to high level of extension participation category, respectively.

Source of information utilized by the beneficiary and non-beneficiary farmers:

Table 10 indicates that amongst the total majority of farmers 67 (26.80 %) had taken FLD on your field. Further reported that the total majority of farmers 45 (18.00%) had fall under participation in training programmes. While, the total majority of farmers 40 (16.00%) belonged to contact with the extension personnel were reported from high level source of information utilized. Further recorded that the total majority of farmers 27 (10.80%) were found in contact to agriculture supervisor. While, the total majority of farmers 22 (8.80%) were contacts to assistant agriculture officer recorded from medium level source of information utilized. Further reveals that the total majority of farmers 15 (6.00 %) were contact to educated family members. While, the total majority of farmers 15 (6.00 %) were contact to kisan mandal membership reveals from least level source of information utilized. Further observed that the total majority of farmers 10 (4.00 %) were visit to leading institutions. On the other hand, only the total majority of farmers 9 (3.60 %) were contact to retired persons with low level of source of information utilized.

The data recorded in Table 10 indicates that about

Table 8 : Distribution of the mustard growers (B. F. and NB. F.) according to their risk orientation						(n=250)	
Sr. No.	Level of risk orientation	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Low risk (Below 19.79)	35	28.00	37	29.60	72	28.80
2.	Medium risk (19.79 to 24.77)	64	51.20	66	52.80	130	52.00
3.	High risk (Above 24.77)	26	20.80	22	17.60	48	19.20
	Total	125	100.00	125	100.00	250	100.00
Mean=22.28		S.D =2.49					

Table 9: Distribution of the (B. F. and NB. F.) according to their extension participation						(n=250)	
Sr. No.	Extension participation	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Low (below 6.95 score)	35	28.00	38	30.40	73	29.20
2.	Medium (from 6.95 to 9.13 score)	64	51.20	60	48.00	124	49.60
3.	High (above 9.13 score)	26	20.80	27	21.60	.53	21.20
	Total	125	100.00	125	100.00	250	100.00
Mean=8.04		S.D. = 1.09					

the majority 35 of the beneficiary farmers (28.00 %) and the majority 32 of non-beneficiary farmers (25.60 %) had taken FLD on their field. Further reported that the majority 25 of the beneficiary farmers (20.00 %) and the majority 20 of non-beneficiary farmers (16.00 %) fall under participation in training programmes. While, the majority 18 of the beneficiary farmers (14.40 %) and the majority 22 of non-beneficiary farmers (17.60 %) belonged to contact with the extension personnel were reported from high level source of information utilized. Further recorded that the majority 12 of the beneficiary farmers (9.60 %) and the majority 15 of non-beneficiary farmers (12.00 %) were belonged to contact to agriculture supervisor. While, the majority 10 of the beneficiary farmers (8.00 %) and the majority 12 of non-beneficiary farmers (9.60 %) were belonged to contact to assistant agriculture officer were recorded from medium level source of information utilized. Further reveals that the majority 8 of the beneficiary farmers (6.40 %) and the majority 7 of non-beneficiary farmers (5.60 %) were contact to educated family members. While, the majority 7 of the beneficiary farmers (5.60

%) and the majority 8 of non-beneficiary farmers (6.40 %) were contact to Kisan Mandal membership reveals from least level source of information utilized. Further observed that 6 of the beneficiary farmers (4.80 %) and 4 of non-beneficiary farmers (3.20 %) were visit to leading institutions. On the other hand only 4 of the beneficiary farmers (3.20 %) and 5 of non-beneficiary farmers (4.00 %) were contact to retired persons with low level of source of information utilized.

Economic motivation of the beneficiary farmers and non-beneficiary farmers:

Table 11 shows that the total majority of farmers 116 (46.40 %) had from medium level of economic motivation category. Further reported that the total majority of farmers 76 (30.40 %) had fall under high level of economic motivation category. Further observed that the total majority farmers 58 (23.20 %) were belonged to low level of economic motivation category.

The data recorded in Table 11 indicates that the majority 56 of the beneficiary farmers (44.80 %) and the majority 60 of non-beneficiary farmers (48.00 %)

Sr. No.	Source of information utilized	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Educated family members	8	6.40	7	5.60	15	6.00
2.	Contacts with the retired persons	4	3.20	5	4.00	9	3.60
3.	Kisan mandal membership	7	5.60	8	6.40	15	6.00
4.	Participation in training programmes	25	20.00	20	16.00	45	18.00
5.	Visit to leading institutions	6	4.80	4	3.20	10	4.00
6.	Taken FLD on field	35	28.00	32	25.60	67	26.80
7.	Contacts with the extension personnel	18	14.40	22	17.60	40	16.00
8.	Agri. supervisor	12	9.60	15	12.00	27	10.80
9.	Assistant agriculture officer	10	8.00	12	9.60	22	8.80
	Total	125	100.00	125	100.00	250	100.00

Table 10 : Distribution of the (B. F. and NB. F.) according to their source of information utilized (n=250)

Sr. No.	Economic motivation	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Low (below 11.23 score)	30	24.00	28	22.40	58	23.20
2.	Medium (11.24 to16.71 Score)	56	44.80	60	48.00	116	46.40
3.	High (above 16.71 score)	39	31.20	37	29.60	76	30.40
	Total	125	100.00	125	100.00	250	100.00

Table 11 : Distribution of the (B. F. and NB. F.) according to their economic motivation (n=250)

Mean= 13.97   S.D. = 2.74

had medium level of economic motivation category. Further reported that the majority 39 of the beneficiary farmers (31.20 %) and the majority 37 of non-beneficiary farmers (29.60 %) fall under high level of economic motivation category. Further observed that only the majority 30 of the beneficiary farmers (24.00 %) and the majority 28 of non-beneficiary farmers (22.40 %) were belonged to low level of economic motivation category.

Irrigation potentiality of the beneficiary farmers and non-beneficiary farmers:

The Table 12 reveals that the total majority of farmers 105 (42.00 %) had from medium level of irrigation potentiality. Further reported that the total majority of farmers 78 (31.20 %) fall under high level of irrigation potentiality. Further observed that the total majority of farmers 67 (26.80 %) were belong to low level of irrigation potentiality.

The data recorded in Table 12 indicates that the majority 55 of the beneficiary farmers (44.00 %) and the majority 50 of non-beneficiary farmers (40.00 %) had medium level of irrigation potentiality. Further reported that the majority 40 of the beneficiary farmers (32.00 %) and the majority 38 of non- beneficiary farmers (30.40 %) fall under high level of irrigation potentiality. Further observed that the majority 30 of the beneficiary farmers (24.00 %) and the majority 37 of non-beneficiary farmers (29.60 %) were belonged to low level of irrigation potentiality. These findings of the study are similar in compliance with the findings of Singh (2004); Ashiwal (2006); Singh *et al.* (2006); Tambade (2007); Chander *et al.* (2009); Singh *et al.* (2009); Gopal and Prasad (2011); Sharma *et al.* (2011); Ashiwal *et al.* (2012); Badhala (2012); Balai *et al.* (2012); Dudi *et al.* (2012); Rai *et al.* (2012); Asiwal *et al.* (2013); Mandavkar *et al.* (2013); Rajeev Bairathi *et al.* (2013); Singh *et al.* (2013); Kumar *et al.* (2016) and Rojh *et al.* (2016).

Conclusion:

General profile/general information of the mustard growers (B. F. and NB.F.) according to their selected personal characteristics

This study was undertaken in Bharatpur Region of Rajasthan State, to know the general information/general profile of the mustard growers on a sample size (125, beneficiary farmers and 125, non-beneficiary farmers) regarding recommended mustard production technology. It was found that maximum number, the majority 99 of beneficiary (79.20 %) and the majority 35 of non-beneficiary (28.00 %) was belonged to joint type family. The majority 70 of beneficiary (56.00 %) and the majority 97 of non-beneficiary (77.60 %) were belonged to large size of family. The majority 54 of beneficiary (43.20 %) and the majority 56 of non-beneficiary (44.80 %) were having other backward caste. The majority 47 of beneficiary (37.60 %) and the majorities 49 of non-beneficiary farmers (39.20 %) were belonged to middle age groups. The majority 21 of beneficiary (16.80 %) and the majority 44 of non-beneficiary (35.20 %) were indicate from Middle level of education. The majority 42 of beneficiary (33.60 %) and the majority 12 of non-beneficiary (9.60 %) were reported from Secondary level of education. The majority 64 of beneficiary (51.20%) and majority 66 of non-beneficiary (52.80%) were belonged to medium size of land holding groups. The majority 35 of beneficiary (28.00%) and the majority 55 of non-beneficiary (44.00%) were found to be member of one organization groups. The majority 64 of beneficiary (51.20 %) and the majority 66 of non-beneficiary (52.80 %) had from medium level of risk orientation category. The majority 64 of beneficiary (51.20 %) and the majority 60 of non-beneficiary (48.00 %) had from medium level of extension participation category. The majority 35 of beneficiary (28.00 %) and the majority 32 of non-beneficiary (25.60 %) had taken FLD on their field. The majority 56 of beneficiary (44.80 %) and the majority 60 of non-beneficiary (48.00 %) had medium level of

Table 12 : Distribution of the (B. F. and NB.F.) according to their irrigation potentiality						(n=250)
Sr. No.	Irrigation potentiality	Beneficiary (n=125)		Non-beneficiary (n=125)		Total	
		F	%	F	%	F	%
1.	Low (below 3.19 score)	30	24.00	37	29.60	67	26.80
2.	Medium (from 3.19 to 13.65 score)	55	44.00	50	40.00	105	42.00
3.	High (above 13.65 score)	40	32.00	38	30.40	78	31.20
	Total	125	100.00	125	100.00	250	100.00

Mean = 8.42   S.D. = 5.23

economic motivation category. The majority 55 of beneficiary (44.00 %) and the majority 50 of non-beneficiary (40.00 %) had medium level of irrigation potentiality.

Authors' affiliations :

G. S. Bangarva, Department of Extension Education, S.K.N. College of Agriculture, Sri Karan Narendra Agriculture University, Jobner-Jaipur (Rajasthan) India

REFERENCES

Anonymous (2015). *Vision 2050*, "Annual Report Published by [Directorate of Rapeseed-Mustard Research: DRMR: (ICAR) Sewar, Bharatpur 321 303 (Rajasthan) India].

Ashiwal, B.L. (2006). Impact of front line demonstration on adoption of improved mustard production technologies among the farmers of Laxmangarh Panchayat Samiti of Sikar district of Rajasthan.M.Sc.(Ag.) Thesis, S.K. Rajasthan Agricultural University, Bikaner, campus-Jobner, Rajasthan (India).

Ashiwal, B.L., Singh, Sangram, Sharma, N.K. and Khan, I.M. (2012). Factors associated with adoption of improved mustard production technology. *Rajasthan J. Extn. Edu.,* **20** (1) : 61-64.

Asiwal, B.L., Singh, Sangram and Sharma, N.K. (2013). Adoption gaps and constraints in adoption of improved mustard production technology in semi arid region of Rajasthan. *Rajasthan J. Extn. Edu. & R.D.,* **21**: 105-108.

Badhala, B.S. (2012). Impact of front line demonstrations on adoption of groundnut production technologies by the farmers of Rajasthan. Ph.D. (Ag.) Thesis, S.K. Rajasthan Agricultural University, Bikaner, campus-Jobner, Rajasthan (India).

Balai, C.M., Meena, R.P., Meena, B.L. and Bairwa, R.K. (2012). Impact of front line demonstration on rapeseed-mustard yield improvement. *Indian Res. J. Extn. Edu.,* **12** (2): May, 2012.

Chander, S., Nand, H. and Sharma, K.P. (2009). Knowledge, adoption and yield level of groundnut production technology. *AIAEE,* **16** (2): 18-21.

Dobariya, J.B., Thesiya, N.M. and Bambhrolia, R.P. (2018). Attitude of beneficiary farmers towards activities of Krishi Vigyan Kendra of Dang district. *J. Krishi Vigyan,* **7** (1): 39-43.

Kokate, K.D., Dubey, S.K., Sah, Uma and Paul, Sudipto (2016). Tools, policies and practices in farm technology delivery system A review. *Inter. J. Curr. Res.,* **8** (5): 31438-31445.

Kumar, Amit, Bareth, L.S. and Samota, Santosh Devi (2016). Impact of agricultural technology management agency on adoption of mustard production technology by beneficiary and non-beneficiary farmers. *Indian. J. Extn. Edu.& R.D.,* **24**: 2016.

Mandavkar, P.M., Talathi, M.S., Mahadik, R.P. and Sawant, P.A. (2013). Farmers knowledge and correlates of oilseed production technology. *Raj. J. Extn. Edu. & R.D.,* **21** : 15-19.

Patil, Sandeep, Mahale, Mahesh, Chavan, Sudesh Kumar and Shinde, Vaibhav (2018). Impact of frontline demonstrations on oilseed crops in Konkan region of Maharashtra. *Indian Res. J. Extn. Edu.,* **18** (4): October, 2018.

Patil, S.S., Mahesh, M. M. and Sudesh Kumar, S.C. (2018). Impact of frontline demonstrations (FLDs) on oilseed crops in South Konkan Coastal Zone of Maharashtra. *Curr. Agric. Res.,* **6** (3): 355-364.

Prasad, Gopal (2011). Impact of front line demonstrations on knowledge, attitude and adoption of recommended production technology of mustard cultivation by the farmers in Bharatpur district of Rajasthan. M.Sc. (Ag.) Thesis, S.K. Rajasthan Agricultural University, Bikaner, campus-Jobner, Rajasthan (India).

Rajeev, Bairathi, Verma, A.K. and Patodiya, R.S. (2013). Dissemination of improved technology of mustard through front line demonstrations. *Rajasthan J. Extn. Edu. & R.D.,* **21** : 141-145 .

Rojh, Rajpal, Hanuman, Ram, Sharma, S.K. and Prasad, Dwarka (2016). Knowledge and adoption of improved cultivation practices of groundnut by the farmers of Bikaner district of Rajasthan. *Indian. J. Extn. Edu. & R.D.,* **24**: 2016.

Sharma, A.K., Kumar, V., Jha, S.K. and Sachan, R.C. (2011). Front line demonstrations on Indian mustard an impact assessment. *Indian Res. J. Extn. Edu.,* **11** (3) : 25-31.

Singh, Amar and Kothari, Kusum (2013). Oilseed brassica crop in Bharatpur eastern district of Rajasthan- A case study. *J. Oilseed Brassica,* **4** (2): 90-95.

Singh, A., Singh, A.K. and Singh, Lakhan (2013). Performance of front line demonstrations on mustard hybrid. *Indian J. Extn. Edu.,* **49** (1-2): 115-117.

Singh, N. (2004). Knowledge and adoption of recommended technology mustard cultivation in Jhunjhunu district of Rajasthan. M.Sc. (Ag.) Thesis, S.K. Rajasthan Agricultural University, Bikaner, campus-Jobner, Rajasthan (India).

Singh, N., Lal, Hanuman and Sharma, Poonam (2006). Adoption of recommended mustard production technology by the farmers. *Raj. J. Extn. Edu.,***14** (1): 149-151.

Singh, N., Bareth, L.S. and Sharma, A.K. (2009). Impact of front line demonstration on adoption of mustard production technology by the farmers. Souvenir, November-2009. RSEE, MPUAT, Udaipur, pp.111-112.

Sodani, R., Seema, Singhal, R.K., Gupta, S., Gupta, N., Chauhan, K.S. and Chauhan, J. (2017). Performance of yield and yield

attributes of ten Indian mustard (*Brassica juncea* L.) genotypes under drought stress. *Inter. J. Pure App. Biosci.,* **5** (3): 467-476.

Tambade, L.R. (2007). A study on knowledge, adoption and yield gap analysis of farmers under-taking front line demonstration (FLD) on oil-seed and pulses in Solapur district. Ph.D. Thesis, YCMOU, Nashik, M.S. (India).

WEBLIOGRAPHY

Anonymous (2015). Crop wise area, average yield and production and estimates and rainfall" from World Wide Web, *http//agriharyana.nic.in/information.html.*

14th Year
★ ★ ★ ★ ★ of Excellence ★ ★ ★ ★ ★