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Social impact of marked pigeon pea improved variety BDN 711 grown by small landholders in Chhatrapati Sambhajnagar and Jalna districts

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Abstract

Background: In Maharashtra in 2013-14 area under pigeonpea was 11.41 lakh hectares and productivity was 906 kg / ha. Majority of the farmers cultivated pigeonpea as a cash crop, but it cannot see to all farmers due to dry land cultivation with using long duration and local varieties. Recently in 2011-12 VNMKV Parbhani has developed BDN 711 new variety of pigeonpea to overcome the problems and increasing the productivity of pigeonpea in Maharashtra.

Methods: The present study was undertaken in the Marathwada region of Maharashtra state during the years 2021–22. Purposively on the basis of the maximum number of farmers cultivating red gram (BDN 711), were found in these two districts and Four talukas sixteen villages were selected for conducting the study. So from each village, fifteen farmers were selected purposefully from that list, and we considered them respondents, thus making a sample of 240 respondents. To study the impact, some respondents were analysed before and after cultivation of BDN 711, i.e., recall memories of farmers. An ex-post facto research design was adopted in this study.

Result: The findings with regard to total social impact percentage divided by the overall percentage of each component before and after cultivation of BDN 711 show that the farmers have established 14.44 % social impact.

Keywords: BDN 711, social impact, before cultivation, after cultivation etc.

Introduction

The red gram, or cajanus cajan, is a perennial legume of the Fabaceae family that was first domesticated on the Indian subcontinent. It accounts for slightly less than two percent of the world's land area, but supports about 18% of its total population. The 2011 census projection study projects that by 2021, it was the proportion of working-age people (15–59) will have increased from 58% in 2001 to around 64%.

Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, Uttar Pradesh, Coastal Andhra Pradesh, Gujarat, Tamil Nadu, Jharkhand, Odisha, Chhattisgarh, Telangana, Bihar, and the West Bengal delta area are the most significant regions with high productivity. A vital part of the diets of Indians are pulses. It is utilized to make shelters, feed animals, and provide fuel. Relative to other pulse crops and its uses are the most varied. For more than one billion individuals worldwide, primarily vegetarians and the impoverished, it is their primary source of protein in the diet. Its seed is rich in minerals, both A and C vitamins, vital amino acids, carbohydrates, and 21 percent protein. These vitamins and minerals enhance the health of individuals while also contributing to higher fertility of the soil and productivity.

The grave dares to the workforce / youth of these resource poor and rainfed regions viz. lack of skill in scientific crop cultivation, repair and maintenance of farm machineries and implements, production of quality seeds, primary processing, value addition, modern animal husbandry, poor infrastructure (Irrigation, godowns /warehouses, trading centres) and organized pulses markets etc. have been considered by the government while formulating the strategy and roadmap to increase the production of pulses.

Red gram has more calorific values which as follows.

Crop	Energy (cal)	Protein (g)	Fat (mg)	Ca (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin A value (mg)	Fe (mg)
Red gram	335	22.5	1.7	7.3	0.45	0.19	2.9	132	5.8

The country's total area coverage and production of tur has been about 45 Lha and 42 Lt respectively. As known traditionally, Maharashtra has contributed >27 percent of area and 25 percent of total production during this period. With aggressive Transfer of Technology (ToT) in various thematic areas, highest ever productivity level of 937 kg/ha was achieved during 2017-18 (Table 1). More than 80 percent of arhar production of the country during the period under report has been realized from 10 states of MS, MP, Karnataka and Gujarat, UP, Telangana, Jharkhand, Odisha, AP and TN.

In Maharashtra in 2013-14 area under Pigeonpea was 11.41 lakh hectares and productivity was 906 kg / ha. Majority of the farmers cultivated Pigeonpea as a cash crop, but it cannot see to all farmers due to dry land cultivation with using long duration and local varieties. In 2011-12 VNMKV Parbhani has developed BDN 711 new variety of Pigeonpea to overcome the problems and increasing the productivity of Pigeonpea in Maharashtra. Now this variety is much popularized in the farmer's field level. BDN 711 variety is short duration, escaping terminal draught and wilt resistant and predominately grown as an intercrop with other crops therefore, the present investigation on "Socio – economic impact of red gram BDN 711 on farmers in Marathwada region of Maharashtra is undertake with following objective that is "To obtain the socioeconomic impact of the red gram (BDN-711) on growers in Marathwada region".

Materials and Methods

The present study was conducted purposively in Chhatrapati Sambhajnagar and Jalna district out of eight districts of Marathwada region of Maharashtra state. The selections of talukas were done from the selected district. There are two talukas in Chhatrapati Sambhajnagar district and two talukas in Jalna district. From all these four talukas from two districts, namely, Paithan and Gangapur talukas from Chhatrapati Sambhajnagar district Ambad, Badnapur from Jalna district were selected purposively (on the basis of maximum Red gram (BDN 711) growers for research study. From each selected taluks four villages will be selected purposively on the basis of list obtained from Agricultural

research Canter, Badnapur and Divisional extension canter Chhatrapati Sambhajnagar, VNMKV, Parbhani. Hence sixteen villages will selected for conducting the study.

Results and Discussions

Social impact

Educational impact

It was found from table 1 Findings of respondents indicate that majority of the BDN 711 growers were belonged to medium educational impact before cultivation (56.25%) to after cultivation (60.00%) changed. Low educational impact 40.83% before and 36.25% after, followed by high category of 2.92% before cultivation of BDN 711 impact and 3.75% of the respondents having higher category after cultivation of BDN 711 having educational impact.

It was revealed from table 1 Findings of respondents indicate that impact of red gram (BDN 711) on about social impact through educational impact, more than half of respondents before cultivation (56.25%) and after cultivation (60.00%) were belong to one fourth of medium change category with (3.75) percent value. It could be concluded that, before cultivation of BDN 711, the main source of farmers from traditional crop cultivation like cereals, fodder by adopting mono cropping of local varieties or previous year seeds. But after cultivation of BDN 711 intercropping pattern or solo cropping of BDN 711 through its income the school dropouts of their children they could stop and provide good education and adopting new production technology than traditional cultivation practices to cope up with natures' unpredicted conditions etc. However, educational impact of the farmers before cultivation of BDN 711 was not enough to meet their basic needs of family and hence there was no scope for saving and sometimes they had to borrow to maintain their routine life. After cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic educational impact changes observed after cultivation of BDN 711.

Table 1: Distribution of the respondents according to their change educational impact in before and after cultivation of BDN 711

A.	Social impact 1. Educational impact							'Z' value
	Sr. No	Category	Before cultivation BDN 711			After cultivation BDN 711		
Score			N	%	Score	N	%	
1	Low	Up to 15	98	40.83	Up to 25	87	36.25	13.76**
2	Medium	16 to 28	135	56.25	26 to 33	144	60.00	
3	High	29 and above	7	2.92	34 and above	9	3.75	
			240	100.00		240	100.00	
	Mean	22.4458			29.8041			
	S.D.	7.2968			3.9504			

**Significant at 0.01 % level of probability

The Z value (13.76**) of educational impact on before cultivation and after cultivation of BDN 711 of red gram variety was found significant at 0.01 percent level of probability, which indicate that there was significant

difference among them.

The similar findings with the result of Anonymous (2013-A), Mankar *et al.* (2014) [14], Adsul (2016) [11].

Annual income impact

From table 2 shows that the majority of the BDN 711 growers were changed to annual impact before cultivation (78.75%) to after cultivation (79.58%). Due to increase in production the annual income enhanced with varietal impact. Low annual income impact at 17.50% before and 16.67% after cultivation of BDN 711 and shifted to medium level, whereas 3.75% high annual income level stood same. It was observed that impact of red gram (BDN 711) on annual income impact, majority of growers before cultivation (78.75%) and after cultivation near about one third (79.58%) were belong to medium change category with (0.83%) percent value. It could be concluded that,

before cultivation of BDN 711, the main source of farmers from traditional crop cultivation like cereals, fodder by adopting mix cropping, intercropping to cope up with nature's unpredictable conditions etc. However, total income of the farmers before cultivation of BDN 711 was not enough to meet their basic needs and hence there was no scope for saving and sometimes they had to borrow to maintain their routine life. After cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic annual income changes observed after cultivation of BDN 711.

Table 2: Distribution of the respondents according to their change annual income impact in before and after cultivation of BDN 711

2.		Annual impact						'Z' value
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711			
		Score	N	%	Score	N	%	
1	Low	Up to 17	42	17.50	Up to 26	40	16.67	9.89**
2	Medium	18 to 30	189	78.75	27 to 32	191	79.58	
3	High	31 and above	9	3.75	33 and above	9	3.75	
			240	100.00		240	100.00	
	Mean	24.5666			29.925			
	S.D.	7.3992			3.9307			

**Significant at 0.01 % level of probability

The Z value annual income impact (9.89**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them.

The similar findings of the result with the findings of Ali *et al.* (2014) [3], Mankar *et al.* (2014) [14], Pandya *et al.* (2015) [17], Adsul (2016) [1] and Zade *et al.* (2020) [28].

Saving pattern impact

Table 3 revealed that saving pattern impact of majority of the BDN 711 growers were changed to before cultivation (52.08%) to after cultivation (57.50%), low level at saving pattern impact 45.00% before cultivation of BDN 711, 27.92% decreased upto after cultivation BDN 711, high level at saving pattern impact 2.92% before cultivation of BDN 711, 14.58% after cultivation BDN 711 saving pattern impact.

It was observed that impact of red gram (BDN 711) on saving pattern impact, majority of growers before cultivation (52.08%) and after cultivation more than half (57.50%) were belong to medium change category with

(5.42) value. It could be concluded that, before cultivation of BDN 711, the main source of farmers from saving pattern from income through traditional crop cultivation like cereals, fodder, and postharvest technology like dal mill processing etc. However, total income of the farmers before cultivation of BDN 711 was not enough to meet their basic needs and hence there was no scope for saving and sometimes they had to borrow to maintain their routine life. After cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic saving pattern impact observed after cultivation of BDN 711.

The Z value saving pattern impact (9.90) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them.

The similar findings of the result with the findings of Anonymous (2013-A), Ali *et al.* (2014), Mankar *et al.* (2014) and Pandya *et al.* (2015).

Table 3: Distribution of the respondents according to their change saving pattern impact in before and after cultivation of BDN 711

3.		Saving pattern impact						'Z' value
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711			
		Score	N	%	Score	N	%	
1	Low	Up to 15	108	45.00	Up to 26	67	27.92	9.90**
2	Medium	16 to 31	125	52.08	27 to 33	138	57.50	
3	High	32 and above	7	2.92	34 and above	35	14.58	
			240	100.00		240	100.00	
	Mean	22.725			29.8875			
	S.D.	7.4378			4.0042			

**Significant at 0.01 % level of probability

Expenditure change impact

Table 4 proved that expenditure impact of majority of the BDN 711 growers were changed before cultivation (53.75%) to after cultivation (61.67%) was increased. Low

level at expenditure impact 40.83%, after cultivation of BDN 711 (28.33%), high level at expenditure impact 5.42% changed to after cultivation of BDN 711 (10.00%) changed expenditure impact in before and after cultivation of BDN

711. Due to better minimum support prize hence farmers could spend expenditure on their required family and farming deeds.

It was proved that expenditure change impact of red gram (BDN 711) on expenditure impact, majority of growers before cultivation (53.75 %) and after cultivation more than one fourth of respondents (61.67%) were belong to medium change category with (7.92) value. It could be concluded that, before cultivation of BDN 711, the main source of farmers from traditional crop cultivation like cereals, fodder etc. However, total income of the farmers before cultivation of BDN 711 was not enough to meet their basic needs and hence there was no scope for spending expenditure on agricultural implements, children school fees and sometimes they had to borrow to maintain their routine life. After

cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic expenditure changes impact observed after cultivation of BDN 711.

The Z value expenditure impact (9.80**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them. The similar investigation findings with the result of Velgu (2001) [26], Kale (2011) [13], Seema Tandekar (2014) [22], Mankar *et al.* (2014) [14], Adsul (2016) [1], Supe *et al.* (2017) [24], Jat (2016) [11], Patidar (2017) [16] and Kumar *et al.* (2022) [12].

Table 4: Distribution of the respondents according to their change expenditure impact in before and after cultivation of BDN 711

4.		Expenditure change Impact						'Z' value
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711			
		Score	N	%	Score	N	%	
1	Low	Up to 17	98	40.83	Up to 26	68	28.33	9.80**
2	Medium	18 to 31	129	53.75	27 to 33	148	61.67	
3	High	32 and above	13	5.42	34 and above	24	10.00	
			240	100.00		236	100.00	
	Mean	24.6458			29.9916			
	S.D.	7.4555			3.9653			

**Significant at 0.01 % level of probability

Material possession impact

From table 5 observed that majority of the BDN 711 growers were changed of material possession before cultivation (60.83%) to after cultivation (70.00%) changed. It happened due to better returns of MSP could purchase

materials for agricultural implements, kitchen materials, other materials as need. Low at 35.00% before cultivation of BDN 711 followed by 24.17% decreased, and high level of material possession increase in percent change increase from 4.17 before to 5.83 after cultivation of BDN 711.

Table 5: Distribution of the respondents according to their change material possession impact in before and after cultivation of BDN 711

5.		Material Possession Impact						'Z' value
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711			
		Score	N	%	Score	N	%	
1	Low	Up to 17	84	35.00	Up to 25	58	24.17	8.98**
2	Medium	18 to 30	146	60.83	26 to 40	168	70.00	
3	High	31 and above	10	4.17	41 and above	14	5.83	
			240	100.00		240	100.00	
	Mean	25.0083			30.0708			
	S.D.	7.6042			5.4984			

**Significant at 0.01 percent % level of probability

It was studied that impact of red gram (BDN 711) on material possession impact, near about one fourth of respondents before cultivation (60.83 %) and increased after cultivation more than one fourth of the respondents (70.00 %) were belong to medium change category with (9.17), respectively. there was observed that farmers before cultivation of BDN 711, farmers after cultivation of BDN 711 had lack of needy facility, assets like agricultural implements, T.V., Radio, Bullock cart, bicycle, kitchen materials due to their low annual income but result showed that farmers after cultivation of BDN 711, there was change in their life like required facility like tractor or basic agricultural implements, T.V. set, radio set, bicycle, mobile, motor cycle and their housing pattern which improve their standard of living of their life. This material possession of farmers after cultivation of BDN 711 might be due to the increase in income due to employment generation. It was observed from the above table that, by some means change

in material possession impact observed after cultivation of BDN 711.

The Z value material possession impact (8.98**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them.

The similar finding with the result of Ajani E. N. and Agwu A. E. (2012) [2], Wani *et al.* (2012) [27], Siddique *et al.* (2012) [19], Anonymous (2013-A), Mankar *et al.* (2014) [14], Adsul (2016) [1], Chavhan (2019) [9] and Kumar *et al.* (2022) [12].

Employment generation impact

Table 6 shows that employment generation impact of majority of the BDN 711 growers were before cultivation (67.92%) changed to after cultivation increased (73.33%). Low level of employment generation impact decrease from before 27.08% to after 21.67% change observed followed by

high level of remained same i.e 5.00%. This shows the result as increased production of second crop farmers could starts dal mill and next crop production.

It was noticed that impact of red gram (BDN 711) on medium employment generation impact, more than half of before cultivation (67.92%) and after cultivation near about one third of the respondents (73.33%) were belong to medium change category with (5.42) value. It could be concluded that, before cultivation of BDN 711, the main source of farmers from saving pattern from income through traditional crop cultivation like cereals, fodder, and postharvest technology like dal mill processing etc. However, total income of the farmers before cultivation of BDN 711 was not enough to meet their basic needs and hence there was no scope for spending expenditure and

sometimes they had to borrow to maintain their routine life. After cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic annual income changes through employment generation impact observed after cultivation of BDN 711.

The Z value employment generation impact (9.80**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them.

The similar findings with the result of Singh and Prakash (2010) [21], Anonymous (2013-B), Ingole (2014) [10], Mankar *et al.* (2014) [14], Adsul (2016) [1] and Barman (2019) [18].

Table 6: Distribution of the respondents according to their change employment generation impact in before and after cultivation of BDN 711

6.		Employment Generation impact						'Z' value	
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711				
		Score	N	%	Score	N	%		
1	Low	Up to 6	65	27.08	Upto 15	52	21.67	9.80**	
2	Medium	7 to 9	163	67.92	16 to 17	176	73.33		
3	High	10 and above	12	5.00	18 and above	12	5.00		
			240	100.00			240	100.00	
Mean			8.5458			17.3833			
S.D.			1.8243			2.0028			

**Significant at 0.01 % level of probability

Shifting of cropping pattern

From table 7 was observed at low level of before cultivation of BDN 711, (44.17%) and after cultivation more than one fourth of the respondents (69.17%), 45.00% decreased than after cultivation of BDN 711 majority of the BDN 711 growers were changed 16.67%. Also at high level of shifting of cropping patten find that Upto 10.83 percent changed 14.17 percent after cultivation of BDN 711.

Table 7 discovered that shifting of cropping pattern before cultivation BDN 711 was at medium level impact, more than one sixth of respondents (44.17%) and after cultivation more than one fourth of the respondents (69.17%) were belong to medium change category with (25.00) impact change value. The cost of production increased in cotton main cause behind this changed in percent. It could be concluded that, before cultivation of BDN 711, the main source of farmers from traditional crop cultivation like

cereals, fodder by adopting mono cropping of local varieties or previous year seeds. But after cultivation of BDN 711 intercropping pattern or solo cropping of BDN 711, this is early variety which leads to another crop can grow in same season like Rabi groundnut and adopting new production technology than traditional cultivation practices to cope up with natures' unpredicted conditions etc. However, shifting of cropping pattern impact on the farmers before cultivation of BDN 711 was not enough to meet their basic needs of family and hence there was no scope for enough production, less income and sometimes they had to borrow to maintain their routine life. After cultivation of BDN 711, additional employment generated by farmers had made significant changes in the annual per capita income of the farmers after cultivation of BDN 711. It was observed from the above table that, drastic shifting of cropping pattern changes observed after cultivation of BDN 711.

Table 7: Distribution of the respondents according to their change shifting of cropping pattern impact in before and after cultivation of BDN 711

7.		Shifting Of Cropping Pattern						'Z' Value	
Sr. No.	Category	Before cultivation BDN 711			After cultivation BDN 711				
		Score	N	%	Score	N	%		
1	Low	Up to 17	108	45.00	Up to 26	40	16.67	9.97**	
2	Medium	18 to 24	106	44.17	27 to 33	166	69.17		
3	High	25 and above	26	10.83	34 and above	34	14.17		
			240	100.00			240	100.00	
Mean			24.5333			29.9250			
S.D.			7.3858			3.9307			

**Significant at 0.01 % level of probability

The Z value shifting of cropping pattern impact (9.97**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 percent level of probability, which indicate that there was highly significant difference among them.

The similar findings with the result of Robertson *et al.* (2001b) [18] & Carberry *et al.* (2001) [18], Asmatoddin *et al.* (2009) [6], Singh *et al.* (2015) [20], Smith *et al.* (2016) [23] and Ayanan *et al.* (2017) [7].

Table 8: Component wise distribution of the respondents according to socio-economic impact of RED GRAM (BDN 711)

Sr. No.	Components	Before			After			Impact Percent
		Mean Obtained score	Obtainable score/max. score	Percent	Mean Obtained score	Obtainable score/max. score	Percent	
1.	Social Impact							
1	Educational impact	22.4375	35	64.10	29.8041	35	85.15	21.04
2	Annual income impact	24.575	35	70.21	29.9333	35	85.52	15.31
3	Saving pattern impact	24.5666	35	70.19	29.925	35	85.50	15.29
4	Expenditure impact	24.650	35	70.42	30.000	35	85.71	15.31
5	Material possession impact	24.7583	50	49.51	29.5625	50	59.12	9.60
6	Employment Generation impact	24.650	40	61.62	30.000	40	75.00	13.37
7	Shifting of cropping pattern	24.5416	40	61.35	29.9333	40	74.83	13.48
	Overall impact	170.17	270	63.02	209.15	270	77.46	14.44

Social Impact

Educational Impact

It is observed from table number 1.2 as per as educational impact is concern the average mean percentage before cultivation was 64.10, whereas after cultivation the average mean percentage was 85.15 the difference between before and after was 21.04 from above it. It conclude that as per as social change concern 26.8 social change was observed due to cultivation of red gram (BDN 711) variety. After cultivation of BDN 711 farmers have shown positive and medium change impact in educational impact which enhance their own knowledge about variety and lesser the school drop out of children by paying school fees timely.

The similar findings are with Anonymous (2013-A), Mankar *et al.* (2014) [14], Adsul (2016) [1] and Patel and Shekhawat (2014) [15].

Annual income impact

It is observed from table number 1.2 as per as annual income impact is concern the average mean percentage before cultivation was 64.10, whereas after cultivation the average mean percentage was 85.15 the difference between before and after was 15.31 from above it. It conclude that as per as social change concern 15.31 annual income was observed due to cultivation of red gram (BDN 711) variety. Annual income provides the economic base for BDN 711 growers and increases their risk bearing and make them more capable to procure inputs need for the cultivation of BDN 711 and other crops. Annual income help to increase the living standard, thus annual income has medium change impact with socio-economic impact of BDN 711 on famers.

The finding was in agreement with the Uma (2014) [25], Mankar *et al.* (2014) [14], Pandya *et al.* (2015) [17], Adsul (2016) [1].

Saving pattern impact

It is observed from table number 1.2 as per as saving pattern impact is concern the average mean percentage before cultivation was 70.19, whereas after cultivation the average mean percentage was 85.50 the difference between before and after was 15.29 from above it it conclude that as per as social change concern 15.29 impact change was observed due to cultivation of red gram (BDN 711) variety. Saving pattern increase the chances to purchasing power of farmers and decision making which has positive.

The similar findings of the result with the findings of Anonymous (2013-A), Ali *et al.* (2014) [3], Mankar *et al.* (2014) [14] and Pandya *et al.* (2015) [17].

Expenditure change impact

It is observed from table number 1.2 as per as expenditure

impact is concern the average mean percentage before cultivation was 70.42, whereas after cultivation the average mean percentage was 85.71 the difference between before and after was 15.31 from above. It concluded that as per as social change concern 15.31 expenditure change was observed due to cultivation of red gram (BDN 711) variety. The similar investigation findings with the result of Mankar *et al.* (2014) [14], Adsul (2016) [1], Supe *et al.* (2017) [24], Jat (2016) [11], Patidar (2017) [16] and Kumar *et al.* (2022) [12].

Material possession impact

It is observed from table number 1.2 as per as material possession impact is concern the average mean percentage before cultivation was 49.51, whereas after cultivation the average mean percentage was 59.12 the difference between before and after was 9.60 from above it. It conclude that as per as social change concern 9.60 material possession was observed due to cultivation of red gram (BDN 711) variety.

The similar finding with the result of Ajani and Agwu (2012) [2], Wani *et al.* (2012) [27], Siddique *et al.* (2012) [19], Anonymous (2013-A), Mankar *et al.* (2014) [14], Adsul (2016) [1], Chavhan (2019) [9] and Kumar *et al.* (2022) [12].

Employment generation impact

It is observed from table number 1.2 as per as employment generation impact is concern the average mean percentage before cultivation was 61.62, whereas after cultivation the average mean percentage was 61.62 the difference between before and after was 13.37 from above it. It conclude that as per as social change concern 13.37 employment generation impact change was observed due to cultivation of red gram (BDN 711) variety.

The similar findings with the result of Singh and Prakash (2010) [21], Anonymous (2013-B), Ingole (2014) [10], Mankar *et al.* (2014) [14], Adsul (2016) [1] and Barman (2019) [8].

Shifting of cropping pattern impact

It is observed from table number 1.2 as per as shifting of cropping pattern impact is concern the average mean percentage before cultivation was 61.35, whereas after cultivation the average mean percentage was 74.83 the difference between before and after was 13.48 from above it. It concluded that as per as social change concern 13.48 shifting of cropping pattern impact change was observed due to cultivation of red gram (BDN 711) variety.

Shifting of cropping pattern in selected area observed due to diverse climate, with varying temperatures, rainfall patterns, and weather events, pest and diseases in cotton crop, Soil type, Technology, Socio-economic conditions of the farmers, Changes in consumption pattern, Market

conditions, Changes in agrarian policy, Availability of agricultural inputs, Improvement in technology, etc.

The similar findings with the result of Robertson *et al.* (2001b) [18] & Carberry *et al.* (2001) [18], Asmatoddin *et al.* (2009) [6], Singh *et al.* (2015) [20], Smith *et al.* (2016) [23] and Ayanan *et al.* (2017) [7].

Conclusion

The result shows that Impact of red gram BDN 711 was studied on the before and after cultivation. For study, the base year was selected 2018 to 2022 i.e based on recall memory and the different components such as educational impact, annual income impact, saving pattern impact, expenditure impact, material possession impact, employment generation impact, shifting of cropping pattern, etc. The total social impact change percentage divided by the overall percentage of each component of before cultivation impact was found 14.44 %. Hence, it conclude that after cultivation of BDN 711 the farmers has established 14.44 % social impact.

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