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Social Impact of Evident Pigeon Pea Improved Variety BDN 711 Grown by Small Landholders in Chh. Sambhajinagar 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. In 2011-12 VNMKV Parbhani has developed BDN 711 new variety of Pigeonpea to overcome the production 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. Purposive 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 analyse 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 change 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.

Key words: After cultivation, BDN 711, Before cultivation, Social impact.

INTRODUCTION

Red gram (*cajanus cajan*) is a perennial legume from the family *Fabaceaesince* its domestication in the Indian subcontinent India occupies only 2.2% of the world's land area, it supports approximately 18% of the world's population. The census projection report has further revealed that the proportion of the working age population between 15 and 59 years is likely to increase from 58% in 2001 to > 64 per cent by 2021. Such a trend would make the country one of the youngest nations in the world. Thus, one of the India's competitive advantages is its demographic dividend. The future agricultural operations are likely to be highly skilled and competitive (Anonymous, 2017a). The serious challenges 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. The main regions with high productivity are Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, Uttar Pradesh, Coastal Andhra Pradesh, Gujarat, Tamil Nadu, Jharkhand, Odisha, Chhattisgarh, Telangana, Bihar and West Bengal delta region. Pulses are an important food in Indian people's diet. It is used for food, feed, making huts and for fuel. It has more diverse uses than any other pulse crop. It is the principle source of dietary protein for more than billion people most of whom are vegetarian and poor. Its seed contains about 21 per cent protein and rich in essential amino acids, carbohydrate, minerals and vitamin A and C, also it helps to increase productivity and fertility of soil (Anonymous, 2016).

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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 per cent of area and 25 per cent 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. More than 80 per cent 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. (Anonymous, 2017b).

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. 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 objectives.

Materials and Methods

The present study was conducted purposively in Aurangabad 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 Aurangabad district and two talukas in Jalna district. From all these four talukas from two districts, namely, Paithan and Gangapur talukas from Auranagbad 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 Centre, Badnapur and Divisional extension centre Aurangabad, VNMKV, Parbhani. Hence sixteen villages will selected for conducting the study.

Results and Discussion

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) per cent 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

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

Social impact							
Educational impact							
Category	Before cultivation BDN 711			After cultivation BDN 711			'Z' value
	Score	N	%	Score	N	%	
Low	Up to 15	98	40.83	Up to 25	87	36.25	13.76**
Medium	16 to 28	135	56.25	26 to 33	144	60.00	
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.

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.

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 per cent 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), Adsul (2016).

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%) per cent 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 natures' unpredicted 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.

The Z value annual income impact (9.89**) of before cultivation and after cultivation of BDN 711 was found significant at 0.01 per cent 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); Mankar *et al.* (2014); Pandya *et al.* (2015); Adsul (2016) and Zade *et al.* (2020).

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

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

Category	Annual impact						'Z' value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 17	42	17.50	Up to 26	40	16.67	9.89**
Medium	18 to 30	189	78.75	27 to 32	191	79.58	
High	31 and above	9	3.75	33 and above	9	3.75	
	100.00	240	100.00		240	100.00	
Mean		24.5666			29.925		
S.D.		7.3992			3.9307		

**Significant at 0.01% level of probability.

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

Category	Saving pattern impact						'Z' value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 15	108	45.00	Up to 26	67	27.92	9.90**
Medium	16 to 31	125	52.08	27 to 33	138	57.50	
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.

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 per cent 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).

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 per cent level of probability, which indicate that there was highly significant difference among them.

The similar investigation findings with the result of Velgu (2001); Kale (2011); Seema Tandekar (2014); Mankar *et al.* (2014); Adsul (2016); Supe *et al.* (2017)' Jat (2016)' Patidar (2017) and Kumar *et al.* (2022).

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 per cent change increase from 4.17 before to 5.83 after cultivation of BDN 711.

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. It was observed that farmers before cultivation of BDN 711, farmers after cultivation of BDN 711 had lack of needy facility, assets like agricultural

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

Category	Expenditure change impact						'Z' value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 17	98	40.83	Up to 26	68	28.33	9.80**
Medium	18 to 31	129	53.75	27 to 33	148	61.67	
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.

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 per cent level of probability, which indicate that there was highly significant difference among them.

The similar finding with the result of Ajani and Agwu (2012); Wani *et al.* (2012); Siddique *et al.* (2012); Anonymous (2013-A); Mankar *et al.* (2014); Adsul (2016); Chavhan (2019) and Kumar *et al.* (2022).

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 per cent level of probability, which indicate that there was highly significant difference among them.

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

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

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

Category	Material possession impact						'Z' value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 17	84	35.00	Up to 25	58	24.17	8.98**
Medium	18 to 30	146	60.83	26 to 40	168	70.00	
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% level of probability.

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

Category	Employment Generation impact						'Z'value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 6	65	27.08	Upto 15	52	21.67	9.80**
Medium	7 to 9	163	67.92	16 to 17	176	73.33	
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.

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 patter find that Upto 10.83 percent changed 14.17 per cent 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 per cent. 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.

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 per cent level of probability, which indicate that there was highly significant difference among them.

Shukla *et al.* (2024) stated that Incorporation of legume residues also had significant effect on plant height, dry matter production and chlorophyll content; leaf area and leaf area index at 60 days after sowing and crop growth rate and absolute growth rate of maize crop. The similar findings with the result of Robertson *et al.* (2001), Asmatoddin *et al.* (2009), Singh *et al.* (2015); Smith *et al.* (2016) and Ayenan *et al.* (2017).

Component wise distribution of the respondents according to socio-economic impact of red gram (BDN 711)

Social impact

Educational impact

It is observed from Table 1 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.

(Garud *et al.* 2023) mentioned that the result of the demonstrations concluded that an average yield of pigeonpea under improved technology ranged from 1430 kg/ha to 1800 kg/ha with a mean 1664 kg/ha; which was 30.61 per cent higher over farmers practice (1274 kg/ha). Morever, average yield recorded was higher under demonstrations over district and state average. The study exhibited mean extension gap of 391 kg/ha, mean technology gap 535 kg/ha with mean technology index 25.23 per cent. Higher mean net return of Rs. 71912/ha with mean B:C ratio 2.36 was obtained with improved technologies in comparison to farmers practice.

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

Annual income impact

It is observed from Table 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

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

Category	Shifting of cropping pattern						'Z' Value
	Before cultivation BDN 711			After cultivation BDN 711			
	Score	N	%	Score	N	%	
Low	Up to 17	108	45.00	Up to 26	40	16.67	
Medium	18 to 24	106	44.17	27 to 33	166	69.17	9.97**
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.

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.

Singh *et al.* (2018) mentioned that Fusarium wilt (FW) is a major fungal disease of pigeonpea causing huge economic losses annually and breeding of FW resistant cultivars is essential as other control measures such as fungicides are expensive and harmful to environment.

The finding was in agreement with the Uma (2014); Mankar *et al.* (2014); Pandya *et al.* (2015); Adsul (2016).

Saving pattern impact

It is observed from Table 3 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); Mankar *et al.* (2014) and Pandya *et al.* (2015).

Expenditure change impact

It is observed from Table 4 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); Adsul (2016); Supe *et al.* (2017); Jat (2016), Patidar (2017) and Kumar *et al.* (2022).

Material possession impact

It is observed from Table 5 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); Wani *et al.* (2012); Siddique *et al.* (2012); Anonymous (2013-A); Mankar *et al.* (2014); Adsul (2016); Chavhan (2019) and Kumar *et al.* (2022).

Employment generation impact

It is observed from Table 6 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); Anonymous (2013-B); Ingole (2014); Mankar *et al.* (2014); Adsul (2016) and Barman (2019).

Shifting of cropping pattern impact

It is observed from Table 7 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

	Before			After			Impact
Components	Mean Obtained score	Obtainable score/ max. score	Per cent	Mean Obtained score	Obtainable score/ max. score	Per cent	Per cent
Social impact							
Educational impact	22.4375	35	64.10	29.8041	35	85.15	21.04
Annual income impact	24.575	35	70.21	29.9333	35	85.52	15.31
Saving pattern impact	24.5666	35	70.19	29.925	35	85.50	15.29
Expenditure impact	24.650	35	70.42	30.000	35	85.71	15.31
Material possession impact	24.7583	50	49.51	29.5625	50	59.12	9.60
Employment Generation impact	24.650	40	61.62	30.000	40	75.00	13.37
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

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

Garud *et al.* (2019) reported that The pigeonpea variety BDN-711 was used for sowing with spacing 90 × 20 cm. The main plot treatments were three land configurations as (L1) broad bed furrow (BBF), (L2) ridges and furrow and (L3) flat bed method. Sub plot treatments were four intercropping systems *i.e.* (I1) pigeonpea + soybean (2:1), (I2) pigeonpea + green gram (2:1), (I3) pigeonpea + black gram (2:1) and (I4) pigeonpea + cowpea (2:1). It was observed that seed yield of pigeon pea andpigeonpea equivalent yield were significantly affected due to different land configuration and intercropping systems. The highest pigeonpea seed yield (1588 kg ha^{-1}) and pigeonpea equivalent yield (1823 kg ha^{-1}) were obtained with Broad bed furrows (L1) followed by ridges and furrow (L2). Among the intercropping systems, pigeonpea + greengram intercropping system (I2) recorded higher seed yield (1574 kg ha^{-1}) and pigeonpea equivalent yield (1832 kg ha^{-1}). Periodical soil moisture observations in different land configuration considering depth of soil, higher average soil moisture was recorded under broad bed furrow followed by ridges and furrows while lesser was recorded under flatbed sowing.

The similar findings with the result of Robertson *et al.* (2001); Asmatoddin *et al.* (2009); Singh *et al.* (2015); Smith *et al.* (2016) and Ayenan *et al.* (2017).

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.

Conflict of interest

The researcher received a Ph.D Fellowship from Dr. Babasaheb Ambedkar Research and Training Institute, Pune, enabling them to conduct research on a specific variety of crops.

References

Adsul, G.B.(2016). Socio-economic impact of National Horticulture Mission on its beneficiaries in Marathwada region. Ph.D. (Agri.) Thesis, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (Maharashtra).

Ajani, E.N. and Agwu, A.E. (2012). Information communication technology needs of small-scale farmers in Anambra State, Nigeria. Journal of Agricultural and Food Information. 13(2): 144-156. doi: 10.1080/10496505.2012.663694.

Ali, S.S., N.R. Koshti and A. Deshmukh.(2014). Impact of Cluster Promotion Programme on socio-economic status of sericulturist. International Journal Extension Education. 10: 127-130.

Anonymous. (2013A). Socio-economic impact of technology developed by Marathwada Krishi Vidyapeeth on Farmers with respect to Soybean crop. Agresco Report, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (Maharashtra). pp: 43-56.

Anonymous .(2013B). Impact of farm ponds on beneficiary farmers of Western Vidarabha, Research Review Committee Project, submitted on 2nd April, 2013 at RRC meeting Dr. Punjanbrao Deshmukh Krishi Vidyapeeth, Akola.

Anonymous. (2016). Agricultural Statistics at a Glance,. Directorate of Economics and Statistics, Ministry of Agriculture and FW, Govt. of India. Website http://www.dacnet.nic.in/ean.

Anonymous. (2017a). website. http://ipga.co.in/wp-content/uploads/2020/03/Vol-3-Issue-2-Pulse-India- Jul-Sep-2017.pdf All India Pulses and Grains Association Publication. Retrieved and accessed on 08feb.

Anonymous. (2017b). Website. http://www.agriculturlproductsindia.com/cereals-pulses/cereals-pigeon-pea. html Retrieved and accessed on 08feb.

Asmatoddin, M., Jawale S.V. and Ghulghule. J.N. (2009). Studied socio-economic status and cropping pattern of medium farm owner in Marathwada. Internal J. Com. Busi. Manage., 2(1): 37-39.

Ayenan, M.A.T., Danquah, A., Ahoton, L.E. *et al.* (2017). Utilization and farmers' knowledge on Pigeonpea diversity in Benin, West Africa. J. Ethnobiology Ethnomedicine. 13: 37. https://doi.org/10.1186/s13002-017-0164-9.

Barman, P. (2019)."Rural Transformation in Terms of Socio-Economic Status and Household Consumption Pattern: A Case Study of the Villages Azadnagar, Audali and Tilpuri-1 of Udhamsing Nagar District of Uttarakhand, India". International Journal of Humanities Social Sciences and Education (IJHSSE), 6(9): 59-65. doi: http://dx.doi.org/10.20431/2349-0381. 0609006.

Chavhan, P. N.(2019). Impact of mobile based agro advisory services by state department of agriculture in Marathwada region. Ph.D. (Agri.) Thesis, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani.

Garud, H.S., Asewar, B.V., Dhawan, A.S., Gokhale, D.N., Mirza, I.A.B. (2019). Productivity and soil moisture conservation studies of pigeon pea based intercropping systems as influenced by different land configurations. Legume Research. 42(3): 365-369. doi: 10.18805/LR-4093.

Garud H.S., Gaikwad B.B., Surpam T.B., Patgaonkar D.C., Jagtap K.L. (2023). Impact of cluster front line demonstrations on productivity and profitability of pigeonpea under NFSM in Beed District of Maharashtra, India. Legume Research. 46(7): 888-892. doi: 10.18805/LR-5116.

Ingole, S.A. (2014). Impact of farm ponds in saline tract of western vidarbha. M.Sc. (Agri.) Thesis, Dr. Panjabrao Deshmukh Krishi Vidypeeth, Akola (Maharashtra).

Jat, R.A. (2016). study on socio-economic change among the beneficiaries farmers of crop loan scheme in Dewas district of Madhya Pradesh (Master's Thesis). Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Retrieved from http://krishikosh.egranth.ac.in/handle/1/5810000879.

Kumar, A., Sahu, K.K. and Sangode, P.K. (2022). Socio-economic Analysis of Soybean Growers with Reference to Cost of Cultivation and Income in Rajnandgaon District of Chhattisgarh. The Pharma Innovation Journal: SP-11(3): 27-31.

Kale, N.M. (2011). A study constraints in adoption of land care techniques for saline-sodic soils of Purna Vally in RRC.

Mankar, D.M., Wankhade, P.P. and Kale, N.M. (2014). Socio-economic impact of improved Soybean technology on farmers. International Journal Extension Education. 10: 146-152.

Patel, J.R. and Shekhawat.(2014). Impact of krushijivan farm magazine, Ind. J. Extn. Educ. and R.D. 22 : 110-113.

Patidar, M. (2017). Impact analysis of Credit Through District Co-operative Bank on agricultural development of beneficiary farmers in Ratlam District of M. P. (Master's Thesis). Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Retrieved from-http://krishikosh.egranth.ac.in/handle/1/5810030756.

Pandya, S.P., Prajapati M.R. and Thakar, K.P. (2015). Socio-economic impact of Krishi Mahotsav on beneficiary farmers of Gujarat. Indian Journal of Extension Education. 51(1 and 2): 75-77.

Robertson, M.J., Carberry, P.S., Chauhan, Y.S., Ranganathan, R. and O'leary, G.J.(2001).'Predicting growth and development of Pigeonpea: A simulation model'. Field Crops Research. 71: 195-210.

Shukla, M., Sadhu, A.C., Mevada, K.D., Shitap, M., Patel, P. (2024). Effect of legume crop residues and nitrogen management on growth parameters and growth indices of maize (*Zea mays* L.). Indian Journal of Agricultural Research. 58(2): 266-272. doi: 10.18805/IJARe.A-5679.

Siddique, K.H.M., Johansen, C., Turner, N.C., Jeuffroy, M.H., Hashem, A., Sakar, D., Gan, Y., Alghamdi, S.S. (2012). Innovations in agronomy for food legumes. A review. Agronomy for Sustainable Development. 32: 45-64.

Singh, B., Singh, Y.K., Tripathi, S. and Binjhade, C.L. (2015). Adoption of improved pulse production technology by pulse growers of Chhindwara district of Madhya Pradesh. Indian Res. Journal of Extension Education.15(4): 189-190.

Singh, S.B. and Prakash, N. (2010). Socio-economic impact of watershed development project in Manipur. Indian Res. J. Extn. Edu. 10(1): 78-82.

Singh, K.A, Singh, K.D., Kumar, R., Singh, N., Ved, R.P. (2018). Inheritance studies on Fusarium wilt resistance in long duration pigeonpea [*Cajanus cajan* (L.) Millsp.]. Legume Research. 41(6): 934-937. doi: 10.18805/LR-3805.

Smith A., Snapp S., Dimes J.,Gwenambira C, Chikowo, R. (2016). Doubled-up legume rotations improve soil fertility and maintain productivity under variable conditions in maize-based cropping systems in Malawi. Agricultural Systems. 145: 139-149, ISSN 0308-521X. https://doi.org/10.1016/j.agsy.2016.03.008.

Supe, D.V., Kadam, R.P. and Pawar, G.S. (2017). Relational analysis of profile of beneficiaries of farm ponds and its socio economic impact. International Journal of Environment, Agriculture and Biotechnology (IJEAB) 2, Issue-4, July-Aug.

Tandekar, S. (2014). Assessment of stress management by farmers in distress prone area of western Vidarbha. M.Sc. Thesis (unpublished), PDKV, Akola.

Uma. (2014). Prasher. Mahatma Gandhi National Employment Guarantee Act and its impact on the beneficiaries. Asian Journal of Research in Social Sciences and Humanities. 4(4): 50-60.

Velgu, T.C. (2001). Role of migration in people lives- A qualitative study of four villages in Mahaboobnagar and Anantpur district, Andhra Pradesh Rural Livelihood Programme (APRLP) Hyderabad.

Wani, S.P., Rockström, J., Sahrawat,K. (2012). Watershed development as a growth engine for sustainable development of rainfed areas. Integrated Watershed Management in Rainfed Agriculture. 10.1201/b11424-3. 35-52.

Zade, K., Pawar, S. and Irfan, S. (2020). Performance and economic impact of pigeaon pea-(BDN-711) under drought condition in NICRA Village of Marathwada region of Maharashtra. Journal of Pharmacognosy and Phytochemistry. Sp 9(5): 207-209.