P-ISSN 2322 - 0678 & E-ISSN 3048 - 9946
https://doi.org/10.56572/gjoee.2026.41.1.0013 Gujarat Journal of Extension Education Vol. 41 : Issue 1 : June - 2026

A STUDY ON THE SOCIAL IMPACT OF CFLD-PULSE PROGRAM IN AGRICULTURE

M. Vamshi [1], C. Padma Veni [2] and Ramesh Chand Bunkar[3]

1 M.Sc. Research scholar, Department of Agricultural Extension, Professor Jayashankar Telangana State Agricultural University, Hyderabad-500 030
2 Professor and Head, Department of Agricultural Extension, Professor Jayashankar Telangana State Agricultural University, Hyderabad - 500 030
3 Ph. D Research Scholar, Dairy Extension Division, ICAR-National Dairy Research Institute, Karnal 132 001
Email: vamshi6654@gmail.com

ABSTRACT

To meet the nutritional requirements of the population, the Government of India launched the Cluster Frontline Demonstration programme. The Present paper focuses on assessing the social impact of the program by employing the Difference-In-Difference approach to control external environmental factors affecting the results. The present study was carried out in 2021-22 in the Central Telangana Zone at KVK Wyra (Khammam district) and KVK Malyal (Mahabubabad district). A total of 50 beneficiaries from each district were purposively selected as part of the program, while 30 respondents cultivating local variety pulses were chosen randomly from a non-sampling area as non-beneficiaries representing control group. The study revealed that, as a result of the efforts from KVK scientists, indicators/ components like social status has increased by 0.12 units, perception on quality of advisory services is 0.53 units more than control, while the quantity of pulse grains retained for family consumption has 2.21 kg more than the control respondents who were not part of the programme. The study reveals that though the program has shown a positive impact on the beneficiaries, If the programme were expanded to neighbouring areas and placed greater emphasis on the nutritional aspect, it could prove to be more beneficial.

Keywords: *cluster frontline demonstration, difference-in-difference, pulses, social impact, nutritional impact.*

INTRODUCTION

Pulses are primary source of dietary protein for a significant portion of the population in our country. Due to their leguminous nature, pulses are regarded as essential components of agricultural systems (Rakhode et al., 2011 and Swati et al., 2022).). Although pulses are consumed globally, their intake is particularly higher in regions where animal proteins are limited and costly (Swaroopa et al., 2016). India's pulse production for 2023-24 was 24.25 million tons, covering approximately 29 million hectares, showing a decline from the previous year's record of 27.3 million tons in 2021-22, which was achieved from over 30.7 million hectares (dpd.gov and Pib.gov). Telangana contributed around 2% of India's total pulse output, with recent yearly production in the state estimated at about 4.8 to 5 lakh tons from an area of around 4.6 to 4.8 lakh hectares (des. telangana.gov). India remains the largest global producer (25-28% global share), consumer (27%), and importer (14%) of pulses. Despite the vast acreage, domestic production is still below annual consumption, which is estimated at 28 million tons, resulting in continued nutrient and protein deficiencies for the population due to the shortfall (dpd.gov and Pib.gov). In 2023-24, India's pulse imports surged to a six-year high of approximately 4.65 to 4.7 million tons to meet demand (Economic times, assessed on 30th July,2024). key factor contributing to the low preference for pulse crops compared to other crops is their lower yield and the less profitable prices farmers receive. Typically, pulse crops are grown as a secondary crop after the main harvest or along field borders (Singh et al., 2019), which limits both area and production. To address this issue and achieve self-sufficiency in pulse production, the Government of India launched the Cluster Frontline Demonstration (CFLD) program as part of the National Food Security Mission. This initiative is a crucial method for delivering the latest agricultural practices, aiming to showcase newly developed crop production and protection technologies in farmers' fields across various agro-climatic conditions and farming scenarios (Amit *et al.,* 2020). Additionally, these demonstrations are carefully designed to promote the rapid spread of the showcased technology among the farming community through supportive extension activities such as field days and farmers' conventions (Singh et al., 2018). While implementing the technologies in farmers' fields, researchers are tasked with examining factors that lead to increased crop production, identifying production

challenges, and generating crucial production factor feedback. The CFLD programme is particularly focussed on small and marginal farmers who are the dominant landholders. As the program's focus is on small and marginal farmers, studying their social upliftment is of utmost importance to make any adjustments in the implementation of the programme. Many of the previous studies, like (Vamshi *et al*., 2024) have focussed on assessing knowledge gain and Economic impact (Shah *et al.,* 2019), but true impact in terms of the social lens has not been done. In this context, the present paper aims to evaluate the impact of the CFLD program concerning the social status of farmers and increased pulse consumption at the household level. The study employs a unique Difference-in-Difference methodology to measure the CFLD's impact.

OBJECTIVE

To evaluate the social impact of the CFLD pulse program on the beneficiary farmers

METHODOLOGY

The CFLD program was implemented from 2015-16 under the National Food Security Mission by the Government of India. The present assessment study was conducted in 2020-21, five years past the implementation of the programme, which is believed to be a good time to study the program's impact so that administration can plan to rectify any initial tailbacks. For the purpose of selecting sample farmers, initially central Telangana zone was purposively selected for the study, from which 2 KVK's which were performing CFLD program from the 2015-16 were purposively selected. The selected KVK's were KVK Wyra and KVK Malyal from Khammam and Mahabubabad districts respectively. Village wise CFLD pulse beneficiary list from both KVK's was acquired through proper channel for the year 2018-19, based on availability of more number of beneficiaries. Then from the list of beneficiaries, 50 farmers from each KVK were selected randomly. Farmers from the beneficiary list were categorized as treatment farmers (Pulse-farmers under CFLD) from the sampling area, and farmers from the non-sampling area were taken as control (Pulse farmers not in CFLD programme). Altogether, our sample of farmers comprises 100 treatment (50 from each KVK) and 60 control farmers. The observations were taken both before and after the introduction of CFLD programme. To study the social impact of CFLD on beneficiary farmers, a baseline year 2018-19 was chosen based on the maximum number of available farmers to interact and elicit information on CFLD programme. As the procedure is based on data recall method, 2018-19 baseline year was found suitable for the study as the beneficiary farmers are expected to have fresh knowledge of both before and after the program.

Data was collected for each selected respondent on aspects such as quantity of produce stored for household consumption, perception of farmers on advisory services, social status by using a pre-tested questionnaire. The Difference-in- Difference method was used which is a quasi-experimental regression tool applied to know the impact of CFLD (by using double difference: before/after treatment and with/without treatment). It is one of the methods which is used to evaluate the impact of any intervention/programme by comparing the changes in outcomes over time between beneficiaries (the treatment group) and non-beneficiaries (the control group) using longitudinal data from treatment (beneficiaries) and control (non-beneficiaries) groups to obtain an appropriate counterfactual to estimate a causal effect of CFLD . It is based on a combination of before-after and treatment-control group comparisons and used to compare the beneficiaries with non-beneficiaries in terms of social impact (Bhavani et al., 2022). DID was implemented as an interaction term between time and treatment group dummy variables in a regression model as shown in Table 1. In this β3 indicates the true impact or actual impact of CFLD on beneficiaries towards the change in the social wellbeing over non-beneficiaries.

Treatment (After-before) – Control (After-before)

The data used for the analysis was taken before and after 2018-19 for both beneficiary and non-beneficiary farmers. In the difference-in-difference approach, comparison groups can start at different levels of the outcome. Hence it focuses on change rather than absolute levels.

$$Y = \beta 0 + \beta 1*[Time] + \beta 2*[Intervention] + \beta 3*[Time*Intervention] + \varepsilon$$

Table 1: Interpretation of difference - in - difference regression parameters

Coefficient	Calculation	Interpretation
β_0	B	Baseline average (Before 2018-19)
β_1	D-B	Time trend in control group (non-beneficiaries)
β_2	A-B	Difference between two groups before 2018-19
β_3	(C-A)-(D-B)	Difference in social status over time

The following are the detailed results on the social change occurred in the Treatment group (demonstration group) *i.e.,* hundred beneficiaries (n=100) who were involved in Cluster Frontline Demonstration Programme with respect

to non- beneficiaries (n=60).

(**Note :** In this study treatment group refers to demonstration farmers and control group refers to farmer's practice.)

RESULTS AND DISCUSSION

(1) Quantity of produce storage for family consumption

It is expected that, increased production from their own field will eventually help them to save more for their household consumption. The present study revealed that a very little pulse grain was retained and consumed in the study area, indicating a less significant effect on nutritional security. The respondents in the study location did not include pulses in their diet plan as they prefer non-vegetarian protein, though costly than vegetarian protein. This might be one of the factors for the below result. From the Fig.1, it is evident that the average mean of nutrition before (4.18 kg) and after (7.16 kg) for the beneficiaries had significantly increased compared to non-beneficiaries before (4.26 kg) and after (5.03 kg). The percent increment in seed saving among beneficiaries (71%) is comparatively higher than non-beneficiaries (18 %).

In difference-in-difference regression, from Table.2, the interaction term between time and intervention (beneficiaries=1; non-beneficiaries=0) indicates the impact of CFLD programme on the nutrition of beneficiaries. It shows that in case of beneficiaries, the quantity of produce retained was higher by 2.2 Kg compared to non- beneficiaries (Table 1) and with each year, on an average quantity of produce retained increased by 0.767 Kg among beneficiaries and before the baseline year the quantity of produce retained by beneficiaries was lesser by 0.87 Kg compared to non-beneficiaries. (Venkatesan et al.,2025 and Kang et al., 2022)

Treatment (After- Before) – Control (After – Before)

= (7.16 – 4.18) – (5.03 – 4.26) = (2.98) – (0.77) = **2.21**Kg

Table 2 : Difference-in-Difference Regression on quantity of produce storage for family consumption.

	Unstandardized coefficients	t	Sig.
Time (year)(β1)	0.767	**4.470**	**.000**
Intervention (beneficiaries=1; non beneficiaries=0) (β2)	-0.87**	**-0.567**	**.027**
Interaction between time and intervention (β3)	2.213**	**10.202**	**.000**
Adj. R^2	0.65		

Note: Dependent Variable: quantity of produce retained for household consumption (Kg),
** significant at 0.05 level of significant

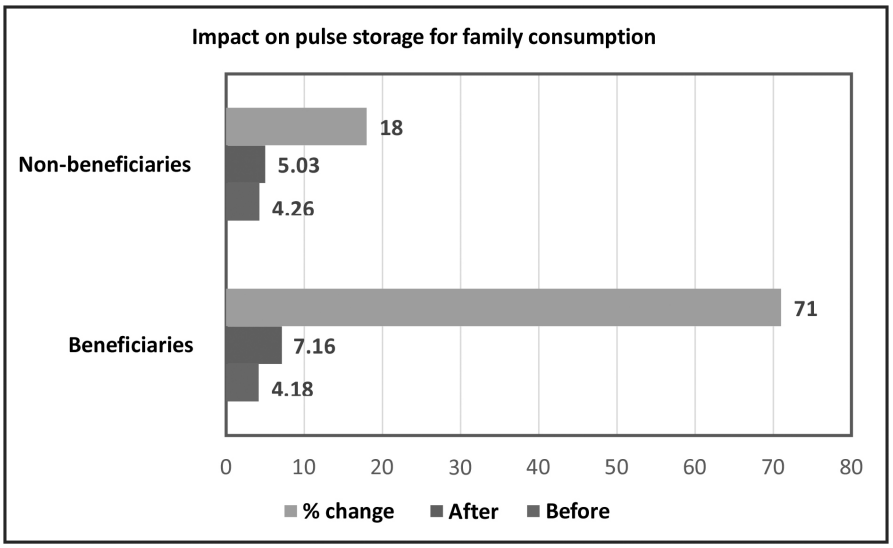

Fig. 1: **The average produce storage before and after the CFLD, percent change in storage (Impact of CFLD) between beneficiary and non-beneficiary farmers**

Therefore, the impact of CFLD on quantity of produce retained by the beneficiaries was 2.21Kg. This less quantity of produce retainment by the farmers is due to their immediate sale of produce after harvesting, with little amount of produce keeping for household consumption. This sale might be due to their urgency in money requirement or due to lack of proper storage structures with farmers. One of the other reasons for the above result might be that as the programme is designed in a way that small and marginal farmers were the main target population of the programme and most of the respondents were compelled to sell their produce to clear out their debts. So, by this marketed surplus is more than the marketable surplus. This indicates a need for further support in improving storage facilities and financial literacy among farmers to encourage retention of produce for family consumption.

(2) Social status

To measure social status of the pulse farmers, 2 dimensions were considered, which were 1) Active participation of farmers in the training programs, public meetings and 2) participation in decision making at household and societal level. These dimensions were selected for the study as research is focused on small and marginal farmers as the target population and these dimensions play a crucial role in rural background. In the difference-in- difference regression model, the interaction term between time and intervention (beneficiaries=1 and non-beneficiaries=0) indicates the impact of CFLD onthe social status of farmers. It shows that in the case of beneficiaries, the social status was higher by 0.12 units compared to non-beneficiaries.

Treatment(After - before) – Control (After – before)

= (0.80 – 0.59) – (0.73 – 0.64) = (0.21)- (0.09) = **0.12**

Therefore, DID of social status = 0.12 units. As mentioned in Table 3.

Table 3 : Difference-in-Difference Regression in social status

	Unstandardized coefficients	t	Sig.
Time (year)(β1)	0.067	1.170	.000
Intervention (beneficiaries=1; non beneficiaries=0) (β2)	-0.05^{NS}	-0.267^{NS}	.057
Interaction between time and intervention (β3)	0.12^{NS}	1.012^{NS}	.063
Adj. R^2	0.25		

The interaction term between time and treatment (Time * Treatment) variable shows positive and non-significant impact of CFLD among beneficiaries after participation in CFLD programme. Therefore, the treatment effect was very low in terms of the increase in social status of farmers compared to the control group. Hence, before and after the programme, the social status of both the beneficiaries and non-beneficiaries was being nearly similar with less change. This shows that, the CFLD programme has not much impact on social status of beneficiary farmers. The reason might be that, just by being involved in the programme, respondents do not show any interest to hold social positions or do not wish to have special status in the society. This indicates that while the CFLD program has improved some aspects of agricultural practice, its influence on enhancing social status among beneficiaries remains limited. Studies like (Nikhitha et al., 2023), mentioned that social participation was not significantly related to yield change or income change among beneficiaries, and showed a negative or non-significant role among non-beneficiaries

(3) Perception on quality of Advisory service

In the difference-in-difference regression, the interaction term between time and intervention (beneficiaries=1; non-beneficiaries=0) indicates the impact of the CFLD programme on the perception of farmers on quality advisory services. It shows that in the case of beneficiaries, the perception of quality of advisory services was higher by 0.53units compared to non-beneficiaries

Treatment(After-before) – Control (After-before)

= (1.31-0.76) – (0.81-0.79) = (0.55)-(0.02) = 0.53 units

Table 3 : Difference-in-Difference Regression in perception about quality of Advisory service

	Unstandardized coefficients	T	Sig.
Time (year) (β1)	0.217	2.460	.000
Intervention (beneficiaries=1; non beneficiaries=0) β2)	-0.03**	-0.317	.016
Interaction between time and intervention (β3)	0.529**	7.002	.008
Adj. R^2	0.35		

The interaction term between time and treatment (treatment*time) variable shows positive and significant impact of 0.529 units increase among beneficiary farmers afterthe participation in CFLD programme. Therefore, the treatment is showing minimum incremental effect for the indicator perception about quality of advisory service of farmers compared to control group. Frequency of contact with scientists mainly influence the perception about quality of advisory services. There were respondents who were poorly contacted by the officials and less participation in training programmes and extension activities. Frequent visit to farmer fields and making contact with them by scientists would help in improving the perception of farmers. Field days conducted by KVK scientists provide a good opportunity for them to meet and interact with farmers, but daily routines of the farmers hinder them from attending field days. These findings underscore the necessity of enhancing communication strategies between scientists and farmers to bridge knowledge gaps and improve the adoption of agricultural innovations. The findings also suggest that regular extension contact with the farmers will have beneficial rapport with good Farmer-Extension communication (Choudhary et al., 2025; Vinaya et al., 2017; Kemekar & Salunkhe, 2024; Mishra et al., 2025; Vamshi et al., 2025)

CONCLUSION

Programs that are meant to address the socio-economic development of farmers usually focus on an increase in their yield and thereby income from that increased yield which is usually the outcome of any programme. The Program's actual impact is seen when the objectives have an effective and significant impact on farmers' social upliftment i.e., their status, awareness and overall wellbeing. The Cluster frontline demonstration program has shown its true social impact by significantly improving beneficiary farmers' well-being and livelihood. By reaching a larger population, the programme would not only enhance awareness and adoption of improved practices but also contribute to better health outcomes, particularly by addressing issues of dietary diversity and nutritional security. A wider spread would ensure that more communities benefit from the interventions, ultimately leading to sustainable improvements in livelihoods and overall well-being.

POLICY IMPLICATIONS

(1) The findings suggest that, as the social impact was not quiet significant among farmers, more extension contact with the farmers to interact and communicate the tailbacks would be efficient.

(2) As the program primarily focuses on small and marginal farmers, initial plan should include bringing nutritional awareness among farmers, to divert farmers from the sale of the pulse produce to keep them for household consumption.

ACKNOWLEDGEMENT

The authors would like to thank Krishi Vigyan Kendra Malyal and Krishi Vigyan Kendra Wyra for their technical and material support which helped in the successful completion of the research. I want to thank Professor Jayashankar Telangana State Agricultural University, for providing me with an opportunity to build my research career.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest with this paper and have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

Amit Kar, Pramod Kumar, Burman, R. R., Nain, M. S., Dubey, S. K., Singh, H., Satish, Balasubramanian, M., Prakash, P. and Sharma, J. P. (2020). *Impact of Cluster Frontline demonstration on pulses in northern India*. Indian Agricultural Research Institute, New Delhi. M.S. printers. 978-93-83168-51-4.

Bhavani, G., Sreenivasulu, M., Naik, R.V., Reddy, M. J. M., Darekar, A.S. and Reddy, A.A. (2022). Impact Assessment of Seed Village Programme by Using Difference-in-Difference (DiD) Approach in Telangana, India. *Sustainability*, 14(15), 9543. https://doi.org/10.3390/su14159543

Choudhary, O., Verma, R.K., Aravindh Kumar, S. and Choudhary, R. S. (2025). Assessment of Technology Adoption in Chickpea Cultivation under Cluster Front Line Demonstrations by Farmers of Bikaner, Rajasthan, India. *Journal of Experimental Agriculture International*. https://doi.org/10.9734/jeai/2025/v47i53422.

Kang, Y., Prihartono, I., Hossain, M., Min, S., Kim, H., Cho, Y., Han, S., Kim, H. and Biswas, J. (2022). Impact evaluation of a community nutrition and livelihood program on child nutrition in rural Bangladesh. *Maternal & Child Nutrition, 19*. https://doi.org/10.1111/mcn.13461.

Kemekar, Pavankumar and Salunkhe, S. R. (2024) Impact of farmer first programme on livelihood security of small and marginal farmers. Gujarat Journal of Extension Education, 37(1):52-58. https://doi.org/10.56572/gjoee.2024.37.1.0008.

Mishra, S., Naberia, S. and Bisht, K. (2025) Impact assessment of DAESI programme on knowledge level of agri-input dealers. Gujarat Journal of Extension Education, 40(1): 51–56. https://doi.org/10.56572/gjoee.2025.40.1.0008

Nikhitha, A., Reddy, P., Sailaja, V. and Ramu, Y. (2023). Relational Analysis between Profile of Farmers and Extent of Adoption of Cluster Frontline Demonstrations (CFLDS). *Asian Journal of Agricultural Extension, Economics & Sociology*. https://doi.org/10.9734/ajaees/2023/v41i92041.

Rakhode, P.N., Koche, M.D. and Harne, A.D. (2011). Management of powdery mildew of greengram. *Journal of Food Legume*, 24(2):120-122.

Shah, K.A., Nayaka, P. and Lad, A.N. (2019). Impact of Cluster Frontline Demonstration of Scientific Cultivation Practices of Major Pulses in Navsari District of Gujarat. *Gujarat Journal of Extension Education*. 30(1): 38-41

Singh, A.K., Singh, R.P., Singh, R.K. and Upadhyay, S.P.(2019). Effect of cluster front-line demonstration on rapeseed mustard in Gorakhpur district of Uttar Pradesh. *Indian Journal of Extension Education*, 55(3), 123–127.

Singh, D., Kumar, C., Chaudhary, M.K. and Meena, M.L. (2018). Popularization of improved mustard (*Brassica juncea L.)* production technology through frontline demonstration in Pali district of Rajasthan. *Indian Journal of Extension Education.* 54(3), 115–118.

Swaroopa, J., Mounica, D. and Pavani, U. (2016). Impact of frontline demonstrations on the yield of green gram in KVK, Pandirimamidi, Andhra Pradesh, India. *International Journal of Farm Sciences.* 6(1):169-173.

Swati, N.J., Bariya, M.K. and Chandravadia, K. (2022). Knowledge level of demonstrator and non-demonstrator groundnut growers under the scheme of NMOOP. *Gujarat Journal of Extension Education.* 34(1): 34–37

Vamshi, M., Padma Veni, C. and Rama Krishna, V. (2025) Farmer profile and perception nexus: A study on KVK's technological diversification efforts under CFLD-pulses. *Gujarat Journal of Extension Education,* 40(1): 45–50. https://doi.org/10.56572/gjoee.2025.40.1.0007

Vamshi, M., Padma Veni, C. and Ravinder Naik, V. (2024). Construction of test and measurement of knowledge level of Cluster frontline demonstrations pulse farmers. *Gujarat Journal of Extension Education*. 37(1): 94-100

Venkatesan, P., Sivaramane, N., Rao, S., Venkattakumar, R., Sivakumar, S., Mooventhan, P., Burman, R., Kalyani, B. and Challa, L. (2025). Confronting food insecurity through agricultural interventions: the Farmer FIRST program in India. *Frontiers in Nutrition, 11*. https://doi.org/10.3389/fnut.2024.1423599.

Vinaya Kumar H. M., Shivamurthy M., and Lunagaria M.M. (2017). Impact of rainfall variability and trend on rice yield in Coastal Karnataka. J*ournal of Agrometeorology.* 19 (3): 286-287

Received : March 2026 : Accepted : May 2026