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Mustard Prosperity: Assessing Economic Realities among KVK Beneficiary and Non-beneficiary Farmers in Samba District of Jammu Division

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: The study was conducted purposively in Samba district during the year 2020-21 because KVK, Samba has laid maximum number of Frontline Demonstrations (FLDs) under its Cluster Frontline Demonstration Programme during 2019-20.
Methods: A list of 166 mustard growing beneficiaries was collected from KVK Samba. Out of the available list, 60 number of mustard growing beneficiary were selected randomly. Equal numbers of

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non-beneficiary mustard growing farmers were also selected from the representative/adjoining villages. Total sample size comprised of 120 respondents.
Results: It shows that average seed cost of the beneficiaries and non-beneficiaries were 411.66 and 310.83 Rs./ha, the average cost of fungicide of the beneficiaries and non-beneficiaries were 291.41 and 171.46 Rs./ha for *Albugo occidentalis* and *Erisiphe cruciferam*, average cost of urea of the beneficiaries and non-beneficiaries were 614.33 and 574 Rs./ha. The study also shows that total cost of the beneficiaries and non-beneficiaries were 311173.67 and 29596.33 Rs./ha. The B:C ratio of the beneficiaries and non-beneficiaries were 1.97:1 and 1.34:1, respectively.

Keywords: Frontline demonstrations; mustard; B:C ratio; fungicide; beneficiaries; non-beneficiaries.

1. INTRODUCTION

“Agriculture is the foundation of India's economy, as it provides food to people, feed to cattle, raw materials to primary and secondary industries, contributes upto 19 per cent of GDP and employs 54.6 per cent of the workforce” (Kirti and Prasad, 2016). “Due to diverse soil and climate conditions, vast varieties of crops such as cereals, pulses, spices, millets, oilseeds, flowers and fruits are being grown in India. Among these crops, India is among the leading producers of pulses, cereals and spices in the world” (Mishra et al., 2021). “India is the fourth largest oilseed economy in the world. Among oilseeds, there are nine crops that are the primary sources of oils in the country out of which seven are edible oils (soybean, rapeseed-mustard, groundnut, sunflower, sesame, niger and safflower) and two are non-edible (linseed and castor). The above mentioned oilseed crops are grown throughout the year and mustard is the sole oilseed crop which is well-suited to rabi season. It is a key source of revenue and contributes significantly to the livelihood security of resource to poor, small and marginal farmers living in rain-fed areas of the country” (Shekhawat et al., 2012). “Mustard plant belongs to the Brassicaceae family and Brassica or Sinapis genera” (Swati et al., 2015). “Mustard seeds are high in oil and protein content and its oil content ranges from 24 to 40 per cent and protein content ranges from 17 to 26 per cent. The seeds of mustard are mostly processed for the extraction of oil and the residue left behind known as mustard cake is used for cattle feed” (Kumrawat and Yadav, 2018). “Mustard aphid (*Lipaphis erysimi* (L.) is the most notorious, cosmopolitan louse-like and obligate ecto parasite which causes a bulk of the qualitative and quantitative loss of rapeseed-mustard crops” (Koirala, 2020). “Timely and efficient crop management practices such as, disease pest resistant varieties along with adoption of proper crop rotation, selection of high yielding, timely planting, adequate plant stand, balanced plant nutrition, need base plant protection, irrigation and timely weed control have great influence on productivity of mustard. Package and practices for mustard are developed by agricultural universities, research institutes and are refined, demonstrated, popularised through Krishi Vigyan Kendras (KVK) and field extension departments in different states etc. Krishi Vigyan Kendra in particular from 1992 onwards have been on the frontline in providing farmers with wide variety of services like frontline demonstrations, technology testing/refinement, training and popularising concepts of integrated farming system, entrepreneurship, crop diversification, value addition, biodiversity conservation, organic farming etc” (Katole et al., 2017). “There are about 20 KVKs in Jammu and Kashmir, out of which nine KVKs are under the administrative control of Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu (SKUAST –J Chatha). Empirical evidences have highlighted that KVK system has highly and positively impacted the rural farming community in terms of yield, income, productivity, sale price and above all capacity for optimal utilization of resources etc” (Singhal and Vatta, 2017). “In this line, this study was carried during the year 2020-21, to assess the impact of KVK’s cluster frontline demonstrations on mustard overall economics, cost of cultivation and income of farmers in Samba district of Jammu division. Cluster frontline demonstrations mainly involves selection of farmers through interactive discussions/meetings, organizing these farmers into groups (10-15 per group), identifying the gaps in adoption of currently existing package of practices, conducting frontline demonstration of newly developed or refined package of practices on farmers field, supply of required inputs in the form of high yielding seed varieties, insecticides, fertilizers, weedicides etc, regular monitoring and technical support by KVK experts and at last impact assessment in terms of yield, productivity, selling price, quality etc.” (Jha et al., 2020).

2. METHODOLOGY

Ex-post facto design was applied to conduct the study and multi stage sampling plan was followed for the selection of ultimate farmers. Samba district was selected purposively because KVK, Samba has laid maximum number of Front Line Demonstrations (FLDs) under its Cluster Frontline Demonstration Programme. A list of 166 mustard growing beneficiaries was collected from KVK Samba. Out of the available list, 60 number of mustard growing beneficiary were selected by using random sampling technique. Equal numbers of non-beneficiary mustard growing farmers were also selected from the representative/adjoining villages. By this way total sample size comprised of 120 respondents with equal number of beneficiary and non-beneficiary of mustard growing farmers. Data was collected at individual farmer level, through open ended questionnaire. Data was tabulated and analyzed through SPSS software.

3. RESULTS AND DISCUSSION

3.1 Economics of Mustard Crop

This result depicts the various costs incurred in the usage of inputs, cultivation of mustard crop like cost of seeds, cost of fertilizers, cost of ploughing, human labour costs etc. Further, it also reveals the net income, gross income and on farm and off farm income of the farmers of the study area.

3.2 Cost of Cultivation of Mustard Crop

Table 1 shows the various cost incurred in the usage of inputs and cultivation of mustard crop. It revealed that 411.66 and 310.83 Rs./ha of seed cost was incurred in the category of beneficiaries and non-beneficiaries, respectively with difference value of Rs 100.83. This might be due to the fact that beneficiaries were growing more mustard crop on large fields as compare to non-beneficiaries. Further, expenditure incurred in usage of insecticide for the management of *Lipaphis erysimi* and *Athalia lugens proxima* was found highest in the category of beneficiaries (402.83 Rs./ha) as compare to non-beneficiaries (293.33 Rs./ha) with difference value of Rs 109.5. Among insecticide used for the management of *Lipaphis erysimi*, insecticide dimethoate was used, which have expenditure value of 641 and 510 Rs./ha in the category of beneficiaries and non-beneficiaries, respectively with difference value of Rs 131, whereas, for the management of *Athalia lugens proxima,* cypermethrin was used, which have highest expenditure value in the category of beneficiaries (164.66 Rs./ha) as compare to non-beneficiaries (75.83 Rs./ha) with difference value of Rs 88.83. As far as fungicide usage is concern for the management of *Albugo occidentalis* and *Erisiphe cruciferam*, expenditure incurred in usage of fungicide was found highest in the category of beneficiaries (291.41 Rs./ha) as compared to non-beneficiaries (171.46 Rs./ha) with difference value of Rs 119.95. Among fungicides used for the management of *Albugo occidentalis*, ridomil-mz was used and have expenditure value of 193.33 Rs./ha in the category of beneficiaries and 270 Rs./ha in the category of non-beneficiaries with difference value of Rs 76.67, whereas, carbendazim was only used by beneficiaries and have expenditure value of 36 Rs./ha. For the management of *Erisiphe cruciferam,* ridomil-mz was used and have highest expenditure value in the category of beneficiaries (296.66 Rs,/ha) as compare to non-beneficiaries (293.33 Rs./ha) with difference value of Rs 3.33, whereas, carbendazim was also used and have highest expenditure value in the category of beneficiaries (639.66 Rs./ha) as compared to non-beneficiaries (141 Rs./ha) with difference value of Rs 498.66. Further, expenditure value of herbicide pendimethalin was found highest in the category of beneficiaries (62 Rs./ha) as compared to non-beneficiaries (30 Rs./ha) with difference value of Rs 32. This might be due to the reason that the area of mustard crop for the beneficiaries was more for beneficiaries. With regard to fertilizer usage, average cost incurred in the usage of urea was highest in the category of beneficiaries (614.33 Rs./ha) as compare to non-beneficiaries (574 Rs./ha) with difference value of Rs 40.33, whereas, 1198.66 and 1390.66 Rs./ha was found as average cost of DAP in the category of beneficiaries and non-beneficiaries, respectively with difference value of 192. Similarly, 315.5 and 172.66 Rs./ha was found as average cost of MOP in the category of beneficiaries and non-beneficiaries with difference value of Rs 142.84.With regard to land preparation, ploughing cost was incurred highest in the category of beneficiaries (10783.33 Rs./ha) as compared to non-beneficiaries (10283.33 Rs./ha) with difference value of Rs 500. Further, cost of harvesting was incurred highest in the category of non-beneficiaries (9200 Rs./ha) as compared to beneficiaries (8900.00Rs./ha) with difference value of Rs 300. Cost of threshing was incurred highest in the category of non-beneficiaries

(3241.66 Rs./ha) as compare to (3128.50 Rs./ha) with difference value of Rs 113.16. The other human labour cost was incurred highest in category of beneficiaries (2800.00 Rs./ha) as compared to non-beneficiaries (2500.00 Rs./ha) with difference value of Rs 300.00. The total cost incurred by comprising various cost involved in mustard was found highest in the category of beneficiaries (31173.67 Rs./ha) as compared to non-beneficiaries (29596.33 Rs./ha) with difference value of Rs 1577.34. The difference in total cost of cultivation of beneficiaries and non- beneficiaries might be due to the reason that the respondents of beneficiaries were using resources more intensively and were spending higher amount on all the inputs namely urea, DAP, MOP application of herbicides and pesticides and other human labour cost. Yield of mustard crop was found highest in the category of beneficiaries (12.25q/ha) as compared to non-beneficiaries (8.06 q/ha) and the result of mustard yield was found significant at 1 per cent level of significance with difference value of 4.19.The reason behind this might be that the beneficiaries had cultivated KVK, Samba recommended varieties (high yielding varieties) which yields twice the yield obtained by the traditional mustard variety which is desi-sarson. The rate of selling of mustard crop was found highest in the category of beneficiaries (5026 Rs./q) as compared to non-beneficiaries (4920 Rs./q) with difference value of Rs 106. Beneficiaries and non-beneficiaries have gross income of 61576.67 and 39688.00 Rs. with difference value of Rs 21888.67, whereas, the net income of beneficiaries and non-beneficiaries was found as 33203.00 and 12547.00 Rs, respectively with difference value of Rs 20656.00. So, the B:C ratio of beneficiaries and non-beneficiaries was found as 1.97:1 and 1.34:1, respectively which means that the supremacy of recommended package of practices under the frontline demonstration for beneficiaries was more profitable over the farmers practices of non-beneficiaries. Above findings were in line with Chaudhary et al. (2018).

Table 1. Operation Wise Cost of Cultivation of Mustard Crop (Rs./ha)

Particulars	Beneficiary(n=60)	Non-Beneficiary (n=60)	Difference
Seed cost(Rs./ha)	411.66	310.83	100.83
Pesticide use in mustard crop			
Insecticide cost (Rs./ha)			
Dimethoate(*Lipaphis erysimi*)	641.00	510.00	131.00
Cypermethrin(*Athalia lugens proxima*)	164.66	75.83	88.83
Overall	402.83	293.33	109.50
Fungicide cost (Rs./ha)			
Ridomil-Mz(*Albugo occidentalis*)	193.33	270	76.67
Carbendazim(*Albugo occidentalis*)	36.00	0.00	36.00
Ridomil-Mz(*Erisiphe cruciferam*)	296.66	293.33	3.33
Carbendazim(*Erisiphe cruciferam*)	639.66	141.00	498.66
Overall	291.41	171.46	119.95
Herbicide cost (Rs./ha)			
Pendimethalin	62.00	30.00	32.00
Fertilizer use in mustard crop			
Average cost of urea (Rs./ha)	614.33	574.00	40.33
Average cost of DAP (Rs./ha)	1198.66	1390.66	192.00
Average cost of MOP (Rs./ha)	315.50	172.66	142.84
Land preparation cost			
Ploughing cost (Rs./ha)	10783.33	10283.33	500.00
Cost of harvesting (Rs./ha)	8900.00	9200.00	300.00
Cost of threshing (Rs./ha)	3128.50	3241.66	113.16
Other human labour cost	2800.00	2500.00	300.00
Total cost(Rs./ha)	31173.67	29596.33	1577.34

Particulars	Beneficiary(n=60)	Non-Beneficiary (n=60)	Difference
Yield(qtl/ha)	12.25	8.06	4.19
Rate per quintal (in Rs.)	5026.00	4920.00	106
Gross income (in Rs.)	61576.67	39688.00	21888.67
Net income (in Rs.)	33203.00	12547.00	20656.00
B.C Ratio	1.97:1	1.34:1	

Table 2. Distribution of income from off- farm and on farm

Income (Rs.)	Beneficiary	Non-Beneficiary	Difference
Off farm income	356569.70	249613.70	106956.00
On farm income	53186.33	33497.00	19689.33
Total income	409756.03	283110.70	126645.33

3.3 Off-Farm and On-Farm Income of Farmers

Table 2 depicts that total income was found highest in the category of beneficiaries (409756.03Rs.) as compared to non-beneficiaries (283110.70 Rs.) with difference value of Rs 126645.33. Among these, beneficiaries have off farm income of 356569.70 Rs. and non-beneficiaries have off farm income of 249613.70 Rs. with difference value between these two categories was Rs 106956.00. Similarly, beneficiaries have on farm income of 53186.33 Rs. and non-beneficiaries have on farm income of 33497.00 Rs. with difference value between these two categories was Rs 19689.33. The results are in conformity with the findings of Bagal (2016).

4. CONCLUSION AND POLICY IMPLICATIONS

Beneficiary farmers were outperforming non-beneficiary farmers in terms of mustard crop productivity and revenue because they were implementing all of the practices that the KVK experts had shown them during their field visits and cluster frontline demonstrations. Lead farmers must be further encouraged to share their knowledge and skills with other farmers in their area through group discussions, panchayat sabhas, and other means in order to increase the benefits of CFLDs in a horizontal manner. Since it has the ability to increase mustard output at the state level without expanding the region, more research station technology needs to be made more widely known through extension programs. Also the extension agencies in collaboration with KVKs should held demonstrations at regular interval so as to show the effects of new technology in mustard production and motivate farmers for adoption of new technology to bridge the yield gap between lab and land. Moreover, Krishi Vigyan Kendra in the state need to play more active and lead role in providing proper technical support to the farmers through different educational and extension activities to reduce the extension gap for better cereal, pulses, oilseeds, spices and fruit crop production in the state.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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