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Assessment of Constraints and Suggestion Insights from Beneficiaries of Centrally Sponsored Agricultural Schemes: A study of PKVY, PMKSY and SHC in Vidarbha Region of Maharashtra, India

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

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ABSTRACT

The present study focused on assessing the constraints faced by the beneficiaries of centrally sponsored agricultural schemes namely Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and the Soil Health Card Scheme (SHC) and invited suggestions from them to overcome the constraints. For the proposed study, 60 beneficiary farmers were selected from Amravati districts and 60 beneficiary farmers were selected from Buldhana districts in Vidarbha region of Maharashtra for each scheme. Thus, for the three schemes, a total of 360 beneficiary farmers were selected. In the case of PKVY beneficiaries, the major constraints faced were lack of proper marketing channel for organic produce, lack of sustainability in the reduction of cost of organic cultivation and reduced productivity of organic farm produce even after conversion period. Whereas, in the case of constraint faced by PMKSY beneficiaries, the first constraint faced by the beneficiary was longer time for getting the subsidy credited, followed by lack of increase in the sources of irrigation and load shedding of electricity. In the case SHC beneficiaries, the major constraint faced were long time gap between soil sample collection and issuing SHC, difficulty to comprehend the information and follow the recommendations provided in SHC and lack of effective training and demonstrations provided to farmers about soil health. In the case of PKVY beneficiaries, majority of them (74.17%) gave the suggestion for establishment of proper marketing channel for organic produce, followed by 34.17 per cent of them suggested the strengthening of farmer groups and developing them into Farmer Producer Organizations (FPOs). Whereas in the case of PMKSY beneficiaries, 84.17 per cent of them suggested to ensure timely crediting of subsidies, followed by expansion of irrigation infrastructure through the construction of water harvesting structures such as check dams, farm ponds, tanks and bore wells (59.16%). In the case of SHC beneficiaries, majority of them (85.83%) gave the suggestion to speed up the process of issuing Soil Health Cards and 71.66 per cent suggested for training programs and field level demonstrations focused on soil health and the practical application of SHC recommendations to improve farmers' knowledge and skills.

Keywords: Paramparagat Krishi Vikas Yojana (PKVY); Pradhan Mantri Krishi Sinchayee Yojana (PMKSY); Soil Health Card Scheme (SHC); constraints; suggestions; Vidarbha; Maharashtra.

1. INTRODUCTION

The agricultural sector's significance in India's economy is evident from its 20.21 per cent contribution to the nation's GDP [1]. However, it faces pressing challenges such as shrinking cultivation areas, declining productivity, and rising cultivation costs, which threaten farmers' incomes [2]. To address these issues, new policies and programs have been regularly introduced to enhance agricultural productivity and growth through technical and financial interventions, optimizing the use of agro-resources. Since independence, India's agricultural policies have evolved, initially focusing on irrigation, fertilizers, and High Yielding Varieties (HYV) for self-sufficiency, then shifting to diversification for nutrition and employment in the 1970s, resource conservation in the 1980s, and post-harvest technology in the 1990s [3]. Recent initiatives emphasize sustainable agriculture, with key Centrally Sponsored Schemes like Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Pradhan Mantri Fasal Bhima Yojana (PMFBY), Soil Health Card (SHC), Paramparagat Krishi Vikas Yojana (PKVY), and National Food Security Mission (NFSM) launched by 2023 to boost farmer incomes and address regional needs. This study focuses on three such schemes: Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and the Soil Health Card Scheme, which support sustainable agriculture through organic farming, efficient water management, and soil health improvement. These schemes play a vital role in enhancing productivity, conserving resources, and promoting eco-friendly farming practices,

making them highly relevant for assessing their impact on beneficiaries in today's agricultural landscape.

The present study focused on assessing the constraints faced by the beneficiaries of centrally sponsored agricultural schemes namely Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and the Soil Health Card Scheme (SHC) and invited suggestions from them to overcome the constraints. The study is crucial for optimizing the scheme's effectiveness in addressing key agricultural challenges. PKVY promotes organic farming, which can reduce input costs and environmental degradation, while PMKSY enhances water-use efficiency through micro-irrigation, essential for water-scarce regions. The Soil Health Card Scheme aims to improve soil quality and boost productivity. Identifying constraints helps policymakers refine these schemes, ensuring better adoption by farmers, efficient resource utilization, and sustainable agricultural growth, thereby enhancing farmers' livelihoods and food security.

1.1 Paramparagat Krishi Vikas Yojana (PKVY)

The Indian agricultural sector faces challenges from rising input costs and stagnant output prices, which threaten profitability. Organic farming is seen as a solution to these issues, as well as to the growing impact of climate change, such as erratic rainfall and extreme weather events [4]. In response, the Indian government promotes organic farming through the Paramparagat Krishi Vikas Yojana (PKVY). Globally, around 80% of certified organic farms are in India, with two million farmers practicing organic agriculture [5]. Organic farming avoids synthetic inputs and enhances ecosystem health, as defined by global organizations like FAO, IFOAM, and the Codex Alimentarius Commission. The Food and Agriculture Organization (FAO) describes it as a unique production system that enhances agro-ecosystem health, biodiversity, and biological activity through agronomic, biological, and mechanical methods, avoiding synthetic off-farm inputs. The International Federation of Organic Agriculture Movements (IFOAM) defines organic farming as a system that maintains the health of soils, ecosystems, and people, relying on ecological processes and biodiversity adapted to local conditions rather than harmful inputs.

1.1.1 Objectives of Paramparagat Krishi Vikas Yojana (PKVY)

i. To encourage the adoption of integrated, climate-resilient farming systems based on natural resources, aimed at preserving and enhancing soil fertility, conserving natural resources, promoting on-farm nutrient recycling, and minimizing farmers' reliance on external inputs.
ii. To lower agricultural costs for farmers by promoting sustainable organic farming practices, thereby increasing their net income per unit of land.
iii. To produce healthy, chemical-free, and nutritious food sustainably for human consumption.
iv. To protect the environment from harmful inorganic chemicals by encouraging eco-friendly, cost-effective traditional methods and farmer-friendly technologies.
v. To empower farmers by fostering their institutional development through the formation of clusters and groups capable of managing production, processing, value addition, and certification processes.
vi. To turn farmers into entrepreneurs by establishing direct market linkages with both local and national markets [6]

1.2 Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

India is classified as a water-stressed nation, with an annual water availability of 1,000 to 1,700 cubic meters per person [7]. To address this, the Central Government launched the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) to provide irrigation to all agricultural land and improve crop yield per unit of water. The scheme has four key components: the Accelerated Irrigation Benefits Programme (AIBP), Har Khet Ko Pani, Per Drop More Crop, and Watershed Development. AIBP targets major irrigation projects, while 'Har Khet Ko Pani' focuses on command area development, water management, and renovation of water bodies. Micro irrigation, identified as having a potential of 69.5 million hectares in India, currently covers only 7.73 million hectares, with 3.37 million under drip irrigation and 4.36 million under sprinkler irrigation [7]. Micro irrigation could potentially double irrigated areas by improving water use

efficiency to 80 to 90 per cent, compared to 30 to 50 per cent for surface irrigation [8].

1.2.1 Objectives of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

i. Expand the use of micro irrigation technologies to improve water use efficiency nationwide.
ii. Boost crop yields and farmer incomes through precision water management techniques.
iii. Optimize the use of micro irrigation systems for fertigation practices.
iv. Encourage the adoption of micro irrigation in water-scarce, stressed, and critical groundwater regions.
v. Integrate tube-well and river-lift irrigation with micro irrigation technologies to maximize energy efficiency in both water lifting and pressurized irrigation.
vi. Advance and share micro irrigation technologies for agriculture and horticulture using modern scientific approaches.
vii. Generate employment opportunities, especially for youth, in the installation and maintenance of micro irrigation systems [7]

1.3 Soil Health Card Scheme

Soil test-based fertilizer application is crucial for improving fertilizer efficiency and boosting crop yields [9]. To address soil-related issues, the Government of India launched the Soil Health Card (SHC) Scheme on February 19, 2015. The scheme provides farmers with crop-specific recommendations for nutrients and fertilizers tailored to their individual farms, helping them enhance productivity through optimized input use [10]. The SHC offers a detailed analysis of soil quality, including its functional characteristics, water, nutrient content, and other biological properties, along with corrective measures for better yields [13].

1.3.1 Objectives of soil health card scheme

i. Enhance soil quality and increase farmers' profitability.
ii. Keep soil analysis information up-to-date.
iii. Offer farmers soil testing services at their doorstep.
iv. Promote Integrated Nutrient Management (INM) by encouraging the balanced use of chemical fertilizers (including secondary and micro-nutrients) alongside organic and bio-fertilizers to boost soil health and productivity.
v. Ensure compliance with the quality control standards for fertilizers, bio-fertilizers, and organic fertilizers as per the Fertilizer Control Order, 1985.
vi. Improve the skills and knowledge of soil testing lab staff, extension workers, and farmers through training and demonstrations [12].

The study was limited to a few districts of Vidarbha region in Maharashtra due to constraints related to time, funding, and other resources in the student's research project, which restricted the study's scope. Consequently, 360 respondents were chosen, and the results cannot be broadly generalized. The findings are based on the opinions expressed by the respondents, limiting the objectivity of the data to their personal perspectives. Furthermore, the accuracy of the study relied on the respondents' ability to recall information and their honesty in sharing details, which imposed additional limitations on the objectivity of the results.

2. METHODOLOGY

An ex post facto research design was employed in the present study. As defined by [13], ex post facto research involves investigating a situation where the independent variable(s) have already occurred, and researchers begin by observing the dependent variable(s). The term 'ex post facto' translates to 'from what is done afterwards,' indicating that the independent variable is not manipulated. This quasi-experimental study aimed to explore how an independent variable affected a dependent variable.

The present investigation was carried out in Vidarbha region of Maharashtra state. Maharashtra has 35 districts which are divided into six revenue divisions viz. Mumbai (Konkan), Pune, Nashik, Aurangabad, Amravati and Nagpur for administrative purposes. Vidarbha area includes Amravati and Nagpur revenue division comprises of eleven districts namely; Amravati, Akola, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim, and Yavatmal. For each selected centrally sponsored agricultural

schemes, two districts were selected purposively having maximum number of beneficiaries of the respective schemes and convenient to investigator for data collection.

Paramparagat Krishi Vikas Yojana (PKVY) is implemented in seven districts in Maharashtra namely, Ahmednagar, Amravati, Jalgaon, Buldhana, Nasik, Pune and Solapur. Out of these, this scheme is implemented in Amravati and Buldhana districts in Vidarbha region [6]. Thus, these districts were purposively selected. From selected Amravati district, Chandurbazar and Amravati talukas were selected and from Buldhana district Chikhli and Khamgaon talukas were selected as they were having a greater number of beneficiaries in these selected talukas. Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was implemented in all the eleven districts of Vidarbha region in Maharashtra. Out of these, most of the beneficiaries of this scheme were from Amravati and Buldhana districts in Vidarbha region [7]. Thus, these districts were purposively selected. Morshi and Chandurbazar taluka were selected from Amravati district and Chikhli and Buldhana taluka were selected from Buldhana district for the present study. Soil Health Card scheme is implemented in all the eleven districts of Vidarbha region in Maharashtra. Out of these, most of the beneficiaries of this scheme resides in Buldhana, Yavatmal and Amravati districts in Vidarbha region [12]. Since Amravati district is already selected for the other centrally sponsored agricultural schemes and due to convenience, Amravati was selected for the study instead of Yavatmal. Thus, Buldhana and Amravati were purposively selected for the study, as per having more number of beneficiaries of this scheme, Chikhli and Buldhana talukas were selected from Buldhana district and Chandurbazar and Morshi talukas were selected from Amravati district for the present study. Thus, Amravati and Buldhana districts of Vidarbha region of Maharashtra were selected for the present study.

Villages from each taluka were selected purposively which were having maximum number of beneficiaries of selected centrally sponsored agricultural schemes from the respective four talukas of two districts for each scheme. From the list of beneficiary farmers in each selected village, beneficiaries who were taking benefits of selected respective centrally sponsored agricultural schemes for at least three years were selected by proportionate random sampling method. Thus, for the proposed study 60 beneficiary farmers were selected from Amravati districts and 60 beneficiary farmers were selected from Buldhana districts for each scheme. Thus, for the three schemes, a total of 360 beneficiary farmers were selected from seven selected talukas of two districts of Vidarbha for three schemes. These 360 beneficiary farmers were considered as respondents for the present study.

A well-structured interview schedule was used for data collection, developed after consultations with experts to align with the study's objectives. The collected data were organized into a master table in an Excel sheet, and basic statistical tools such as frequency, percentage, mean, and standard deviation were applied for analysis. Final categories were determined based on the mean and standard deviation.

In this study, Garrett ranking was used to rank the constraints faced by the beneficiaries of centrally sponsored agricultural schemes. The ranks assigned by respondents were converted into scores by using Garettes' ranking technique.

$$\text{Per cent position} = 100 (Rij – 0.50) / Nj$$

where,
Rij = Rank given for the i^{th} factor by j^{th} individual
Nj = Number of problems ranked by j^{th} individual

Further, per cent position obtained were converted into scores using the table given by Garrett. The scores obtained for each statement by various respondents were added and mean value were calculated. The mean values were arranged in descending order.

After finalization of the interview schedule, the data collection was carried out with the beneficiaries through direct interview method. The interviewees were approached for direct interviews based on their availability in their native. Thus, through this method, first-hand information and discussion about the research problem was made possible. The data collected from the respondents were coded, tabulated, analyzed and presented in the form of tables after using basic statistical tools such as frequency, percentage, mean, and standard deviation in order to make the findings meaningful and easily understandable. The findings emerged from the analysis of data were suitably interpreted and conclusions were drawn.

3. RESULTS AND DISCUSSION

3.1 Constraints Faced by the Beneficiaries

Constraints are the circumstances or causes which prohibit the performance of the individual. It plays a vital role in adoption of technology. In the present study, constraints were operationally defined as the problems faced by the beneficiary farmers in adopting centrally sponsored schemes. Constraints faced by the beneficiaries of centrally sponsored agricultural scheme is given in Table 1.

Results in Table 1 shows in the case of constraint faced by PKVY beneficiaries, the first constraint faced by the beneficiary was lack of proper marketing channel for organic produce, the second constraint was sustainability in the reduction of cost of organic cultivation, the third constraint was reduced productivity of organic farm produce even after conversion period and fourth constraint was the low empowerment of farmers in clusters and farmer groups. Whereas, in the case of constraint faced by PMKSY beneficiaries, the first constraint faced by the beneficiary was longer time for getting the subsidy credited, the second constraint was lack of increase in the sources of irrigation, the third constraint was load shedding of electricity, fourth constraint was difficulty to follow fertigation along with micro irrigation system and fifth constraint was difficulty in maintenance of micro irrigation system. In the case SHC beneficiaries, the first constraint faced by the beneficiary was the long time gap between soil sample collection and issuing SHC, the second constraint was difficulty to comprehend the information and follow the recommendations provided in SHC, the third constraint was lack of effective training and demonstrations provided to farmers about soil health , fourth constraint was the timely non availability of organic and fertilizers make farmers difficult to follow INM and fifth constraint was the less number of soil testing laboratories.

The major constraint faced by the beneficiaries of Paramparagat Krishi Vikas Yojana (PKVY) beneficiaries was the lack of proper marketing channel for organic produce. This gap in market connectivity not only affects the income potential of the farmers but also limits their ability to compete effectively in the market. The second major constraint faced was the lack of sustainability in the reduced costs of organic cultivation. This suggests that the initial cost reductions may be reflected by the organic input support from ATMA officials, potentially impacting the overall financial viability of organic farming. The reduced productivity of organic farm produce even after the conversion period, further underscores the difficulties in achieving expected yields and highlights the need for ongoing support and improvement in organic farming practices. The fourth major constraint was the low empowerment of farmers in clusters and farmer groups. This indicates that there is a need for stronger institutional support to enhance farmer collaboration, resource sharing, and collective action, which are essential for sustainable agricultural development and greater self-sufficiency. Addressing these issues will be crucial for enhancing the effectiveness of agricultural schemes and improving the overall success of beneficiaries in the future. Saran [14] based on study on constraints for organic farming practices by PKVY beneficiaries in Bikaner district of Rajasthan revealed that the important constraint faced by the beneficiary farmers of Paramparagat Krishi Vikas Yojana (PKVY) were low productivity of organic farming, lack of selling outlets, marketing of organic farming produce [15]. However, [16] based on their study on evaluating constraints-faced by farmers in the adoption of Paramparagat Krishi Vikas Yojana in Rajasthan reported that the main constraints faced by the farmers in the adoption of PKVY were ‘time consuming process’, ‘lack of literacy among farmers’, ‘low yield during transition period’ [17], and ‘low incentive’.

The major constraint faced by the PMKSY beneficiaries was the long time for the subsidy to be credited. This delay is critical as it directly impacts farmers' financial planning and their ability to promptly adopt and implement micro-irrigation systems. The longer waiting period for subsidy credits can create a cash flow bottleneck, discouraging farmers from investing in necessary infrastructure or expanding their irrigation capabilities. Lack of increase in the sources of irrigation was the second major constraint faced by the beneficiaries, which might have affected the increase in the area under irrigation. This suggests that the implementation of the scheme may not have fully addressed the on-ground realities and needs of the farmers. The expected diversification and expansion of irrigation sources, a key goal of PMKSY, seem to be unmet for a large portion of the beneficiaries, which could limit the long-term sustainability and impact of the scheme. Electric load shedding in rural areas, reported as the third major

constraint, further exacerbates the situation by affecting the reliability and efficiency of the irrigation systems. The dependency on a consistent power supply is crucial for the operation of modern irrigation systems, and frequent load shedding disrupts the irrigation schedules. Fourth major constraint faced by the PMKSY beneficiaries was the difficulty to follow fertigation along with micro irrigation system. This constraint highlights a gap in the training or awareness provided to farmers regarding the advanced techniques that could enhance the utility of the micro irrigation systems. Fertigation, which involves the application of fertilizers through the irrigation system, could significantly improve crop yields if utilized effectively, but the lack of knowledge or support in this area prevents farmers from fully benefiting from the technology. The fifth major constraint faced by the beneficiary was the difficulty in the maintenance of micro irrigation system. Patidar et al. [8] based on their study on impact of micro irrigation on production and profitability of green chilly under drip method of irrigation in Madhya Pradesh reported that difficulty in obtaining government subsidy & support (56.00%) followed by poor quality of drip irrigation equipment (55.00%) were the major constraints faced by the beneficiary farmers. [18] based on his study on impact of Pradhan Mantri Krishi Sinchayee Yojana on its beneficiaries reported that majority of the beneficiaries reported that, lack of awareness and knowledge about fertigation (85.00%), credit assessment is low from Govt. (83.33%), irregular power supply (83.33%), insufficient training on operation and maintenance of equipment's (81.67%) and high initial investment cost (78.33%). Kajale and Shroff [19] based on their study on analysis of constraints affecting beneficiaries under Pradhan Mantri Krishi Sinchayee Yojana in Odisha revealed that the most significant constraints perceived by farmers were medium and large land holding farmers availing the maximum limit of subsidy, followed by frequent equipment repair and the tedious procedure to obtain the benefits of PMKSY.

The major constraint faced by the SHC beneficiaries was the long time gap between soil sample collection and issuing of the SHC. This delay undermines the timely application of the recommendations provided in the SHC, reducing its relevance and potential impact on crop management decisions. The second major constraint faced by the SHC beneficiaries was the difficulty in comprehending the information and follow the recommendation provided in the SHC. If the information is not presented in a farmer-friendly manner, it limits the card's practical utility, making it difficult for beneficiaries to adopt the recommended practices. Even when the SHC is received and understood, other factors, such as lack of resources or external support, prevent farmers from implementing the recommended practices. This suggests a need for complementary support mechanisms, such as subsidies or access to affordable inputs, to enable farmers to follow through on the recommendations. Lack of effective training and demonstrations provided to farmers about soil health was the third major constraint faced by the SHC beneficiaries. Without adequate training and practical demonstrations, farmers may struggle to adopt the best practices suggested in the SHC, thereby limiting the scheme's impact. This gap in capacity building points to the need for a more robust extension system that can provide continuous support and guidance to farmers. Timely non availability of organic fertilizers (FYM, biofertilizers and vermicompost) makes farmers difficult to follow Integrated Nutrient Management (INM) was the fourth major constraint faced by SHC beneficiaries. While the SHC promotes sustainable practices, the financial burden of implementing these practices, particularly the use of biofertilizers and vermicompost, discourages many farmers from adopting them. This issue underscores the need for financial support or subsidies to make INM more accessible to farmers. The less number of soil testing laboratories was the fifth major constraint faced by Soil Health Card (SHC) beneficiaries, leading to delays and difficulties in getting soil samples tested. With fewer laboratories available, farmers often had to wait longer for their soil samples to be processed, which in turn delayed the issuance of SHCs. This lack of accessibility made it challenging for farmers to receive timely soil health reports and apply the recommended nutrients and fertilizers, ultimately impacting their ability to improve soil fertility and productivity. Expanding the network of soil testing laboratories could help address this issue and improve the efficiency of the SHC program. [2] based on their study on awareness about Soil Health Card and [21] based on their study on knowledge, adoption and constraints of Soil Health Card based Fertilizer Application reported that the major constraints faced by the farmers in adoption of Soil Health Card were difficulty in calculating dosages, high prices of fertilizers are high, knowledge about the importance of micronutrients and on non-

availability of organic manure. Sunil et al.[22] based on their study on awareness about soil health card and constraints faced by members in utilization of information in soil health card, [23] based their study on farmers' knowledge of soil health card and constraints in its use, and [13] based on their study on profile and constraints faced by beneficiary farmers in utilization of soil health card in Surguja district of Chhattisgarh reported that the major constraint in utilizing information were long time gap between soil sample collection and issuing of soil health card faced followed by difficulty in calculating the fertilizer dose on the basis of nutrient status of soil.

3.2 Suggestions Provided by the Beneficiaries

Suggestions are the solutions to overcome or minimize the constraints. In the present study, suggestion was operationally defined as the opinion of beneficiary farmers of selected centrally sponsored agricultural schemes about what action should be taken for improvement of the schemes.

From Table 2, it is clear that, in the case of PKVY beneficiaries, majority of them (74.17%) gave the suggestion for establishment of proper marketing channel for organic produce, followed by 34.17 per cent of them suggested the strengthening of farmer groups and developing them into Farmer Producer Organizations (FPOs). Whereas in the case of PMKSY beneficiaries, 84.17 per cent of them suggested to ensure timely crediting of subsidies, followed by expansion of irrigation infrastructure through the construction of water harvesting structures such as check dams, farm ponds, tanks and bore wells (59.16%) and enhanced training and support for the effective use of micro irrigation systems for fertigation practices (26.67%). In the case of SHC beneficiaries, majority of them (85.83%) gave the suggestion to speed up the process of issuing Soil Health Cards, 71.66 per cent suggested for training programs and field level demonstrations focused on soil health and the practical application of SHC recommendations to improve farmers' knowledge and skills, whereas more than half (53.33%) suggested for subsidized organic inputs and financial assistance for organic fertilizers and inputs to make them more affordable and encourage the adoption of Integrated Nutrient Management (INM) practices and 23.33 per cent of SHC beneficiaries suggested to increase the number of soil testing laboratories .

Table 1. Distribution of respondents according to constraints faced by the beneficiaries

Sl. No.	Constraints	Garett Score	Rank
A)	**Constraints faced by PKVY beneficiaries**		
1	No proper marketing channel for organic produce	92.45	I
2	Lack of sustainability in the reduced cost of organic cultivation	47.98	II
3	Reduced productivity of organic farm produce even after conversion period	40.01	III
4	Low empowerment of farmers in clusters and farmer groups	11.03	IV
B)	**Constraints faced by PMKSY beneficiaries**		
1	Long time for subsidy to be credited	97.37	I
2	No increase in the sources of irrigation	72.85	II
3	Electric load shedding in rural areas	58.01	III
4	Difficulty to follow fertigation along with micro irrigation system	23.88	IV
5	Difficulty in maintenance of micro irrigation system	6.73	V
C)	**Constraints faced by SHC beneficiaries**		
1	Long time gap between soil sample collection and issuing SHC	98.04	I
2	Difficulty to comprehend the information and follow the recommendations provided in SHC	86.89	II
3	Lack of effective training and demonstrations provided to farmers about soil health.	63.85	III
4	Timely non availability of organic fertilizers make farmers difficult to follow INM.	43.97	IV
5	Less number of soil testing laboratories	10.26	V

Figures in parentheses indicate percentage

Table 2. Suggestions provided by beneficiaries in overcoming constraints

Sl. No.	Suggestions	F	%	Rank
A)	**Suggestions provided by PKVY beneficiaries**			
1	Establish proper marketing channel for organic produce	89	74.17	I
2	Empower farmers by strengthening farmer groups and developing them into Farmer Producer Organizations (FPOs).	41	34.17	II
3	Approach to increase the organic farm productivity following the transition from inorganic to organic cultivation.	59	49.17	III
B)	**Suggestions provided by PMKSY beneficiaries**			
1	Ensure timely crediting of subsidies	101	84.17	I
2	Expand irrigation infrastructure through the construction of water harvesting structures such as check dams, farm ponds, tanks, bore wells.	71	59.16	II
3	Enhance training and support for the effective use of micro irrigation systems for fertigation practices.	32	26.67	III
C)	**Suggestions provided by SHC beneficiaries**			
1	Speed up the process of issuing Soil Health Cards	103	85.83	I
2	Provide training programs and field level demonstrations focused on soil health and the practical application of SHC recommendations to improve farmers' knowledge and skills.	86	71.66	II
3	Subsidize organic inputs and provide financial assistance for organic fertilizers and inputs to make them more affordable and encourage the adoption of Integrated Nutrient Management (INM) practices.	64	53.33	III
4	Increase the number of soil testing laboratories	28	23.33	IV

F- Frequency, %- Percentage

In the case of PKVY beneficiaries, a significant majority (74.17%) recommended the establishment of well-organized marketing channels for organic produce. This suggests that many beneficiaries recognize the need for a structured and efficient system to connect their organic products with buyers, which could enhance market access, improve profitability, and reduce the reliance on intermediaries. To address the lack of direct market linkages, it is crucial to leverage digital platforms for market access, provide training on digital tools, offer market intelligence services, and develop physical infrastructure like collection centers and transportation facilities, thereby enabling farmers to efficiently engage with local and national markets and enhance their income and sustainability. Additionally, 34.17 per cent of the PKVY beneficiaries suggested strengthening existing farmer groups and developing them into Farmer Producer Organizations (FPOs). This indicates a demand for greater collective organization among farmers, allowing them to pool resources, negotiate better terms, and access larger markets more effectively. Transforming these groups into FPOs could also provide a platform for shared knowledge, better access to inputs, and enhanced bargaining power, contributing to a more sustainable and profitable organic farming sector. Near to half (49.17%) of the PKVY beneficiaries suggested the approach to increase the organic farm productivity following the transition from inorganic to organic cultivation. This recommendation highlights the challenges farmers face in maintaining yield levels after the shift to organic farming. The transition often results in reduced productivity due to the time it takes for soil to regain its natural fertility without synthetic inputs. Beneficiaries likely recognize the need for interventions such as improved organic farming techniques, high-yield organic seed varieties, effective organic pest management, and soil fertility enhancement practices to overcome these productivity gaps. By addressing these challenges, organic farmers can achieve better yields, making organic farming more viable and profitable in the long term.

Among PKVY beneficiaries, a substantial 84.17 per cent emphasized ensuring the timely crediting of subsidies. It is suggested to simplify the subsidy disbursement process by implementing efficient methods for handling and distributing subsidies. Utilizing digital platforms or automated systems can help ensure timely crediting and reduce delays. Following this, 59.16 per cent of PMKSY beneficiaries advocated for the expansion of irrigation infrastructure through the construction of water

harvesting structures, such as check dams, farm ponds, tanks, and bore wells. This suggests that many farmers see the development of such infrastructure as vital for improving the sources of irrigation, water availability and irrigation efficiency. Building these structures can help to capture and store rainwater, reducing dependence on erratic rainfall and ensuring a more reliable water supply for irrigation. The 26.67 per cent of PMKSY beneficiaries suggested for enhanced training and support for the effective utilization of micro irrigation systems in fertigation practices. This highlights a need for practical guidance on compatibility and solubility of fertilizers along with the pH and Electrical Conductivity management to avoid nutrient imbalance.

In the case of SHC beneficiaries, a significant majority (85.83%) of beneficiaries emphasized the need to speed up the processing and issuance of Soil Health Cards. This suggests that delays in receiving SHCs are a major concern, affecting the timely implementation of recommended soil management practices. Accelerating processing times would ensure that farmers receive recommendations more quickly, allowing them to make timely adjustments to their farming practices and improve soil health more effectively. The 71.66 per cent of SHC beneficiaries recommended the establishment of training programs and field-level demonstrations focused on soil health and the practical application of SHC recommendations. This indicates a strong demand for hands on education and practical guidance to help farmers understand and apply the information provided in their SHCs. Training and demonstrations can bridge the gap between theoretical knowledge and practical application, enhancing farmers' skills and confidence in using Soil Health Card data to optimize their agricultural practices. About 53.33 per cent of SHC beneficiaries suggested providing subsidies for organic inputs and financial assistance for organic fertilizers. This recommendation highlights the need to make organic farming practices more affordable by reducing the financial burden associated with purchasing organic inputs. By subsidizing these inputs and offering financial support, the program could encourage more farmers to adopt Integrated Nutrient Management (INM) practices, which involve using organic fertilizers to improve soil health and enhance crop yields. More than one fifth (23.33%) of SHC beneficiaries suggested increasing the number of soil testing laboratories, indicating that limited access to these facilities is a significant concern. With a small number of labs available, farmers face long waiting times for soil sample testing, which delays the receipt of Soil Health Cards and the necessary recommendations for soil management. Expanding the number of soil testing labs would improve accessibility, reduce waiting times, and enable more farmers to receive timely and accurate soil health assessments, ultimately enhancing their ability to implement the recommendations and improve soil fertility.

4. CONCLUSION

In conclusion, the present study focused on assessing the constraints faced by the beneficiaries of centrally sponsored agricultural schemes namely Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and the Soil Health Card Scheme (SHC) and invited suggestions from them to overcome the constraints. In the case of constraint faced by PKVY beneficiaries, the first constraint faced by the beneficiary was lack of proper marketing channel for organic produce, the second constraint was sustainability in the reduction of cost of organic cultivation, the third constraint was reduced productivity of organic farm produce even after conversion period and fourth constraint was the low empowerment of farmers in clusters and farmer groups. Whereas, in the case of constraint faced by PMKSY beneficiaries, the first constraint faced by the beneficiary was longer time for getting the subsidy credited, the second constraint was lack of increase in the sources of irrigation, the third constraint was load shedding of electricity, fourth constraint was difficulty to follow fertigation along with micro irrigation system and fifth constraint was difficulty in maintenance of micro irrigation system. In the case SHC beneficiaries, the first constraint faced by the beneficiary was the long time gap between soil sample collection and issuing SHC, the second constraint was difficulty to comprehend the information and follow the recommendations provided in SHC, the third constraint was lack of effective training and demonstrations provided to farmers about soil health , fourth constraint was the timely non availability of organic and fertilizers make farmers difficult to follow INM and fifth constraint was the less number of soil testing laboratories. In the case of PKVY beneficiaries, majority of them (74.17%) gave the suggestion for establishment of proper marketing channel for organic produce, followed by 34.17 per cent of

them suggested the strengthening of farmer groups and developing them into Farmer Producer Organizations (FPOs). Whereas in the case of PMKSY beneficiaries, 84.17 per cent of them suggested to ensure timely crediting of subsidies, followed by expansion of irrigation infrastructure through the construction of water harvesting structures such as check dams, farm ponds, tanks and bore wells (59.16%) and enhanced training and support for the effective use of micro irrigation systems for fertigation practices (26.67%). In the case of SHC beneficiaries, majority of them (85.83%) gave the suggestion to speed up the process of issuing Soil Health Cards, 71.66 per cent suggested for training programs and field level demonstrations focused on soil health and the practical application of SHC recommendations to improve farmers' knowledge and skills, whereas more than half (53.33%) suggested for subsidized organic inputs and financial assistance for organic fertilizers and inputs to make them more affordable and encourage the adoption of Integrated Nutrient Management (INM) practices and 23.33 per cent of SHC beneficiaries suggested to increase the number of soil testing laboratories. Identifying constraints helps policymakers refine these schemes, ensuring better adoption by farmers, efficient resource utilization, and sustainable agricultural growth, thereby enhancing farmers' livelihoods and food security.

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 the writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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