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The constraint analysis of Krishi Vigyan Kendra western Maharashtra

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Abstract

Present study was conducted in the Western Maharashtra region of Maharashtra State. The research study was carried out on 'Impact of Krishi Vigyan Kendras on Farm Economy In Western Maharashtra'. Multistage sampling design was carried out to fulfill the research needs in which region Western Maharashtra was purposively selected for this study as this region was having more number of KVKs (12) as compared to other regions of Maharashtra (Source: <https://kvk.icar.gov.in/aboutkvk.aspx>). During analysis various economical aspects of KVK were studied like organizational structure, different activities carried out, economical impact on beneficiary and non-beneficiary farmers, technology adoption index, various factors affecting on technology adoption through KVK, different constraints faced by KVK/KVK staff. Regarding constraints faced by various KVK/KVK staff in Western Maharashtra, all KVK staffs were questioned via a predetermined schedule which listed various constraints that a KVK/KVK staff may encounter during day-to-day functioning of KVK. Constraints were majorly categorized into five different groups such as technological constraints, administrative constraints, personal constraints, socio-economic constraints and input constraints. After surveying all the KVK/KVK staff, the compiled data was analyzed by Garret ranking method. Output of analysis showed that level of skill development to use new technologies among KVK staff was a major technological constraint with 63.66 Garret mean score and problems in applying research and development was of lowest important technological constraint with Garret mean score of 15.86. In administrative constraints, insufficient collaboration with local farmers was major constraint with value of 62.20 Garret mean score and policies not in-line with needs was of lowest important administrative constraint with Garret mean score of 38.14. From the category of personal constraint, High workload of responsibilities and problem of gender imbalance in KVK were respectively the major and minor ranked personal constraints with Garret mean score value of 60.68 & 27.68 accordingly. In case of socio-economic constraints, problem of literacy level of farmers was highly ranked constraint and inconsistent availability of quality inputs to farmers was lowest ranked constraint with both constraints having Garret mean score value of 54.43 and 45.66, respectively. Availability and affordability of mechanization affecting technology adoption was major constraint with Garret mean score of 51.71 in the category of input constraints.

Keywords: KVK, garret mean score, constraints, western Maharashtra etc.

Introduction

The Indian Council of Agricultural Research (ICAR) is an apex organization having responsibility to conduct and coordinate research, education, extension education and international cooperation in agriculture with the mandates like to plan, undertake, aid, promote and co-ordinate education, research and its application in agriculture, agro forestry, animal husbandry, fisheries, home science and allied sciences. In discharge of its functions, ICAR lays considerable emphasis on technology development and its adoption through use of cutting edge technologies leading to

enhancing agricultural productivity, keeping sustainability of the agriculture upfront, human resource development and technology assessment and its application. The ICAR has over the years evolved an effective and well-tested frontline extension system, which is exemplary and admired all over the world. It started with establishment of first Krishi Vigyan Kendra (KVK) in Pondicherry in 1974 based on Dr. Mohan Singh Mehta Committee Report and subsequent increase of KVKs in different parts of the country. The KVKs under ICAR have evolved over the time for meeting the expectations and emerging challenges being faced by the

Indian farming community. With respect to our India, the first KVK was established in 1974 at Puducherry. The number of KVKs has risen to 731 till today. The KVK scheme is 100% financed by Govt. of India and the KVKs are sanctioned to Agricultural Universities, ICAR institutes, related Government Departments and Non Government Organizations (NGOs) working in Agriculture. KVK is an integral part of the National Agricultural Research System (NARS) which aims at assessment of location specific technology modules in agriculture and allied enterprises, through technology assessment, refinement and demonstrations. KVKs have been functioning as Knowledge and Resource Centre of agricultural technology supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district and are linking the NARS with extension system and farmers. (Source: ICAR Website, February 2024. As of now, ICAR has established a total of 731 KVKs in the country under different host organizations viz., SAUs, CAU, ICAR Institutes, Deemed Universities (DUs), State Governments, Public Sector Undertaking (PSU), Non-Government Organizations (NGOs) and Other Educational Institutions (OEI) aiming at assessment, refinement and large scale adoption of technology/products. (<https://kvk.icar.gov.in/aboutkvk.aspx>)

Methodology

Multistage sampling method was carried out to fulfill the research needs. Region Western Maharashtra was purposively selected for this study as this region was having more number of KVKs (12) as compared to other regions of Maharashtra (Source: <https://kvk.icar.gov.in/aboutkvk.aspx>). From the six districts of western Maharashtra namely Ahilyanagar, Pune, Satara, Sangali, Solapur and Kolhapur, one KVK from each district was considered for the research study. If a district had two or more KVKs functioning, then the KVK which was established earlier was selected to carry out sampling analysis. From each KVK, 60 farmers were selected from which 30 farmers were beneficiary farmers of KVK and 30 were non-beneficiary farmers of KVK. Beneficiary farmers were defined as the farmers who regularly visit the KVK institution in the need of new and applied knowledge of various agricultural technologies that were meant to be spread by KVK and non-beneficiary farmers were those who do not visit KVK at all or haven't visited KVK yet and engaged in traditional farming. Thus from six selected districts, a total of 360 sample was considered comprising 180 were beneficiary farmers of KVK and 180 were non-beneficiary farmers of KVK.

Analytical Tools and Techniques

Garret ranking method was applied to come-up for the various constraints faced by KVK so that suitable policy measures could be suggested. The technique was used to rank the preference mentioned by the respondents on different factors and aspects. The formula for Garrets ranking is:

$$\text{Percent Position} = \frac{(R_{ij} - 0.5)}{N_j}$$

Where R_{ij} = Rank given for the i th variable by j th respondents

N_j = Number of variable ranked by j th respondents

Steps in Garrett Ranking Method: Survey Design: SMS of all KVKs ranked various constraints based on preference (1st, 2nd, 3rd, etc.). Garrett's Table: Each rank (e.g., 1st, 2nd, 3rd) was assigned a specific score percentage from Garrett's Table. Convert Ranks to Scores: Multiplied the number of respondents ranking each item by the corresponding Garrett score. Calculate Total and Average Scores: Sum scores for each item was taken, then divided by the total number of respondents to get an average score. Rank Items: Items were ranked based on their average scores (higher score = more preferred). The Garrett Ranking Method enables to rank preferences based on respondent data, helping to identify the most important factors in research.

Results and Discussion

Present investigation was carried to study the various constraints faced by various KVK/KVK staff in Western Maharashtra. In total five major constraints were studied which were again sub-categorized in number of sub-constraints as shown in the following table:

Table 1: Constraints considered for research study

Sr.no	Major Constraint	No. of sub-constraints
1	Technological constraints	11
2	Administrative constraints	10
3	Personal constraints	10
4	Socio-Economic constraints	09
5	Input constraints	08

1. Technological constraints: Under the category of technological constraints, total of 11 sub-constraints were studied by the method of Garret ranking after careful investigation and survey of KVK/KVK staff. The technological constraints faced by various Krishi Vigyan Kendra (KVK) staff or entire KVK in Western Maharashtra were ranked according to their Garret Mean Score. The highest technological constraint faced by KVK staff was the level of skill development required to use new technologies with Garret mean score of 63.66. Then it was followed by ICT infrastructure availability (Rank II, Score 62.28), availability of farm mechanization (Rank III, Score 60.46), infrastructure availability (Rank IV, Score 57.08), post-harvest management technologies available (Rank V, Score 50.80), policy and regulatory environment affecting work efficiency (Rank VI, Score 49.31), access to technology (Rank VII, Score 41.94), availability of water management technologies (Rank VIII, Score 38.03), challenge in adopting climate-resilient agricultural practices (Rank IX, Score 35.37), difficulty in disseminating complex technology (Rank X, Score 34.14). Problems in applying research and development was the lowest-ranked technological constraint with rank XI and Score 15.86.

Table 2: Technological constraints faced by KVK/KVK staff as per Garret ranking method

Sr. No.	Techno logical Constraints	Rank	Garret Mean Score
1	Level of skill development to use new technologies among KVK staff	I	63.66
2	ICT Infrastructure availability	II	62.28
3	Availability of farm mechanization	III	60.46
4	Infrastructure availability	IV	57.08
5	Post harvest management technologies available	V	50.80
6	Policy and regulatory environment affecting work efficiency	VI	49.31
7	Access to technology	VII	41.94
8	Availability of Water management technologies	VIII	38.03
9	Challenge in adopting climate-resilient agricultural practices	IX	35.37
10	Difficulty in disseminating complex technology	X	34.14
11	Problems in applying Research and development	XI	15.86

2. Administrative Constraints: Under the category of administrative constraints, total of 10 sub-constraints were studied by the method of Garret ranking after careful investigation and survey of KVK/KVK staff. The administrative constraints faced by Krishi Vigyan Kendra (KVK) or KVK staff in Western Maharashtra were investigated based on the Garret Mean Score, which ranked these constraints from most to least significant. Insufficient collaboration with local farmers (Rank I, Garret Mean Score: 62.20) was the most significant administrative constraint. After that certain constraints that followed it were shortage of qualified personnel (Rank II, Garret Mean Score: 58.88), insufficient collaboration between colleagues and line departments (Rank III, Garret Mean Score: 57.08),

challenges in data collection, management, and analysis (Rank IV, Garret Mean Score: 53.86), maintenance issue of infrastructure (Rank V, Garret Mean Score: 51.40), inadequate system of monitoring (Rank VI, Garret Mean Score: 48.51), inadequate funding or limited budget (Rank VII, Garret Mean Score: 47.86), various complex administrative procedures (Rank VIII, Garret Mean Score: 46.37), high staff turnover due to various reasons (Rank IX, Garret Mean Score: 40.68). Policies not in-line with needs Table 3: Administrative constraints faced by KVK/KVK staff as per Garret ranking method (Rank X, Garret Mean Score: 38.14) was the lowest ranked administrative constraint with rank X and Garret mean score of 40.68.

Sr. No.	Administrative Constraints	Rank	Garret Mean Score
1	Insufficient collaboration with local farmers	I	62.20
2	Shortage of qualified personnel	II	58.88
3	Insufficient collaboration between colleagues, line-department	III	57.08
4	Challenges in data collection, management, analysis	IV	53.86
5	Maintenance issue of infrastructure	V	51.40
6	Inadequate system of monitoring	VI	48.51
7	Inadequate funding or limited budget problem	VII	47.86
8	Various Complex administrative procedures	VIII	46.37
9	High staff turnover due to various reasons	IX	40.68
10	Policies not in-line with needs	X	38.14

3. Personal Constraints: Under the category of personal constraints, total of 10 sub-constraints were studied by the method of Garret ranking after careful investigation

and survey of KVK/KVK staff and following results were found after analyzing the data:

Table 4: Personal constraints faced by KVK/KVK staff as per Garret ranking method

Sr. No.	Personal Constraints	Rank	Garret Mean Score
1	High workload of responsibilities	I	60.68
2	Problem of effective leadership in KVK management	II	57.03
3	Insufficient training opportunities for KVK staff	III	54.03
4	Difficulty in decoding technical information	IV	54.00
5	Constraints in decision making processes	V	53.77
6	Language barrier between KVK staff and farmers	VI	51.00
7	Lack of specialized skills in personnels	VII	50.85
8	Lack of job satisfaction	VIII	49.83
9	Limited capacity building among KVK staff	IX	46.11
10	Problem of gender imbalance in KVK	X	27.68

The various personal constraints faced by various KVK (Krishi Vigyan Kendra) or KVK staff in Western Maharashtra showed breakdown based on the Garrett Mean Score from highest to lowest. Results revealed that the

constraint of high workload of responsibilities holds the highest rank, indicating that KVK staff faced significant pressure due to extensive workload with Garret mean score of 60.68. This constraint was followed by various other

constraints one-by-one as problem of effective leadership in KVK management (score: 57.03), insufficient training opportunities for KVK staff (score: 54.03), difficulty in decoding technical information (score: 54.00), constraints in decision-making processes (score: 53.77), language barrier between KVK staff and farmers (score: 51.00), lack of specialized skills in personnel (score: 50.85), lack of job satisfaction (score: 49.83), limited capacity building among KVK staff (46.11). The problem of gender imbalance in

KVK was of least importance according to the method of Garret ranking as this constraint received lowest rank and point values of 27.68 Garret mean score.

4. Socio-Economic constraints: Under the category of socio-economic constraints, total of 09 sub-constraints were studied by the method of Garret ranking after careful investigation and survey of KVK/KVK staff and following results were found after analyzing the data:

Table 5: Socio-Economic constraints faced by KVK/KVK staff as per Garret ranking method

Sr. No.	Socio-Economic Constraints	Rank	Garret Mean Score
1	Problem of literacy level of farmers	I	54.43
2	Lack of basic infrastructure towards farmers	II	51.48
3	High cost associated with technology adoption	III	49.77
4	Limited markets access to sell commodity	IV	49.60
5	Lack of response from farmers	V	49.23
6	Limited credit availability of farmers creating problems	VI	48.00
7	Lack awareness among farmers about KVK services	VII	47.54
8	Issues of natural resource management by farmers	VIII	46.28
9	Inconsistent availability of quality inputs to farmers	IX	45.66

The socio-economic constraints faced by Krishi Vigyan Kendra (KVK) or KVK staff and farmers in Western Maharashtra were ranked based on their Garret Mean Score. Problem of literacy level of farmers was first ranked constraint with Garret mean score of 54.43. Then lack of basic infrastructure towards farmers was second ranked constraint with Garret mean score of 51.48. Similarly, the high cost associated with technology adoption (Rank III), Limited Markets Access to Sell Commodity (Rank IV), lack of response from farmers (Rank V, Score: 49.23) limited credit availability of farmers creating problems (Rank VI, Score: 48.00), lack of awareness among farmers about KVK services (Rank VII, Score: 47.54), issues of natural resource management by farmers (Rank VIII, Score: 46.28). The inconsistent availability of quality inputs to farmers (Rank IX, Score: 45.66) was the lowest ranked socio-economic constraint.

5. Input Constraints

Under the category of input constraints, total of 08 sub-constraints were studied by the method of Garret ranking after careful investigation and survey of KVK/KVK staff.

The above table shows various input related constraints faced by Krishi Vigyan Kendra (KVK) or KVK staff in Western Maharashtra impacting their work efficiency and the adoption of agricultural technologies. Availability and affordability of mechanization affecting technology adoption was the highly ranked constraint with Garret mean Score 51.71. Internet connectivity, electricity supply, and cleanliness in KVK affecting work efficiency was second ranked constraint with Score 51.48. Various other constraints which followed these two constraints were level of input availability in KVK affecting work efficiency (rank III, score: 51.40), availability and affordability of pesticides affecting technology adoption (rank IV, score: 51.03), availability and affordability of fertilizers affecting technology adoption (rank V, score: 50.20), availability and affordability of irrigation affecting technology adoption (rank VI, score: 49.77), availability and affordability of quality seeds affecting technology adoption (rank VII, score: 49.68). Lack of technical knowledge and information about inputs affecting technology adoption was the lowest ranked input constraint with rank VIII and Garret mean score of 48.71.

Table 6: Input related constraints faced by KVK/KVK staff as per Garret ranking method

Sr. No.	Input Constraints	Rank	Garret Mean Score
1	Availability and affordability of mechanization affecting technology adoption	I	51.71
2	Internet connectivity, electricity supply, cleanliness in KVK affecting work efficiency	II	51.48
3	Level of input availability in KVK affecting work efficiency	III	51.40
4	Availability and affordability of pesticides affecting technology adoption	IV	51.03
5	Availability and affordability of fertilizers affecting technology adoption	V	50.20
6	Availability and affordability of irrigation affecting technology adoption	VI	49.77
7	Availability and affordability of quality seeds affecting technology adoption	VII	49.68
8	Lack of technical knowledge and information about inputs affecting technology adoption	VIII	48.71

Summary and Conclusion

The study identified five major constraints faced by Krishi Vigyan Kendras (KVKs) in Western Maharashtra such as technological, administrative, personal, socio-economic, and input-related constraints. Key issues included a lack of skill development among staff, inadequate ICT infrastructure,

and insufficient collaboration with farmers. Personal challenges like high workloads and leadership issues were also prominent. Socio-economic constraints highlighted low literacy among farmers and high technology adoption costs, while input constraints focused on the availability and affordability of farm mechanization and inputs.

Policy Recommendations

1. **Enhance Skill Development and Training:** Given the high rank of *skill development* among technological constraints, policies should focus on strengthening training programs for KVK staff to effectively use new technologies. Workshops and hands-on sessions could address gaps in knowledge and skill.
2. **Improve ICT and Infrastructure:** To tackle issues like *ICT infrastructure availability*, the KVK institution/management should invest in strengthening digital infrastructure and connectivity at KVKs. This could include providing access to reliable internet and the necessary hardware for efficient technology dissemination.
3. **Boost Farmer-KVK Collaboration:** The administrative constraint pointed to the need for *better collaboration with local farmers and qualified personnel*. Policies should encourage more field-based extension work, where KVK staffs may get active engagement with farmers.
4. **Address Socio-Economic Barriers:** The socio-economic constraints suggested the importance of improving literacy rates and providing *basic infrastructure* for farmers. Government/KVK programs should be aimed at improving education and rural infrastructure that would help create a more conducive environment for the adoption of agricultural innovations.
5. **Enhance Input Availability:** The input constraints can be addressed by increasing the availability of affordable *farm mechanization, fertilizers, and quality seeds*. Policies could include subsidies, improved distribution channels, and providing timely information on input availability.

By tackling these constraints through targeted policy measures, KVKs in Western Maharashtra can be better equipped to serve farmers and promote sustainable agricultural development in the region.

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