

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 7; July 2026; Page No. 828-831

Received: 24-04-2026
Accepted: 26-05-2026

Indexed Journal
Peer Reviewed Journal

Constraints faced by tribal farmers in getting benefits from water resource creation and management technology in Palghar District of Maharashtra

¹SK Mayekar, ²HV Borate and ³DP Gosavi

¹Ph.D. Scholar, Department of Agricultural Extension Education, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (DBSKKV), Dapoli, Maharashtra, India

²Professor (CAS), Department of Agricultural Extension Education, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (DBSKKV), Dapoli, Maharashtra, India

³Principal, Agriculture College, Department of Agricultural Extension and Communication, Pal (Gargoti), Maharashtra, India

DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i7k.3960>

Corresponding Author: SK Mayekar

Abstract

Water resource creation and its efficient management are crucial for sustaining agricultural production and improving livelihood security in tribal and rainfed regions. Despite receiving high monsoon rainfall, the tribal areas of Palghar district experience seasonal water scarcity due to rapid runoff, undulating topography and inadequate storage and irrigation infrastructure. The present study was conducted to identify and prioritize the constraints faced by tribal farmers in deriving benefits from Water Resource Creation and Management Technology (WRCMT) in Palghar district of Maharashtra. The investigation covered 250 tribal farmers from the selected tribal areas of the district. Data were collected personally using a pre-tested structured interview schedule. The constraints reported by the respondents were analysed using frequency and percentage and ranked according to their relative importance. The findings revealed that lack of awareness about government schemes related to water management (89.60%) was the foremost constraint, followed by weak coordination between line departments and local institutions (85.60%), limited number of Jalkunds sanctioned under the Tribal Sub-Plan (83.20%), high cost of constructing water harvesting structures (82.00%) and difficulty in group or community-based water resource management (80.00%). Low motivation and participation in water conservation programmes (76.40%), poor transportation and road connectivity (74.00%), irregular electricity supply (72.00%) and inadequate training on water-use efficiency (69.60%) were also prominent constraints. The results indicate that informational and institutional barriers are more prominent than purely technical or environmental limitations. Strengthening extension communication, institutional convergence, need-based sanctioning of Jalkunds, financial and technical support, capacity building and participatory water governance would enhance the effectiveness and sustainability of WRCMT among tribal farming communities.

Keywords: Tribal farmers, constraints, water resource management, Jalkund, water harvesting, Tribal Sub-Plan, Palghar

Introduction

Water is a critical natural resource for agricultural production, food security and rural livelihood development. Its significance is particularly high in rainfed and tribal farming systems, where agricultural production largely depends on the availability and distribution of monsoon rainfall. Creation, conservation and efficient utilization of available water resources are therefore essential for reducing production risks, increasing cropping opportunities and improving the livelihood security of resource-poor farmers. The Konkan region of Maharashtra receives substantial rainfall during the monsoon season; nevertheless, many parts of the region experience seasonal water scarcity. High rainfall intensity, rapid surface runoff, undulating topography and limited water-storage capacity restrict the effective utilization of available rainfall. These problems are particularly important in the tribal areas of Palghar district, where agriculture is predominantly rainfed and farming households generally operate with limited land and financial resources. Water Resource Creation and Management Technology

(WRCMT) comprises various interventions aimed at harvesting, conserving, storing and efficiently utilizing available water. Technologies such as Jalkunds, farm ponds, check dams, nala bunds, soil and water conservation structures and micro-irrigation systems can provide protective irrigation, reduce vulnerability to dry spells and facilitate crop diversification. Effective utilization of such technologies can consequently contribute to agricultural productivity, income generation and livelihood security. However, the creation of physical water infrastructure alone does not guarantee its effective utilization. Farmers' ability to derive benefits depends on awareness of available schemes, financial capacity, and technical guidance, and institutional support, accessibility of infrastructure, maintenance mechanisms and community participation. Earlier investigations have reported financial limitations, inadequate technical guidance, insufficient training, poor transportation and weak extension support as important constraints affecting the adoption of watershed and agricultural technologies.

In tribal regions, these difficulties may be further intensified by geographical isolation, limited access to institutional services and socio-economic disadvantages. Identification and prioritization of farmers' actual field-level constraints are therefore necessary for developing effective extension strategies and improving the implementation of water-resource development programmes.

Against this background, the present study was undertaken to systematically identify and prioritize the constraints faced by tribal farmers in deriving benefits from Water Resource Creation and Management Technology in Palghar district of Maharashtra.

Objective

To identify and prioritize the constraints faced by tribal farmers in deriving benefits from Water Resource Creation and Management Technology.

Methodology

The present investigation was conducted in Palghar district of Maharashtra, where tribal communities constitute a substantial proportion of the rural population. The study covered 250 tribal farmers from the selected tribal areas of the district. An ex-post-facto research design was adopted because the phenomena under investigation had already occurred and the researcher had no direct control over the independent conditions.

For the present study, constraints were operationally defined as the specific problems, difficulties or limiting conditions experienced by tribal farmers while attempting to derive benefits from Water Resource Creation and Management Technology. The identified constraints covered informational, institutional, financial, technical, infrastructural, social, operational and environmental dimensions.

A structured interview schedule was developed in consultation with subject-matter specialists and on the basis of relevant literature. The schedule was pre-tested among tribal farmers outside the actual study area, and necessary modifications were incorporated before final data collection. Data were collected personally through face-to-face interviews.

The respondents were asked to indicate the constraints experienced by them while obtaining and utilizing the benefits of WRCMT. The frequency of respondents reporting each constraint was determined and converted into percentage. Constraints were subsequently ranked according to the percentage of respondents reporting them, with the most frequently reported constraint receiving the first rank.

Results and discussion

The constraints experienced by tribal farmers in deriving benefits from Water Resource Creation and Management Technology are presented in Table 1

Table 1: Constraints faced by tribal farmers in deriving benefits from Water Resource Creation and Management Technology (n = 250)

Sl. No.	Constraints	Frequency	Per cent	Rank
1	Lack of awareness about government schemes related to water management	224	89.60	I
2	Delay in sanction and disbursement of financial assistance	140	56.00	XIV
3	Insufficient technical guidance from agricultural and water resource officers	154	61.60	XII
4	High cost of constructing water harvesting structures	205	82.00	IV
5	Poor maintenance of existing water structures (check dams, wells, farm ponds)	168	67.20	X
6	Non-availability of skilled labour during construction period	148	59.20	XIII
7	Lack of timely repair and renovation of damaged structures	165	66.00	XI
8	Irregular electricity supply affecting irrigation pumps	180	72.00	VIII
9	Difficulty in group or community-based water resource management	200	80.00	V
10	Poor soil and topographical conditions restricting water retention	135	54.00	XV
11	Lack of transportation and road connectivity to access input markets	185	74.00	VII
12	Inadequate training and awareness programmes for water-use efficiency	174	69.60	IX
13	Weak coordination between line departments and local institutions	214	85.60	II
14	Low motivation and participation among farmers in water conservation programmes	191	76.40	VI
15	Limited number of Jalkunds sanctioned under TSP (Tribal Sub-Plan)	208	83.20	III

The findings presented in Table 1 reveal that tribal farmers encountered multidimensional constraints while accessing and utilizing the benefits of WRCMT. The problems extended beyond technical limitations and included informational, institutional, financial, infrastructural and socio-organizational barriers.

The foremost constraint was lack of awareness about government schemes related to water management, reported by 89.60 per cent of the respondents. The finding indicates that information regarding available schemes, eligibility criteria, subsidies and application procedures has not adequately reached tribal farmers. Limited extension contact, remoteness of tribal villages and inadequate communication channels may contribute to this information gap. The finding receives support from Patel *et al.* (1998)^[3], who reported lack of knowledge about the utility of soil and water conservation measures as an important constraint among watershed

beneficiaries and non-beneficiaries. Similarly, Samantaray *et al.* (2009)^[4] identified inadequate training, lack of demonstrations, insufficient community awareness and weak follow-up services as important constraints among tribal growers. The second-ranked constraint was weak coordination between line departments and local institutions (85.60%). Water-resource development involves multiple agencies, including Agriculture, Water Conservation, Tribal Development, Rural Development and local self-government institutions. Lack of coordination among these agencies may result in fragmented planning, delayed implementation and inadequate post-construction support. The finding highlights the importance of institutional convergence for ensuring that water-resource interventions reach intended beneficiaries effectively.

The limited number of Jalkunds sanctioned under the Tribal Sub-Plan (83.20%) ranked third. This indicates that the

existing coverage of decentralized water harvesting structures is inadequate compared with farmers' requirements. Jalkunds are particularly relevant to small and resource-poor farmers because they can provide stored water for protective irrigation during critical periods. Insufficient sanctioning therefore limits the number of farmers who can benefit from water-resource interventions. The high cost of constructing water harvesting structures (82.00%) was ranked fourth. Water harvesting structures require expenditure on excavation, lining materials, labour and associated irrigation facilities, making independent investment difficult for economically weaker tribal farmers. This finding is in agreement with Patel *et al.* (1998)^[3], who reported lack of finance as a major constraint among watershed beneficiaries. Kulshreshtha *et al.* (2010)^[2] also observed lack of capital and high input costs as important constraints in the adoption of watershed technologies. Similarly, Yadav *et al.* (2013)^[5] reported high input cost and poor financial condition among the important constraints experienced by watershed beneficiaries.

The fifth-ranked constraint was difficulty in group or community-based water resource management (80.00%). Community water-resource management requires cooperation, collective decision-making, equitable sharing of water and clearly defined responsibilities for maintenance. Differences in interests, resource ownership and local leadership can create difficulties in collective action. This finding indicates that physical creation of community resources should be accompanied by institutional mechanisms for participatory management. Low motivation and participation among farmers in water conservation programmes (76.40%) occupied the sixth rank. Inadequate understanding of long-term benefits, limited demonstration of successful interventions and insufficient community mobilization may restrict participation. Strengthening farmer involvement from the planning stage itself could increase ownership and improve sustainability of water-resource interventions.

Lack of transportation and road connectivity to access input markets (74.00%) ranked seventh. Tribal villages are frequently situated in remote and difficult terrain, making transportation of construction materials, agricultural inputs and irrigation equipment expensive and time consuming. The result is supported by Kulshreshtha *et al.* (2010)^[2], who identified lack of transport facilities as a constraint in watershed technology adoption. Yadav *et al.* (2013)^[5] also reported inadequate transportation and communication facilities among constraints faced by watershed beneficiaries. Further, Dhanasree *et al.* (2014)^[1] identified poor connectivity and limited accessibility to nearby markets as important livelihood constraints among tribal communities.

The problem of irregular electricity supply affecting irrigation pumps (72.00%) ranked eighth. Although water harvesting structures enhance water availability, farmers require a reliable energy source to lift and distribute stored water. Unreliable electricity consequently restricts timely irrigation and reduces the effective utilization of created water resources. Inadequate training and awareness programmes for water-use efficiency (69.60%) ranked ninth. Farmers require practical knowledge regarding irrigation scheduling, micro-irrigation, maintenance and water-saving agronomic practices to maximize the benefits of limited

stored water. This finding closely corresponds with Patel *et al.* (1998)^[3], who identified lack of training and technical guidance as important barriers. Samantaray *et al.* (2009)^[4] similarly emphasized inadequate training programmes and demonstrations, while Kulshreshtha *et al.* (2010)^[2] reported lack of training as an important constraint in watershed technology adoption.

Poor maintenance of existing water structures (67.20%) and lack of timely repair and renovation of damaged structures (66.00%) occupied the tenth and eleventh ranks, respectively. These findings emphasize that infrastructure creation without adequate provision for maintenance may reduce the long-term effectiveness of water-resource investments. Periodic monitoring, community participation and dedicated maintenance funds are therefore necessary. Insufficient technical guidance from agricultural and water-resource officers (61.60%) ranked twelfth. Technical support is essential for appropriate site selection, construction, operation, maintenance and efficient utilization of water resources. The finding is consistent with Patel *et al.* (1998)^[3], who reported lack of technical guidance among the major constraints to watershed technology adoption. It also corresponds with the observations of Yadav *et al.* (2013)^[5] regarding inadequate availability of watershed techniques and grass-root-level trainers.

The non-availability of skilled labour during the construction period (59.20%) occupied the thirteenth rank. Skilled labour is necessary for technically sound construction of water harvesting structures. Shortages may delay construction, increase costs and compromise structural quality. Although delay in sanction and disbursement of financial assistance (56.00%) ranked fourteenth, it affected more than half of the respondents. Delayed release of assistance can postpone construction beyond the appropriate period and discourage farmers from participating in government programmes. The finding corresponds with Kulshreshtha *et al.* (2010)^[2], who identified complexity of loan procedures and uncertainty regarding availability of funds, and with Yadav *et al.* (2013)^[5], who reported non-availability of agricultural loans on time as an important constraint.

The comparatively least reported constraint was poor soil and topographical conditions restricting water retention (54.00%), ranked fifteenth. Despite occupying the last rank, more than half of the respondents experienced this problem. This indicates the importance of location-specific planning, scientific site selection and appropriate engineering designs for water harvesting structures in the undulating terrain of tribal regions.

Overall, the results are broadly consistent with previous investigations. Patel *et al.* (1998)^[3] emphasized finance, technical guidance, knowledge and training; Samantaray *et al.* (2009)^[4] highlighted inadequate training, demonstrations, community awareness and follow-up; Kulshreshtha *et al.* (2010)^[2] identified capital, training, transportation and irrigation-related barriers; while Yadav *et al.* (2013)^[5] reported financial, training, technical and transportation constraints. These similarities demonstrate that several barriers identified in earlier watershed and tribal development studies continue to influence farmers' ability to benefit from water-resource interventions.

However, the present study further highlights weak interdepartmental coordination and inadequate sanctioning of

Jalkunds under the Tribal Sub-Plan as highly prominent location-specific institutional constraints. Thus, the challenge is not limited to farmers' financial or technical capacity; deficiencies in programme delivery and institutional convergence also substantially determine access to WRCMT benefits.

Conclusion

The study revealed that tribal farmers face a combination of informational, institutional, financial, technical, infrastructural and community-level constraints in deriving benefits from Water Resource Creation and Management Technology. Lack of awareness regarding government water-management schemes emerged as the most important constraint, followed by weak coordination between line departments and local institutions, limited sanctioning of Jalkunds under the Tribal Sub-Plan, high construction cost and difficulty in community-based water-resource management. The findings are generally consistent with earlier research on watershed and tribal development, particularly with respect to inadequate knowledge, financial limitations, lack of technical guidance, insufficient training and transportation difficulties. However, the prominence of institutional coordination and inadequate Jalkund coverage in the present study indicates that effective water-resource management in tribal areas requires attention not only to farmers' capabilities but also to the functioning of the institutional delivery system.

The study therefore concludes that creation of water infrastructure alone is insufficient to ensure its benefits. An integrated approach combining awareness, institutional convergence, financial support, technical guidance, capacity building, reliable infrastructure and participatory management is essential for enhancing the effectiveness and sustainability of WRCMT among tribal farmers.

References

1. Dhanasree K, Vijayabhinandana B, Pradeepkumar PB. Socio-economic empowerment of tribal women in high altitude and tribal zone of Andhra Pradesh. 2014.
2. Kulshreshtha A, *et al.* Adoption of watershed technologies by the farmers in Morena district of Madhya Pradesh. 2010.
3. Patel, *et al.* Constraints experienced by the beneficiaries in adoption of watershed management technology. 1998.
4. Samantaray SK, *et al.* Constraints in vegetable production: experiences of tribal vegetable growers. 2009.
5. Yadav, *et al.* Techno-economic changes and constraints among farmers in relation to watershed development programme. 2013.