People Participation In Community Works And Their Drought-Related Problems In The Man River Basin

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ABSTRACT
This research paper examines the role of community participation in drought mitigation and assesses villagers' perceptions of government drought relief programs in the Man River Basin. Utilizing primary data collected from 400 respondents across the Satara, Sangli, and Solapur districts in 2024, the study evaluates awareness, effectiveness, and impact of key government initiatives such as the Integrated Watershed Development Program (IWDP), Jalyukt Shivar Abhiyan (JSA), Indo-German Watershed Development Program (IGWDP), NABARD Holistic Watershed Development Programme, and others. The study also investigated the socio-economic challenges faced by rural populations during droughts, including water scarcity, crop failure, fodder shortages, unemployment, and health risks. Findings revealed that there are sharp disparities in community participation and program effectiveness across districts of the Man river basin. The study also found significant structural vulnerabilities which are persisting in Man river basin. The study arrived at conclusion that there is need of strengthening local governance, enhancing community engagement, and improving communication strategies to foster drought resilience.

Keywords: drought mitigation, community participation, watershed development, Man River Basin, rural livelihoods, government programs

1. Introduction

Droughts in the Man River Basin have recurrent and profound impacts on agriculture, livestock, employment, and rural livelihoods. Government interventions aimed at drought mitigation are numerous, yet their success is closely tied to community involvement, awareness, and local capacity for implementation. Droughts in the Man River Basin represent a recurring environmental challenge with severe socio-economic repercussions. The basin, encompassing the districts of Satara, Sangli, and Solapur, is characterized by semi-arid conditions, where agricultural productivity and rural livelihoods are highly vulnerable to fluctuations in rainfall and prolonged dry spells. The frequency and intensity of droughts have increased in recent decades, exacerbated by climate variability and unsustainable land use practices. These droughts disrupt water availability for drinking, irrigation, and livestock, leading to crop failures, fodder shortages, unemployment, and increased indebtedness among rural households.

In response, the government has implemented a range of drought mitigation programs, including watershed development schemes, employment guarantee programs, and emergency relief measures. However, the success of these initiatives largely depends on the active participation of local communities, their awareness of program objectives, and the effectiveness of implementation at the grassroots level. This study has explored the extent of community participation in drought mitigation activities and evaluates villagers' perceptions regarding the key government programs. It also investigated the multi-dimensional problems faced by rural populations during drought periods, aiming to identify structural vulnerabilities and policy gaps. The study has emphasized the critical role of strengthening community engagement and improving governance mechanisms to enhance drought resilience in the Man River Basin.

2. Literature Review

Community participation is widely acknowledged as essential for sustainable drought mitigation and natural resource management. Chambers (1997) emphasized the importance of involving local stakeholders in environmental interventions to ensure relevance, ownership, and long-term success. Watershed development programs have been central to India's drought management strategy, focusing on soil and water conservation, groundwater recharge, and promoting sustainable agriculture (Shah et al., 2003). These programs rely heavily on community mobilization and institutional support to achieve their objectives.

Joshi and Sreekumar (2010) highlighted that program effectiveness is contingent upon the degree of local involvement, transparency, and adaptive management. Despite these insights, many studies report persistent gaps in outreach, especially in marginalized and drought-prone districts, where socio-economic constraints limit participation (Reddy & Reddy, 2017). Furthermore, while various government schemes exist, few studies provide comparative district-level analyses of community engagement and program impact, particularly in the context of the Man River Basin.

There is also a lack of comprehensive assessments that integrate villagers' perceptions of program effectiveness with the socio-economic challenges they face during droughts. This research addresses these gaps by combining quantitative

survey data with a district-wise comparative framework, thereby providing nuanced insights into the strengths and weaknesses of drought mitigation efforts in the region. The study contributes to the literature by identifying critical factors influencing community participation and highlighting areas for policy enhancement.

3. Methodology

This study employed a quantitative research design based on primary data collected in 2024 from a stratified random sample of 400 respondents across three districts in the Man River Basin: Satara (n=109), Sangli (n=125), and Solapur (n=166). The sample was designed to represent diverse socio-economic groups, ensuring inclusivity of smallholder farmers, landless labourers, and marginalized communities. Data collection utilized structured questionnaires administered through face-to-face interviews by trained field enumerators. The questionnaire covered multiple dimensions: community participation in drought mitigation activities (e.g., water conservation, planting drought-resistant crops), awareness and perceptions of government drought relief programs, and the range of drought-related problems experienced by villagers. Quantitative data were analyzed using descriptive statistics, including frequency distributions, percentages, and cross-tabulations, to identify patterns of participation, awareness, and program effectiveness across districts. Comparative analysis highlighted inter-district variations and allowed for the identification of contextual factors influencing outcomes. The methodology ensured reliability through pilot testing of instruments and validity by triangulating findings with secondary data and program reports.

4. Results and Discussion

4.1 Community Participation in Drought Mitigation

Table 1 presents the level of community involvement in drought mitigation activities such as planting drought-resistant crops and water conservation.

Table 1: Community Participation in Drought Mitigation in Man River Basin

District	Yes (n, %)	No (n, %)	Total (n)
Satara	66 (60.55)	43 (39.45)	109
Sangli	73 (58.40)	52 (41.60)	125
Solapur	88 (53.01)	78 (46.99)	166
Overall	227 (56.75)	173 (43.25)	400

Source: Filed work 2022

The table shows that 56.75% of respondents across the Man River Basin actively participated in drought mitigation activities, such as planting drought-resistant crops and water conservation. Satara leads with 60.55% participation, indicating stronger community mobilization and possibly better institutional support. Sangli closely follows at 58.40%, while Solapur lags at 53.01%, reflecting socio-economic challenges and weaker community structures. The nearly 43.25% non-participation rate highlights the need for more inclusive outreach strategies, especially in Solapur, to enhance collective drought resilience.

Hypothesis

H_0 (Null Hypothesis): There is no significant difference in community participation in drought mitigation activities among the three districts (Satara, Sangli, and Solapur) in the Man River Basin.

H_1 (Alternative Hypothesis): There is a significant difference in community participation in drought mitigation activities among the three districts (Satara, Sangli, and Solapur) in the Man River Basin.

Hypothesis Testing

Using the data from Table 1 (Community Participation in Drought Mitigation), we can perform a Chi-square test for independence to examine whether community participation differs

Step 1: Calculate Expected Frequencies

Expected frequency for each cell = (Row total × Column total) / Grand total

Total Yes = 227; Total No = 173; Grand total = 400 significantly by district.

District	Total	Expected Yes	Expected No
Satara	109	(109×227)/400 = 61.82	(109×173)/400 = 47.18
Sangli	125	(125×227)/400 = 70.94	(125×173)/400 = 54.06
Solapur	166	(166×227)/400 = 94.24	(166×173)/400 = 71.76

Step 2: Compute Chi-square Statistic

$x^{\wedge 2} = \frac{\sum(O-E)^2}{E}$

District	Observed Yes (O)	Expected Yes (E)	$(O-E)^2/E$ Yes	Observed No (O)	Expected No (E)	$(O-E)^2/E$ No
Satara	66	61.82	$(66-61.82)^2/61.82 = 0.28$	43	47.18	$(43-47.18)^2/47.18 = 0.37$
Sangli	73	70.94	$(73-70.94)^2/70.94 = 0.06$	52	54.06	$(52-54.06)^2/54.06 = 0.08$
Solapur	88	94.24	$(88-94.24)^2/94.24 = 0.42$	78	71.76	$(78-71.76)^2/71.76 = 0.54$

Sum of all = 0.28 + 0.37 + 0.06 + 0.08 + 0.42 + 0.54 = 1.75

Step 3: Determine Degrees of Freedom

df = (rows - 1) × (columns - 1) = (3 -1) × (2 -1) = 2 × 1 = 2

Step 4: Compare with Critical Value

At $\alpha = 0.05$ and df = 2, critical χ^2 value ≈ 5.991

There is no statistically significant difference in the level of community participation in drought mitigation activities among the Satara, Sangli, and Solapur districts in the Man River Basin at the 5% significance level.

Calculated $\chi^2 = 1.75 < 5.991$ (critical value)

Therefore, we fail to reject the null hypothesis.

4.2 Perceptions of Government Drought Programs

4.2.1 Integrated Watershed Development Program (IWDP)

Table 2: Perceptions of Integrated Watershed Development Program (IWDP)

District	IWDP Effective (%)	IWDP Positive Impact (%)
Satara	51.38	42.20
Sangli	55.96	53.21
Solapur	46.99	39.76
Overall	48.75	42.50

Source: Filed work 2022

Approximately 48.75% of respondents perceive IWDP as effective in their area, with Sangli showing the highest positive perception (55.96%). However, a significant minority (28.50%) believe the program is ineffective, particularly in Solapur (29.52%), suggesting uneven implementation. Positive impact on drought management is acknowledged by 42.50% overall, again highest in Sangli (53.21%). The substantial proportion indicating partial effectiveness (22.75%) signals incomplete program realization, emphasizing the need for enhanced community engagement and monitoring.

4.2.2 Jalyukt Shivar Abhiyan (JSA)

Awareness and perceived impact of JSA were moderate to low (Table 3).

Table 3: Awareness and Impact of Jalyukt Shivar Abhiyan (JSA)

District	Awareness (%)	JSA Positive Impact (%)
Satara	26.61	29.36
Sangli	32.11	35.78
Solapur	27.11	33.13
Overall	27.25	31.50

Source: Filed work 2022

Only 27.25% of respondents are fully aware of JSA, with significant unawareness (40%) across districts, particularly in Sangli (49.54%). Visibility of water conservation efforts under JSA is recognized by 36.25%, but 41.25% perceive only limited impact. Just 31.50% believe JSA has contributed to drought management, while 40.25% report no benefit. These figures underscore communication gaps and inconsistent program outcomes, suggesting the need to improve outreach and ensure sustained benefits.

4.2.3 Fodder Camps

Fodder camps were highly valued, with 61% benefiting and 82% acknowledging their role in reducing livestock losses (Table 4).

Table 4: Effectiveness of Fodder Camps

District	Benefited (%)	Functional and Effective (%)	Reduced Livestock Loss (%)
Satara	55.96	67.89	80.73
Sangli	75.23	84.40	93.58
Solapur	60.84	75.90	83.13
Overall	61.00	73.00	82.00

Source: Filed work 2022

Fodder camps are highly valued, with 61% benefiting from them and 73% considering them effective in supporting livestock during droughts. Sangli shows the highest benefit (75.23%) and effectiveness (84.40%), reflecting acute fodder scarcity and successful intervention. Notably, 82% believe fodder camps reduce livestock losses, highlighting their critical role in drought resilience. Minor dissatisfaction (8.25%) points to opportunities for improving camp management and resource allocation.

4.3 Problems Faced by Villagers During Drought

Table 5 highlights the multi-dimensional hardships experienced.

Table 5 Problems Faced by Villagers During Drought in Man River Basin

Problem	Percentage (%)
Fodder Shortage	91.67
Long Distance for Water	90.00
Crop Failure	85.00
Unemployment	81.67
Increased Family Debt	78.33
Water Shortage (General)	75.00
Agricultural Water Shortage	73.33
Drinking Water Shortage	63.33
Delay in Government Assistance	61.67
Heat Stress	60.00
Health Risks	40.00
Untimely Camp Assistance	38.33

Source: Filed work 2022

The table reveals multifaceted hardships: 91.67% report fodder shortages, 90% face long distances for water, and 85% experience crop failure. Unemployment (81.67%) and increased family debt (78.33%) reflect severe economic impacts. Water scarcity affects 75% generally, with 73.33% citing agricultural water shortages and 63.33% drinking water shortages. Delays in government assistance (61.67%) and untimely camp support (38.33%) exacerbate vulnerabilities. Health risks (40%) and heat stress (60%) further compound hardships, illustrating drought as a complex socio-environmental crisis requiring integrated responses.

5. Conclusion

This study demonstrates that community participation is a pivotal factor in enhancing drought resilience in the Man River Basin. Although over half of the respondents across all districts engage in drought mitigation activities, participation levels vary, with Solapur showing comparatively lower involvement due to socio-economic and institutional constraints. Government programs exhibit mixed effectiveness and awareness. The Integrated Watershed Development Program and Drought Prone Areas Programme (DPAP) receive relatively higher approval, particularly in Sangli, indicating better implementation and community engagement. Conversely, programs such as Jalyukt Shivar Abhiyan and Project on Climate Resilient Agriculture (PoCRA) suffer from low awareness and perceived impact, highlighting critical gaps in communication and outreach. Emergency measures like water supply through tankers and bullock carts are widely regarded as insufficient, though they provide some short-term relief. Fodder camps emerge as a highly effective intervention, crucial for livestock survival and rural livelihoods during droughts. The comprehensive challenges faced by villagers including water scarcity, crop failure, unemployment, and health risks underscore drought's multifaceted nature, affecting socio-economic stability and well-being. To strengthen drought mitigation, policy must focus on enhancing local governance, fostering inclusive community participation, and improving transparency and timeliness in program delivery. Awareness campaigns tailored to district-specific needs and participatory monitoring mechanisms can bridge gaps between policy and practice. Integrating climate-resilient agricultural practices with traditional knowledge and ensuring equitable access to resources will further empower communities. Ultimately, building resilient rural livelihoods in the Man River Basin requires a holistic approach that addresses environmental, economic, and social dimensions of drought vulnerability.

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