

Beyond the Tea Gardens: A Critical Appraisal of Health and Hygiene Status Among Tea Tribes in Sivasagar, Assam

Dr. Krishnamoni Saikia

¹Assistant Professor, Department of Geography, Dibrugarh University. Email: krishnamoni2016saikia@gmail.com

Abstract

The present study titled “Beyond the Tea Gardens: A Critical Appraisal of Health and Hygiene Status among Tea Tribes in Sivasagar, Assam” was conducted in Chandbecha village, Sivasagar district, Assam. Tea tribes constitute a vital labour force of Assam’s tea industry but continue to experience health and developmental disparities. The objectives of the study were to assess the health and hygiene status of tea tribe households and to examine the relationship between environmental conditions and health and hygiene status. The study adopted a quantitative research design. Primary data were collected from 100 respondents through a semi-structured questionnaire covering environmental and health-related indicators. Data were processed and analyzed using Jamovi statistical software. Karl Pearson’s correlation coefficient was used to examine relationships between variables. The results revealed a statistically significant moderate positive correlation between environmental conditions and health and hygiene status, $r(98)=0.601$, $p<.001$, 95% CI [0.458, 0.713]. The null hypothesis was rejected. The findings suggest that better environmental conditions are associated with better health and hygiene. The study suggests improving basic amenities, strengthening healthcare services, and promoting health awareness through community-based interventions to sustainably improve the health status of tea tribes.

Keywords: Tea Tribes, Health and Hygiene, Environmental Conditions, Jamovi, Sivasagar.

1. Introduction:

Health and hygiene are essential components of human well-being and are closely associated with socio-economic conditions, environmental quality, sanitation, nutrition, education and access to healthcare services. Good health is not merely the absence of disease but also reflects an individual's physical, mental and social well-being. The World Health Organization (1948) emphasises this comprehensive understanding of health, highlighting the importance of living conditions and access to essential services. However, these facilities are not equally available to all sections of society. Marginalised and economically disadvantaged communities often experience greater health inequalities due to inadequate infrastructure, low income, poor housing conditions and limited access to healthcare. Marmot (2005) highlights that social and economic inequalities significantly influence health outcomes, making the study of health and hygiene particularly important for understanding differences in quality of life.

Assam is one of India's major tea-producing states, and the tea industry has played a significant role in shaping its economy, society and cultural landscape. The establishment of tea plantations during the colonial period led to the migration of labourers from different parts of India, whose descendants are now widely recognised as Tea Tribes or tea-garden communities. These communities have made an invaluable contribution to the growth and development of Assam's tea industry. Nevertheless, many tea-tribe households continue to experience socio-economic challenges relating to income, education, housing, sanitation, nutrition and healthcare accessibility. Their living conditions are closely connected with the plantation economy and the availability of basic facilities within tea-garden settlements. Besky (2014), through her study of labour and justice on Darjeeling tea plantations, illustrates the importance of examining plantation workers' everyday experiences, working conditions and social relationships to understand the broader realities of plantation life.

Health and hygiene conditions among tea-tribe communities are influenced by a combination of occupational, environmental and household factors. Tea-garden workers generally engage in physically demanding activities and may experience prolonged exposure to varying climatic conditions and occupational hazards. At the household level, inadequate sanitation, unsafe drinking water, poor drainage, overcrowded housing and improper waste disposal can increase the risk of infectious and water-related diseases. Access to clean drinking water and safe sanitation is therefore fundamental to disease prevention and the improvement of community health. The World Health Organization and UNICEF (2023) emphasise the continuing importance of safe drinking water, sanitation and hygiene services in protecting public health. Consequently, examining health and hygiene requires attention not only to the availability of basic facilities but also to their accessibility, quality and regular utilisation by households.

Healthcare accessibility is another important determinant of the health status of tea-tribe communities. The presence of hospitals, health centres and dispensaries does not necessarily guarantee effective healthcare access, as distance, transportation, treatment costs, working hours and awareness can influence people's ability to obtain medical assistance. Financial constraints and occupational responsibilities may also affect the timely treatment of illnesses. Furthermore, healthcare-seeking behaviour, including the use of public healthcare institutions, private practitioners, traditional remedies and self-medication, provides valuable insights into how households respond to health problems. Understanding these factors is essential for identifying barriers to medical care and assessing the adequacy of existing healthcare services.

From a geographical perspective, health and hygiene are closely related to place, accessibility, settlement patterns and the distribution of essential infrastructure. Differences in the location of healthcare facilities, drinking-water sources, sanitation infrastructure and residential settlements can produce variations in health conditions across communities. The socio-economic characteristics of households, including income, education, occupation, family size and housing conditions, further influence their ability to maintain a healthy living environment. Therefore, a geographical approach to health and hygiene helps explain how spatial and social inequalities interact to shape human well-being. This perspective is particularly relevant in tea-garden settlements, where occupational landscapes, residential environments and access to essential services are closely interconnected.

Against this background, the present study, entitled "Beyond the Tea Gardens: A Critical Appraisal of Health and Hygiene Status among Tea Tribes in Sivasagar, Assam," examines the health and hygiene conditions of tea-tribe households in Chandbessa Village, Sivasagar district, Assam. The study focuses on major aspects of household well-being, including drinking-water sources, toilet facilities, sanitation, drainage, waste disposal, common health problems and access to healthcare services. It also considers healthcare-seeking behaviour and the socio-economic and environmental factors that influence the health status of the community. By examining these interconnected dimensions, the study seeks to develop a comprehensive understanding of the living conditions and health-related challenges experienced by tea-tribe households.

The significance of the study extends beyond the identification of health problems, as it also draws attention to the relationship between basic amenities, social inequality and human development. An assessment of existing health and hygiene conditions can help identify gaps in infrastructure, healthcare delivery, sanitation facilities and public awareness. The findings may also provide useful insights for local authorities, healthcare providers and policymakers in developing measures to improve drinking-water access, sanitation, healthcare accessibility and overall living conditions. Ultimately, the study emphasises that the economic contribution of Assam's tea industry should be accompanied by greater attention to the health, dignity and well-being of the communities whose labour sustains it.

2. Significance of the study:

The study is significant as it examines the health and hygiene conditions of tea-tribe communities in Chandbecha village, Sivasagar, Assam, who play an important role in the tea industry. It focuses on access to healthcare, safe drinking water, sanitation, housing, waste disposal and personal hygiene. The study also highlights the socio-economic and environmental factors affecting their health and quality of life. Its findings can help identify existing gaps in basic health and sanitation facilities and may be useful for policymakers, local authorities and researchers in planning better healthcare and welfare measures for tea-tribe communities.

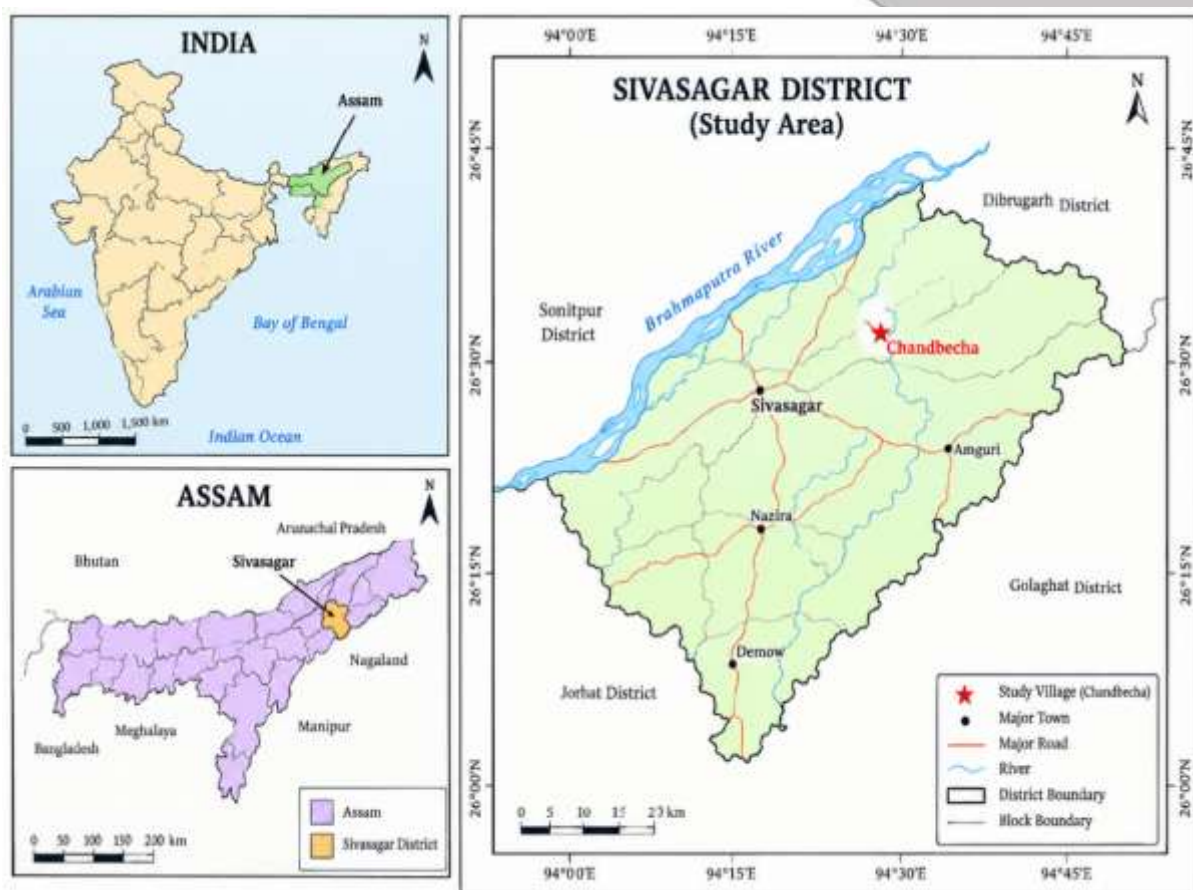
3. Study area:

Chandbecha, located in Sivasagar district of Assam, is selected as the study area for examining the health, hygiene, and environmental conditions of tea garden workers. The study focuses on the living and working conditions of tea garden workers and their relationship with health and personal hygiene. The socio-economic circumstances of workers, housing facilities, access to safe drinking water, sanitation, waste disposal, and healthcare services are important aspects of the investigation. The physical and environmental conditions surrounding workers' residential areas and workplaces are also considered to understand the challenges they face in maintaining a healthy life.

Chandbecha is recorded as a village in Dimow sub-district of Sivasagar district. According to Census 2011-based village data, it had a population of 774 people and 176 households. These figures provide a demographic background for the locality, although current population and household figures require verification.

The selection of Chandbecha is relevant for understanding how living environments and working conditions influence the well-being of tea garden workers. The study examines these issues through field-level information on workers' health, hygiene practices, sanitation, drinking water, housing, and environmental surroundings. The findings will help identify local problems and

provide a basis for suggesting improvements in the health and living conditions of the workers.



4. Objectives:

1. To analyse the impact of environmental conditions on the health, hygiene, and overall well-being of tea garden workers.
2. To examine the level of awareness regarding personal hygiene, sanitation, and preventive healthcare among tea garden workers.

5. Methodology:

This study uses primary data collected from a sample of 100 tea garden workers through a structured questionnaire and field surveys. The questionnaire gathers information on workers' health status, personal hygiene, sanitation facilities, access to safe drinking water, housing conditions, waste disposal practices, and environmental problems affecting their well-being. The collected data are systematically classified, coded, and analysed using Jamovi statistical software. Frequency and percentage analyses are employed to understand the health, hygiene, and environmental conditions of the respondents. In addition, Karl Pearson's correlation coefficient is used to examine the relationship between selected environmental factors and the health and hygiene status of tea garden workers. This statistical method helps identify the direction and strength of the relationship between the selected variables. The study follows ethical principles by ensuring voluntary participation and maintaining the confidentiality and anonymity of all respondents.

6. Results and Discussion:

The first objective of the study analyses the impact of environmental conditions on the health, hygiene, and overall well-being of tea garden workers. For this purpose, five parameters of environmental conditions are considered: drinking water quality,

sanitation and drainage, waste management, housing environment, and workplace environment. Similarly, health and hygiene are assessed through five parameters: general health status, personal hygiene, water-related health problems, respiratory and occupational health, and healthcare accessibility. Data relating to these parameters are collected from 100 tea garden workers using a structured questionnaire. The responses are classified and analysed using frequency and percentage methods in Jamovi statistical software. Furthermore, Karl Pearson's correlation coefficient is applied to examine the relationship between environmental conditions and the health and hygiene status of the respondents. This analysis helps determine the strength and direction of the association between environmental conditions and workers' health and hygiene.

Table 1 presents the parameters used to assess environmental conditions, while Table 2 outlines the parameters used to analyse the health and hygiene status of tea garden workers.

The environmental conditions and health and hygiene status of tea garden workers in Chandbecha were analysed using a five-point Likert scale. The scale was used to assess five parameters of environmental conditions: drinking water quality, sanitation and drainage, waste management, housing environment, and workplace environment. Similarly, health and hygiene were examined through general health status, personal hygiene, water-related health problems, respiratory and occupational health, and healthcare accessibility. The responses were assigned scores from 1 to 5, representing very poor, poor, moderate, good, and very good conditions, respectively. The mean scores for each parameter were calculated to determine the overall condition and classify the findings into appropriate categories. This approach provides a systematic basis for understanding the environmental challenges and health and hygiene conditions experienced by tea garden workers in the study area.

Table 1: Parameters of Environmental Conditions

Sl. No.	Parameter	Indicators for Analysis
1	Drinking Water Quality	Availability, cleanliness, and safety of drinking water
2	Sanitation and Drainage	Toilet facilities, drainage systems, and stagnant water
3	Waste Management	Disposal of household waste and accumulation of garbage
4	Housing Environment	Ventilation, overcrowding, dampness, and surrounding cleanliness
5	Workplace Environment	Exposure to chemicals, dust, heat, and other occupational hazards

Table 2: Parameters of Health and Hygiene

Sl. No.	Parameter	Indicators for Analysis
1	General Health Status	Frequency of illness and common health problems
2	Personal Hygiene	Handwashing, bathing, and personal cleanliness
3	Water-Related Health Problems	Incidence of diarrhoea and other reported water-related illnesses
4	Respiratory and Occupational Health	Cough, breathing difficulties, skin irritation, and work-related health complaints
5	Healthcare Accessibility	Access to medical facilities, medicines, and regular health

check-ups

Based on this parameter, the study reveals that the environmental conditions, health, and hygiene of tea garden workers are closely associated with their living and working environments. In the present study, these aspects are examined through selected parameters to understand the major challenges affecting the overall well-being of tea garden workers in Chandbecha, Sivasagar district, Assam. Environmental conditions are assessed in terms of drinking water quality, sanitation and drainage, waste management, housing environment, and workplace environment. Similarly, health and hygiene are examined through general health status, personal hygiene, water-related health problems, respiratory and occupational health, and healthcare accessibility. These parameters provide a comprehensive framework for understanding the environmental and health-related circumstances of the workers.

Access to safe and clean drinking water is an essential requirement for maintaining good health and personal hygiene. However, difficulties in obtaining adequate drinking water can create challenges for household activities, food preparation, and personal cleanliness. Similarly, proper sanitation and drainage facilities are important for maintaining a healthy residential environment. Inadequate drainage, stagnant water, and poorly maintained sanitation facilities can contribute to unhygienic surroundings and increase the risk of certain infectious diseases. Effective waste management is equally important, as the accumulation of household garbage and improper waste disposal can affect environmental cleanliness and attract insects and other disease-carrying organisms. Therefore, regular waste collection, proper disposal practices, and improved drainage systems are necessary to maintain a clean and healthy environment.

Housing conditions also play an important role in determining the quality of life of tea garden workers. Adequate ventilation, sufficient living space, proper lighting, and protection from dampness are important features of a healthy home. Overcrowding and poorly maintained residential structures can create discomfort and affect the health and well-being of household members. In addition to residential conditions, the workplace environment is another important factor influencing workers' health. Tea garden workers may experience exposure to heat, dust, agricultural chemicals, and other occupational hazards during their daily activities. Such exposures can contribute to health problems if appropriate preventive measures, protective equipment, and workplace safety practices are not provided. Maintaining safe working conditions is therefore essential for protecting workers from avoidable occupational risks.

Health and hygiene conditions are also influenced by personal practices, access to healthcare, and the environmental facilities available to workers. General health status provides an understanding of common illnesses and health complaints experienced by the respondents. Personal hygiene, including regular handwashing, bathing, and maintaining cleanliness, is important for preventing infections and promoting individual well-being. However, maintaining proper hygiene becomes difficult when clean water and adequate sanitation facilities are limited. Water-related health problems, including reported cases of diarrhoea and other illnesses potentially associated with unsafe water, are important indicators for assessing the relationship between environmental conditions and health. Respiratory problems, skin irritation, and other occupational health complaints also require attention because of the nature of tea garden work and possible exposure to environmental hazards.

Furthermore, healthcare accessibility is an important component of workers' overall health and well-being. The availability of medical facilities, affordable medicines, regular health check-ups, and timely treatment helps workers prevent and manage illnesses. Difficulties in accessing healthcare can delay treatment and increase the burden of illness on workers and their families. Awareness of preventive healthcare, personal hygiene, occupational safety, and environmental cleanliness can also contribute to improving health outcomes. Therefore, healthcare services and preventive measures need to be considered alongside improvements in housing, sanitation, drinking water, and workplace conditions.

The assessment of environmental conditions and health and hygiene provides an understanding of the multiple challenges that may affect the quality of life of tea garden workers in Chandbecha. The selected parameters help identify areas requiring attention, particularly in relation to safe drinking water, sanitation, waste disposal, housing quality, workplace safety, personal hygiene, and healthcare accessibility. Improving these conditions requires coordinated efforts involving relevant authorities, tea garden management, healthcare providers, and the workers themselves. Greater attention to environmental maintenance, occupational safety, sanitation infrastructure, and accessible healthcare can contribute to a cleaner living environment and better health and hygiene practices. The study therefore emphasises the importance of examining environmental and health-related conditions together to develop a more comprehensive understanding of the well-being of tea garden workers.

Table 3: Karl Pearson's Correlation Matrix

Correlation Matrix			
		Environmental Conditions	Health And Hygiene
Environmental Conditions	Pearson's r	—	
	df	—	
	p-value	—	
	95% CI Upper	—	
	95% CI Lower	—	
	N	—	
Health and Hygiene	Pearson's r	0.601***	—
	df	98	—
	p-value	<.001	—
	95% CI Upper	0.713	—
	95% CI Lower	0.458	—
	N	100	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

The relationship between environmental conditions and the health and hygiene status of tea garden workers in Chandbecha, Sivasagar district, Assam, was examined using Karl Pearson's correlation coefficient. The analysis was based on data collected from 100 respondents and processed using Jamovi statistical software. The results revealed a statistically significant positive correlation between environmental conditions and health and hygiene status ($r = 0.601$), ($p < .001$). The 95% confidence interval ranged from 0.458 to 0.713, indicating a positive association between the two variables. This finding suggests that higher scores for environmental conditions are associated with higher scores for health and hygiene among the respondents, assuming that higher scores represent better conditions in both cases.

The relationship was examined using five environmental parameters: drinking water quality, sanitation and drainage, waste management, housing environment, and workplace environment. Similarly, health and hygiene were assessed through general health status, personal hygiene, water-related health problems, respiratory and occupational health, and healthcare accessibility. These parameters provide a framework for understanding how environmental facilities and living and working conditions are associated with workers' health and hygiene. The results highlight the importance of maintaining safe drinking water facilities, improving sanitation and drainage, ensuring proper waste disposal, providing adequate housing, and promoting safer workplace practices. Attention to personal hygiene, prevention of illness, occupational health protection, and access to healthcare services is also important for improving workers' overall well-being.

The findings have practical implications for the future management of tea garden workers' living and working environments. Tea garden management, local authorities, and relevant healthcare agencies should prioritise improvements in basic environmental infrastructure, including reliable drinking water, functional sanitation facilities, effective drainage, and systematic waste disposal. Regular inspection of residential areas and workplaces, the provision of appropriate protective equipment, and health awareness programmes can further support environmental cleanliness and occupational safety. In addition, accessible medical services, regular health check-ups, and preventive healthcare initiatives should be strengthened to address workers' health needs.

Overall, the correlation analysis provides statistical evidence of a meaningful positive relationship between environmental conditions and the health and hygiene status of tea garden workers in Chandbecha. The findings can serve as a useful basis for identifying priority areas for environmental improvement and planning future health and hygiene interventions. However,

correlation does not establish a direct cause-and-effect relationship. Therefore, future management strategies should combine environmental improvements with healthcare support, hygiene awareness, and continued assessment of workers' living and working conditions to promote their health, safety, and quality of life.

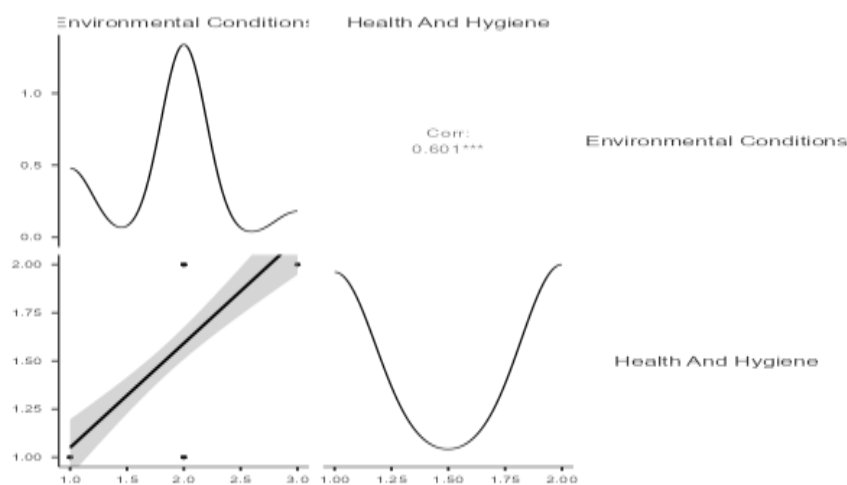


Figure1: Scatter Plot

The correlation plot illustrates a positive relationship between environmental conditions and the health and hygiene status of tea garden workers. The Pearson correlation coefficient ($r = 0.601$) indicates a moderately strong positive association between the two variables. The upward-sloping line shows that higher environmental-condition scores tend to be associated with higher health and hygiene scores. The shaded confidence region represents uncertainty around the estimated relationship.

Overall, the plot supports the correlation matrix findings and highlights the importance of drinking water quality, sanitation, waste management, housing conditions, and workplace safety in understanding the health and hygiene of tea garden workers in Chandbecha, Sivasagar district, Assam. However, the plot demonstrates an association rather than proving that environmental conditions directly cause changes in health and hygiene.

➤ In continuation of the health-related inquiry, Objective 2 was formulated to examine the level of awareness regarding personal hygiene, sanitation, and preventive healthcare among tea garden workers. Since environmental conditions were found to be strongly correlated with health and hygiene ($r = 0.601$), it becomes imperative to understand the awareness level that mediates this relationship.

1. Personal Hygiene Practices: Personal hygiene practices are inadequately maintained, with shortcomings in regular handwashing, oral hygiene, and personal cleanliness.
2. Sanitation Conditions: Sanitation facilities are inadequately maintained, with problems relating to toilet cleanliness, drainage systems, and the disposal of household waste.
3. Unsafe Drinking-Water Practices: Safe drinking-water practices are insufficiently maintained, and the availability of clean water, water purification, and hygienic storage require attention.
4. Preventive Healthcare Awareness: Awareness of vaccination, regular health check-ups, early diagnosis, and preventive medical care is inadequate.
5. Disease Prevention Awareness: Knowledge of the causes and prevention of common communicable, waterborne, and mosquito-borne diseases is limited.
6. Inadequate Access to Healthcare Services: Access to medical facilities, essential medicines, and regular health consultations may be constrained by financial and practical difficulties.
7. Awareness of Government Health Schemes: Awareness of available government healthcare services and welfare programmes requires improvement.
8. Maintenance of Hygienic Surroundings: Household surroundings and community environments may require better maintenance through proper waste disposal, drainage management, and regular cleaning.

The assessment of personal hygiene, sanitation, and preventive healthcare among tea garden workers in Chandbecha, Sivasagar district, Assam, focuses on identifying shortcomings in hygiene practices, sanitation facilities, safe drinking-water practices, and healthcare awareness. The major areas requiring attention include inadequate maintenance of sanitation facilities, improper waste disposal, insufficient awareness of preventive healthcare, and limited knowledge of disease prevention. These conditions

can create difficulties in maintaining a healthy living environment and following recommended hygiene practices. Inadequate access to healthcare services and limited awareness of available health programmes can further affect the use of preventive medical services.

Improving these conditions requires greater attention to health education, sanitation maintenance, safe drinking-water facilities, proper waste management, and access to affordable healthcare. Awareness programmes on personal hygiene, disease prevention, vaccination, and regular health check-ups can also support better health practices among tea garden workers.

7. Conclusion:

The present study concludes that there is a significant positive relationship between environmental conditions and health and hygiene status among tea garden workers of Chandbecha, Sivasagar ($r = 0.601$, $p < .001$). Better environmental conditions are associated with better health and hygiene. However, awareness regarding sanitation and preventive healthcare remains inadequate. Thus, improving environmental infrastructure along with community-based health education is essential for ensuring better health outcomes for the tea tribes.

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