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Sustainable Development Through Clean Water & Sanitation Toward Gender Dignity in Tripura

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Abstracts

Sustainable development is closely linked with equitable access to clean water and sanitation, which are fundamental human rights and key determinants of health, well-being, and social dignity. This study examines the role of clean water and sanitation in promoting gender dignity in rural areas of Tripura, a northeastern state of India characterized by diverse socio-cultural practices and varying levels of infrastructural development. The research highlights how inadequate water supply and poor sanitation facilities disproportionately affect women and girls, exposing them to health risks, time poverty, reduced educational opportunities, and threats to personal safety and dignity. Adopting a rights-based framework, the study underscores the need for inclusive, gender-responsive policies and community-level interventions that ensure equitable access to water resources. It concludes that recognizing women as key stakeholders in water governance is critical to advancing gender equality, health, and sustainable development in rural Tripura.

Keywords: Sustainable Development, Clean Water, Sanitation, Gender Dignity, Rural Tripura.

1.0 INTRODUCTION:

Clean Water means water that meets all local, state, and federal water quality standards, and which is of sufficient quality to protect recreation, fish consumption, and the maintenance of a healthy, well-balanced ecosystem of plants, animals, and other wildlife. (Vishal Vennu, 2018). When we're talking about clean water, we are often referring to drinking water, but it is also essential that water for all domestic use is clean. Domestic use of clean water includes water used indoors and outdoors for activities including Drinking, Food preparation, Bathing, Brushing teeth, Washing dishes, Washing clothes, Cleaning the home, Watering crops, Swimming, etc. (Deka, 2011)

Sustainable development has emerged as a central paradigm in addressing the complex interlink ages between environmental sustainability, social equity, and economic growth. Among its core dimensions, access to clean water and sanitation is recognized as a fundamental human right and a critical component of public health and human development. The United Nations, through its Sustainable Development Goals (SDGs), particularly Goal 6 (Clean Water and Sanitation), emphasizes ensuring availability and sustainable management of water and sanitation for all by 2030. However, achieving this goal remains a significant challenge in many developing regions, including parts of northeastern India. (Placeholder3)

(Swapan kumar pul, 2020)Clean Water and sanitation access, behaviors, experiences, and physical and social environments have been shown to influence multiple outcomes, including diarrheal disease, protozoa infection, active trachoma and pneumonia, anemia, mental health and general well-being, economic productivity, school absence, and child growth and cognitive development. This demonstrated the importance of WASH underlying Sustainable Development Goal (SDG) 6, which aims to "Ensure availability and sustainable management of clean water and sanitation for all". (Vinay Tripathi, 2024

(Venkatashiva Reddy, 2017)Access to clean water and basic sanitation is a worldwide concern. Almost 2.6 billion people in the world lack access to improved sanitation with fewer than one billion people having access to clean water for domestic purposes (WHO, 2010). In the year 2000, member-states of the United Nations agreed to eight Millennium Development Goals (Caballero, 2019)(MDGs) to help alleviate global poverty. MDG Goal 7, to ensure environmental sustainability, has a specific target (10) to halve the proportion of people unable to afford or reach safe drinking water and without access to basic sanitation by 2015. With a national population of over 1.1 billion people, clean water and basic sanitation are vital to the people of India. According to the 2001 Census, only 73% of people had access to clean water and 21.9 % of people had toilets attached to homes in rural areas. Women and marginalized populations are most impacted by a lack of clean water and sanitation in the country. (John, 2011)

The list is compiled from the 2011 India Census Report published by the Government of India. The rank is based on the percentage of households which have access to clean water. Tripura has 67.5% of households having access to clean water. Kerala ranked highest with 97.6%, while Andhra Pradesh has the worst rank with only 33.5% of households having access to clean water. The national average stands at 85.5%. (Census, 2011) Over 10.88 corer rural households in the country have been provided with tap water connections. 125 districts, 1,528 blocks, 82,354 panchayats, and 1, 51,442 villages have become "Har Ghar Jal" Census report, 2011.

In the content of Tripura, according to the Census Report 2001, the total drinking water facility was 24.6% tap water but we have seen according to the Census, 2011 report the scenario has changed from 24.6% to 33.2% in the case of tap water and change from 38.3% to 27.4% in case of well, 14.9% to 18.1% in case of hand pump, 13.1% to 16.3% in case of tube well and 9.1% to 5.1% in case of others source. In the content of Tripura according to the Jal Jeevan Mission (JJM) report, Tripura has been able to provide tap water connection coverage to households has increased from 3% in 2019 to 57% in 2023. Households in Tripura (District- wise) with Tap Water connections in percent, west Tripura has 70.21%, Unakoti 70.09%, North Tripura 67.24%, Gomati District 59%, Khowai 56.13%, South Tripura 52.28%, Dhalai 52.47% and Sepahijala 45.43% household have tap water supply in Tripura.

1.1 Concept of Clean Water and Sanitation:

1.1.1 Clean Water: Clean Water means water that meets all local, state, and federal water quality standards, and which is of sufficient quality to protect recreation, fish consumption, and the maintenance of a healthy, well-balanced ecosystem of plants, animals, and other wildlife.
Sources of clean water like dug wells, wells, tap water, tube wells, shallow tube wells, artesian wells, and other sources. (Bishu Karmakar, 2021)

1.1.2 The Benefits of Clean Water: access to clean water is beneficial for individuals and communities. In part, it impacts health, the economy, and education.
Health impact: One human being dies from dirty water every ten seconds. Most children will have lost their lives from waterborne illnesses. These are lives that would be saved if they had access to clean water.
Economic impact: Clean water has a positive economic impact on families and communities. Clean water means income earners in the family can continue to work because they don't get sick or die from waterborne illnesses. Access to clean water also means improved crops from which families earn incomes. Improved agriculture means healthier people and healthy people can contribute financially to a family and the entire community. (Hazarika, 2015)

Educational impact: When children spend time receiving an education in school, instead of collecting water, it opens doors to more opportunities and a brighter future. Globally, 31% of schools lack adequate sanitation and clean water.
Importance of clean water: Safe and readily available water is important for public health:
Poor-quality water can make you sick. **Poor quantity** (amount) of water will not clean your surroundings and your body, so hygiene suffers. (Mark Gius, 2015)

1.1.3 Sanitation: The World Health Organization defines the term "SANITATION" as follows: "Sanitation is the provision of facilities and services for the safe disposal of human urine, feces, and maintenance of hygienic conditions, through services such as garbage. Sanitation refers to the provision of facilities and services for the safe disposal of human urine and face (WHO, 2018). However, the term "sanitation" from a broader perspective also refers to the effective maintenance of hygienic conditions through city-level services. It has been realized that integral and whole-system sanitation solutions need to take an integrated approach, thereby addressing other sanitation sectors such as solid waste management, storm water management, water supply, and access to toilets. (Wren vogel, 2022)

1.1.4 Gender Dignity and Clean Water and Sanitation in India: It is important to examine gender in the context of Clean Water and Sanitation resources because gender affects who has access to, who participates in the planning of, and who manages Clean Water and Sanitation systems. Many people confuse gender with sex. Sex is the classification of species as female or male based on reproductive functions. (Brown, 2022)Gender not only includes perspectives of women but also women and men of varied socio-economic backgrounds. The scope of this paper does not cover transgender individuals, but this is an important and valid issue when understanding gender concerns. The rights, roles, and responsibilities of women and men in society are rooted in culture and history. Many factors determine which women or men have the best access or the most say in planning and managing Clean Water and Sanitation. (Ritabrata Roy, 2017)All people have the right to clean water and sanitation. In the urban areas in India, access to improved water and sanitation was reported among 73% and 81% of the households, respectively. However, it is still a major challenge in rural communities where about 80% of the population lives. 54% of rural households had access to improved clean water sources and only 13% of households had access to proper sanitation. (Caroline Sweetman, 2017)Open defecation is common. Hand-washing with soap after defecation or before eating or handling food, was only practiced by 16% of the population. Inadequate Clean water, sanitation, and hygiene contribute to the prevalence of infectious diseases such as diarrhea, skin diseases, and respiratory diseases. In 2018, poor access to water supply, sanitation, and hygiene (WASH) was the cause of child mortality. (Rjeet Nath, 2022)

1.2 Relationships on Clean Water, Sanitation, and Gender Dignity and Women Empowerment:
Clean Water and Sanitation programs lead to the empowerment of women and gender dignity and equality. They believe that access to resources or participation in decision-making will automatically lead to empowerment and gender equality. (Morgan pommells, 2018)The right to equality, to be treated fairly, and to be free and protected from discrimination is fundamental to human dignity. It is enshrined in the Universal Declaration of Human Rights, all of the core human rights treaties, and many national laws and constitutions. (Leigh Hamlet, 2022)Women's access to sustainable clean water and sanitation services enables them to enjoy better health, pursue their education, participate more fully in the economy, build their social capital, increase their dignity, and reach their full potential. When women and girls are empowered, they build a better world—one with greater economic opportunities and stability for all. Recent studies have shown that programs that include women in the early stages of development tend to have a long-term sustainable impact on clean water and sanitation. (Christy Lowe, 2019)
1.3 Sustainable Development:

SDGs:
The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

SDG-5:
"Gender equality" Sustainable Development Goal 5 concerns gender equality and is the fifth of the 17 Sustainable Development Goals established by the United Nations in 2015. Goal 5 aims to achieve gender equality and empower all women and girls.
SDG-6: "Clean water and sanitation" Sustainable Development Goal 6 declares the importance of achieving "clean water and sanitation for all". Sustainable Development Goal 6 goes beyond drinking water, sanitation, and hygiene to also address the quality and sustainability of water resources, (Cameron, 2016)

2. Review of Literature:

(Dickin,2020)In his paper has tried to capture "Empowerment in water, sanitation, and hygiene index" This study was Water, sanitation, and hygiene services are often promoted as insecure for women's empowerment and gender equality. Tools for monitoring water, sanitation, and hygiene (WASH) have focused largely on technical standards related to public health outcomes & The Empowerment in Water, Sanitation and Hygiene Index (EWI) is a novel survey-based index designed to measure agency, participation and empowerment in the water and sanitation sector. This study used a method pilot tool in Banfora, Burkina Faso & used individual-level survey data collected from both male & female respondents from the same household. Men are 31% more empowered than women respondents.

(Caruso,2021)In her paper has tried to capture "Water, Sanitation, and Women's Empowerment: A Systematic Review and Qualitative Met Synthesis" Water and sanitation programs historically have paid attention to women's influential value in improving efficiency and impact of programs, though the focus is shifting to consider how programming and conditions may contribute to women's empowerment a gender equality. To date, no systematic review has widely assessed and synthesized evidence on water and sanitation and women's and girls' empowerment.

(Brown,2010)In his paper has tried to capture "Empowerment and Gender Equality for Water and Sanitation in Rural India" The study was Access to clean drinking water and basic sanitation is a worldwide concern. Almost 2.6 billion people in the world lack access to improved sanitation with fewer than one billion people having access to safe drinking water for domestic purposes. A mix of data collection tools provides a more reliable and complete picture of the phenomenon under this study. Gender equality measurements should include quantitative indicators and qualitative indicators. This section will seek to understand if the empowerment of women directed gender equality in relation to Water and Sanitation in the main village according to participants in individual interviews.

(Bethany A. CarusoID1, 2022) Their paper has tried to capture that Water, sanitation, and hygiene (WASH) access, behaviors, experiences, and physical and social environments have been shown to influence multiple outcomes, including diarrheal disease, soil-transmitted and protozoa infection, active trachoma, pneumonia, anemia, mental health and general well-being, economic productivity, school absence, and child growth and cognitive development. This demonstrated the importance of WASH underlying Sustainable Development Goal (SDG) 6, which aims to "Ensure availability and sustainable management of water and sanitation for all". The majority of research took place in Asia

(46%; 117) or Africa (40%; 102), engaged adults (69%; 177), This report their review using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

(Georgia L,2019)In this study, the right to water and sanitation is recognized as fundamental to attaining all other human rights. Globally, however, 2.1 billion people do not have access to safe drinking water at home, 2.3 billion do not have basic sanitation, and 1 billion practice open defecation. Women and girls also have a larger role relative to men in water, sanitation, and hygiene activities, including in agriculture and domestic labor. Inequalities in access to water, sanitation and hygiene services have been measured between rural and urban areas. In many low- and middle-income countries, water, sanitation, and hygiene in healthcare facilities are far from adequate.

(Naomi C,2022)In this paper "The intentional pursuit of gender equality is needed alongside efforts to improve water; sanitation and hygiene (WASH) in low and middle-income countries". As development actors seek to address gender equality in WASH policy, strategy, and programs, they are faced with the challenge of measuring contributions to changes in gender equality. To date, work in this area has sought to understand gender outcomes associated with WASH programs, the most recent wave of gender equality measurement tools emerged in the 2010s as quantitative cross-country comparable empowerment measures. The WASH sector has historically adopted a technical approach, leading to solutions and systems that may disregard the roles and needs of women and girls and the opportunity to address gender dynamics.

(Sarah D,2020)In this paper "Access to safe water and sanitation, Sustainable Development Goal (SDG) 6", is necessary for human development, but is seen as particularly critical for women and girls and for making progress towards SDG 5 to 'Achieve gender equality and empower all women and girls.' Prevalent social norms assign the majority of water collection work for domestic purposes to women in many low and middle-income countries. The importance of women's empowerment for development has led to the creation of a range of approaches and tools to measure empowerment. The Empowerment in WASH index (EWI), was developed as a novel tool to measure agency, participation, and empowerment in the water and sanitation sector.

(Fisher J,2015)This paper demonstrates the fundamental linkages between the United Nations' third millennium development goal (MDG) 'to promote gender equality and to empower women' and MDG 7 'to ensure environmental sustainability', with target 10 'to halve the proportion of people without access to safe drinking water and sanitation by 2015'. A synthesis of the evidence gathered for the Water Supply and Sanitation Collaborative Council (WSSCC) shows the connections between women's well-being and water supply, sanitation facilities, and hygiene practices. The paper shows that if women's interests relating to water and sanitation provision are at the center of the planning and implementation of programs, this has a direct impact on women's life experience, potential, and opportunities. This work goes on to provide examples of the benefits to women when they themselves are involved in the planning, implementation, and operation of water supply, sanitation, and hygiene programs.

(Vinay T,2024) In this study Access to safe drinking water, adequate sanitation, and hygiene make a meaningful and substantial contribution toward reducing the global disease burden through preventing and reducing illness. The paper is based on the data collected under the two rounds of the National Family Health Survey (NFHS), namely, NFHS-4 (2015–2016) and NFHS-5 (2019–2021). NFHS surveys, which are conducted under the aegis of the Ministry of Health and Family Welfare, Government of India, The total number of households covered in the tribal-dominated districts, Accordingly, this paper analyzes coverage of key WASH indicators in tribal-dominated geographies of India, for the time period between 2015 and 2021 with an attempt to score and rank them on their performance.

(Islay M,2021)"Water, women, and disability: Using mixed-methods to support inclusive WASH program design in Vanuatu" In this study was that Adequate access to water, sanitation, and hygiene (WASH) is imperative for health and wellbeing, yet people with disabilities, people with incontinence and people who menstruate often experience unmet WASH requirements. The study was completed in the TORBA and SANMA provinces. The terrain across the

provinces is predominantly small to medium-sized islands. There is one urban location, Loganville, at the southern tip of the largest island, which is the residence of 20% of the population of the two provinces.

(Mokharjee.D, 2000) "Gender Equality and Female Empowerment in WASH" women's access to sustainable water and sanitation services enable them to enjoy better health, pursue their education, participate more fully in the economy, build their social capital, increase their dignity, and reach their full potential. When women and girls are empowered, they build a better world—one with greater economic opportunities and stability for all. Recent studies have shown that programs that include women in the early stages of development tend to have a long-term sustainable impact on water and sanitation. World Bank study of 121 rural water supply projects found strong associations between women's involvement and increased project effectiveness.

3. RESEARCH METHODOLOGY:

The research methodology has been outlined in accordance to the objectives under study. The proposed study was based on, the composition of both secondary and primary data. The methodology adopting was both descriptive and analytical where both quantitative and qualitative data has taken in account. For in-depth analysis, along with Survey method, Focus Group Discussions (FGDs) was also adopting keep in view the qualitative nature of this study. Focus group discussions have among the rural women in Tripura. This study is based on field survey and interview method with the women rural area in Tripura.

3.1 OBJECTIVES

The specifics objectives are as follows:

1) To study the status of clean water and sanitation for women in Tripura.
2) To access the role of water and sanitation in Gender Dignity.
3) To prepare the synthesis chart for various domain and sub domain of SDG-5 & SDG-6

3.2 Data: Data of the study was collecting from both Primary and secondary sources.

3.2.1 Primary Data

Primary data was collecting through a well-designed and structured questionnaire. During the study, field survey, interviews and Focus Group Discussions (FGD) was make with rural women in groups or singly also for the purpose of collecting necessary data and observation.

3.2.2 Secondary Data

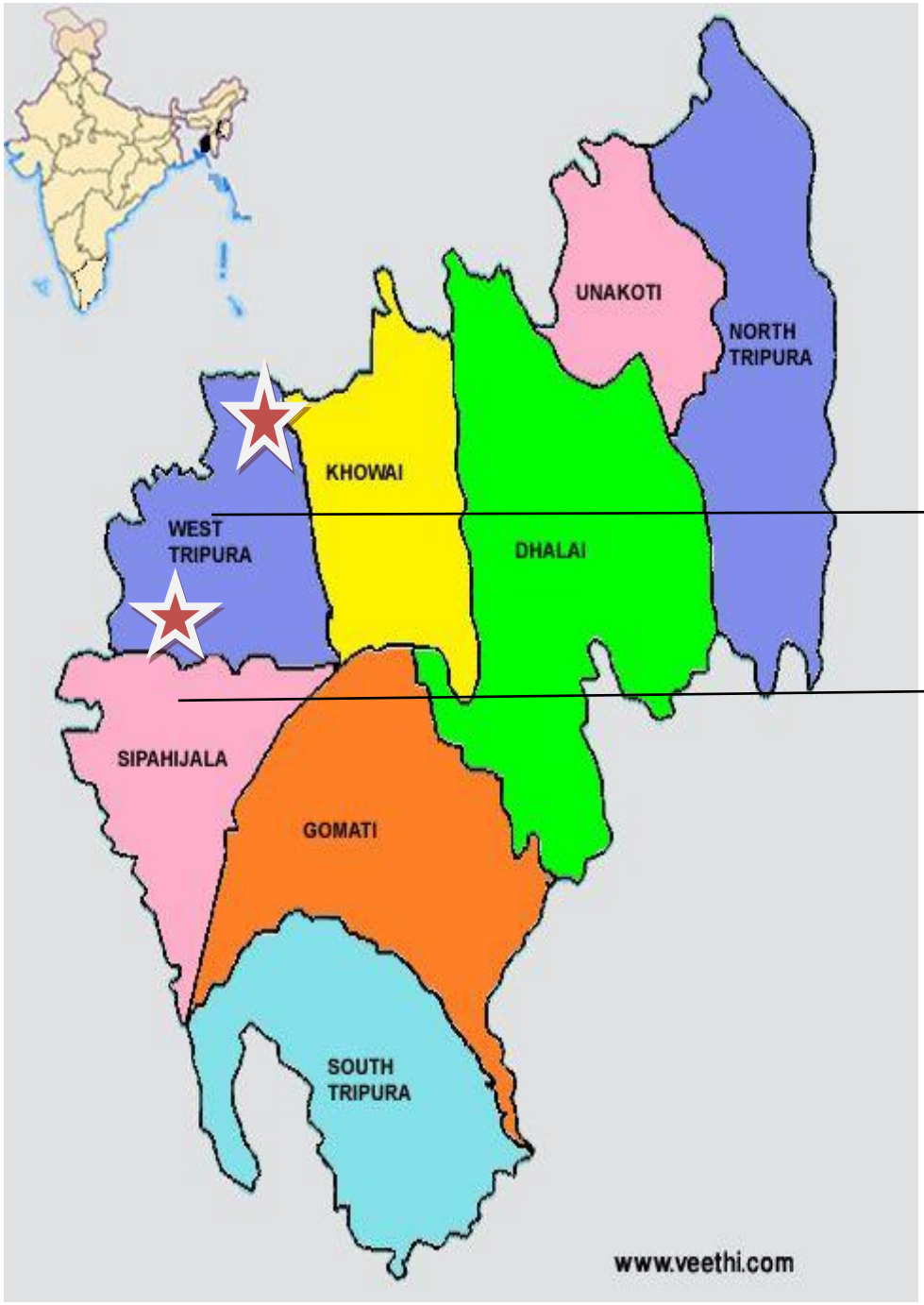
Secondary data was collecting from the 'Statistics of Tripura' for 2017. DWS Report Govt. of Tripura, and also from various governmental annul reports, census reports, Central Statistical Organization (CSO) report, The National Family Health Surveys (NFHS-4/5), National Sample Survey Organization (NSSO) report, journal, articles, books etc. And rural development blocks.

3.3 Study Area:

Tripura (District- wise) with availability Water sources in percent.

3.4 STUDY AREA MAP:

Figure 1



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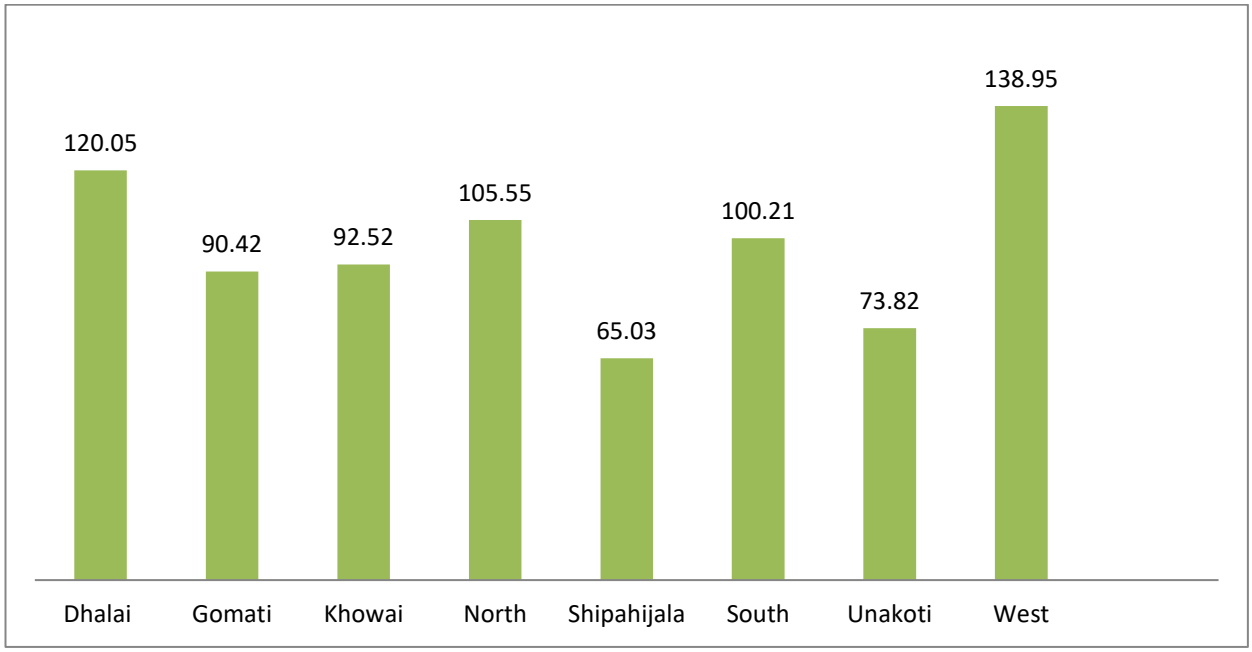
4. Result and Discussion

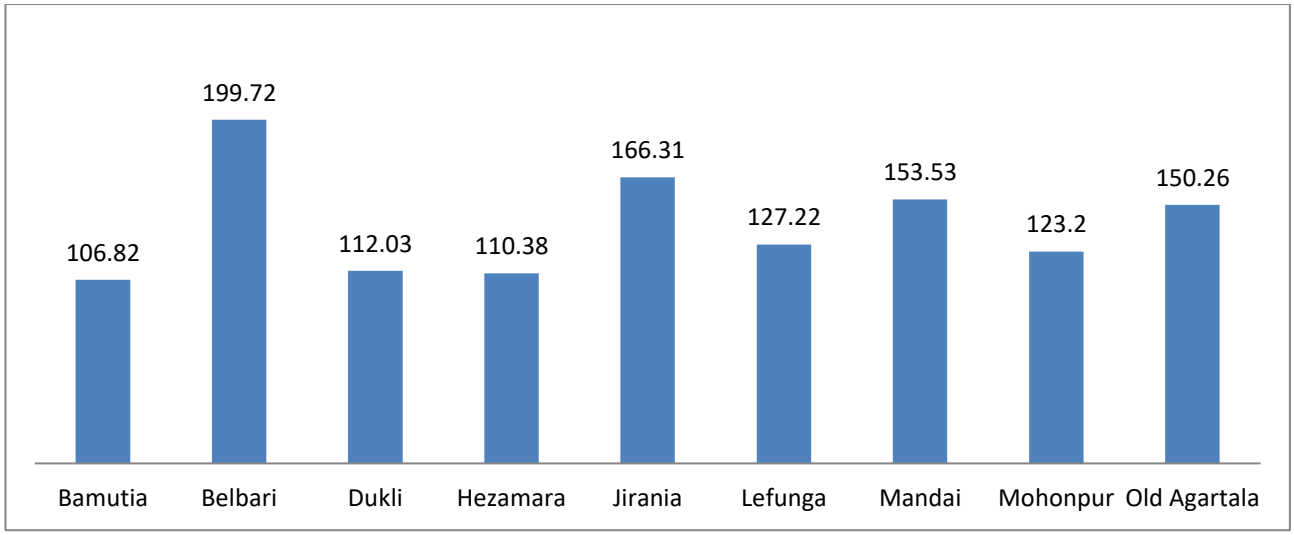
Figure 2: Availability of water sources in Tripura (District-wise): LPCD



Sources: DWS Report, Govt. of Tripura (2017)

According to This table it has been showing that the highest of available water sources **Liter Per Capita Per Day (LPCD)** is west Tripura district has 138.95 and lowest of available water sources is shipahijala district has 65.03 water sources is available in Tripura.

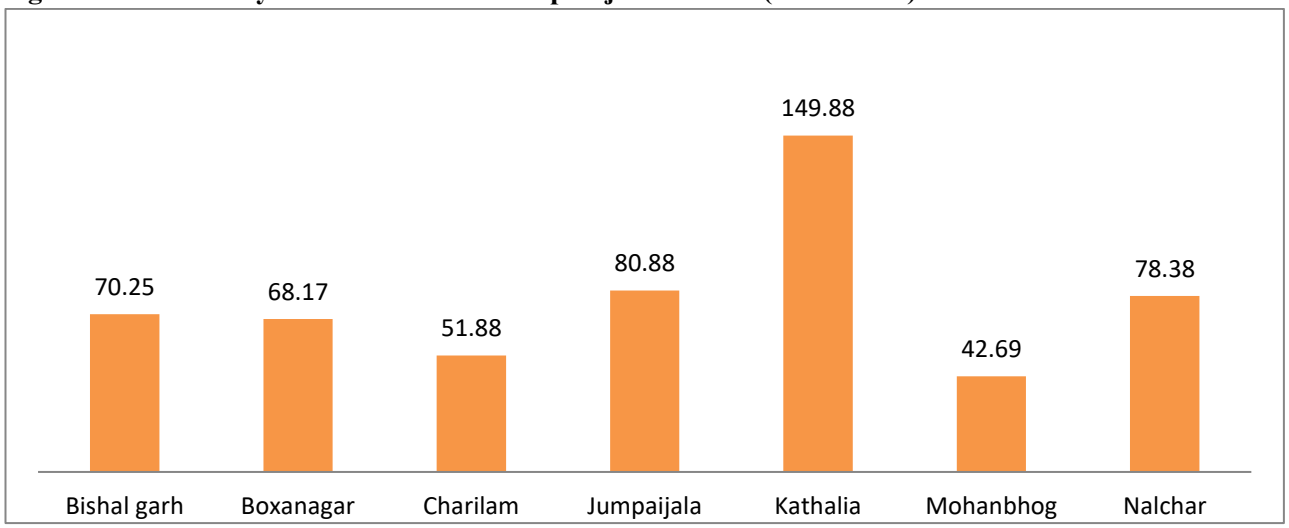
Figure 3: Availability of water sources in West Tripura District (Block-wise): LPCD



Sources: DSW Report, Govt. of Tripura (2017)

According to This table it has been showing that the highest percentage of available water sources is 199.72 in Belbari R.D. Block, the second highest prominent is water sources in Jirania R.D Block i.e., 166.31. There are only 106.82 in Bamutia R.D. block water sources is available.

Figure 4: Availability of water sources in Sepahijala District (Block-wise): LPCD



Sources: DSW Report, Govt. of Tripura (2017)

According to This table it has been showing that the highest percentage of available water sources is 149.88 in Kathalia R.D. Block, There are only 42.69 in Jampuijala R.D. block water sources is available.

Table 1: District-wise Availability of Water Sources in Tripura (LPCD)

Sl. No.	District Name	Availability of Water Sources (LPCD)	Status
1	West Tripura	138.95	Highest
2	Sepahijala	65.03	Lowest

Source: DWS Report, Government of Tripura (2017)

According to This table it has been showing that the highest percentage of available water sources is West Tripura District and lowest percentage of available water sources is Sepahijala District.

Table 2: Block-wise Availability of Water Sources in West Tripura District (LPCD)

Sl. No.	R.D. Block Name	Availability of Water Sources (LPCD)	Observation
1	Belbari R.D. Block	199.72	Highest availability
2	Jirania R.D. Block	166.31	Second highest
3	Bamutia R.D. Block	106.82	Comparatively lower

Source: DWS Report, Government of Tripura (2017)

Table 3: Block-wise Availability of Water Sources in Sepahijala District (LPCD)

Sl. No.	R.D. Block Name	Availability of Water Sources (LPCD)	Observation
1	Kathalia R.D. Block	149.88	Highest availability
2	Jampuijala R.D. Block	42.69	Lowest availability

Source: DWS Report, Government of Tripura (2017)

Conclusion:

The study finds that access to clean and adequate water in Tripura is uneven, with areas like West Tripura and Belbari R.D. Block having better availability, while rural regions, particularly in Sepahijala district and Jampuijala R.D. Block, face significant water scarcity. This lack of water is linked to sanitation, health, and gender dignity issues. Women and girls, who primarily collect household water, bear the burden of insufficient supply, impacting their education, livelihoods, and safety. Therefore, ensuring equitable access to safe drinking water and sanitation is vital for sustainable development and gender dignity in rural Tripura. Effective water resource management, improved infrastructure, and community involvement are necessary to address these disparities and enhance the quality of life for rural communities.

Recommendations:

1. Strengthen rural water supply infrastructure in underperforming areas.
2. Promote rainwater harvesting and water conservation.
3. Monitor water quality and supply systems regularly.
4. Raise awareness of sanitation and hygiene.
5. Involve women in water management committees.
6. Improve sanitation facilities in schools and public spaces.
7. Integrate SDG-6 with gender empowerment and rural development policies.

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