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# **A Study of Indigenous Knowledge and Sustainable Development in the Indian Context**

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## **ABSTRACT**

*India, home to 1.37 billion people, makes up one-sixth of the world's population. This population significantly contributes to the achievement of the Sustainable Development Goals (SDGS), scrutinizing government policies and programs that aim to achieve SDG-6 Targets 6.1 and 6.2, which prioritize sanitation and safe drinking water. We examine program and policy alignment in light of the results and effects on these SDG-6 objectives. In 2014, the introduction of the Swachh Bharat (Clean India) Mission (SBM) led to over 98% of households in the nation having access to toilets. The goal of the Jal Jeevan Mission is to ensure universal access to clean drinking water. Even though these programs contribute to general development, there is still significant room for improvement, especially considering the impact of urbanization, economic growth, population growth, and climate change. The analysis demonstrates that sufficient quantitative and qualitative data on the execution of different policies and programs would be beneficial in facilitating the coordination of the SDGs' implementation. We advise a systems-thinking approach to maintain ongoing program efforts and ensure equal benefits of development in India's water and sanitation sectors.*

**Keywords:** Swachh Bharat Mission; Sustainable Development Goals; Indigenous Knowledge; Drinking Water

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## **INTRODUCTION**

Given the scope and duration of five years, the Government of India's announcement on October 2, 2019, that all states and Union Territories (UTs) of India would become "open defecation-free" represents a historic turning point that has not been surpassed globally. This accomplishment has received a lot of validation and citations in rural India, where the Swachh Bharat Mission (SBM) raised toilet coverage from 40% in 2014 to almost universal coverage in just five years. The Swachh Bharat Mission (SBM) successfully stopped open defecation for over 60 crores (600 million) people and built over 10.5 crore (105 million) toilets. India's remarkable achievements played a significant role in reducing open defecation worldwide. From 2015 to 2019, the country's pace of decline was more than 12 percentage points annually. In 2019, the Jal Jeevan Mission (JJM) introduced the "Har Ghar Jal" program for India's water sector, aiming to replicate the success of SBM. By 2024, 100% of rural Indian households will have access to clean water through operational tap water connections. In the water sector, India met the UN Millennium Development Goals (MDGs) (2000–2015) by 2015, and by 2019, its performance in the sanitation sector had significantly improved. India will be able to meet the 2030 Sustainable Development Goals (SDGs) for improved sanitation and safe, universal access to water with the support of ongoing programs in the water and sanitation sectors.

Water resources are critical to the survival of all living forms on Earth as well as to a nation's economic growth. With only 4% of the world's water resources, India sustains 17% of the world's population, placing a tremendous strain on the country's water supplies. India receives around 1,105 mm of rainfall each year, with significant regional and seasonal variations in its distribution. Experts predict that by 2050, India's per-capita water availability, which has already crossed water-stressed thresholds, will further decline towards water scarcity. India ranked 13th out of 17 countries in the world with "extremely high" baseline water stress. The sanitation and water industries are closely related. Sanitation includes proper disposal of human waste, wastewater management, solid waste management, water supply, vector-borne illness prevention, and personal and household cleanliness. Improper hygiene practices and poor sanitation have negatively influenced health, leading to increased morbidity and mortality, particularly in children. Similarly, in India, there is a strong correlation between water and sanitation, as well as the availability of water and its effective management and use.

## **REVIEW OF LITERATURE**

Nakashima et al. (2012) highlighted that there is also a wealth of information on best practices for using gender-sensitive approaches, available instruments, and indigenous knowledge to enhance adaptation processes.

Recent studies by United Nations FCCC (2013) show how Indigenous and local knowledge is becoming more and more important in disaster risk reduction, agriculture, and resilience building at the local and national levels as a means of adapting to climate change.

Thaman et al. (2013) mentioned that locals have evolved their knowledge and customs over time to adapt to shifting social, ecological, and economic conditions. They still do this to lessen the risks and hazards that climate change places on them, and these modifications have evolved into native adaptation strategies.

According to Anik and Khan (2012), these approaches are assisting communities in reducing their risk of disaster and developing affordable, community-driven adaptation strategies that will improve their ability to deal with shocks.

According to Nakashima et al. (2012), local customs have changed throughout the ages in response to weather and climate shifts, enabling adaptation to environmental dangers. Thus, these methods of adaptive shifting cultivation being one example can be referred to as climate-adaptation methods. The reasoning behind these adaptive behaviours is that they are based on indigenous resiliency.

Prakash (2013) opined that communities utilise their unique indigenous and local knowledge to adjust to climate change. This knowledge includes understanding (a) the seasons; (b) historical storm patterns; (c) the colour of clouds that carry rain; and (d) wind patterns, which include wind direction and type (e.g., wind from the east is cool and brings rain, while wind from the west dries crops). He expressed his gratitude towards the indigenous knowledge, that people can plan their agricultural activities and use management techniques, such as scheduling irrigation and building storm walls, shelters, wind barriers, and homestead fences.

Mukhopadhyay (2009) stated that locals use the hue of the clouds, the sound of thunder, and the length of the drought to forecast rain and hailstorms that could destroy property and crops.

In 2010, Gearhead et al. described Indigenous knowledge as the fundamental knowledge that locals can access when making decisions on peer learning and community readiness. Indigenous and local knowledge is fluid and constantly changing due to interactions with outside knowledge and institutions as well as internal creativity and experimentation incorporating local culture, ethos, and values. As indicated, there is widespread recognition of the function and significance of indigenous and local knowledge in adapting to climate change.

The primary justification for its increased significance in climate change adaptation is that it is a socio-economic issue and that there is a pressing need to customize responses to location-specific vulnerabilities (IPCC, 2007; Mukhopadhyay, 2009; UNFCCC, 2013; Gautam et al., 2013). Because indigenous knowledge is ingrained in local traditions and values, it is viewed as a useful resource that enables people to adjust to climate change.

Indigenous knowledge has become more important in the fight against climate change since it is essential to the quick validation of scientific findings. Only indigenous and local

knowledge can address the social context needed for the application of outside knowledge (Naess, 2007).

## **INDIGENOUS COMMUNITIES ACTIVES**

### **Local water resource management:**

To ensure ownership and sustainability, local water-use habits that are climate-adaptive must be taken into account while implementing new water-management systems. Many effective indigenous and local water management strategies are currently in danger of disappearing because they do not receive government priority. Government organizations should focus on maintaining indigenous and local knowledge of water management to guarantee their continued existence.

Since watershed boundaries are followed by indigenous water practices, basin-wide management should also be governed by national and local policies and regulations. This would guarantee a fair distribution of water, taking into account the rights of indigenous people to utilise it, the balance between supply and demand, and widely recognised social norms and values.

The management of drinking and irrigation water supply by indigenous systems is facing new issues due to rapid and unplanned urbanisation. Without support from higher levels of government and public policies that acknowledge the connections between local rights, quality of services (food production from irrigation and drinking water), real estate development, land-use changes, and balancing competing demands for water, local government bodies cannot effectively address these issues.

Given the vital role that water plays in adaptation methods, limited water resources must be managed fairly and effectively. To successfully help minimize vulnerability to hazards connected with climate change, public policy on climate change adaptation should be reformed based on practices built in indigenous and local knowledge and bottom-up processes.

To make better use of water, indigenous and local practices like upholding customary ponds and farmer-managed irrigation systems must be combined with broader advocacy of methods like rainwater collection, using drip irrigation and sprinklers, conserving ponds and wetlands, and so on. These initiatives should also aim to increase water production by utilizing it for a variety of purposes. These tactics support diversity, which is essential to resilience and aids in climate change adaptation.

### **Community-based management of forests and pastures:**

Indigenous and local knowledge of local ecosystems, collective work principles, community-based organizations, and cultural knowledge have all contributed to the evolution of forest and pasture management techniques. Government organizations should thus acknowledge these methods as resilient and climate-adaptive.

The development of supportive policies and institutions with greater ability and technical support is necessary to enhance and maintain the adaptable and resilient characteristics of indigenous forestry methods. By offering financial and legislative incentives, the government should encourage the fusion and complementarity of modern and traditional community-based approaches to pasture and forest management.

Where tenure security is established under the "care and share" principle and access to resources is assured, Indigenous forestry methods have flourished. To encourage forests' ability to adapt to change, ownership rights to forest resources should be properly granted, and benefits should be shared fairly.

Inclusion of women and minorities as well as equity are still important goals in indigenous forestry. Through community-based forestry, income-generating and livelihood-enhancing ventures centred around the commercial utilisation of non-timber forest products can foster the growth of inclusive and enhanced resilience.

Building technical competence, protecting and regenerating forests, and managing pasture and forest resources through group action are necessary preconditions for creating resilient forest management techniques and require ongoing assistance.

#### **Infrastructure for rural transportation:**

Community-built traditional bridges, paths, and tins (metal-wire river crossings) serve as vital transportation and communication links that support efforts to reduce the risk of disaster and promote local adaptability. Due to their low cost and local construction, indigenous suspension-bridge building techniques are effective climate-resilient technologies. They ought to be supported to increase the adaptability and resilience of the community.

Traditional technology and techniques should be integrated into the design and construction of new rural roads and bridges. Policy for building roads and bridges must be taken into account, depending on cost and practicality, enhancing or retrofitting native local transportation infrastructures. Local communities should be consulted frequently by government engineers when choosing rural transport options. As part of community-based adaptation, the indigenous and local culture of volunteering during the construction and upkeep of rural transit infrastructure should be encouraged.

#### **Housing and settlements:**

Due to their reliance on the natural world for a living and their settlement on marginal and unstable ground, indigenous and local communities are disproportionately vulnerable to disasters. Ensuring human safety, which includes enhanced access to food, water, dependable electricity with a low carbon footprint, and the availability of social support networks, should be the primary focus when building the resilience of settlements and housing.

Planning for increased resilience in traditional settlements should take into account the importance of technologies and practices rooted in indigenous knowledge. To lower risks and dangers in such communities, it is necessary to strengthen capacity and acquire new skills. When creating and constructing climate-resilient and adaptive housing and settlements, an awareness of local perspectives, culture, economic behaviour, and collaborative action is essential. Understanding how traditional social institutions provide safety nets to vulnerable groups and evaluating institutional capacity are important considerations in the development of community-based disaster management.

### **Conventional social structures:**

To enable effective climate change adaptation, it is imperative to acknowledge the critical role that traditional social institutions play in leading and encouraging people to conserve their natural environment and cultural heritage.

Locals may easily introduce and popularise new ideas, practices, and information thanks to the community's traditional social institutions' credibility. These institutions could be modified to incorporate climate resilience into all development sectors.

To increase the complementarity, efficacy, and sustainability of adaptation activities, there has to be more push for the formal institutional structure to incorporate traditional informal institutions.

Using women's social capital to address local changes is made simple by the well-established and widely recognized knowledge, abilities, and insights that indigenous and local women have on environmental concerns. As a result, women ought to be at the forefront of creating plans and strategies for adaptation. For hundreds of years, indigenous and local populations have been adapting to changes in the environment.

### **CONCLUSION**

We compared the conclusions drawn from observable weather variations with the beliefs held by local groups about climate change. Average temperatures are rising, and rainfall patterns are becoming more unpredictable, according to both local perception and scientific research on historical trends. Local communities have created and implemented techniques that can adapt to stressors in a multi-sectoral environment. Since vulnerability is, by its very nature, multi-dimensional, a multi-dimensional approach would be more effective in handling it than one that merely addresses one aspect. Institutions and local communities must be ready to effectively address climate change vulnerabilities. This entails increasing their ability to advance (or create) indigenous and local knowledge and customs to better prepare them to handle the obstacles associated with resilience development. This study evaluates the policies, programs, and alignment of the Government of India with the relevant SDGs, even though several studies and reports showcase the advancements made in India's water and sanitation sectors. Significant political backing exists for the Government of India's initiative to put programs like SBM and Har Ghar Jal into action, both at the federal and state levels. The Government of India

is updating several significant policies, such as the National Policy on Safe Reuse of Treated Water (SRTW) and the NWP, and launching a new policy to address current needs and strategic gaps. Strong policy and legal frameworks are necessary to ensure that everyone has access to comprehensive, sustainable, and affordable sanitation services. We should regularly evaluate these frameworks to ensure they adapt to evolving technology, societal concerns, and expectations.

The document acknowledges the concerns and obstacles, emphasizing the need for more involvement from Gram Panchayats and local bodies, as well as the necessity of collaboration between Ministries and Departments at different levels. It also discusses how climate change is affecting initiatives like the Atal Bhujal Scheme in the water and sanitation sectors. It is evident that maintaining the effectiveness of the programs requires effective data management. Even though SBM has significantly improved the sanitation sector, further advancements in sewage, wastewater, and faecal sludge management are required to meet the sanitation-related SDG targets. We recommend adding qualitative studies to quantitative research and data to evaluate the local level of achievement towards SDG 6. Future studies should focus on the effects and process of change, especially in underdeveloped areas and with vulnerable groups within society.

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