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Impact of Pilgrimage Activities on Water Resources: A Pre- and Post-Parikrama Analysis of the Girnar Ecosystem

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Abstract

Pilgrimage activities play an important role in India's cultural and spiritual life, but they also place pressure on local natural resources. The Girnar Parikrama, conducted annually around the Girnar hills, attracts a large number of devotees within a short time period. This study presents a conceptual assessment of how pilgrimage activities may influence water resources in the Girnar ecosystem. The paper discusses potential sources of water pollution, types of water quality changes expected before and after Parikrama, and the importance of systematic monitoring. Emphasis is given to sustainable water resource management strategies to protect ecologically sensitive pilgrimage regions.

Keywords: *Pilgrimage, Water Resources, Girnar Parikrama, Ecosystem Impact, Sustainable Management*

Introduction

Water is a vital natural resource that supports human life, biodiversity, and ecosystem stability. In ecologically sensitive regions, sudden increases in human population due to pilgrimage or tourism can create stress on available water resources. Religious pilgrimages often involve mass gatherings, temporary settlements, food preparation, bathing, and waste generation, all of which may affect surface and groundwater quality. The Girnar hill range near Junagadh is one such region where natural ecosystems and religious traditions coexist. The Girnar Parikrama is a traditional pilgrimage route that encircles the Girnar Hills and passes through forested areas, water springs, ponds, and small streams. Understanding the potential impacts of these activities on water resources is essential for long-term environmental conservation.

Significance of the Study

Pilgrimage-related environmental studies are important because:

- Pilgrimages are repetitive and seasonal, causing recurring pressure on ecosystems.
- Water sources in hill ecosystems are often limited and fragile.
- Local communities depend on the same water resources used by pilgrims.
- Poor water quality can affect human health, wildlife, and vegetation.

This conceptual study provides a scientific basis for planning water quality monitoring and management in pilgrimage-dominated landscapes.

Overview of Girnar Ecosystem

The Girnar ecosystem consists of rocky hills, forest cover, seasonal streams, natural springs, and man-made water structures such as wells and tanks. These water sources support:

- Pilgrims during Parikrama
- Nearby villages
- Forest wildlife
- Temple and ashram activities

The region experiences semi-arid climatic conditions, making water conservation particularly important. Any contamination or overuse during pilgrimage events can have long-lasting effects.

Pilgrimage Activities and Water Resource Interaction

1. Nature of Pilgrimage Activities

During Parikrama, the following activities commonly occur:

- Temporary camps and shelters
- Cooking and food distribution
- Bathing and washing near water sources

- Religious offerings and rituals
- Solid and liquid waste generation

These activities, if unmanaged, can influence water quality and availability.

2. **Potential Sources of Water Pollution**

Conceptually, the main pollution sources include:

- **Domestic waste** from pilgrims
- **Organic matter** such as food waste and offerings
- **Human excreta** due to insufficient sanitation facilities
- **Soil erosion** caused by heavy foot movement
- **Plastic and non-biodegradable waste**

These factors can introduce physical, chemical, and biological contaminants into water bodies.

Pre- and Post-Parikrama Conceptual Framework

1. **Pre-Parikrama Conditions**

Before Parikrama, water bodies generally exhibit:

- Lower human interference
- Relatively stable water quality
- Natural self-purification processes
- Minimal waste accumulation

This phase represents the baseline condition of the ecosystem.

2. **Post-Parikrama Conditions**

After Parikrama, conceptual changes may include:

- Increased turbidity due to disturbance
- Elevated nutrient levels from organic waste
- Possible microbial contamination
- Reduced aesthetic and potable quality
- Stress on aquatic organisms

These changes highlight the need for post-event environmental assessment.

Water Quality Parameters of Concern

Although no results are presented, the following parameters are commonly considered in pilgrimage-related studies:

1. **Physical Parameters**

- Temperature
- Turbidity
- Colour and odour

2. **Chemical Parameters**

- pH
- Dissolved Oxygen
- Biological Oxygen Demand
- Nutrients such as nitrates and phosphates

3. **Biological Parameters**

- Total coliform bacteria
- Fecal coliform bacteria

Monitoring these indicators helps in understanding overall water health.

Methodological Approach (Conceptual)

A typical pre- and post-Parikrama study may include:

1. Selection of representative water sources along the pilgrimage route
2. Sample collection before and after the pilgrimage event
3. Laboratory analysis using standard methods
4. Comparison with national and international water quality standards

This framework ensures scientific reliability without disturbing religious practices.

Environmental and Public Health Implications

Poor water quality can lead to:

- Water-borne diseases among pilgrims
- Long-term contamination of drinking water sources
- Loss of aquatic biodiversity
- Increased treatment cost for local communities

Hence, preventive measures are more effective than post-damage restoration.

Sustainable Water Management Strategies

To minimize pilgrimage-related impacts, the following measures are recommended:

- Installation of eco-friendly toilets
- Proper solid and liquid waste management systems
- Restricted access to sensitive water sources
- Awareness programs for pilgrims
- Regular environmental monitoring by local authorities
- Community participation in conservation activities

Conclusion

Pilgrimage activities such as the Girnar Parikrama represent a unique interaction between faith and the environment. While spiritually significant, these events can exert pressure on water resources if not managed responsibly. A conceptual understanding of pre- and post-Parikrama impacts helps policymakers, researchers, and religious authorities design sustainable strategies. Protecting water resources in pilgrimage ecosystems like Girnar is essential for preserving both cultural heritage and environmental integrity.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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