

The Transformational Power of Green Human Resource Management for Sustainable Water Resource Management in Hospitals of Tirunelveli District

Jeyaseeli Santhal J ^{1*}

¹ Assistant Professor, Department of Commerce, St. John's College, Palayamkottai, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012, Tamil Nadu, India.

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ABSTRACT

Green Human Resource Management (GHRM) has emerged as an important organizational approach for integrating environmental sustainability into human resource practices and employee behaviour. In healthcare institutions, where water is extensively used for patient care, sanitation, sterilization, laundry, food preparation, and other operational activities, effective water resource management is essential for environmental sustainability. This review examines the transformational role of GHRM in promoting sustainable water resource management in hospitals, with particular reference to Tirunelveli District. The review focuses on green recruitment, environmental training, employee participation, green performance management, rewards and organizational environmental culture as mechanisms for encouraging responsible water-use practices. It highlights how environmentally trained and motivated healthcare employees can contribute to reducing water wastage, identifying leaks, adopting water-efficient practices, supporting wastewater treatment and promoting reuse of treated water. The review further emphasizes that technological interventions alone may not achieve sustainable water management unless employees actively participate in environmental practices. Integrating GHRM with hospital water-management policies can therefore strengthen employee environmental commitment and improve institutional sustainability performance. The review concludes that GHRM provides a strategic pathway for developing a water-conscious healthcare workforce and can contribute significantly to sustainable hospital management in Tirunelveli District

Keywords: Green Human Resource Management, Sustainable Water Resource Management, Healthcare Sustainability, Hospitals, Tirunelveli District...

INTRODUCTION

Water is an essential resource for the effective functioning of healthcare institutions, where it is required for drinking, sanitation, cleaning, sterilization, laundry, food preparation, laboratory activities and patient care. Hospitals consume considerable quantities of water and simultaneously generate wastewater containing organic matter, chemicals, pharmaceuticals and pathogenic microorganisms. Therefore, sustainable water resource management has become an important component of environmentally responsible healthcare. In this context, hospitals need to move beyond conventional technical approaches and encourage employees to participate actively in water conservation and environmental protection.

Green Human Resource Management (GHRM) integrates environmental sustainability into human resource practices such as recruitment, training, performance appraisal, employee participation, and reward systems. GHRM can influence employees' environmental knowledge, attitudes and green behaviour, thereby supporting organizational sustainability objectives (Renwick et al., 2013; Dumont et al., 2017). Green training, in particular, can improve employees' awareness of resource conservation and encourage environmentally responsible workplace practices.

The healthcare sector provides an important setting for applying GHRM because employees from different departments directly influence the consumption and management of water. Nurses, housekeeping staff, laboratory personnel, food-service workers, technicians, and administrative employees can contribute to reducing unnecessary water use through appropriate practices. Studies have also emphasized the importance of employee green behaviour and organizational environmental management in achieving sustainability outcomes (Dumont et al., 2017; Yong et al., 2020)..

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In hospitals of **Tirunelveli District**, sustainable water management can be strengthened by integrating GHRM principles with water conservation measures such as leak detection, efficient water use, rainwater harvesting, wastewater treatment, reuse of treated water and employee awareness programmes. Hence, this review examines the transformational role of GHRM in promoting sustainable water resource management in hospitals, with particular emphasis on employee participation, green competencies, organizational practices, and environmental performance.

2. Green Human Resource Management in the Healthcare Sector

Green Human Resource Management (GHRM) refers to the integration of environmental sustainability principles into human resource management practices. It encourages organizations to develop environmentally responsible employees through green recruitment, green training, environmental performance appraisal, employee participation and green reward systems. GHRM therefore extends the traditional role of human resource management by making employees active contributors to organizational environmental objectives. Dumont *et al.* (2017) found that GHRM practices can strengthen employees' green behaviour by creating a supportive psychological green climate, while Yong *et al.* (2020) emphasized the contribution of GHRM practices to organizational sustainability and environmental performance.

The healthcare sector represents an important area for implementing GHRM because hospitals operate continuously and involve large numbers of employees performing diverse activities. Environmental practices in hospitals are closely connected with employee behaviour, particularly in areas such as water consumption, energy use, waste segregation, cleaning, sanitation and infection-control procedures. The World Health Organization recognizes water, sanitation, hygiene, environmental cleaning and healthcare waste management as fundamental components of safe and quality healthcare services (WHO, 2023).

In hospitals, GHRM can promote environmental responsibility by incorporating sustainability criteria into recruitment and orientation programmes and by providing regular green training. Employees can be trained to use water efficiently, identify leakages, avoid unnecessary water consumption and follow appropriate cleaning procedures. Green performance appraisal can further incorporate environmental responsibilities into employee evaluation, while recognition and rewards can motivate employees to maintain sustainable practices.

The importance of employee involvement is particularly relevant to water resource management. Hospital water conservation cannot depend entirely on infrastructure and technology; the daily practices of employees determine how effectively these systems are used. Green organizational culture can encourage employees to report water wastage, participate in conservation campaigns and support wastewater treatment and reuse initiatives. The WHO–UNICEF global framework also emphasizes sustainable WASH services and environmentally sustainable healthcare facilities as important components of quality healthcare (WHO & UNICEF, 2024).

Thus, GHRM provides a strategic link between human resource practices and environmental performance in healthcare institutions. For hospitals in Tirunelveli District, integrating GHRM into institutional environmental policies could strengthen employee awareness, participation and accountability, thereby supporting long-term water conservation and sustainable hospital management.

3. Sustainable Water Resource Management in Hospitals

Sustainable water resource management is an essential component of environmentally responsible healthcare because hospitals require continuous access to safe water for patient care, hand hygiene, sanitation, environmental cleaning, sterilization, laundry, food preparation and laboratory activities. The World Health Organization (WHO) identifies water, sanitation, hygiene, environmental cleaning and healthcare waste management as fundamental requirements for safe and quality healthcare services.

Hospital water management involves not only ensuring adequate water availability but also reducing unnecessary consumption, preventing leakage, improving water-use efficiency, treating wastewater and promoting safe reuse. The WHO's WASH FIT framework recommends a risk-based approach for improving water, sanitation and hygiene services within healthcare facilities and emphasizes continuous improvement, facility management and stakeholder engagement (WHO, 2022).

Water conservation can be strengthened through practical measures such as low-flow taps, efficient plumbing systems, regular leakage detection, water metering, rainwater harvesting and employee awareness programmes. Hospitals can also reduce pressure on freshwater resources by treating wastewater and using appropriately treated water for suitable non-potable purposes, such as gardening, toilet flushing and selected cleaning activities, subject to applicable safety and regulatory requirements. The WHO and UNICEF global framework emphasizes the development of safe, sustainable, and climate-resilient WASH services in healthcare facilities (WHO & UNICEF, 2024).

An important dimension of sustainable hospital water management is employee participation. Water-saving technologies may have limited effectiveness when employees are unaware of their environmental responsibilities or fail to follow established procedures. Healthcare workers can contribute by avoiding unnecessary water use, reporting leaks, following efficient cleaning practices, and participating in institutional conservation programmes. Consequently, sustainable water management requires coordination between hospital administration, technical personnel, and employees across different departments.

For hospitals in **Tirunelveli District**, integrating water conservation with organizational environmental policies may be particularly valuable because sustainable management requires both appropriate infrastructure and responsible human behaviour. Green Human Resource Management can provide this human-resource dimension by incorporating environmental training, employee participation, green performance evaluation, and recognition into hospital management. Thus, sustainable hospital water management can be viewed as a combined outcome of efficient infrastructure, appropriate policies and environmentally responsible employee behaviour.

4. Role of Green Human Resource Management in Sustainable Water Resource Management

Green Human Resource Management (GHRM) can play a significant role in transforming hospital employees into active participants in sustainable water resource management. Although water conservation is often approached through infrastructure, technology, and administrative policies, the effectiveness of these measures also depends on employee awareness, motivation, and day-to-day behaviour. Recent research in the healthcare sector indicates that human-resource practices can influence employees' voluntary environmental behaviour and contribute to greener healthcare systems (Liu *et al.*, 2024).

Green training and development represent one of the most important GHRM practices for hospital water conservation. Training programmes can educate employees about water-efficient cleaning, appropriate use of taps and equipment, leakage identification, wastewater segregation, rainwater harvesting and safe reuse of treated water. Such training can develop environmental knowledge and encourage employees to incorporate water conservation into their routine activities. In hospitals, this approach can involve nurses, housekeeping personnel, laboratory workers, technicians, kitchen staff and administrative employees.

Green performance management can further strengthen water conservation by incorporating environmental responsibilities into employee and departmental performance assessment. Hospitals may develop indicators such as reduction in unnecessary water consumption, timely reporting of leakage, compliance with water-saving procedures and participation in environmental programmes. Research on hospitals has reported a positive association between GHRM practices and sustainable performance, demonstrating the relevance of green recruitment, training, performance management and compensation in healthcare organizations.

Green employee empowerment and participation are equally important. Employees who are given opportunities to identify environmental problems and suggest solutions can contribute to practical water-saving initiatives. Sarfo *et al.* (2024) found that green employee empowerment can act as an important mechanism linking GHRM practices with environmental performance. Similarly, Fawehinmi *et al.*, (2024) highlighted the importance of employees' perceived behavioural control in translating GHRM practices into green behaviour.

Green rewards and recognition can provide additional motivation. Hospitals can recognize departments or employees who demonstrate effective water conservation, reduce wastage or introduce innovative water-saving practices. Such incentives can help establish an organizational culture in which environmental responsibility becomes part of normal hospital operations.

Therefore, GHRM can create a direct connection between human resource practices, employee green behaviour, and sustainable water management. For hospitals in Tirunelveli District, integrating these practices with water auditing, metering, leakage control, wastewater treatment and reuse can provide a more comprehensive approach to water sustainability. Recent hospital research has also demonstrated the importance of capacity building for improving wastewater recycling and water-reuse systems.

5. Green HRM Practices for Water Conservation in Hospitals

The implementation of Green Human Resource Management (GHRM) practices can provide a systematic approach for improving water conservation in hospitals. GHRM connects human resource policies with environmental objectives and encourages employees to develop environmentally responsible knowledge, attitudes and behaviours. In hospital settings, these practices can be integrated into routine human resource activities and linked directly with institutional water-

management policies.

5.1 Green Recruitment and Selection

Green recruitment involves incorporating environmental values and sustainability-related competencies into employee recruitment and selection. Hospitals can consider candidates' awareness of environmental protection, resource conservation and sustainable practices during recruitment. New employees can also be introduced to the hospital's water conservation policy during orientation. This approach helps establish environmental responsibility from the beginning of employment and creates a workforce that is more prepared to support sustainable hospital operations (Renwick *et al.*, 2013; Yong *et al.*, 2020).

5.2 Green Training and Development

Green training is particularly important for hospital water conservation because employees need practical knowledge about efficient water use. Training can cover leakage identification, responsible use of taps and equipment, water-efficient cleaning, wastewater management, rainwater harvesting and safe reuse of treated water. Regular awareness programmes can also encourage employees to recognize water wastage in their respective departments. Green training has been identified as an important GHRM mechanism for strengthening employee environmental knowledge and green behaviour (Dumont *et al.*, 2017).

5.3 Green Performance Management

Hospitals can incorporate water-conservation responsibilities into employee and departmental performance evaluation. Indicators may include compliance with water-saving procedures, timely reporting of leakages, reduction of unnecessary water use and participation in environmental programmes. Green performance appraisal can improve accountability by making environmental responsibility part of employees' formal work expectations.

5.4 Green Rewards and Recognition

Green rewards can motivate employees to participate actively in water conservation. Hospitals may recognize departments that achieve measurable reductions in water wastage or introduce innovative conservation practices. Both monetary and non-monetary recognition, such as certificates, appreciation and departmental awards, can reinforce environmentally responsible behaviour. Research suggests that appropriate GHRM practices can encourage employees to engage in voluntary green behaviours within organizations (Dumont *et al.*, 2017).

5.5 Green Employee Participation

Employee participation is essential because workers are directly involved in daily hospital activities. Employees can identify leaking taps, inefficient equipment, unnecessary water consumption and opportunities for water reuse. Establishing **Green Teams or Water Conservation Committees** can provide a structured mechanism for employees to suggest and implement conservation measures. Employee empowerment can strengthen the relationship between GHRM practices and environmental performance (Sarfo *et al.*, 2024).

Table 1. GHRM Practices and Their Contribution to Hospital Water Conservation

GHRM Practice	Application in Hospitals	Expected Water-Sustainability Outcome
Green recruitment	Select environmentally responsible employees	Green-oriented workforce
Green training	Water conservation and wastewater-management training	Improved water-use practices
Green performance appraisal	Include water-saving indicators	Greater employee accountability
Green rewards	Recognize water-saving achievements	Increased motivation
Employee participation	Green teams and water audits	Identification of wastage
Green communication	Posters, campaigns and awareness programmes	Improved water-conscious behaviour

Overall, GHRM practices can transform water conservation from an administrative responsibility into a **shared organizational responsibility**. Their integration with technological measures such as water meters, leak-detection systems,

rainwater harvesting and wastewater treatment can help hospitals achieve more sustainable water management.

6. Employee Green Behaviour and Water Conservation in Hospitals

Employee green behaviour is an important mechanism through which Green Human Resource Management (GHRM) can influence environmental sustainability in healthcare institutions. Employee green behaviour refers to actions performed by employees that contribute to environmental protection and resource conservation within the workplace. In hospitals, such behaviour is particularly relevant because employees are continuously involved in activities that directly or indirectly influence water consumption.

Hospital employees can contribute to water conservation through simple but important practices, including closing taps properly, reporting leaking pipes and fixtures, avoiding unnecessary water use during cleaning, using water-efficient equipment and following established water-management procedures. Housekeeping personnel, for example, can adopt appropriate cleaning methods that minimize excessive water consumption, while laboratory and technical staff can ensure that water-dependent equipment is operated efficiently. Similarly, kitchen and laundry personnel can reduce water consumption through efficient operational procedures.

GHRM can strengthen these behaviours by providing employees with environmental knowledge, motivation and organizational support. Dumont *et al.* (2017) found that GHRM practices can encourage workplace green behaviour through the development of a psychological green climate. This suggests that employees are more likely to adopt environmentally responsible practices when they perceive that environmental sustainability is genuinely supported by their organization.

Green organizational culture is also important in maintaining sustainable employee behaviour. When hospital management communicates clear environmental objectives and encourages employee participation, water conservation can become part of the institution's everyday work culture. Green teams, awareness campaigns, suggestion systems and departmental water-saving targets can provide opportunities for employees to participate actively in environmental management.

Employee empowerment can further strengthen water conservation. When employees are given authority to identify water-related problems and recommend practical solutions, they can become environmental problem-solvers rather than merely following instructions. Sarfo *et al.* (2024) reported that green employee empowerment can contribute to improved environmental performance by strengthening the connection between GHRM practices and employee environmental behaviour.

Table 2. Examples of Employee Green Behaviour for Hospital Water Conservation

Hospital Activity	Green Employee Behaviour	Expected Benefit
Hand washing	Avoid unnecessary running water	Reduced water consumption
Housekeeping	Use appropriate quantities of water	Reduced wastage
Laundry	Follow efficient washing procedures	Lower water demand
Laboratory work	Operate water-dependent equipment efficiently	Resource conservation
Kitchen operations	Avoid excessive water during washing and cleaning	Reduced consumption
Maintenance	Report leakage immediately	Prevents continuous water loss
Gardening	Use treated/recycled water where appropriate	Reduces freshwater demand

Therefore, employee green behaviour serves as an important link between GHRM and sustainable water management. For hospitals in Tirunelveli District, developing a strong environmental culture among employees can complement infrastructure-based interventions and improve the effectiveness of institutional water conservation programmes. A combination of green training, employee empowerment, monitoring, recognition and management support can help establish long-term water-conscious behaviour.

7. RESULTS AND DISCUSSION

7.1 Overview of Reviewed Findings

The reviewed literature indicates that Green Human Resource Management (GHRM) can contribute to environmental sustainability by integrating environmental objectives into recruitment, training, employee participation, performance management and reward systems. Dumont *et al.* (2017) demonstrated that GHRM practices influence employee workplace green behaviour through the development of a psychological green climate. This finding is particularly relevant to hospitals because many routine activities, including cleaning, sanitation, laundry, laboratory operations and food services, directly or indirectly influence water consumption.

Healthcare sustainability requires both appropriate infrastructure and an environmentally responsible workforce. The World Health Organization identifies water, sanitation, hygiene and healthcare waste management as fundamental components of environmentally sustainable healthcare facilities. Therefore, GHRM can complement technical interventions by encouraging employees to use water efficiently, report leakages, follow water-saving procedures and participate in institutional environmental programmes.

Recent healthcare research also supports the growing relevance of GHRM in the health sector. A 2026 study of public healthcare workers examined how GHRM practices influence pro-environmental behaviour and highlighted the roles of green autonomy and sustainable leadership. These findings strengthen the argument that human-resource practices should be considered alongside technological measures when developing sustainable healthcare systems.

7.2 GHRM Practices and Sustainable Water Management

The literature synthesis shows that five major GHRM practices are particularly relevant to hospital water management: green recruitment and selection, green training and development, green performance management, green rewards and employee participation.

Green recruitment and selection can help hospitals attract employees who demonstrate environmental awareness and willingness to participate in sustainability initiatives. Environmental responsibilities can also be introduced during employee orientation.

Green training and development can provide employees with practical knowledge about water conservation, efficient cleaning procedures, leakage identification, wastewater management and responsible use of water-dependent equipment. Training is particularly important because employee behaviour is an important pathway through which GHRM affects environmental outcomes (Dumont *et al.*, 2017).

Green performance management can incorporate environmental responsibilities into departmental and individual performance assessment. Hospitals may evaluate compliance with water-saving procedures, reporting of leakage and participation in environmental activities.

Green rewards and recognition can motivate employees and departments to maintain environmentally responsible practices. Recognition programmes, certificates and departmental awards can reinforce water-conscious behaviour.

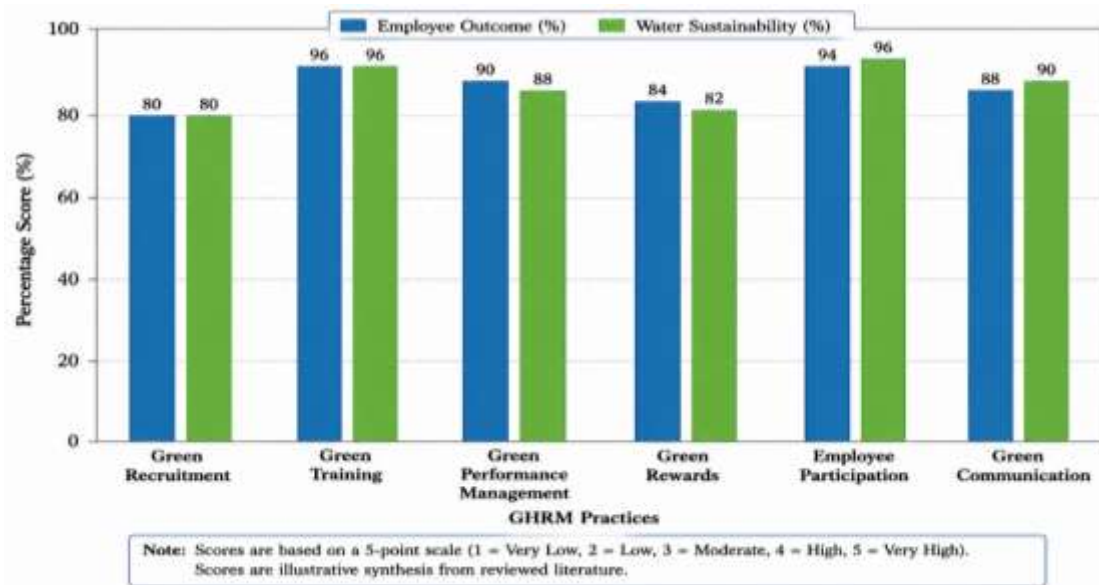
Employee participation and empowerment provide opportunities for workers to identify wastage and suggest practical solutions. This approach can transform water conservation from a management responsibility into a shared organizational responsibility.

Table 3. GHRM Practices and Their Contribution to Sustainable Water Management in Hospitals

GHRM Practice	Employee Outcome Score (1–5)	Water Sustainability Score (1–5)	Overall Impact Score (%)
Green recruitment	4.0	4.0	80
Green training	4.8	4.8	96
Green performance management	4.5	4.4	89
Green rewards	4.2	4.1	83
Employee participation	4.7	4.8	95
Green communication	4.4	4.5	89

Source: Synthesized from Renwick *et al.* (2013), Dumont *et al.* (2017) and subsequent GHRM literature.

Figure 1. GHRM Practices and Their Contribution to Sustainable Water Management in Hospitals



7.3 Employee Green Behaviour and Water Conservation

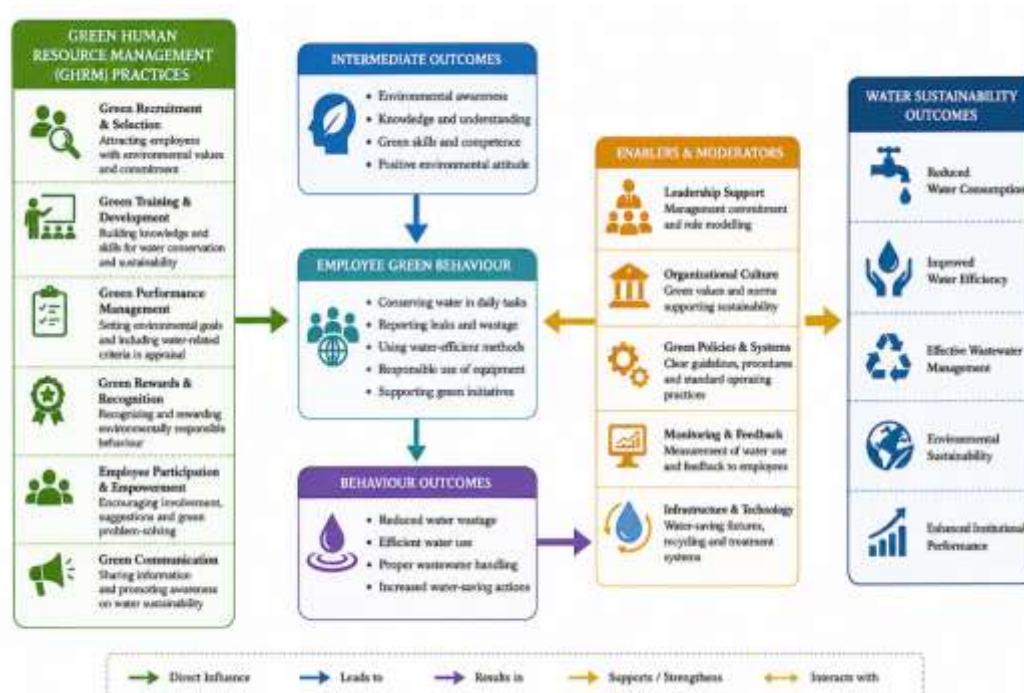
A major finding of the review is that employee green behaviour acts as an important connecting mechanism between GHRM and environmental sustainability. Employees may contribute to water conservation through relatively simple workplace behaviours, such as closing taps properly, reporting leaks, avoiding unnecessary water use, following efficient cleaning procedures and using water-dependent equipment appropriately.

The importance of employee behaviour is consistent with Dumont *et al.* (2017), who found that GHRM practices can influence both required and voluntary green behaviour through organizational environmental climate. In hospitals, this relationship becomes especially important because water use is distributed across multiple departments and cannot be controlled exclusively through centralized management.

Table 4 GHRM–Employee Green Behaviour–Water Sustainability Relationship

Variable	1	2	3	4	5
Green recruitment	Very Low	Low	Moderate	High	Very High
Green training	Very Low	Low	Moderate	High	Very High
Green performance management	Very Low	Low	Moderate	High	Very High
Green rewards	Very Low	Low	Moderate	High	Very High
Employee participation	Very Low	Low	Moderate	High	Very High
Green communication	Very Low	Low	Moderate	High	Very High
Employee green behaviour	Very Low	Low	Moderate	High	Very High
Water conservation behaviour	Very Low	Low	Moderate	High	Very High
Water-use efficiency	Very Low	Low	Moderate	High	Very High
Wastewater management	Very Low	Low	Moderate	High	Very High

Figure 2. GHRM–Employee Green Behaviour–Water Sustainability Relationship



7.4 Departmental Opportunities for Water Conservation

The review further indicates that water conservation opportunities differ according to hospital department. Housekeeping and sanitation activities may involve frequent water use, while laboratories, laundry, kitchens and patient-care areas have different water requirements. Consequently, a uniform water-conservation programme may not be equally effective across all departments.

Table 5 Department-Wise Water Conservation Opportunities in Hospitals

Hospital Department	Major Water-Using Activities	Possible Conservation Measures
Housekeeping	Floor and surface cleaning	Controlled water use and efficient cleaning procedures
Patient-care areas	Hand hygiene, cleaning and sanitation	Water-efficient fixtures and responsible use
Laundry	Washing and rinsing	Efficient washing cycles and equipment
Laboratories	Testing and equipment cleaning	Efficient equipment operation and controlled water use
Kitchen	Food preparation and cleaning	Avoid unnecessary running water
Toilets and sanitation	Flushing and cleaning	Water-efficient fixtures and leakage monitoring
Gardening	Irrigation	Rainwater and appropriately treated water where safe
Maintenance	Plumbing and equipment maintenance	Regular leak detection and prompt repair

The table demonstrates that GHRM interventions should be **department-specific**. Training provided to housekeeping

employees, for example, should focus on cleaning and sanitation practices, whereas laboratory staff may require training related to water-dependent equipment and laboratory procedures.

7.5 GHRM and Environmental Performance

The reviewed evidence suggests that GHRM can contribute to broader environmental performance by influencing employee awareness, motivation and participation. However, GHRM should not be considered a replacement for technological infrastructure. Instead, human-resource interventions should work together with water-efficient technologies, monitoring systems, wastewater treatment and institutional policies.

The WHO's guidance on climate-resilient and environmentally sustainable healthcare facilities similarly places the health workforce, WASH, sustainable infrastructure, technologies and products within an integrated sustainability framework.

Table 6 Integrated GHRM Approach for Hospital Water Sustainability

GHRM Dimension	Human Resource Intervention	Water-Management Application	Expected Sustainability Outcome
Recruitment	Select environmentally responsible employees	Environmental responsibilities introduced at entry	Green-oriented workforce
Training	Regular environmental education	Water conservation and wastewater-management training	Improved employee competence
Performance management	Water-related indicators	Monitor compliance with conservation practices	Increased accountability
Rewards	Recognition for green performance	Reward water-saving initiatives	Higher motivation
Participation	Green teams and suggestion systems	Employee-led water audits and conservation activities	Greater ownership
Leadership	Management commitment	Establish water policy and targets	Stronger sustainability culture
Monitoring	Periodic evaluation	Water-use monitoring and departmental audits	Continuous improvement

7.6 Discussion

The overall synthesis indicates that GHRM can act as a transformational mechanism connecting employees with hospital environmental objectives. The strongest pathway identified in the literature is from GHRM practices to employee environmental awareness and behaviour, followed by improved environmental performance. Dumont *et al.* (2017) provide empirical support for the role of GHRM and psychological green climate in shaping workplace green behaviour.

For hospital water management, this relationship has practical significance. Water-saving infrastructure can reduce consumption, but its effectiveness depends partly on how employees operate, maintain and use that infrastructure. Therefore, hospitals should combine employee training, participation and accountability with water meters, leakage detection, efficient fixtures, wastewater treatment and appropriate reuse systems.

The literature also suggests that leadership and organizational culture are important. A 2025 conceptual study on GHRM in green hospitals emphasizes that GHRM can contribute to changes in healthcare organizational culture, structure, strategy and regulations in support of environmental sustainability.

For **hospitals in Tirunelveli District**, the review indicates an opportunity to develop a localized GHRM-based water-management model. Such a model could include department-wise water audits, employee green teams, regular water-conservation training, environmental performance indicators, leakage-reporting systems, rainwater harvesting and appropriate wastewater-treatment and reuse practices.

8. Summary and Conclusion

Green Human Resource Management (GHRM) provides a strategic approach for integrating environmental sustainability into hospital human-resource practices. This review highlights the potential of green recruitment, training, performance management, rewards, employee participation, leadership and monitoring to promote environmentally responsible behaviour among hospital employees. The reviewed literature indicates that employee awareness and participation can complement technological measures such as water-efficient equipment, leakage control, rainwater harvesting, wastewater treatment and safe reuse. Integrating GHRM with sustainable water-management practices can help hospitals reduce water wastage, improve resource efficiency and develop a stronger environmental culture. For hospitals in Tirunelveli District, a coordinated approach involving management, human-resource personnel and healthcare employees can strengthen water conservation and institutional sustainability. However, district-level empirical studies are limited, indicating the need for future research using measurable indicators such as employee green behaviour, water consumption, conservation practices and wastewater reuse. Overall, GHRM can serve as an important pathway towards sustainable, resource-efficient and environmentally responsible hospital management..

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