

## **Assessing the Effect of Green Human Resource Management Practices on Employee Environmental Awareness and Pro-Environmental Behavior: A Quantitative Study of SECMC, Thar Coal Energy Project, Pakistan.**

**Qeemat Rai Meghwar<sup>1\*</sup>, Touheed Ahmed<sup>2</sup>**

**<sup>1</sup> Universitas Atma Jaya Yogyakarta, Indonesia**

**<sup>2</sup>Shah Abdul Latif University Campus Ghotki, Pakistan**

**Corresponding Author: [255028861@students.uajy.ac.id](mailto:255028861@students.uajy.ac.id)**

### *Abstract*

*This study examines the effect of Green Human Resource Management (GHRM) practices on Employee Environmental Awareness (EEA) and Pro-Environmental Behavior (PEB) at Sindh Engro Coal Mining Company (SECMC), Pakistan. Data collected from 73 employees via structured questionnaires was analyzed using quantitative, cross-sectional design. Scales for GHRM ( $\alpha = .75$ ) and EEA ( $\alpha = .77$ ) showed acceptable reliability, whereas PEB showed borderline consistency ( $\alpha = .64$ ). Linear regression revealed GHRM significantly predicted EEA ( $\beta = .51, p < .001$ ) and PEB ( $\beta = .69, p < .001$ ), while EEA significantly predicted PEB ( $\beta = .44, p < .001$ ). Mediation testing indicated EEA had a partial, statistically non-significant indirect effect between GHRM and PEB (Sobel  $z = 1.72, p = .085$ ). Thus, GHRM influences behavior primarily through direct pathways rather than exclusively through awareness. Aligned with the Ability-Motivation-Opportunity framework, GHRM practices—specifically training and recognition—build capability and motivation for sustainability. This study provides context-specific evidence from Pakistan's rarely examined coal energy sector and offers practical guidance for organizations using HR practices to foster environmental responsibility.*

*Keywords: Green Human Resource Management, Employee Environmental Awareness, Pro-Environmental Behavior.*

JEL : M12, Q56, J24

DOI : 10.24002/kinerja.v30i2.14442

Received : 04-Apr-2026

Revised: 04-Aug-2026

Accepted: 17-Sep-2026

## 1. INTRODUCTION

Environmental degradation and climate change have made sustainable practices a growing organizational priority worldwide (Grimshaw et al., 2023). Industries are increasingly expected to move beyond mere legal compliance and embed environmental responsibility into their core management systems, a pressure that is especially visible in energy-producing sectors (Zafar & Suseno, 2024). Pakistan's energy sector, and coal-based projects such as the Sindh Engro Coal Mining Company (SECMC) at the Thar Coal Project in particular, illustrate this tension well: coal energy is central to national economic growth, yet it remains a significant contributor to environmental harm through air pollution, carbon emissions, and land disturbance (Shahani, n.d.). As such industries play a continuing role in the country's energy transition, how they manage their workforce's environmental attitudes and actions become a practical and theoretical question worth investigating.

Green Human Resource Management (GHRM) has emerged as one of the most widely studied organizational mechanisms for building this kind of environmental responsibility (Yasin et al., 2023). GHRM integrates environmental governance into core HR functions such as recruitment, training, performance management, and rewards (Rana & Arya, 2024) with the underlying logic that when organizations formally embed environmental goals into how they hire, train, evaluate, and reward employees, workers are more likely to become aware of environmental issues and to act on that awareness (Xie et al., 2022). This chain of reasoning links three constructs that are conceptually distinct but empirically connected: GHRM practices as the organizational input, Employee Environmental Awareness (EEA) as employees' cognitive and attitudinal response, and Pro-Environmental Behavior (PEB) as the resulting workplace action. Clarifying how these three constructs relate to one another, and specifically whether awareness is a necessary bridge between HR practice and employee behavior or whether GHRM can shape behavior more directly, is the central relationship this study investigates.

Despite the expanding body of GHRM research, most existing studies are situated in developed economies or in service and manufacturing settings (Liu et al., 2023), leaving the coal energy sector in emerging economies such as Pakistan comparatively underexplored (Khan et al., 2025). This gap matters because coal

energy operations combine high environmental impact with organizational structures, workforce demographics, and regulatory pressures that differ substantially from the hospitality, healthcare, or manufacturing contexts where GHRM has typically been tested (Guan, 2025). Pakistan industries in particular face a growing expectation from government and civil society to demonstrate environmental responsibility (Shahani, n.d.), yet there is limited empirical evidence on whether GHRM practices translate into greater environmental awareness and behavior among employees working directly within high-impact extractive operations.

An earlier version of this study proposed a broader model in which GHRM's effect on pro-environmental behavior was expected to operate through green organizational culture and employee engagement, and to be moderated by employees' personal green values. However, the survey instrument administered to SECMC employees measured only three constructs directly: GHRM practices, employee environmental awareness, and pro-environmental behavior. Rather than report relationships for variables that were never measured, this study focuses specifically on the empirically testable relationships among these three constructs. GHRM is treated as the organizational antecedent that shapes environmental awareness, which in turn is examined as a potential mechanism connecting GHRM to employee behavior, alongside GHRM's own direct effect on behavior. Green organizational culture, employee engagement, and employee green values remain theoretically relevant to this relationship, and we return to them in the discussion and future research sections as constructs future studies with an expanded instrument should be tested directly.

This study therefore aims to examine three specific relationships among SECMC employees at the Thar Coal Energy Project: (1) whether GHRM practices are associated with higher employee environmental awareness, (2) whether environmental awareness is, in turn, associated with greater pro-environmental behavior, and (3) whether GHRM practices are directly associated with pro-environmental behavior independent of awareness. Together, these relationships allow this study to test whether awareness functions as a mediating mechanism between organizational HR practice and individual environmental action, or whether

GHRM's influence on behavior operates largely outside of a simple awareness pathway.

This research contributes to literature in two ways. First, it provides quantitative, employee-level evidence on GHRM from Pakistan's coal energy sector, a high-impact but underexamined industrial setting. Second, by testing environmental awareness explicitly as a mediating mechanism rather than assuming it, the study offers a more precise picture of how GHRM practices translate into employee behavior, information that is directly useful to HR practitioners and policymakers deciding where to invest in green HR initiatives, whether in awareness-building activities or in practices that influence behavior more directly.

## **2. LITERATURE REVIEW**

This section reviews the literature on Green Human Resource Management, Employee Environmental Awareness, and Pro-Environmental Behavior, and develops the reasoning that connects them. Because the empirical model in this study includes three constructs, the review concentrates on the relationships among these three, while briefly acknowledging the broader literature on organizational culture and employee engagement that motivated the original, more complex framework.

### **2.1 Green Human Resource Management (GHRM)**

Green Human Resource Management (GHRM) is a branch of Human Resource Management (HRM) incorporating environmental sustainability into HR practices (Gupta et al., 2025; Shah et al., 2024). Typical GHRM practices include environmentally oriented recruitment and selection, environmental training, green performance management, and mechanisms for employee involvement in sustainability initiatives (Khan et al., 2025). These practices are intended to foster an organizational culture conducive to environmental sustainability, which in turn drives pro-environmental behaviors from employees (Renwick et al., 2012). Strictly speaking, GHRM is an extension of the traditional HRM by emphasizing that employees should not only possess qualifications and motivation for performing their assignments but also align their activities with the organization's environmental objectives (Choudhary & Datta, 2024).

Green recruitment and selection are one core GHRM practice, in which organizations seek not only technically qualified candidates but also individuals who show a demonstrated interest in environment (Amrutha & Geetha, 2020). Evidence suggests that hiring employees who already hold pro-environmental values helps cultivate an organizational culture that is more receptive to sustainable action (Liu et al., 2023). Green training and development is a second core practice, ensuring employees have the knowledge and skills needed to apply eco-friendly practices in daily operations (Alreahi et al., 2022), continuous training helps employees understand how to minimize waste, conserve energy, and follow environmentally sound procedures (Esen & Caliskan, 2019).

A third practice, green performance management, links individual performance evaluation and reward systems to measurable environmental contributions, such as waste reduction or more efficient resource use (Ahmad et al., 2023). This connection between individual performance and environmental outcomes allows employees to see a tangible link between their actions and the organization's environmental and cost outcomes over time (Anwar et al., 2020). Finally, employee involvement practices, ranging from participation in environmental committees to simple daily conservation behaviors, create a sense of ownership over environmental results (Daily & Huang, 2001). Recent Indonesian evidence supports this general pattern: Venesia (2026) found that GHRM practices contributed directly to employee welfare through training and environmentally friendly policy, underscoring that the workforce-facing dimension of GHRM, not just its environmental dimension, is central to how employees experience and respond to these practices.

## **2.2 Employee Environmental Awareness (EEA) and Pro-Environmental Behavior (PEB)**

Employee Environmental Awareness refers to an employee's knowledge of, and concern about, environmental issues, along with their understanding of how their own work activities affect the environment (Yucedag et al., 2018). Pro-environmental behavior, in turn, refers to the action employees take that contribute to environmental protection and sustainability, both in the workplace and, by extension, in their personal lives (Peduzzi, 2019). In a workplace setting, PEB includes behaviors such

as making suggestions to improve environmental practices, participating in environmentally friendly programs, and using resources like electricity, paper, and water carefully (Afsar et al., 2018). Several studies have emphasized the role PEB plays in achieving corporate sustainability objectives more broadly (Alherimi et al., 2024; Saleh & Hassan, 2024).

The relationship between awareness and behavior is well established in the broader environmental psychology literature: individuals who understand the environmental consequences of their actions are generally more likely to act on that understanding (Kim et al., 2019). Within organizations specifically, awareness is theorized to function as a translating mechanism between what an organization does (its HR practices) and what employees do (their behavior): GHRM practices are expected to raise awareness first, and that heightened awareness is what then drives behavior (Sajuyigbe et al., 2024). This is the logic tested directly in the present study through the mediation analysis reported in Section 7.

At the same time, a growing number of studies caution that this awareness-to-behavior pathway is not automatic. GHRM practices such as reward systems and clearly communicated environmental goals can plausibly influence behavior directly, by creating incentives and expectations, without needing to pass through a change in an employee's stated awareness (Al-Sabi et al., 2024). (Porya et al., n.d.), for instance, found that the relationship between GHRM and employee green behavior is often indirect and uneven across different GHRM dimensions rather than a single clean pathway running through awareness. This possibility, that GHRM shapes behavior partly independent of awareness, is one this study is specifically positioned to evaluate, since our data allows us to compare GHRM's direct effect on PEB against its indirect effect through EEA.

### **2.3 Organizational Culture, Employee Engagement, and Personal Values: Scope Beyond This Study**

A broader stream of the GHRM literature treats green organizational culture, employee engagement, and employees' personal environmental values as important mechanisms that shape how GHRM practices translate into behavior (Ahmad et al., 2023b; Sajuyigbe et al., 2024). Green organizational culture is understood as a shared set of values, beliefs, and norms about environmental responsibility that can

mediate the relationship between HR practice and individual action (Doghan et al., 2022), while employee engagement with sustainability initiatives is thought to strengthen employees' internalization of organizational environmental goals (Guerci et al., 2016). Employees' personal environmental values, meanwhile, are understood to moderate how strongly they respond to organizational green initiatives in the first place (Kim et al., 2019).

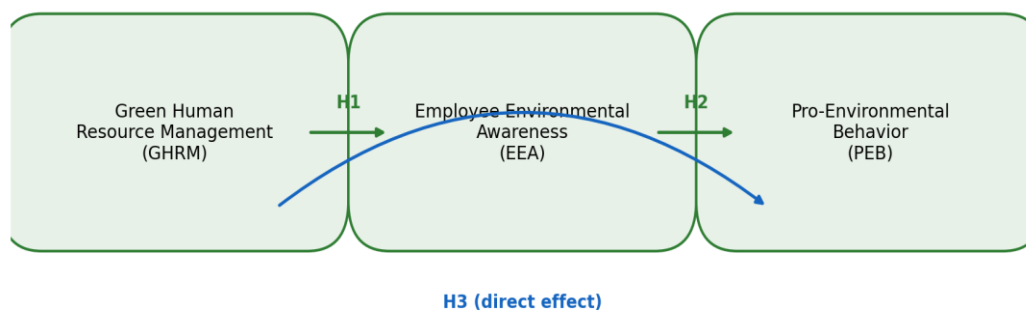
These constructs motivated the original conceptual framework for this research, and they remain theoretically important to understanding the full pathway between GHRM and employee behavior. However, the survey instrument used in this study did not include validated scales for green organizational culture, employee engagement, or personal environmental values; only GHRM, EEA, and PEB were measured. Rather than report statistical results for constructs that were not empirically captured, we narrow the present study's scope to the three measured constructs and treat organizational culture, engagement, and personal values as directions for future research, discussed further in Section 9.

### **3. Theoretical Framework**

This study is grounded in the Ability-Motivation-Opportunity (AMO) theory (Bos-Nehles et al., 2013), which serves as the central theoretical lens for understanding how GHRM practices relate to employee pro-environmental behavior. Based on the AMO theory, employee performance is expected only if three things work together: ability, motivation and opportunity. Ability refers to the skills and knowledge which employees can acquire through green training and development in GHRM. It represents the extent to which people believe they can perform eco-friendly acts, and this factor may be influenced by green rewards and incentives; motivation is the willingness or desire of people to engage in eco-friendly behavior. Opportunity is described as the support employees receive in terms of tools, green adoption, and leadership that encourage the understanding of green behaviors.

Applied to this study, GHRM practices are understood to build each of these three elements with respect to environmental behavior. Green training builds employees' ability by giving them the practical knowledge needed to act sustainably.

Green performance management and recognition build motivation by rewarding environmentally responsible actions. Employee involvement practices and clearly communicated environmental goals create opportunities by giving employees a structured, supported context in which to act. Employee environmental awareness sits within this framework primarily as part of the ability and motivation channels: awareness reflects an employee's cognitive grasp of environmental issues (ability to recognize what matters) and their felt concern about them (motivation to act). The AMO framework therefore predicts both that GHRM should raise environmental awareness (H1) and that awareness should be associated with greater pro-environmental behavior (H2), while also allowing for a direct GHRM-to-behavior pathway through the motivation and opportunity channels that do not strictly require awareness as an intermediate step (H3).



**Figure 1.** Conceptual Framework

Figure 1 depicts the revised conceptual framework used in this study. GHRM is modeled as the organizational antecedent with two possible pathways to PEB: an indirect pathway through EEA (H1 and H2 combined, tested for mediation in Section 7.5) and a direct pathway (H3). This structure replaces the earlier five-construct framework and matches exactly what the survey instrument was designed to measure.

#### 4. Hypotheses

Based on the theoretical framework above, this study tests the following hypotheses:

H1: Green HRM practices have a positive effect on Employee Environmental Awareness.

H2: Employee Environmental Awareness has a positive effect on Pro-Environmental Behavior.

H3: Green HRM practices have a positive direct effect on Pro-Environmental Behavior.

H4: Employee Environmental Awareness mediates the relationship between Green HRM practices and Pro-Environmental Behavior.

### **3. METHODOLOGY**

#### **3.1 Research Design**

This study used a quantitative, cross-sectional research design. Data were collected through a structured, self-administered questionnaire distributed to employees of the Sindh Engro Coal Mining Company (SECMC), Thar Coal Energy Project, Pakistan. The purpose of the study was to examine whether GHRM practices are associated with employee environmental awareness (EEA) and pro-environmental behavior (PEB), and to test whether EEA mediates the relationship between GHRM and PEB.

#### **3.2 Sample and Data Collection**

The questionnaire was distributed to employees across multiple departments and job functions at SECMC using a stratified approach intended to capture a range of roles within the organization. After removing incomplete responses and responses from individuals who did not consent to participate, the final analytic sample consisted of 73 employees. This is the correct and final sample size for all analyses reported in this paper; an earlier draft of this manuscript referred to an intended distribution of approximately 300 questionnaires, which was the number of employees the survey was made available to, not the number of usable, consented responses received. All results reported below are based on  $n = 73$ .

The final sample was 95.9% male ( $n = 70$ ) and 4.1% female ( $n = 3$ ), reflecting the workforce composition typical of coal mining and heavy energy operations.

Respondents ranged in age from 22 to 34 years ( $M = 27.37$ ,  $SD = 3.11$ ); 35.6% were aged 22-25, 46.6% were aged 26-30, and 17.8% were aged 31-35. In terms of organizational tenure, 5.5% of respondents had less than one year of service, 31.5% had one to under three years, 39.7% had three to under six years, and 23.3% had six or more years of service. Educational attainment was not captured in the survey instrument and is therefore not reported; this omission is noted as a limitation in Section 9.

### **3.3 Measures**

Green Human Resource Management (GHRM) was measured with 12 items adapted from the Green HRM scale developed by Tang, Tang, and Cowden (2017), covering green recruitment, green training, green performance management, and green compensation and recognition.

Employee Environmental Awareness (EEA) was measured with 5 items adapted from Yucedag, Kaya, and Cetin (2018), capturing employees' knowledge of, and concern about, environmental issues and their understanding of how their own work activities affect the environment.

Pro-Environmental Behavior (PEB) was measured with 6 items adapted from Afsar, Shahjehan, and Shah (2018), covering behaviors such as making environmental suggestions, participating in environmentally friendly programs, sharing environmental knowledge with colleagues, and careful use of workplace resources.

All items across the three scales used a five-point Likert format ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire also included a demographic section (gender, age, years of service) and a consent item confirming voluntary participation.

### **3.4 Data Analysis**

Data was analyzed using descriptive statistics, reliability analysis, Pearson correlation, and linear regression. Internal consistency for each of the three scales was assessed using Cronbach's alpha, with values of .70 or above generally considered acceptable and values between .60 and .70 considered marginal but

interpretable with caution (Ahmad et al., 2023); this threshold is applied when interpreting the PEB scale's reliability in Section 7.2.

Composite scores for GHRM, EEA, and PEB were computed as the mean of each construct's items for each respondent. Pearson correlations were used to establish the direction and strength of association among the three composite scores. Simple linear regression was used to test H1 (GHRM predicting EEA), H2 (EEA predicting PEB), and H3 (GHRM predicting PEB). To test H4, the mediating role of EEA, a multiple regression of PEB on both GHRM and EEA simultaneously was estimated, and the indirect effect (the product of the GHRM-to-EEA path and the EEA-to-PEB path, controlling for GHRM) was tested for statistical significance using the Sobel test, following the standard approach for mediation analysis with continuous variables and a single mediator.

### 3.5 Ethical Considerations

Participation in this study was voluntary, and respondents were informed of the study's purpose before completing the questionnaire; the survey instrument itself included a consent item, and only responses from employees who confirmed consent were retained for analysis. Respondent identity was not linked to individual response data in the analysis, and results are reported only in aggregate form.

## 4. RESULTS AND DISCUSSION

### 4.1 Respondent Demographics

**Table 1.** Summary of the Demographic Composition of The Final Sample (n = 73)

| Variable | Category    | n  | %     |
|----------|-------------|----|-------|
| Gender   | Male        | 70 | 95.9% |
|          | Female      | 3  | 4.1%  |
| Age      | 22-25 years | 26 | 35.6% |
|          | 26-30 years | 34 | 46.6% |

| Variable | Category           | n  | %     |
|----------|--------------------|----|-------|
| Tenure   | 31-35 years        | 13 | 17.8% |
|          | Less than 1 year   | 4  | 5.5%  |
|          | 1 to under 3 years | 23 | 31.5% |
|          | 3 to under 6 years | 29 | 39.7% |
|          | 6 years or more    | 17 | 23.3% |

## 4.2 Descriptive Statistics of GHRM, EEA, and PEB Indicators

**Table 2.** Descriptive Statistics of GHRM, EEA, and PEB Indicators

| Item   | N  | Mean | SD    | Min | Max |
|--------|----|------|-------|-----|-----|
| GHRM1  | 73 | 3.77 | 0.858 | 2   | 5   |
| GHRM2  | 73 | 3.71 | 0.825 | 2   | 5   |
| GHRM3  | 73 | 3.84 | 0.578 | 3   | 5   |
| GHRM4  | 73 | 3.99 | 0.790 | 1   | 5   |
| GHRM5  | 73 | 3.68 | 0.743 | 2   | 5   |
| GHRM6  | 73 | 3.74 | 0.782 | 2   | 5   |
| GHRM7  | 73 | 3.75 | 0.878 | 1   | 5   |
| GHRM8  | 73 | 3.68 | 0.998 | 1   | 5   |
| GHRM9  | 73 | 3.84 | 0.727 | 2   | 5   |
| GHRM10 | 73 | 3.27 | 1.158 | 1   | 5   |
| GHRM11 | 73 | 3.48 | 0.930 | 2   | 5   |
| GHRM12 | 73 | 3.22 | 1.170 | 1   | 5   |
| EEA1   | 73 | 3.78 | 0.786 | 1   | 5   |
| EEA2   | 73 | 3.96 | 0.633 | 2   | 5   |

| Item | N  | Mean | SD    | Min | Max |
|------|----|------|-------|-----|-----|
| EEA3 | 73 | 3.79 | 0.833 | 1   | 5   |
| EEA4 | 73 | 4.04 | 0.633 | 2   | 5   |
| EEA5 | 73 | 3.95 | 0.685 | 2   | 5   |
| PEB1 | 73 | 3.41 | 0.940 | 2   | 5   |
| PEB2 | 73 | 3.64 | 1.032 | 1   | 5   |
| PEB3 | 73 | 3.84 | 0.866 | 2   | 5   |
| PEB4 | 73 | 3.59 | 0.955 | 1   | 5   |
| PEB5 | 73 | 3.66 | 0.837 | 2   | 5   |
| PEB6 | 73 | 4.00 | 0.799 | 2   | 5   |

All items fall above the scale midpoint of 3.0, indicating generally favorable employee perceptions of GHRM practices, environmental awareness, and pro-environmental behavior. Composite scale means were GHRM = 3.66 (SD = 0.46), EEA = 3.90 (SD = 0.52), and PEB = 3.69 (SD = 0.54), with EEA showing the highest mean, consistent with a workforce that reports relatively strong environmental knowledge and concern even where organizational green practices are perceived somewhat less consistently.

### 4.3 Reliability Analysis

Cronbach's alpha was computed for all three scales to assess internal consistency, addressing a gap in the earlier draft of this manuscript, which reported reliability for the GHRM scale only.

**Table 3.** Reliability Statistics for GHRM, EEA, and PEB Scales

| Scale | No. of Items | Cronbach's Alpha | Interpretation |
|-------|--------------|------------------|----------------|
| GHRM  | 12           | .751             | Acceptable     |

| Scale | No. of Items | Cronbach's Alpha | Interpretation                             |
|-------|--------------|------------------|--------------------------------------------|
| EEA   | 5            | .768             | Acceptable                                 |
| PEB   | 6            | .643             | Marginal / below<br>conventional threshold |

The GHRM and EEA scales both show acceptable internal consistency, above the conventional .70 threshold. The PEB scale's alpha of .643 falls below this threshold. This is reported transparently rather than omitted: it suggests that the six PEB items, which span both attitudinal statements (e.g., questioning practices that may harm the environment) and concrete conservation behaviors (e.g., careful use of electricity, paper, and water), may not form a fully unidimensional construct in this sample. Results involving PEB should therefore be interpreted with some caution, and future studies may benefit from refining or shortening the PEB scale, or analyzing its attitude and behavioral items as separate sub-dimensions.

#### 4.4 Correlation Analysis

Pearson correlation analysis was used to examine the bivariate relationships among the three composite scores.

**Table 4.** Pearson Correlations Among GHRM, EEA, and PEB (n = 73). \*\*p < .01

|      | GHRM   | EEA    | PEB   |
|------|--------|--------|-------|
| GHRM | 1.000  |        |       |
| EEA  | .450** | 1.000  |       |
| PEB  | .578** | .420** | 1.000 |

All three composite scores were significantly and positively correlated with one another. The strongest association was between GHRM and PEB ( $r = .578$ ,  $p < .001$ ), followed by GHRM and EEA ( $r = .450$ ,  $p < .001$ ), and EEA and PEB ( $r = .420$ ,  $p < .001$ ). These correlations provide initial support for all three hypothesized

relationships (H1, H2, and H3) and justify the regression and mediation analyses that follow.

#### 4.5 Hypothesis Testing: Regression Analysis

H1, H2, and H3 were tested using simple linear regression. Table 5 reports the results.

**Table 5.** Simple Linear Regression Results (n = 73, df = 71)

| Hyp. | Path          | B    | SE   | t    | p     | R <sup>2</sup> | Result    |
|------|---------------|------|------|------|-------|----------------|-----------|
| H1   | GHRM<br>→ EEA | .508 | .120 | 4.24 | <.001 | .202           | Supported |
| H2   | EEA →<br>PEB  | .442 | .113 | 3.90 | <.001 | .177           | Supported |
| H3   | GHRM<br>→ PEB | .688 | .115 | 5.97 | <.001 | .334           | Supported |

All three direct-effect hypotheses were supported. GHRM significantly predicted EEA, explaining 20.2% of the variance in employees' environmental awareness (H1). EEA, in turn, significantly predicted PEB, explaining 17.7% of the variance in employees' pro-environmental behavior (H2). GHRM also significantly predicted PEB directly, explaining 33.4% of the variance in PEB on its own (H3), a stronger relationship than either of the two paths that pass-through EEA.

#### 4.6 Mediation Analysis (H4)

To test whether EEA mediates the relationship between GHRM and PEB, PEB was regressed simultaneously on both GHRM and EEA. Table 6 reports this multiple regression, which forms the basis of the mediation test.

**Table 6.** Multiple Regression of PEB on GHRM and EEA Simultaneously (n = 73;  $R^2 = .350$ , Adjusted  $R^2 = .332$ ,  $F(2,70) = 18.86$ ,  $p < .001$ )

| Predictor | B     | SE    | t    | p      |
|-----------|-------|-------|------|--------|
| Constant  | 0.847 | 0.420 | 2.02 | .047   |
| GHRM      | 0.581 | 0.129 | 4.51 | < .001 |
| EEA       | 0.211 | 0.112 | 1.88 | .064   |

When both predictors are entered together, GHRM remains a strong, statistically significant predictor of PEB ( $B = .581$ ,  $p < .001$ ), while EEA's effect drops to marginal significance ( $B = .211$ ,  $p = .064$ ). This pattern, GHRM staying significant while EEA weakens once GHRM is controlled for, is the signature of, at most, partial mediation rather than full mediation.

A Sobel test was used to test the statistical significance of the indirect effect ( $GHRM \rightarrow EEA \rightarrow PEB$ ). The indirect effect was  $ab = .508 \times .211 = .107$ , with a standard error of .062, giving a Sobel  $z$  of 1.72 ( $p = .085$ ). This result does not reach the conventional .05 significance threshold, meaning H4 is not statistically supported at this sample size: the data show a trend consistent with partial mediation, but not one strong enough to confirm statistically.

Interpreted together, Tables 5 and 6 indicate that GHRM influences pro-environmental behavior mainly through a direct pathway, rather than primarily by first raising environmental awareness. Environmental awareness is still meaningfully related to behavior on its own (H2), and GHRM is still related to awareness (H1), but the specific claim that awareness is the mechanism carrying GHRM's effect onto behavior is only weakly and non-significantly supported in this sample. A summary of all hypothesis outcomes is provided in Table 7.

**Table 7.** Summary of Hypothesis Testing Results

| Hypothesis | Statement                         | Result    |
|------------|-----------------------------------|-----------|
| H1         | GHRM has a positive effect on EEA | Supported |
| H2         | EEA has a positive effect on PEB  | Supported |

| Hypothesis | Statement                                | Result                                            |
|------------|------------------------------------------|---------------------------------------------------|
| H3         | GHRM has a positive direct effect on PEB | Supported                                         |
| H4         | EEA mediates the GHRM→PEB relationship   | Not supported<br>(partial, non-significant trend) |

## 4.7 DISCUSSION

This study set out to examine whether Green Human Resource Management (GHRM) practices are associated with employee environmental awareness (EEA) and pro-environmental behavior (PEB) among SECMC employees at the Thar Coal Energy Project, and specifically whether awareness functions as the mechanism linking GHRM to behavior. The results offer a more precise, and in some ways more interesting, picture than a simple full-mediation story would.

First, GHRM practices were positively and significantly associated with both environmental awareness and pro-environmental behavior, supporting H1 and H3 and confirming the broad expectation in the literature that structured green HR practices shape employee environmental outcomes (Rana & Arya, 2024; Venesia, 2026). Consistent with earlier item-level findings from this dataset, employees responded most positively to GHRM items related to training programs and reward-based recognition, while items addressing procedural or compliance-oriented practices received comparatively lower, though still positive, ratings. This suggests that concrete, actionable initiatives, structured training and tangible recognition in particular, may be more effective at shaping both awareness and behavior than compliance-oriented messaging alone, a pattern also observed by Nugraha and Iqbal (2023) in their study of GHRM and environmental performance among health-sector employees in Indonesia.

Second, environmental awareness was positively associated with pro-environmental behavior (H2), reinforcing the general finding in the literature that employees who understand the environmental consequences of their actions are more likely to act accordingly (Kim et al., 2019). However, the mediation test (H4) did

not reach statistical significance. When GHRM and EEA were entered into the same regression model, GHRM retained a strong, significant effect on PEB, while EEA's effect weakened to a marginal, non-significant level. This indicates that awareness is, at most, a partial mechanism: GHRM appears to shape employee behavior substantially through pathways other than a simple increase in stated environmental awareness, most plausibly through the motivation and opportunity components of the AMO framework, such as reward structures and structured opportunities for involvement, that do not strictly require an intervening change in awareness to influence behavior.

This finding is consistent with, and adds nuance to, recent work questioning whether the GHRM-to-behavior relationship is a single clean pathway. Chowdhury et al. (2025) similarly found that the link between GHRM and employee green behavior is often indirect and uneven across different GHRM dimensions, rather than uniformly mediated. For SECMC and organizations like it, the practical implication is that awareness-raising alone, without accompanying reward and involvement structures, may not be sufficient to translate GHRM investment into behavior change; both awareness-building and direct behavioral incentives appear to matter.

The comparatively low reliability of the PEB scale ( $\alpha = .643$ ) is worth discussing on its own terms rather than setting aside. Because the scale combines both attitudinal items and concrete behavioral items, it may be capturing two related but distinct constructs, general pro-environmental disposition and specific conservation actions, that do not move together as tightly as a single unidimensional scale would require. This is a plausible explanation for why EEA's relationship with PEB, while statistically significant on its own, weakened once GHRM was accounted for: measurement imprecision in PEB would tend to attenuate the strength of any single predictor's estimated effect on it.

Overall, these findings are broadly consistent with the Ability-Motivation-Opportunity (AMO) framework. GHRM practices appear to build employees' ability (through training) and motivation (through recognition and reward) to act in environmentally responsible ways, and these effects show up in behavior both through the awareness channel and, more strongly, through pathways independent of it. For SECMC and similar coal energy operations, the practical implication is that

GHRM investment, particularly in training and recognition-based practices, is associated with meaningfully better environmental outcomes among employees, even in a sector where GHRM has rarely been studied directly.

## **5. CONCLUSION**

This study examined the relationships among Green Human Resource Management (GHRM) practices, Employee Environmental Awareness (EEA), and Pro-Environmental Behavior (PEB) among 73 employees at SECMC's Thar Coal Energy Project in Pakistan. GHRM practices were positively and significantly associated with both environmental awareness and pro-environmental behavior, and environmental awareness was itself positively associated with behavior. However, a formal mediation test showed that awareness only partially, and not statistically significantly, carried GHRM's effect onto behavior, indicating that GHRM's influence on employee action operates substantially through channels other than awareness alone.

These findings support the continued integration of structured GHRM practices, particularly training and recognition-based initiatives, into organizational strategy in high-impact industrial sectors such as coal energy. They also suggest that organizations should not rely on awareness-building alone to drive employee environmental behavior; reward systems and structured opportunities for participation appear to play an independent and possibly larger role. This study extends the GHRM literature into a sector, coal energy in an emerging economy, that has received little direct empirical attention, and it offers a methodologically transparent account of what a modest but real dataset can and cannot support.

### **5.1 Limitations and Future Research**

Several limitations should be considered when interpreting these findings. First, the sample size ( $n = 73$ ) is modest and drawn from a single organization, which limits statistical power, particularly for the mediation test, and limits generalizability to other coal energy operations or industrial contexts. Second, the survey instrument did not capture educational attainment, preventing a fuller demographic profile of the sample. Third, the PEB scale's reliability ( $\alpha = .643$ ) fell below the conventional

threshold, suggesting the scale may benefit from refinement in future applications. Fourth, all data were collected through self-report at a single point in time, which raises the possibility of common method bias and does not allow causal claims to be made with confidence.

Fifth, and most substantively, this study's original conceptual framework proposed a more complex model involving green organizational culture, employee engagement, and employee green values as mediating and moderating mechanisms. Because the survey instrument did not include validated measures for these constructs, the present study was necessarily narrowed to the three constructs actually measured. This narrowing improves the internal consistency between what is claimed and what is tested, but it leaves the broader model empirically untested. Employee engagement in particular has been shown elsewhere to shape how organizational practices translate into individual outcomes, for example through its role linking leadership and support to innovative work behavior (Hayati & Purwanto, 2026), which suggests it could plausibly play a similar connecting role between GHRM and PEB if measured directly. Future research on GHRM in the coal energy sector, and in Pakistan more broadly, should incorporate validated scales for green organizational culture, employee engagement, and personal environmental values, ideally with a larger and more gender-balanced sample, to test the fuller model this line of research ultimately aims to establish. A longitudinal or multi-organization design would also help establish whether the direct GHRM-to-behavior pathway observed here holds across different industrial contexts and over time.

## REFERENCES

- Afsar, B., Shahjehan, A., & Shah, I. (2018). Leadership and employee pro-environmental behaviours. In *Research handbook on employee pro-environmental behaviour* (pp. 185–209). Edward Elgar Publishing.
- Ahmad, J., Al Mamun, A., Masukujjaman, M., Mohamed Makhbul, Z. K., & Mohd Ali, K. A. (2023a). Modeling the workplace pro-environmental behavior through green human resource management and organizational culture: Evidence from an emerging economy. *Heliyon*, 9(9). <https://doi.org/10.1016/j.heliyon.2023.e19134>

- Ahmad, J., Al Mamun, A., Masukujjaman, M., Mohamed Makhbul, Z. K., & Mohd Ali, K. A. (2023b). Modeling the workplace pro-environmental behavior through green human resource management and organizational culture: Evidence from an emerging economy. *Heliyon*, 9(9). <https://doi.org/10.1016/j.heliyon.2023.e19134>
- Alherimi, N., Marva, Z., Hamarsheh, K., & Alzaaterh, A. (2024). Employees' pro-environmental behavior in an organization: a case study in the UAE. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-66047-4>
- Alreahi, M., Bujdosó, Z., Kabil, M., Akaak, A., Benkó, K. F., Setioningtyas, W. P., & Dávid, L. D. (2022). Green human resources management in the hotel industry: A systematic review. *Sustainability*, 15(1), 99.
- Al-Sabi, S. M., Al-Ababneh, M. M., Al Qsssem, A. H., Afaneh, J. A. A., & Elshaer, I. A. (2024). Green human resource management practices and environmental performance: the mediating role of job satisfaction and pro-environmental behavior. *Cogent Business & Management*, 11(1), 2328316.
- Amrutha, V. N., & Geetha, S. N. (2020). A systematic review on green human resource management: Implications for social sustainability. *Journal of Cleaner Production*, 247, 119131.
- Anwar, N., Nik Mahmood, N. H., Yusliza, M. Y., Ramayah, T., Noor Faezah, J., & Khalid, W. (2020). Green Human Resource Management for organisational citizenship behaviour towards the environment and environmental performance on a university campus. *Journal of Cleaner Production*, 256. <https://doi.org/10.1016/j.jclepro.2020.120401>
- Bos-Nehles, A. C., Van Riemsdijk, M. J., & Kees Looise, J. (2013). Employee perceptions of line management performance: Applying the AMO theory to explain the effectiveness of line managers' HRM implementation. *Human Resource Management*, 52(6), 861–877. <https://doi.org/10.1002/hrm.21578>
- Choudhary, P., & Datta, A. (2024). Bibliometric analysis and systematic review of green human resource management and hospitality employees' green creativity. *The TQM Journal*, 36(2), 546–571.

- Daily, B. F., & Huang, S. (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations & Production Management*, 21(12), 1539–1552.
- Doghan, M. A. A., Abdelwahed, N. A. A., Soomro, B. A., & Alayis, M. M. H. A. (2022). Organizational Environmental Culture, Environmental Sustainability and Performance: The Mediating Role of Green HRM and Green Innovation. *Sustainability (Switzerland)*, 14(12). <https://doi.org/10.3390/su14127510>
- Esen, E., & Caliskan, A. O. (2019). Green human resource management (GHRM) and environmental sustainability. *PressAcademia Procedia*, 9(1), 58–60.
- Grimshaw, D., Rubery, J., Cooke, F. L., & Hebson, G. (2023). Fragmenting work: Theoretical contributions and insights for a future of work research and policy agenda. *Human Resource Management Journal*, 33(3), 578–591.
- Guan, X. (2025). Exploring the unintended consequences of GHRM: the mediating role of felt green accountability in influencing employee blame avoidance. *Employee Relations: The International Journal*, 47(8), 1294–1310.
- Guerci, M., Longoni, A., & Luzzini, D. (2016). Translating stakeholder pressures into environmental performance – the mediating role of green HRM practices. *International Journal of Human Resource Management*, 27(2), 262–289. <https://doi.org/10.1080/09585192.2015.1065431>
- Gupta, R., Kaur, H., & Bhat, D. A. R. (2025). Green Human Resource Management, Green Organisational Citizenship Behaviour and Organisational Sustainability in the Post-Pandemic Era: An Ability Motivation Opportunity and Resource Based View Perspective. *Business Strategy & Development*, 8(2), e70126.
- Khan, K., Gogia, E. H., Shao, Z., Rehman, M. Z., & Ullah, A. (2025). The impact of green HRM practices on green innovative work behaviour: empirical evidence from the hospitality sector of China and Pakistan. *BMC Psychology*, 13(1), 96.
- Kim, Y. J., Kim, W. G., Choi, H. M., & Phetvaroon, K. (2019). The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance. *International Journal of Hospitality Management*, 76, 83–93. <https://doi.org/10.1016/j.ijhm.2018.04.007>

Liu, R., Yue, Z., Ijaz, A., Lutfi, A., & Mao, J. (2023). Sustainable business performance: Examining the role of green HRM practices, green innovation and responsible leadership through the lens of pro-environmental behavior. *Sustainability*, 15(9), 7317.

Peduzzi, P. (2019). The Disaster Risk, Global Change, and Sustainability Nexus. In *Sustainability (Switzerland)* (Vol. 11, Number 4). MDPI. <https://doi.org/10.3390/su11040957>

Porya, A., Chowdhary, N., Vajpai, G. N., Jana, S., & Mondal, D. (n.d.). Mapping the Intellectual Landscape of Green Human Resource Management: A Bibliometric Analysis and Future Research Agenda. *Available at SSRN 5405676*.

Rana, G., & Arya, V. (2024). Green human resource management and environmental performance: mediating role of green innovation—a study from an emerging country. *Foresight*, 26(1), 35–58.

Renwick, D. W. S., Redman, T., & Maguire, S. (2012). *Green Human Resource Management: A Review and Research Agenda*. *jmr\_328* 1..14. [https://doi.org/10.1111/\(ISSN\)1468-2370/homepage/teaching\\_\\_\\_\\_](https://doi.org/10.1111/(ISSN)1468-2370/homepage/teaching____)

Sajuyigbe, A. S., Ayeni, A. W., Inegbedion, H. E., Ighomereho, O. S., & Peter, A. (2024). Green Human Resource Management Practices and Environmental Performance: The Mediating Effect of Organizational Culture. *Interdisciplinary Journal of Management Studies*, 17(4), 1155–1172. <https://doi.org/10.22059/ijms.2024.343182.675108>

Saleh, H. M., & Hassan, A. I. (2024). The challenges of sustainable energy transition: A focus on renewable energy. In *Applied Chemical Engineering* (Vol. 7, Number 2). Arts and Science Press Pte. Ltd. <https://doi.org/10.59429/ace.v7i2.2084>

Shah, P., Singh Dubey, R., Rai, S., Renwick, D. W. S., & Misra, S. (2024). Green human resource management: A comprehensive investigation using bibliometric analysis. *Corporate Social Responsibility and Environmental Management*, 31(1), 31–53.

Shahani, R. (n.d.). *Development-Induced Dispossession in Pakistan: A Study of Political Economy of Thar Coal-Power Plants, a CPEC Project under the Belt and Road Initiative*. 9(3). [https://doi.org/10.35484/pssr.2025\(9-III\)51](https://doi.org/10.35484/pssr.2025(9-III)51)

Venesia, V. (2026). Green Human Resource Management as a Workforce Management Innovation to Support Sustainability and Poverty Reduction. *KINERJA*, 30(1), 137–156.

Xie, X., Hoang, T. T., & Zhu, Q. (2022). Green process innovation and financial performance: The role of green social capital and customers' tacit green needs. *Journal of Innovation and Knowledge*, 7(1). <https://doi.org/10.1016/j.jik.2022.100165>

Yasin, R., Huseynova, A., & Atif, M. (2023). Green human resource management, a gateway to employer branding: Mediating role of corporate environmental sustainability and corporate social sustainability. *Corporate Social Responsibility and Environmental Management*, 30(1), 369–383.

Yucedag, C., Kaya, L. G., & Cetin, M. (2018). Identifying and assessing environmental awareness of hotel and restaurant employees' attitudes in the Amasra District of Bartin. *Environmental Monitoring and Assessment*, 190(2). <https://doi.org/10.1007/s10661-017-6456-7>