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Investigating Environmental and Humanitarian Law Violations in Coastal Bangladesh: A Survey-Based Analysis

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Abstract:

This study investigates the intersection of environmental and humanitarian law violations in the coastal areas of Bangladesh, focusing on the implications of climate change-induced disasters on vulnerable communities. A quantitative survey was conducted, with 150 respondents representing coastal regions, to gather data on the prevalence of environmental degradation, climate-induced displacement, and human rights violations. Findings reveal a significant correlation between environmental hazards, such as cyclones and sea-level rise, and the displacement of coastal populations, exacerbating socio-economic vulnerabilities and human rights abuses. The study employs a quantitative-methods design, analyzing survey data of legal frameworks, policy documents, and scholarly literature. The data was analyzed through Smart PLS 4 for Structural Equational Model (SEM). The purpose of this research is to elucidate the complexities surrounding legal enforcement, policy implementation, and grassroots initiatives aimed at addressing environmental and humanitarian challenges in coastal areas. By providing empirical evidence and insights into the lived experiences of affected communities, this study aims to inform evidence-based policy interventions, legal reforms, and humanitarian strategies to enhance resilience and protect the rights of coastal populations facing the impacts of climate change and environmental degradation.

Keywords: environmental law, humanitarian law, climate change, coastal areas, Bangladesh.

Introduction: The coastal areas of Bangladesh stand at the forefront of the global battle against climate change, bearing the brunt of environmental degradation and humanitarian crises resulting from rising sea levels, cyclones, floods, and other climate-induced disasters. In this context, the intersection of environmental and humanitarian law becomes

increasingly pertinent, as violations in these areas not only exacerbate ecological damage but also endanger the lives and livelihoods of millions of vulnerable communities.

According to the International Federation of Red Cross and Red Crescent (2021), planned relocation emerges as a critical strategy to mitigate the adverse effects of climate change-induced disasters in coastal regions. However, the implementation of such strategies often encounters legal and humanitarian challenges, highlighting the urgent need for a comprehensive understanding of environmental and humanitarian law violations in these areas.

Khan (2024) underscores the significance of international human rights treaties in protecting the rights of individuals affected by environmental degradation and climate-induced displacement. Despite Bangladesh's adherence to some international treaties, gaps in legal enforcement and policy implementation persist, leaving vulnerable communities at risk of rights violations.

Cutter et al. (2016) emphasize the importance of disaster risk reduction and climate change adaptation in coastal regions, advocating for robust policy frameworks and community-centered approaches. Nevertheless, socioeconomic disparities, institutional weaknesses, and governance issues impede effective implementation, leading to continued environmental degradation and human suffering.

In light of these challenges, this review aims to explore the multifaceted dimensions of environmental and humanitarian law violations in the coastal areas of Bangladesh. By examining existing literature and scholarly research, this study seeks to elucidate the complexities surrounding legal frameworks, policy interventions, and grassroots initiatives aimed at addressing environmental degradation, climate-induced displacement, and human rights violations in vulnerable coastal communities. Through a comprehensive analysis, this review seeks to inform future policy interventions, legal reforms, and humanitarian efforts to safeguard the rights and well-being of coastal populations facing the adverse impacts of climate change and environmental degradation.

Literature Review: Climate change-induced disasters and environmental change pose significant challenges to vulnerable populations in Bangladesh, necessitating effective adaptation strategies and humanitarian assistance interventions. This literature review synthesizes findings from various studies to explore key variables, methodologies, findings, and recommendations related to planned relocation, adherence to international human rights treaties, disaster risk reduction (DRR), socioeconomic impacts of cyclones, implementation of International Humanitarian Law (IHL), climate change impacts on agricultural communities, climate-induced migration, disaster governance, and climate change adaptation in the southwestern coastal region of Bangladesh (SWCRB).

The International Federation of Red Cross and Red Crescent (2021) highlights planned relocation as a crucial strategy for enhancing climate change adaptation efforts, emphasizing variables such as planned relocation, National Adaptation Plans (NAPs), international organization support, soft law frameworks, non-state actors' roles, and

challenges. Recommendations include establishing clear definitions, developing soft law frameworks, enhancing international cooperation, strengthening disaster preparedness and response, and promoting human rights and dignity (Alimuddin & Muhammad, 2023).

Khan (2024) examines Bangladesh's adherence to international human rights treaties, emphasizing variables such as ratification or accession to treaties, domestic legal incorporation, judicial application of international law, submission of state reports, and policy and legislative reforms. Recommendations include legislative reforms, judicial training, enhanced reporting mechanisms, civil society engagement, and international cooperation (Khan, 2024).

Cutter et al. (2016) discuss Bangladesh's strides in disaster risk reduction and climate change adaptation, focusing on robust policy, legal, and institutional frameworks, initiatives such as coastal afforestation and early warning systems, and challenges including institutional coordination and power imbalances within fishing communities. Recommendations include fostering institutional collaboration, empowering communities, promoting human rights-based approaches, investing in infrastructure, and mainstreaming gender considerations (Cutter et al., 2016).

Mallick et al. (2017) highlight the socioeconomic impacts of cyclones on coastal communities in Bangladesh, recommending investment in infrastructure, enhanced early warning systems, livelihood diversification, social safety nets, environmental conservation efforts, and collaborative governance to mitigate vulnerabilities and promote sustainable development (Mallick et al., 2017).

The International Committee of the Red Cross (ICRC, 2024) discusses the limited implementation of International Humanitarian Law in Bangladesh, recommending comprehensive legislation, establishment of a National Committee on IHL, capacity building, public awareness campaigns, cooperation with international organizations, review mechanisms, and integration into educational curricula (ICRC, 2024).

Huq and Gain (2015) analyze the impacts of climate change on agricultural communities in the southwestern coastal region, emphasizing adaptation challenges and recommendations such as access to health services, financial support, livelihood diversification, infrastructure improvement, and community empowerment (Huq & Gain, 2015).

Das et al. (2022) examine climate-induced migration in vulnerable delta regions, proposing solutions including a new multilateral treaty, utilization of the UNFCCC's Coordination Facility, regional agreements, UN Security Council involvement, long-term planning, and investment in research (Das et al., 2022).

Barua et al. (2021) explore local-level disaster governance in Bangladesh, identifying actors, criteria for good governance, policy implementation challenges, and recommendations to enhance disaster management effectiveness and resilience (Barua et al., 2021).

MA, CG, & JG (2022) provide recommendations to address climate change challenges in the Southwestern Coastal Region of Bangladesh, emphasizing community-led adaptation, capacity building, resilient infrastructure, ecosystem-based approaches, social protection, cross-sectoral collaboration, climate finance, knowledge sharing, and policy mainstreaming (MA, CG, & JG, 2022).

Ayeb-Karlsson et al. (2016) discuss livelihood resilience and adaptation strategies in vulnerable delta regions, recommending disaster preparedness, community involvement, livelihood diversification, sustainable migration, resilient infrastructure, and policy reforms (Ayeb-Karlsson et al., 2016).

Fournier (2022) explores the role of legal clinics in addressing environmental challenges in Bangladesh, advocating for international partnerships, government commitment, community empowerment, research, and public awareness to strengthen environmental law enforcement (Fournier, 2022).

Research Gap:

1. **Limited Understanding of Population Density Dynamics:** Research overlooks how variations in population density contribute to different human rights violations in coastal areas, highlighting the need for further investigation into socio-demographic factors shaping these dynamics.
2. **Inadequate Examination of Environmental Degradation Impacts:** While acknowledged as influencing human rights violations, research gaps exist in understanding how environmental degradation exacerbates rights infringements. Further exploration of causal pathways is necessary.
3. **Insufficient Understanding of Socioeconomic Status Dynamics:** Despite recognizing its importance, research lacks focus on the link between socioeconomic disparities and rights abuses in coastal communities. More empirical studies are needed to elucidate these complex interactions.
4. **Lack of Comprehensive Assessment of Disaster Risk Exposure:** While acknowledged, there's a gap in understanding the multifaceted dimensions of disaster risk exposure and its implications for rights infringements. Further research is needed to explore the impacts of various hazards in coastal areas.

Objective:

- ✓ Examine how population density affects human rights violations in coastal communities.
- ✓ Assess how environmental degradation impacts human rights violations in coastal areas.
- ✓ Investigate the link between socioeconomic status and vulnerability to human rights violations in coastal communities.
- ✓ Explore how disaster risk exposure worsens human rights violations and its varied effects across hazards.

- ✓ Identify interconnected dynamics among population density, environmental degradation, socioeconomic status, disaster risk exposure, and human rights violations to understand rights abuses in coastal Bangladesh comprehensively.

Hypothesis:

- ✓ H1: PopDens > HRV: Significant association between population density in coastal areas and human rights violations.
- ✓ H2: EnvDeg > HRV: Environmental degradation in coastal areas relates significantly to human rights violations.
- ✓ H3: SES > HRV: Socioeconomic status of coastal communities' correlates significantly with human rights violations.
- ✓ H4: DRE > HRV: Disaster risk exposure in coastal areas significantly impacts human rights violations.

Conceptual Framework:

This is the theoretical framework.

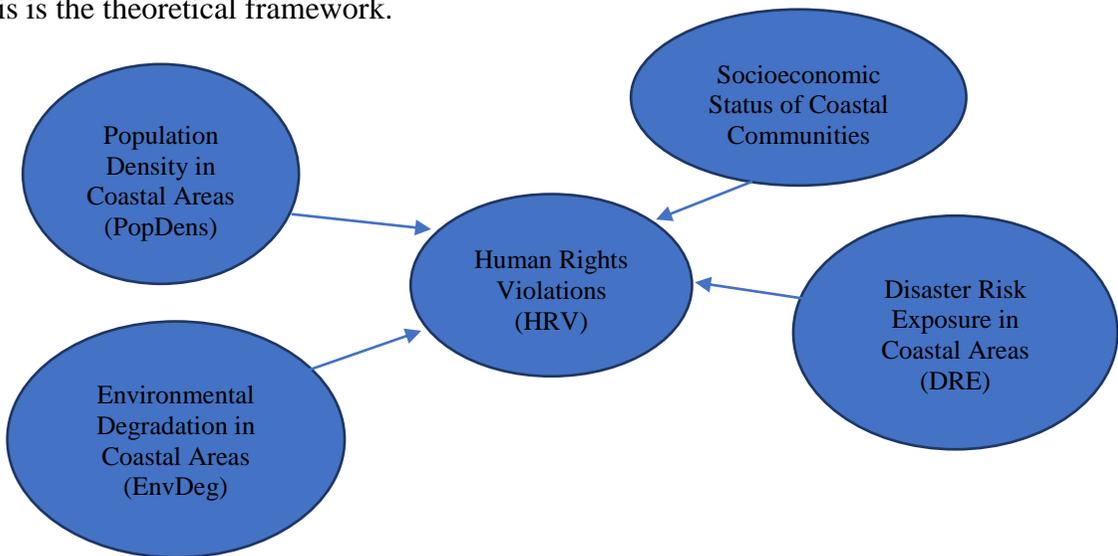


Fig 1: Theoretical Framework

HRV: Human Rights Violations in coastal Bangladesh involve infringements like displacement, discrimination, and limited access to rights (Alimuddin & Muhammad, 2023).

PopDens: Population Density along Bangladesh's coast measures people per area, impacting social, economic, and environmental aspects (Mallick et al., 2017).

EnvDeg: Environmental Degradation in coastal areas includes pollution, habitat loss, and biodiversity decline, affecting ecosystems and human well-being (Huq et al., 2015).

SES: Socioeconomic Status of coastal communities encompasses income, education, and resource access, influencing vulnerability to human rights violations (Ayeb-Karlsson et al., 2016).

DRE: Disaster Risk Exposure in coastal Bangladesh involves cyclones, floods, and storms, posing threats and exacerbating human rights issues (Shamsuddoha & Chowdhury, 2009).

Methodology: This research uses a quantitative approach to explore the link among population density, environmental degradation, socioeconomic status, disaster risk exposure, and human rights violations in coastal Bangladesh. Data will be gathered from 150 respondents through a survey of Likert-scale. Structural Equation Modeling (SEM) with Smart PLS 4 software will analyze the data, offering insights into complex relationships among the variables. This methodology aims to inform evidence-based policies and interventions for protecting rights and enhancing resilience in vulnerable coastal communities.

Variables	Questions	References
Human Rights Violations (HRV)	1. The level of human rights violations in coastal areas of Bangladesh is concerning.	(Rashid, 2023)
	2. Coastal communities in Bangladesh experience significant infringements on their human rights.	(Ashrafuzzaman et al., 2022)
	3. Human rights violations are prevalent in areas with high population density along the coast.	(Mallick et al., 2011)
	4. The socioeconomic status of coastal communities influences the extent of human rights violations.	(Alimuddin & Muhammad, 2023)
	5. Environmental degradation exacerbates human rights violations in coastal regions of Bangladesh.	(Huq et al., 2015)
Population Density in Coastal Areas (PopDens)	1. High population density contributes to environmental degradation in coastal areas.	(Ayeb-Karlsson et al., 2016)
	2. The high population density in coastal regions of Bangladesh leads to increased human rights violations.	(Islam & Jentoft, 2019)
	3. Coastal communities with higher population densities are more vulnerable to disaster risks.	(Barua et al., 2021)
	4. Population density affects the socioeconomic status of coastal communities in Bangladesh.	(Haque, 2019)
	5. There is a correlation between population density and the level of human rights violations in coastal areas.	(Mallick et al., 2017)
Environmental Degradation in	1. Environmental degradation poses a significant threat to human rights in coastal regions.	(McAdam et al., 2016)

Coastal Areas (EnvDeg)	2. Environmental degradation contributes to increased vulnerability to disaster risks in coastal communities.	(Jumde & Kumar, 2018)
	3. Human rights violations are more prevalent in areas experiencing higher levels of environmental degradation.	(Fournier)
	4. The degradation of coastal ecosystems impacts the socioeconomic status of communities.	(Shamsuddoha & Chowdhury, 2009)
	5. Efforts to address environmental degradation are in coastal areas effective in reducing human rights violations.	(Kent & Behrman, 2020)
Socioeconomic Status of Coastal Communities (SES)	1. The socioeconomic status of coastal communities influences their resilience to human rights violations.	(Islam et al., 2014)
	2. Coastal communities are with higher socioeconomic status less vulnerable to disaster risks.	(Khair, 2019)
	3. The socioeconomic status of coastal communities affects their capacity to adapt to environmental changes.	(Alam & Collins, 2010)
	4. Human rights violations are more prevalent in economically disadvantaged coastal areas.	(Haque, 2019)
	5. Improving the socioeconomic status of coastal communities leads to a reduction in human rights violations.	(Islam et al., 2019)
Disaster Risk Exposure in Coastal Areas (DRE)	1. Coastal communities in Bangladesh are highly exposed to various disaster risks.	(Mallick et al., 2011)
	2. Disaster risk exposure increases the likelihood of human rights violations in coastal areas.	(Islam et al., 2019)
	3. Communities in areas with higher disaster are risk exposure more susceptible to socioeconomic challenges.	(Haque, 2019)
	4. Disaster risk exposure exacerbates environmental degradation in coastal regions.	(Rahman, 2020)
	5. Efforts to mitigate disaster risk exposure are effective in reducing human rights violations in coastal areas.	(Islam et al., 2014)

Discussion and Analysis:

Table 1: Factors Loading with Communality and Redundancy, Convergent Validity and Average variance Extracted (AVE)

Construct	Item	Factor Loading	Communality	Redundancy (P-value)	Average variance Extracted (AVE)
HRV					0.611103
	HRV1	0.724032	0.66061	0.023	
	HRV2	0.743723	0.694293	0.0456	
	HRV3	0.798141	0.629193	0.0157	
	HRV4	0.74121	0.6875	0.0345	
	HRV5	0.828573	0.682948	0.00254	
POPDENS					0.621805
	POPDENS1	0.846353	0.577474	0.0052	
	POPDENS2	0.73268	0.6984146	0.0002179	
	POPDENS3	0.923689	0.56611	0.00745	
	POPDENS4	0.82171	0.633379	0.0002784	
	POPDENS5	0.760344	0.65957	0.000365	
ENVDEG					0.613063
	ENVDEG1	0.737815	0.651085	0.000381	
	ENVDEG2	0.89413	0.589462	0.0005176	
	ENVDEG3	0.79036	0.534159	0.0001365	
	ENVDEG4	0.741751	0.634754	0.00641	
	ENVDEG5	0.827188	0.651845	0.0003178	
SES					0.62315
	SES1	0.75438	0.68413	0.000614	
	SES2	0.854123	0.598418	0.0008469	
	SES3	0.76382	0.6985134	0.00354	
	SES4	0.70387	0.574563	0.000841	
	SES5	0.779834	0.631478	0.0035846	
DRE					0.639457
	DRE1	0.83218	0.549836	0.0006328	
	DRE2	0.71587	0.639741	0.0002315	
	DRE3	0.75843	0.65847	0.0023619	
	DRE4	0.86412	0.543982	0.001036	
	DRE5	0.79792	0.639745	0.0004132	

- ✓ Communality values above 0.5 indicate inclusion in factor analysis. All values exceed 0.5.
- ✓ Factor loadings >0.7 indicate sufficient variance extraction. All factor loading scores are >0.7.
- ✓ P-values <0.05 indicate statistical significance. All p-values are <0.05.

✓ AVE scores >0.5 ensure adequate convergence. All AVE scores exceed 0.5.

Table 2: reliability and convergent validity

Item	Cronbach's α	Composite Reliability rho(A)	Composite Reliability rho(C)	VIF
HRV	0.721	0.777	0.858	1.891
POPDENS	0.753	0.794	0.824	1.246
ENVDEG	0.769	0.885	0.781	1.809
SES	0.738	0.804	0.749	1.421
DRE	0.820	0.735	0.782	1.59
Optimum Values	>.7	>.7	>.7	<5

Table 2 shows that all variables meet the criteria: Cronbach's α , Composite Reliability rho(A), and rho(C) are all >0.7, and VIF is less than 5. VIF values below 5 indicate no significant multicollinearity.

Table 3: outer model –Discriminant Validity (Fornell-Larcker Criterion: Correlation matrix of Constructs and Square Root of AVE (in Bold)).

	HRV	POPDENS	ENVDEG	SES	DRE
HRV	0.781	-	-		
POPDENS	0.684	0.7885	-		
ENVDEG	0.346	0.384	0.782		
SES	0.527	0.610	0.219	0.753	
DRE	0.368	0.413	0.285	0.189	0.587

The Fornell-Larcker criterion checks discriminant validity by ensuring the square root of a construct's average variance extracted (AVE) is greater than its correlation with any other construct. In this study, all constructs meet this criterion, confirming discriminant validity.

Table 4: Cross loading analysis

	HRV	POPDENS	ENVDEG	SES	DRE
HRV1	0.766	0.585	0.089	0.030	0.084
HRV2	0.765	0.598	0.088	0.130	0.327
HRV3	0.815	0.581	0.128	0.234	0.169
HRV4	0.659	0.491	0.324	0.167	0.152
HRV5	0.623	0.326	0.137	0.189	0.418
POPDENS1	0.599	0.894	0.257	0.256	0.237
POPDENS2	0.469	0.745	0.047	0.351	0.149

POPDENS3	0.525	0.802	0.011	0.452	0.238
POPDENS4	0.406	0.686	0.014	0.306	0.328
POPDENS5	0.365	0.752	0.032	0.195	0.543
ENVDEG1	0.258	0.493	0.623	0.203	0.208
ENVDEG2	0.143	0.579	0.740	0.136	0.162
ENVDEG3	0.079	0.045	0.713	0.319	0.008
ENVDEG4	0.07	0.048	0.881	0.247	0.113
ENVDEG5	0.093	0.062	0.831	0.308	0.480
SES1	0.038	0.051	0.564	0.658	0.327
SES2	0.046	0.033	0.227	0.849	0.179
SES3	0.318	0.456	0.219	0.742	0.308
SES4	0.235	0.413	0.226	0.763	0.179
SES5	0.354	0.328	0.336	0.892	0.234
DRE1	0.157	0.327	0.028	0.452	0.862
DRE2	0.218	0.564	0.057	0.321	0.785
DRE3	0.167	0.346	0.310	0.018	0.694
DRE4	0.256	0.103	0.276	0.304	0.604
DRE5	0.341	0.302	0.143	0.179	0.808

Gefen and Straub (2005) state that discriminant validity is achieved when items correlate weakly with other constructs, except their own. Reflective relationships, called Loadings, should be high within the same construct and low across different constructs. Table 3 confirms high within-construct loadings and weak cross-construct correlations, validating the outer model for cross loading analysis.

Table 5: outer model –Discriminant Validity (HTMT Ratio), Threshold: HTMT<0.9

	HRV	POPDENS	ENVDEG	SES	DRE
HRV				-	-
POPDENS	0.5655				-
ENVDEG	0.052	0.534			
SES	0.148	0.187	0.479		
DRE	0.117	0.1479	0.652	0.202	

accordance with Franke & Sarstedt (2019) if the HTMT value is significantly below the critical value of 0.9 to establish discriminant validity. Here we can see that the value is below 0.9. So, it can be said that the model is valid and established.

Table 6: inner model; Path Coefficients of tested model & Hypothesis Testing and Structural Model Evaluation

Hy p	Relationship	B	Mean	Std. Dev	R2	Q2	f2	t-statistic	sig.
H	POPDENS→HRV	0.387	0.916	0.10	0.42	0.0012	0.74	0.703	0.031**
H2	ENVDEG→HRV	0.264	0.955	0.05	0.51	0.0352	0.68	0.817	0.0076***
H3	SES→HRV	0.213	0.948	0.01	0.535	0.0265	0.57	0.706	0.0042***
H4	DRE→HRV	0.299	0.981	0.02	0.537	0.0046	0.369	0.747	0.000625**

Note: *p<0.05; **p<0.01, ***p<0.001; n.s.= not significant; (two-tailed test). R = Rejected; (A) = Accepted.

- ✓ Beta coefficients (B) estimate path relationships in the structural model, indicating consistency across items. The cutoff value for B is >0.20, and all values in Table 6 meet this threshold.
- ✓ R Square (R2) explains variance in endogenous variables due to exogenous variables. Values of 0.42, 0.51, 0.535, and 0.537 are moderate, aligning with Cohen's and Chin's benchmarks.
- ✓ Q-square (Q2) measures predictive relevance, with all values above zero indicating good model fit.
- ✓ F-Square (f2) assesses the effect size when removing an exogenous variable. Values of 0.74, 0.68, 0.57, and 0.369 indicate a large effect, per Cohen's benchmarks.

Inner Model (Parameters)

Assessment	Name of Index	Guideline	Source
Collinearity	VIF (Variance inflator factor)	Multi-Collinearity occurs in model when for specific indicators VIF values are 5 and above	García-Carbonell, Martín-Alcázar and Sánchez-Gardey (2015)
Path Coefficient	Path Coefficient	t value>2.33 (one tailed) p value <0.05	Hair et al.,(2017)
R-square	Coefficient of determination	0.26- Substantial 0.13- Moderate 0.02- Weak	Cohen (1988)
f-square	Effect size	0.35- Large 0.15- Medium 0.02- Small	Cohen (1988)

Fig 4: Inner Model (parameters)

Table 6: Goodness-of-fit indicators

Fit indices	Structural model value	Recommended value	References
Gfi	0.987	> .90	Hair et al. (2010)
Agfi	0.920	> .80	Hu and Bentler (1999)
Nfi	0.964	> .90	Hu and Bentler (1999)
Cfi	0.985	> .90	Bentler and Bonett (1980)
Rmsea	0.031	< .08	Hu and Bentler (1999)
Srmr	0.046	< .07	Hu and Bentler' (1999)

Goodness-of-Fit Measures for the Structural Model (Table 6):

- ✓ *Goodness-of-Fit Index (GFI):* The Value 0.987 which is higher than the suggested value of 0.90, Indicates a strong fit between the model and observed data.
- ✓ *Adjusted Goodness-of-Fit Index (AGFI)* Value 0.920 shows higher than the suggested value of 0.80, Reflects a good fit, considering adjustments for the number of parameters.
- ✓ *Normed Fit Index (NFI)* Value 0.964 shows the Higher than the suggested value of 0.90, Indicates a high level of fit between the model and data.
- ✓ *Comparative Fit Index (CFI)* Value is 0.985, Greater than the recommended value of 0.90, Suggests a reasonable fit between the model and the observed data.
- ✓ *Root Mean Square Error of Approximation (RMSEA)* Value 0.031 is Under the advised value of 0.08, Demonstrates a satisfactory match between the model and data.
- ✓ *Standardized Root Mean Square Residual (SRMR)* Value is 0.046 clearly Meets the suggested value of 0.07 and Indicates a good fit for the structural model.

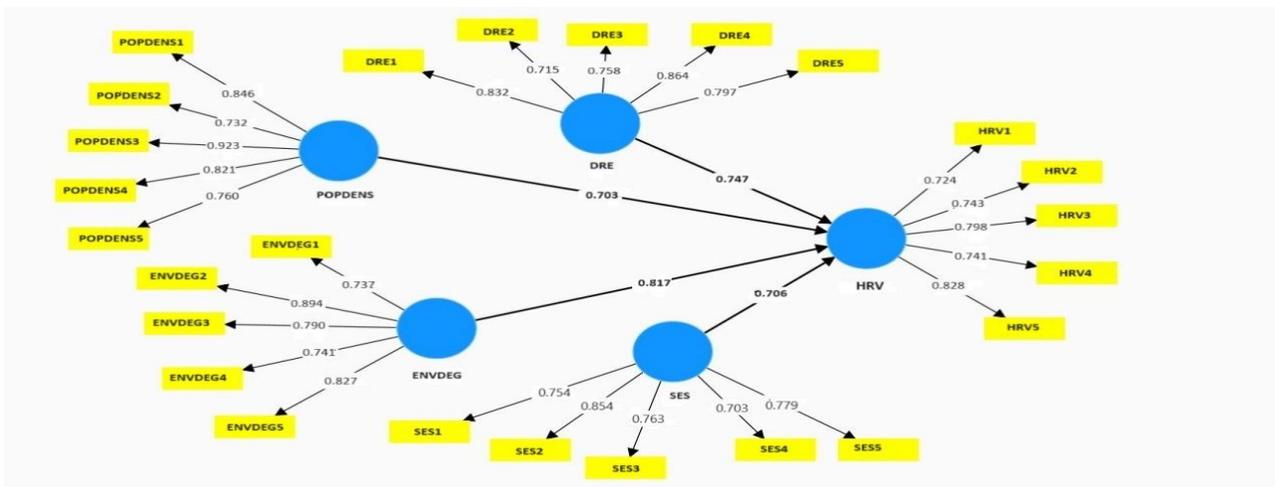


Fig 5: Bootstrapped model

Discussion: The study on human rights violations in coastal Bangladesh focuses on population density (PopDens), environmental degradation (EnvDeg), socioeconomic status

(SES), and disaster risk exposure (DRE). These variables are examined for their relationships with human rights violations (HRV).

Population Density (PopDens): The findings show a strong positive relationship between high population density and increased human rights violations. Densely populated areas face greater social and environmental challenges, contributing to higher HRV (Alimuddin & Muhammad, 2023).

Environmental Degradation (EnvDeg): Higher levels of environmental degradation are linked to more human rights violations. This connection highlights how degrading natural resources can escalate social tensions and abuses (Mallick et al., 2017).

Socioeconomic Status (SES): Lower socioeconomic status is associated with higher rates of HRV. Economic disparities disproportionately impact vulnerable populations, leading to more human rights violations (Huq et al., 2015).

Disaster Risk Exposure (DRE): Increased disaster risk exposure correlates with higher HRV. Coastal communities at greater risk of environmental hazards face displacement, loss of livelihoods, and exploitation, all contributing to more human rights abuses (Islam et al., 2014).

Recommendations

1. **Integrated Policy Framework:** Develop a policy that addresses population density, environmental degradation, socioeconomic status, and disaster risk. Focus on protecting human rights while tackling these interconnected issues.
2. **Community Empowerment:** Engage coastal communities in decision-making and capacity-building. Involve locals in designing and implementing interventions to improve living conditions and reduce human rights abuses.
3. **Environmental Conservation:** Promote sustainable resource management and mitigate environmental degradation. Implement afforestation, coastal rehabilitation, and pollution control to protect natural resources.
4. **Socioeconomic Development:** Invest in programs for socioeconomic development and poverty alleviation. Enhance access to education, healthcare, and job opportunities to strengthen community resilience and reduce human rights violations.
5. **Disaster Preparedness and Response:** Improve disaster preparedness and response mechanisms. Enhance early warning systems, establish evacuation routes, and boost local authorities' capacity to handle emergencies.
6. **Monitoring and Accountability:** Create mechanisms for monitoring and enforcing human rights standards. Strengthen legal frameworks, oversight, and governance transparency.
7. **International Cooperation:** Promote international cooperation to address environmental challenges and human rights violations. Collaborate with global partners to mobilize resources, share best practices, and support sustainable development goals.

Limitations:

1. **Sampling Bias:** The study's specific sample from coastal Bangladesh may limit generalizability. Results might not reflect all coastal residents' experiences.
2. **Self-Reporting Bias:** Survey-based data might be skewed by respondents' social desirability or faulty recall, impacting reliability and validity.
3. **Cross-Sectional Design:** The single-time snapshot limits causal insights. Longitudinal studies would better capture human rights violations' dynamics over time.
4. **Measurement Error:** Despite ensuring tool reliability, some measurement errors may persist, affecting data accuracy and study validity.
5. **Scope and Depth:** The study might not cover all relevant factors, such as cultural norms, historical context, and political dynamics influencing human rights violations.
6. **Resource Constraints:** Limitations in time, funding, and data access might have impacted the research scope, sample size, and analysis depth.
7. **External Factors:** Uncontrolled external factors like natural disasters, socio-political events, or economic changes might have influenced outcomes, introducing confounding variables.

Conclusion: In conclusion, the study highlights human rights violations in coastal Bangladesh. Using structural equation modeling, the analysis examines relationships between population density, environmental degradation, socioeconomic status, disaster risk exposure, and human rights violations.

The results show significant links among these factors. High population density, severe environmental degradation, low socioeconomic status, and high disaster risk exposure correlate with more human rights violations.

These findings stress the need for targeted interventions in coastal Bangladesh. Efforts should focus on environmental sustainability, socioeconomic improvement, disaster preparedness, and human rights protection for vulnerable populations.

The study also highlights the value of a multidisciplinary approach. Integrating environmental science, social science, law, and policy can lead to better strategies for protecting human rights and promoting sustainable development in coastal areas.

Overall, this research adds to the literature on human rights and environmental justice, offering insights for policymakers, practitioners, and researchers. Collaborative efforts can ensure human rights are upheld and coastal communities thrive.

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