



Gender, Governance, and Green Futures: The Impact of Women's Leadership on Climate Policy Effectiveness and Sustainability

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Abstract

Two of the defining challenges of the twenty-first century are climate action and the equal representation of women in decision-making bodies. While policymakers often treat these as distinct agendas, they are strongly interconnected and serve as key determinants in achieving the path of attainment of sustainable development.

Exploring them in the context of Indian philosophy and mythology the fact that Nature, called as Prakriti has been regarded as a feminine energy or principle which represents the strong interrelation between the two. It does mark the necessity of taking into account women's views when drawing up the climate policies. It has also been discovered that women do have a different and influential view on climatic policies since it is one of the sectors of the society that face most risk of being affected by climatic changes. Globally, nations are shifting toward constructing practical, actionable climate policies capable of delivering measurable on the ground results. To effectively address emerging challenges on the path to sustainable development, these frameworks must be built on a nuanced understanding of diverse social contexts and ensure the meaningful representation of all societal sections.

Various researches and case-studies of different countries have depicted that women leadership does play a significant role in taking a leap forward on the path of sustainable development by formulating effective climate policies. This study investigates the relationship between the representation of women in the decision-making bodies and the outcomes of the climate policies while focusing upon the metrics such as greenhouse gas emissions, usage of renewable energy and allocation of climate finance.

The study is based upon the secondary data drawn from the World Economic Forum's Global Gender Gap Index which represents political empowerment and economic participation of women across different countries and the Climate Change Performance Index ranking different countries on the basis of their efforts for protection of climate and stringent climate policies.

By employing certain quantitative methods, the study evaluates the influence of women leadership upon climatic governance and environmental sustainability of different countries. The findings depict a positive correlation between the presence of women leaders in the decisive bodies and the effectiveness of climate policies formulated in the respective countries. It reveals that the countries which have demonstrated better performance in the Climate Change Performance Index which indicates effective climate policies and mitigation are ranked high in the Global Gender Gap Index (GGI).

The findings of this research do support the need to provide equal opportunities and better representation at pivotal roles, especially in the decision-making bodies for achieving sustainable development and building climate resilience.

Keywords: Gender Equality, Women's Leadership, Climate Policy, Sustainability, Governance, Renewable Energy, Climate Finance, Global Gender Gap Index (GGI), Climate Change Performance Index (CCPI).

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1. INTRODUCTION

Women account for roughly half of the world population and are an integral part of the work force. 20th and 21st century have seen multiple occasions where in the importance of equal representation of female population in all walks of life has been emphasized. One of the most highlighted amongst them is the better representation of women in formulating and laying out of the climatic policies and taking impactful actions against the ever-increasing climatic changes. Inclusion of women in the process of planning and executing ideas for building climate resilience and safeguarding our environment will result in consideration of diverse opinions and valuable insights which have had been left untapped.

World history is enriched with multiple examples of such courageous women who had taken strong actions and led successful movements against the deteriorating conditions of nature by boldly standing up against activities which were likely to put the natural vegetation of a particular area in danger. Amrita Devi Bishnoi successfully led the Bishnoi Movement along with the villagers of Khejrali village in the 18th century, which was one of the first mobilized movements for the cause of environmental conservation and protection of flora and fauna. (Mangilal, 2020) The Chipko Movement of 1974 was led by the likes of Sundar Lal Bahuguna and Chandi Bhatt but the success of this movement was a result of an active participation of the women folk of Reni village. (Kalita, 2015) (Jain, 1984) "Hug the Tree" initiative which was a major highlight of this movement was a spontaneous response of the village women led by Gaura Devi against the authorities. (Bandopadhyay, 1999) Inspired by the Chipko Movement, in the year 1983 Appiko Andolan took place in Uttara Kannada district of Karnataka where the women and children stood to safeguard the Kalase forest area. (Venkatesh, 2018)

Silent Valley National Park was the result of silent valley movement led by local women population along with active impact of environmentalist Sugatha Kumari, initially aimed at opposing the dam construction for hydroelectric project. (Shahmeena, 2022) (Punnathara, 2025) 2004 Nobel Peace Prize Laurette Prof. Wangari Maathai led the very famous Green Belt Movement in Kenya against the constantly degrading natural vegetation due to large scale cutting down of large trees resulting into desertification of the rich Kenyan forests. (Gail, 2013) She successfully mobilized the local and uneducated women population to plant millions of trees over the years providing substantial contribution towards climate resilience and also women empowerment at grassroot level. (Hunt, 2014)

Climate activists such as Venesa Nakate of Africa (Barnes, 2021), Greta Thunberg have been able to mobilize the young generation successfully for the cause of Climate change and against the inactivity of the government to formulate stringent policies and norms to deal with climate change. (Matejova, 2025) (Liu, 2024) (Sorce, 2022) (J., 2021). Licypriya Kangujam, Xiye Bastida, Autumn Peltier and more young girls from different countries have stood up for the cause of climate change mitigation and are contributing to reduce global warming and emphasizing upon the need to take action against the degrading environmental conditions. (Lai, 2022)

Female Policymakers such as Christiana Figueres, Eleni Myrivili, Marina Silva, Elizabeth May (Jansen, 2024) (Ivanova, 2021) have led different decisive bodies to



take up stringent actions and lay down effective policies to safeguard the environment against climatic changes.

The call for better opportunities of leadership for women in top decisive bodies for climate change is increasing because the strategies and plans employed by women are generally more viable, effective and grounded in reality. Better representation of women in any sphere will be fruitful because a more representative decisive body is likely to devise better and more realistic ideas to find solutions to the upscaling issues. Often considered as near to nature and more vulnerable to the climatic changes, the perspective brought by women will be different as compared to their male colleagues and are likely to have a positive impact on the policy formulation. (UNWomen, 2025)

2. REVIEW OF LITERATURE

Climate change has been identified to be the major environmental concern in the current times. (Kos, 2023) All the countries are working towards adapting with the climatic changes but the magnitude and intensity, depends upon multiple factors including their economic status and level of development. (Berrang-Ford, 2011)

Strategic planning with holistic approach rather than mere resolutions and cliched ideas is required to be developed and executed to address the mounting problems brought by climate changes. (Martijn van Zomeren, 2019)

Climate Change and gender-based inequalities in our society have been pressing issues and can be considered as the twin challenges in the path to attain Sustainable Development. (Leach, 2016) Sustainability in a society can be attained by inclusion of deprived female population and closing the gender-gap by providing women access to political participation, leadership opportunities along with economic empowerment. (Roig, 2020) Eco-feminist literature emphasizes that women share close proximity with nature as their influence starts from the local levels that can rise up to national and international levels which can be vital in achieving the goal of sustainability. (Demirci, 2025) (Batrićević, 2019) (Allison, 2017) (Mukherjee, 2013)

It has been stated in multiple research papers and articles that climate change cannot be termed as a “Gender Neutral” phenomenon as the impact borne due to these changes is different in case of males and females. (UNWomen, 2025) (Dankelman, 2010) Due to the gendered impact of climatic changes women are considered as vulnerable against these changes in comparison to men. (Smyth, 2012)

This vulnerability combined with the inherent gender inequalities women face across the world especially in the low and middle-income countries cumulatively deteriorate the existing disparities faced by them exposing them to face several new challenges including access to basic resources which are vital for subsistence. (Anjum, 2025) (Eastin, 2018) Female population being more vulnerable to the continued climatic changes, makes it even more necessary to include them in the process of climatic policy formulation. (Sidun, 2024) (Chersich, 2018)

There is a need to acknowledge the impact of women upon environment and sustainable development as they hold the access to traditional knowledge systems which were environment friendly and are implementable to safeguard our planet



against climate change. (Debarchana Biswas, 2025) (Mathur R, 2023) Women should be given the recognition for the multiple roles they play as environmental activists, food producers, businesspersons, health care providers, and mothers are instrumental in creation of a sustainable and prosperous future for all of us. (Bangun, 2020) (Mukherjee, 2013) Women also play a vital role in building resilience in the communities against the climatic changes. (UNFCCC, 2023)

Studies present evidences to show that the presence of women in the executive committees, parliamentary bodies and other decisive bodies have led to greater improvements in the policies on climate mitigation and environmental conservation. (Berniell, 2025) (Wedeman, 2019) (Agarwal, 2009) (Norgaard, 2005) During the process of policy formulation, it has been found that women are more knowledgeable, sensitive and are pro-environment as compared to their male counterparts on the matters of sustainable development, climate action and rising environmental concerns. (Noblet, 2015) (Arnocky, 2010) (Hunter, 2004). Women policymakers focus on policies which may lead to reduction in the GHG emissions, stringent rules against deforestation, protection of natural vegetation and increased creation of protected land areas. (McGann, 2020) (Fredriksson, 2011) (Nugent, 2009)

Existing researches have provided substantial evidences linking the better status of women representation with effective climatic policies, but a nuanced analysis of this relationship using standard indexes published by international organizations or think tanks have been under-explored. Even though the researches present significant material to prove the positive relationship between gender equality and effective climate policy outcomes but the comparative analysis of this relationship depending upon the economic status of countries is often under-explored. This research studies the relationship between gender equality (using GGGI 2025 scores) and climatic policy effectiveness (using CCPI 2025 scores) both in the generalized manner as well presents a comparative analysis between different income groups, providing significant contributions to the existing academic literature.

3. METHODOLOGY

This study aims at determining the relationship between representation of women in the decision-making bodies and the outcomes of the climate policies. This study is based upon secondary data to determine this relationship.

The two indexes which have been used in this study are:

1. **Climate Change Performance Index (CCPI) 2025:** This index is released annually, in collaboration of Germanwatch, New Climate Institute, and Climate Action Network International. The CCPI 2025 report presented the rankings 63 countries along with the European Union, which together account for nearly 90% of the Global Green House Gas Emissions. The index is based upon the assessment of the performance of countries based upon their GHG Emissions, Renewable Energy, Energy Use, and Climate Policy. (Burck, 2025) The indices of this report have been used to signify the outcomes of the climatic policies formulated by the nations.



- 2. Global Gender Gap Index (GGGI) 2025:** This report is released annually by the World Economic Forum, the GGGI report has ranks the situation of gender parity across countries on a scale of 0-1. These scores are based upon the performances of the countries on four subindexes: Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment. The GGGI report 2025 has presented the gender gap indexes, ranking 148 countries across the world. (Global Gender Gap Index Report 2025)

The sample consists of 50 countries which have been randomly selected with the criteria that they have ranked in both the CCPI 2025 report and GGG1 2025 report.

4. DATA ANALYSIS

This research paper aims to study the relationship between representation of women in the decision-making bodies and the outcomes of the climate policy outcomes. To ensure that the data used in the research is contemporaneous, the indices published in the year 2025 have been used.

Pearson's correlation coefficient and simple linear regression analysis has been used to determine the relationship between the two indices. Scatter plots have been used to display visualized form of the data studied.

4.1 Relationship between GGGI scores and CCPI score

A total of 50 countries had been included in this study (details of the countries along with their GGGI score and CCPI score for the year 2025 are provided in Annexure 1)

The mean CCPI score of 53.87 depicts that the countries included in this research have approximately achieved 53% of their GHG emission goals and been able to have satisfactory climate policy outcomes. While the mean GGGI score of 0.7238 indicates that on an average all the 50 countries, in this research have been able to close about 72% of their gender gap.

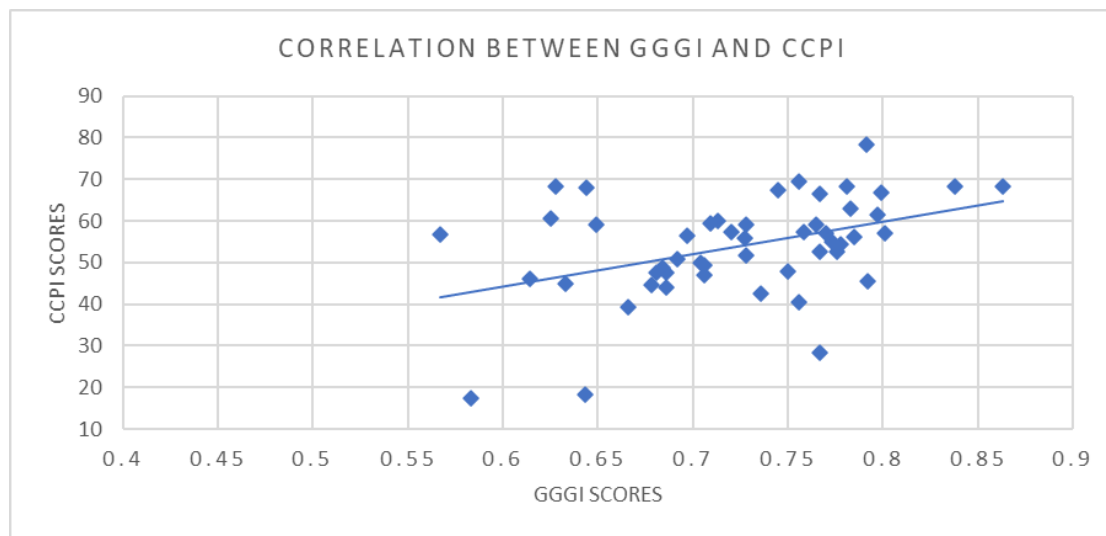
Table 1. Summary of Descriptive Statistics and Correlation Analysis of GGGI and CCPI Scores (N=50)

VARIABLE	GGGI Score	CCPI Score
Mean	0.7238	53.87
Median	0.728	55.94
Standard Deviation	0.064518	12.00362
N	50	50
Correlation Coefficient	0.417693	
p-value	0.00255	

Moderately positive correlation was found between GGGI and CCPI scores, $r(48) = .41$, $p < .05$. This suggests that countries with higher GGGI scores tended to have higher CCPI score.



Figure 1: Scatter Diagram depicting correlation between GGGI and CCPI scores of all 50 sample countries



Regression Analysis between GGGI scores and CCPI scores

To test if a lower gender gap (high GGGI score) predicts better climate performance (higher CCPI). GGGI scores have been considered as X-variable i.e. the independent variable while the CCPI scores have been considered as Y-variable i.e. the dependent variable. For the ease of calculation and better understanding the CCPI scores had been converted to 0-1 scale.

The model is statistically significant with p-value = 0.0025, which means that there is a relationship between the independent variable and the dependent variable. (R^2) = 0.174, indicating that about 17.4% of the variation in the dependent variable can be explained by the independent variable, suggesting a weak to moderate relationship between the variables.

Regression equation: $\hat{y} = 0.77712X - 2.37953$

This means that 1% increase in the GGGI scores will lead to an increase of 0.77% in the CCPI scores. A positive coefficient indicates that with increase in gender equality in the country the climate performance also gets enhanced and becomes more effective.

4.2 Relationship between the GGGI scores and CCPI score within different income groups

As per the classification of the World Bank on the basis of GNI per capita, countries across the world have been grouped into four income categories (Global Gender Gap Index Report 2025):

Category 1: High Income Countries have a GNI per capita more than \$14,005

(The study examines 30 countries from this income group.)

Category 2: Upper Middle-Income Countries have a GNI per capita in between \$4,516 – \$14,005

(The study examines 12 countries from this income group.)



Category 3: Lower-Middle Income Countries have a GNI per capita between \$1,146 -\$ 4,515

(The study examines 8 countries from this income group i.e. Philippines, Morocco, India, Egypt, Vietnam, Nigeria, Pakistan and Uzbekistan.)

Category 4: Low Income Countries have GNI per capita of \$1,145 or less.

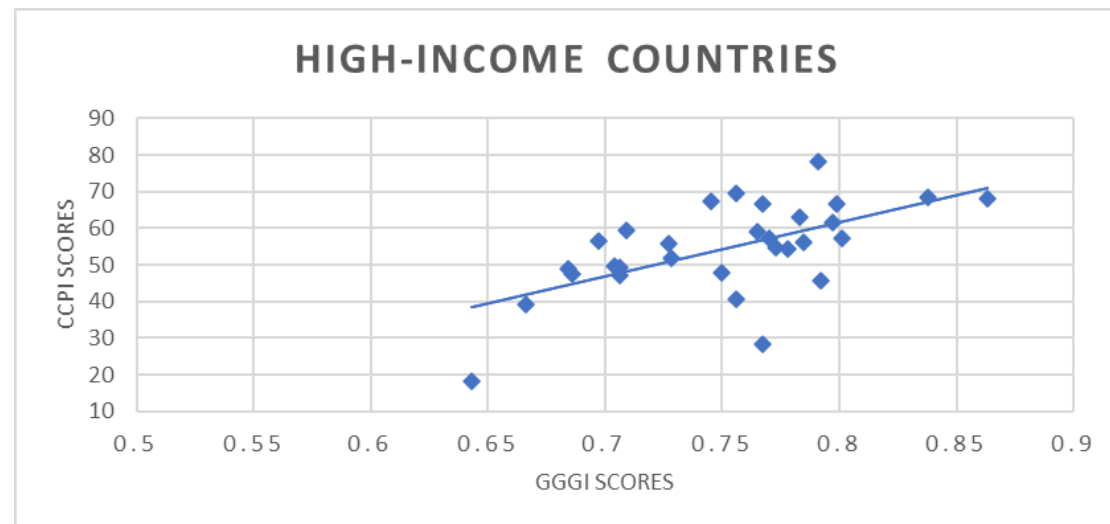
(Low Income Countries are not a part of this study because their climate policy outcomes and effectiveness could not be assessed as they have not been ranked in the CCPI report 2025)

Table 2. Summary of Descriptive Statistics and Correlation Analysis of GGGI and CCPI Scores of Countries within different Income Groups

VARIABLES	High-Income Countries		Upper-Middle Income Countries		Lower-Middle Income Countries	
	GGGI Score	CCPI Score	GGGI Score	CCPI Score	GGGI Score	CCPI Score
Mean	0.751067	54.48933	0.698	47.753	0.660625	60.725
Std. Deviation	0.049836	12.35128	0.05933	10.57028.	0.060256	7.503547
N	30		12		08	
Correlation	0.600806		0.731295		0.1734	
p-value	0.00045		0.00689		.681333	

For high-income countries, a significant positive correlation was found between GGGI and CCPI scores, $r(28) = .60, p < .05$. This suggests that among this group, countries with higher GGGI scores tended to have higher CCPI scores.

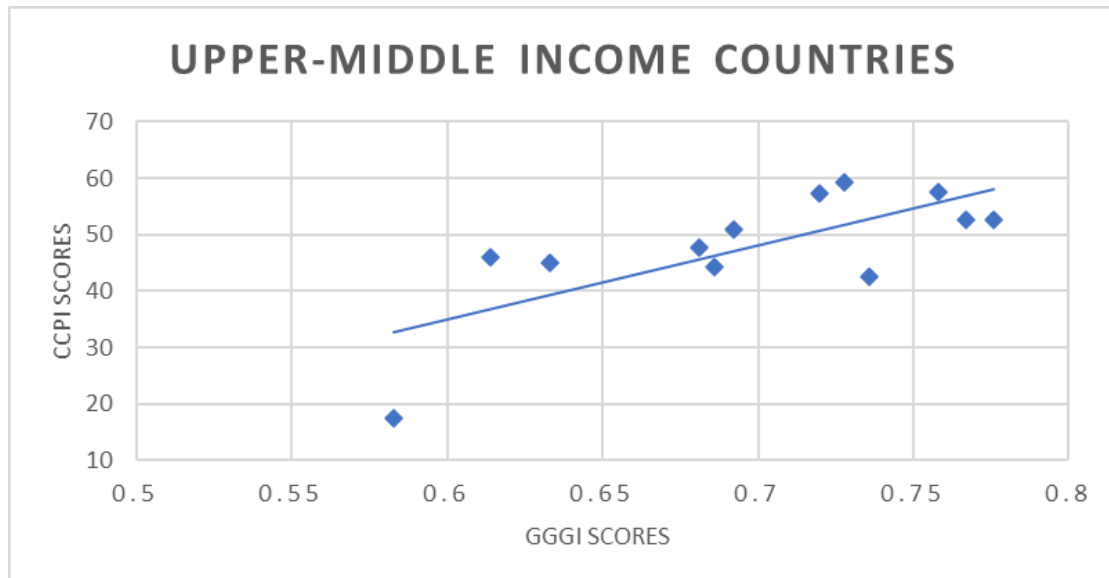
Figure 2: Scatter Diagram depicting correlation between GGGI and CCPI scores in High-Income countries



- For upper-middle-income countries, a strong and significant positive correlation was observed, $r(10) = .73, p < .05$. This indicates a substantial positive linear relationship between the two scores for this group as the countries with higher GGGI do have higher CCPI scores.

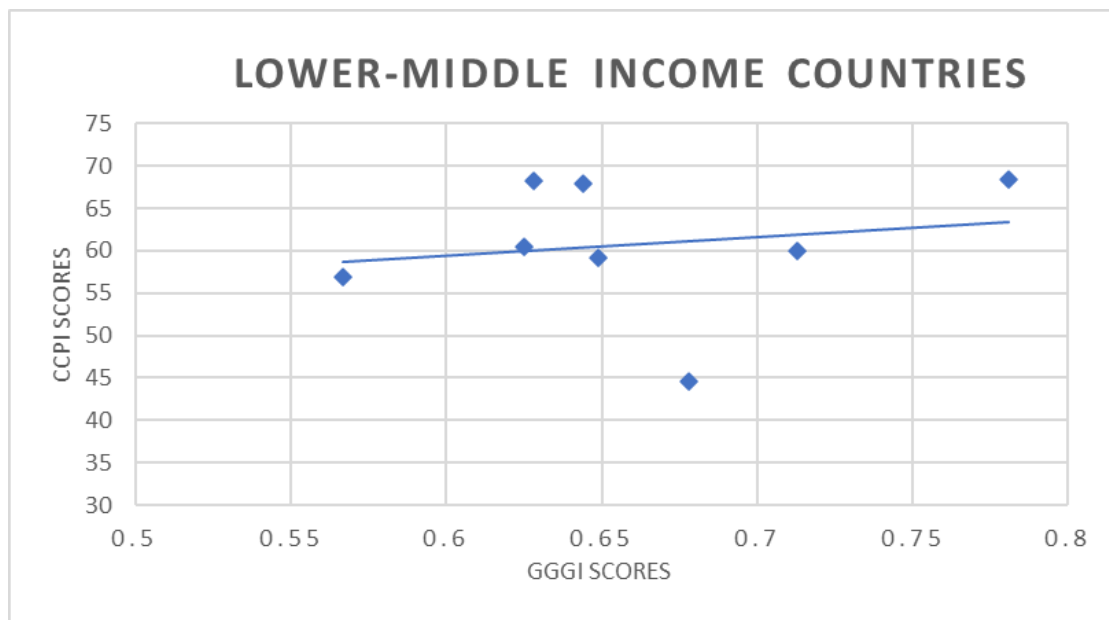


Figure 3: Scatter Diagram depicting correlation between GGGI and CCPI scores in Upper-Middle Income countries



For lower-middle-income countries, the correlation between GGGI and CCPI scores was found as statistically non-significant, $r(6) = .17$, $p = .68$ ($p > .05$). The absence of significance indicates no clear linear relationship was detected between the two variables for this group.

Figure 4: Scatter Diagram depicting correlation between GGGI and CCPI scores in Lower-Middle Income countries



These results indicate that the association between gender gap index and climate change performance differs depending on a country's income level.



Regression Analysis between GGGI scores and CCPI scores:

To test the relationship between the GGGI scores and CCPI scores in countries within the three income groups regression equations for each income group have been formulated, considering the GGGI scores as the independent variables and CCPI scores as the dependent variables. For the ease of calculation and better understanding the CCPI scores had been converted to 0-1 scale.

- **High-Income Group:**

The model is statistically significant with p-value = 0.0004, which means that there is a relationship between the independent variable(x-variable) and the dependent variable(y-variable). (R^2) = 0.3609, indicating that about 36.09 % of the variation in the dependent variable can be explained by the independent variable, suggesting a moderate relationship between the variables.

Regression equation: $\hat{y} = 1.48901X - 57.34583$

This means that 1% increase in the GGGI scores will lead to an increase of 1.48% in the CCPI scores. A positive coefficient indicates that with increase in gender equality in the country the climate performance also gets enhanced and becomes more effective.

- **Upper-Middle Income Group:**

The model is found to be statistically significant with p-value = 0.006, which means that there is a relationship between the x-variable and y variable. (R^2) = 0.534, which indicates that % 53.4% of the variation in the dependent variable (CCPI Score) can be explained by the independent variable (GGGI score), suggesting a moderate relationship between the variables.

Regression equation: $\hat{y} = 1.30277X - 43.1952$

This means that 1% increase in the GGGI scores will lead to an increase of 1.3 % in the CCPI scores. A positive coefficient indicates that with increase in gender equality in the country the climate performance also gets enhanced and becomes more effective.

- **Lower-Middle Income Group:**

The model is not found to be statistically significant as the p-value =0.68, which indicates that there is no significant statistical evidence to conclude that there is a relationship between the x-variable and y variable. (R^2) = 0.301, which is a very low percentage indicating that GGGI score is not a strong predictor of CCPI scores in case of lower-middle income countries.

Regression equation: $\hat{y} = 0.21593X + 46.45996$

This means that 1% increase in the GGGI scores will lead to an increase of 0.21% in the CCPI scores. However, the p-values for both the intercept and the X variable are well above the standard significance level of 0.05 indicating that neither the slope nor the intercept are statistically significant, and does not provide substantial evidence to indicate linear relationship between GGGI scores and CCPI scores in the lower-income countries.



5. INTERPRETATION

As revealed in the previously conducted studies this research also states the fact that better representation of women in the decisive roles have positive influence on the climate policy outcomes, paving a path towards the achievement of sustainable development goals 5 and 13.

The findings of the study do suggest a positive correlation between GGGI and CCPI showing that countries which have less gender disparities have managed to implement better climatic policies and strategies. Although the positive relationship between the two indices have been noticed constantly among the countries included in the research, the magnitude of the relationship of the indexes differs on the basis of the income group they belong to. The comparative analysis of the relationship between GGGI Scores and CCPI Scores across different income groups reveals that the nature and significance of this relationship is heavily dependent on the context of each income level. This reflects that the economic strength and capability of a country play a vital role in transition of countries into sustainable economies.

The positive and statistically significant correlation between the GGGI and CCPI in the case of High-income countries shows that these countries have managed to provide space and opportunities for greater women representation in political, economic and social spheres supported by better management of resources along with switching over to sustainable consumption patterns which leads to effective implementation of climate policy. However, some of the high-income countries (Saudi Arabia, Japan, USA, Canada, etc) have low CCPI scores which reflects that even in this group there are countries which have not been able to reduce their GHG emissions reflecting the huge per capita energy consumption of these countries. This shows that even with high income and high gender equality climate policy outcomes in these countries have not been as per the expectations.

The relationship between GGGI and CCPI in the upper-middle income group is stronger than that in the high-income group, although the mean CCPI and GGGI scores are less than the high-income group. It shows that these countries are working towards closing their gender gaps to promote gender equality while low CCPI scores reflect the reliance of these nations upon fossil fuels and flexible climatic policies. Countries like Colombia and Thailand have taken positive steps to reduce GHG emissions and implement stringent climate policies. While countries like China and Iran depict heavy reliance on fossil fuels leading to a slow transition process towards cleaner energy and hence are very in the CCPI report 2025.

The lower-middle income group does reveal positive relationship between GGGI and CCPI, however due to insufficient data availability, it is not statistically significant. Countries like Philippines, India, Vietnam have made significant progress both in closing their gender gap and implementing better climate policies. The high CCPI score also depicts that the per capita energy consumptions in these nations are low leading to lower GHG emissions. While decreased gender gap can be attributed to multiple factors along with the constant global pressure to comply with various international agreements to close gender gap and increase women participation across all spheres.



Thus, gender equality alone cannot be self-sufficient to ensure that effective climatic policies can be formulated as there are other variables which do have a significant impact upon the climate policies. Income and economic status of the country do play a vital role in implementation of better climatic policies which ensure shifting from dependence upon non-renewable resources to the costlier but technologically upgraded renewable resources.

6. LIMITATIONS

One of the major limitations of this research is the small sample size which is due to the lack of data availability of climate policy effectiveness (CCPI Scores) across various countries particularly the lower-middle income countries which undermines the robustness of the income group-based analysis. The CCPI also does not rank the low-income countries leading to their exclusion from this study. The research is based on the aggregate indices which do present an oversimplified image of the complicated realities missing out several vital influencing factors. To address these limitations more nuanced researches are required to be conducted by acknowledging findings cautiously and using mixed-methods or more granular studies so that better understanding about different factors which influence the relationship between gender equality and climatic policy effectiveness could be attained.

7. CONCLUSION

The study investigated the relationship between the Global Gender Gap Index and Climate Change Performance Index. The analysis revealed a significantly positive relationship between the two indices indicating that promotion of gender equality can prove to be an effective strategy for attaining improved climatic outcomes. However, the research highlights that the relationship is not uniform across all the countries as there are significant differences in the strength of this relationship based on the income group of the country. This shows that the relationship between gender equality and climate policy outcomes is nuanced and is dependent upon other factors particularly the income levels of the countries. The income-group based analysis highlights that different and customized policies should be developed based upon the socioeconomic status of each country because even within one income group countries do exhibit different relationship depending upon factors such as: prioritization of policies, the strength of the policy implementing institutions and primarily the economic structure of the country.

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ANNEXURE 1

Global Gender Gap Index and Climate Change Performance Index Scores, 2025

Name of the Country	GGGI Score 2025	CCPI Score 2025
Algeria	0.614	45.96
Australia	1	45.52
Belarus	0.736	42.64
Belgium	0.773	54.89
Brazil	0.72	57.25
Bulgaria	0.706	47.13
Canada	0.767	28.37
China	0.686	44.15
Colombia	0.758	57.48
Croatia	0.728	51.83
Cyprus	0.706	49.45
Czech Rep. / Czechia	0.686	47.57
Denmark	0.791	78.37
Egypt	0.625	60.52
Estonia	0.799	66.79
France	0.765	59.18
Greece	0.709	59.41
Hungary	0.684	48.81
India	0.644	67.99
Indonesia	0.692	50.84
Iran	0.583	17.47
Ireland	0.801	57.17
Italy	0.704	49.81
Japan	0.666	39.23
Latvia	0.778	54.35
Lithuania	0.783	63.05
Luxembourg	0.745	67.29
Malaysia	0.681	47.59
Malta	0.727	55.78
Mexico	0.776	52.66
Morocco	0.628	68.32
Netherlands	0.756	69.6
Nigeria	0.649	59.16
Norway	0.863	68.21
Pakistan	0.567	56.85
Philippines	0.781	68.41
Poland	0.75	47.86
Portugal	0.767	66.59



Romania	0.697	56.45
Saudi Arabia	0.643	18.15
Slovenia	0.77	57.16
South Africa	0.767	52.74
Spain	0.797	61.57
Switzerland	0.785	56.1
Thailand	0.728	59.19
Turkiye	0.633	45.06
UK	0.838	68.41
USA	0.756	40.58
Uzbekistan	0.678	44.51
Vietnam	0.713	60.04

Source Note: GGGI 2025 data is from the Global Gender Gap Report 2025, published by the World Economic Forum (WEF) on June 11, 2025. (Global Gender Gap Index Report 2025)

Data for the CCPI 2025 has been taken from the annual report “Climate Change Performance Index” for the year 2025, published by Germanwatch, the New Climate Institute, and the Climate Action Network (Burck, 2025)