

Gender Diversity and Environmental Performance: A Quantitative Assessment

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Introduction

Scientists have been ringing alarm bells since the mid-20th century, when scientific evidence started pointing towards a multitude of environmental problems caused by humans such as groundwater pollution from hazardous wastes, the hole in the ozone layer, climate change and the accelerating decrease in biodiversity.¹ Ever since, environmental degradation has been on the political agenda of many countries all around the globe as well as the subject of international cooperation. As the 2010 Environmental Performance Index (EPI) demonstrates, countries vary to a great extent in their environmental performance.² Many scholars have attempted to explain this variation and have found evidence for a variety of explanatory variables. According to Esty and Porter, for example, environmental performance varies with income levels, the sophistication of a country's regulatory regime and its broader economic and social context.³ Other authors link environmental performance to ethnic diversity.⁴ Specifically, Das and DiRienzo found an inverted U-shaped relationship between the two variables.⁵ Additionally, the authors of the EPI themselves find GDP per capita, corruption and government effectiveness to be drivers of envi-

¹ Helmut Breitmeier, "International Organizations and the Creation of Environmental Regimes," in *Global Governance. Drawing Insights from the Environmental Experience*, ed. Oran R. Young (Cambridge: The MIT Press, 1997), 96; Daniel Somers Smith, "Place-Based Environmentalism and Global Warming: Conceptual Contradictions of American Environmentalism," *Ethics & International Affairs* 15, no. 2 (2001): 118.

² Jay Emerson et al., "2010 Environmental Performance Index," Accessed November 8, 2010, http://epi.yale.edu/file_columns/0000/0157/epi2010_report.pdf.

³ Daniel C. Esty and Michael E. Porter, "National environmental performance: an empirical analysis of policy results and determinants," *Environment and Development Economics* 10(2005): 395.

⁴ Julio Videras and Christopher J. Bordoni, "Ethnic Heterogeneity and the Enforcement of Environmental Regulation," *Review of Social Economy* 64, no. 4 (2006).

⁵ Jayoti Das and Cassandra E. DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis," *The Journal of Environment & Development* 19, no. 1 (2010): 105.

ronmental performance.⁶ This paper deals with another more marginalized approach, which links environmental performance to gender diversity.

Since the 1970s, gender theorists have argued that women's participation in environmental policymaking is essential. However, the reasoning behind this claim varies. Eco-feminists argue that women are inherently closer to nature than men.⁷ Others argue that, due to different socially constructed societal roles and functions, men and women alike are important but distinct agents of change in the processes of mitigation of and adaptation to global and local environmental change.⁸ The latter logic would imply that gender diversity, meaning a balance of women and men as decision-makers in environmental politics, would enhance environmental performance. Unfortunately, environmental politics, just like other fields of politics, is a male-dominated field. For example, among the country delegates to the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen in 2009, only 27.7 percent were women.⁹

While such arguments have been around for several decades, investigation in this area has been limited to case studies.¹⁰ There has been no attempt to estimate the degree to which increased participation of women in environmental policymaking affects a country's environmen-

⁶ Emerson et al., "2010 Environmental Performance Index," 34.

⁷ Irene Dankelman and Willy Jansen, "Gender, Environment and Climate Change: Understanding the Linkages," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010), 22-23.

⁸ Irene Dankelman, "Introduction: Exploring Gender, Environment, and Climate Change," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010), 2.

⁹ UNFCCC, "FCCC/CP/2009/INF.1 (Part 1). Conference of the Parties. Fifteenth Session. Copenhagen, 8-18 December 2009. List of Participants," Accessed November 20, 2010, <http://unfccc.int/resource/docs/2009/cop15/eng/inf01p01.pdf>.

¹⁰ For examples, see: Thais Corral, "Gender Perspectives in Adaptation Strategies: The Case of Pintadas Solar in the Semi-arid Region of Brazil," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010); Alice Fothergill, "The Neglect of Gender in Disaster Work: An Overview of the Literature," in *The Gendered Terrain of Disaster: Through Women's Eyes*, ed. Elaine Enarson and Betty Hearn Morrow (Westport: Praeger, 1998); William E. Lovekamp, "Gender and Disaster: A synthesis of flood research in Bangladesh," in *Women and Disasters. From Theory to Practice*, ed. Brenda D. Phillips and Betty Hearn Morrow (Philadelphia: Xlibris, 2008); Koos Neefies and Valerie Nelson, "Responding to Climate Change in Vietnam: Opportunities for Improving Gender Equality," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010); Sibyl Nelson and Yianna Lambrou, "Gender Dimensions, Climate Change and Food Security of Farmers in Andhra Pradesh, India," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010); Omoyemen Odigie-Emmanuel, "The Gender Impact of Climate Change in Nigeria," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010).

tal performance. The lack of quantitative studies in this area is partially due to the fact that many gender theorists do not believe quantitative analysis can adequately capture the most important elements of gender dynamics. Instead, quantitative analysis is viewed as objectifying and reducing humans to social facts and leads to a univariate, atomized analysis.¹¹

This paper aims to demonstrate that quantitative analysis can strengthen gender theorists' claims without obscuring basic feminist beliefs. As Majorie L. DeVault argues, the equation of feminist methodology with qualitative methods is a misconception. Instead, feminist methodology seeks to shift attention away from the primary focus on men's concerns and to 'bring women in.'¹² While this has mainly been done through qualitative methods such as interviews and narrative analysis, this focus on qualitative methods is not stringently derived from feminist beliefs. Instead, it needs to be recognized that quantitative techniques can contribute to 'bringing women in,' and can be more compelling than personal testimony or case studies, which are vulnerable towards criticism regarding selection bias. In other words, what is important is not whether a study is qualitative or quantitative, but whether a study is committed to women and their concerns.¹³

The goal of this paper is to quantitatively assess the empirical validity of the claim that gender diversity is an important determinant of environmental performance. My research question is: Does a causal link exist between increased participation of women in environmental politics and a country's environmental performance? If the answer is yes, how strong is the effect? To answer this question, I will estimate five Ordinary Least Squares (OLS) regression models

¹¹ Elaine Enarson and Brenda Phillips, "Invitation to a New Feminist Disaster Sociology: Integrating Feminist Theory and Methods," in *Women and Disasters. From Theory to Practice*, ed. Brenda D. Phillips and Betty Hearn Morrow (Philadelphia: Xlibris, 2008), 60.

¹² Majorie L. DeVault, *Liberating Method. Feminism and Social Research* (Philadelphia: Temple University Press, 1999), 30.

¹³ *Ibid.*, 30.

testing the validity, robustness, and causality of the hypothesized positive relationship between women's participation in environmental politics and a country's environmental performance.

The paper proceeds as follows: First, I will offer a brief literature review and derive a testable hypothesis. The following section will describe the operational capacity of the variables used. Then, I will offer some descriptive statistics and present and interpret the empirical evidence. This will be followed by a conclusion.

1. Theoretical Background

Radical feminist theory is based on the notion that men and women are essentially different and that gender inequality is rooted in a universal system through which men seek power and control over women - and over the environment.¹⁴ Eco-feminists, whose beliefs are grounded in radical feminist theory,¹⁵ argue that women are inherently closer to nature than men. Male domination of nature is viewed as equivalent to male domination of women, which has led to a marginalization of women's knowledge in general and women's knowledge of nature in particular. Therefore, eco-feminists argue that male dominated "mal-development," which is often assigned to "white" men, has caused major social and environmental problems.¹⁶ This essentialist stance has been criticized for its failure to address power and economic differences, to differentiate women themselves by class, ethnicity, and caste and finally, to recognize that the concept of gender varies across cultures and regions.¹⁷

Taking these criticisms into account, liberal feminist theory posits that gender differences are not based on biological difference. Instead, they are thought to be socially constructed and

¹⁴ Enarson and Phillips, "Invitation to a New Feminist Disaster Sociology: Integrating Feminist Theory and Methods," 50.

¹⁵ *Ibid.*, 50.

¹⁶ Dankelman and Jansen, "Gender, Environment and Climate Change: Understanding the Linkages," 22-23.

¹⁷ *Ibid.*, 23.

reproduced by a gendered structure and practice of social institutions, which ensure a lifelong socialization into gendered cultures. The resulting socially constructed differences disadvantage women in a socially constructed world that privileges 'male' characteristics.¹⁸ This goes hand in hand with an evolution of the definition of gender. Instead of thinking of gender differences as stemming from inherent characteristics of women and men, many gender theorists now think of 'gender' as the manifestation of the context-specific relationships between women and men, and define it as the socially acquired notions of masculinity and femininity by which women and men are identified.¹⁹

Following liberal feminism's definition of gender, this paper links gender diversity in environmental politics to environmental performance in the following ways—first, environmental degradation has gender-differentiated impacts, especially in the developing world, which gives women a distinct perspective. This is due to the fact that the asymmetry of power between women and men is a pervasive trait all over the world, although to varying extents. In fact, gender is a social stratifier, similar to other stratifiers such as class, ethnicity, religion, place and age.²⁰ For instance, women make up 70 percent of the 1.3 billion people living in extreme poverty.²¹ Due to gender inequality, women tend to have less access to resources that are essential for adapting to environmental degradation.²² It has been shown that women are more vulnerable to natural disaster than men because they are over-represented in agricultural and informal sectors, lack access of energy sources, clean water, safe sanitation and health care, and are thus dis-

¹⁸ Enarson and Phillips, "Invitation to a New Feminist Disaster Sociology: Integrating Feminist Theory and Methods," 47.

¹⁹ Janet Henshall Momsen, *Gender and Development* (London: Routledge, 2004), 2.

²⁰ Dankelman, "Introduction: Exploring Gender, Environment, and Climate Change," 11.

²¹ UNDP, *Human Development Report 1995. Gender and Human Development* (New York: Oxford University Press, 1995), 4.

²² Dankelman, "Climate Change, Human Security and Gender," 59.

advantaged in disaster preparedness, mitigation, and rehabilitation.²³ While this link is stronger in developing countries, the same pattern can be found in developed countries. Studies have shown that Hurricane Katrina, which hit the United States Gulf Coast in 2005, affected women more than men due to women's distinct roles within the family, society and the labor market. As a result, women were often left poorer, less able to find jobs and therefore unable to move back to their previous homes.²⁴ Due to the gender-differentiated impacts of environmental degradation, integrating women's perspectives into environmental policymaking is an essential prerequisite to finding adequate responses that protect both men and women.

Second, women's perspectives on environmental degradation can complement men's perspectives in a variety of ways. Due to their different upbringing, different socially acquired roles, norms, values and ways of thinking, an increase in the participation of women in environmental politics may be accompanied by the introduction of new and innovative ideas concerning how to deal with environmental degradation. Jayoti Das and Cassandra E. DiRienzo have made a similar argument when explaining the inverted U-shaped relationship between ethnic diversity and environmental performance. They suggest a moderate level of ethnic diversity offers an advantage to countries in finding solutions to environmental problems, since ethnic diversity leads

²³ For a more elaborate discussion of the causes of women's increased vulnerability to natural disasters, see: Robert Bolin, Martina Jackson, and Allison Crist, "Gender Inequality, Vulnerability, and Disasters: Issues in Theory and Research," in *The Gendered Terrain of Disaster: Through Women's Eyes*, ed. Elaine Enarson and Betty Hearn Morrow (Westport: Praeger, 1998); Dankelman, "Climate Change, Human Security and Gender."; Enarson, Fothergill, and Peek, "Gender and Disaster: Foundations and Directions."; Fordham, "Gendering vulnerability analysis: Towards a More Nuanced Approach."; Alice Fothergill, "The Neglect of Gender in Disaster Work: An Overview of the Literature," in *The Gendered Terrain of Disaster: Through Women's Eyes*, ed. Elaine Enarson and Betty Hearn Morrow (Westport: Praeger, 1998); Eric Neumayer and Thomas Plümper, "The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981-2002," *Annals of the Association of American Geographers* 97, no. 3 (2007); Jennifer Wilson, Brenda D. Phillips, and David M. Neal, "Domestic Violence after Disaster," in *The Gendered Terrain of Disaster: Through Women's Eyes*, ed. Elaine Enarson and Betty Hearn Morrow (Westport: Praeger, 1998).

²⁴ Rachel Harris, "Gender Aspects of Climate Change in the US Gulf Coast Region," in *Gender and Climate Change: An Introduction*, ed. Irene Dankelman (London: earthscan, 2010).

to more creative and innovative solutions.²⁵ If the same is true for gender diversity, the increased participation of women in environmental decision-making should improve environmental performance.

Third, increased participation of women in environmental politics would enhance environmental performance by introducing previously neglected capacities.²⁶ In many countries, women are now more likely to graduate high school and college *and* have better grades than men. In Europe, for example, women account for 55 percent of university graduates.²⁷ The notion that women's excellent performance in education translates into professional performance has been put forward by a study of McKinsey & Company, which shows that companies with three or more women in senior management positions tend to score more highly on indicators of organizational excellence and financial performance than companies with no women at the top.²⁸ Since mitigation of and adaptation to environmental degradation require large amounts of resources and capacities, neglecting women's capacity would be a big mistake. Especially in the fields of promoting sustainable lifestyles, reforestation, education and raising awareness, women's rich contributions and potentials have been particularly valuable for environmental conservation and management.²⁹

On this basis, I theorize that the positive effect of gender diversity and the participation of women, as found by McKinsey & Company, will persist at the aggregate country level and translate into improved environmental performance. This leads me to the hypothesis that there is a positive relationship between women's participation in environmental politics and a country's

²⁵ Das and DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis," 93.

²⁶ Dankelman, "Introduction: Exploring Gender, Environment, and Climate Change," 11.

²⁷ McKinsey&Company, "Women Matter. Gender diversity, a corporate performance driver," Accessed October 30, 2010, http://www.mckinsey.com/locations/swiss/news_publications/pdf/women_matter_english.pdf.

²⁸ *Ibid.*, 12-13.

²⁹ Dankelman and Jansen, "Gender, Environment and Climate Change: Understanding the Linkages," 47-48.

environmental performance. In the following section, the operational capacity of the variables will be laid out. This will be followed by descriptive statistics, regression analyses, and interpretation of findings.

2. Empirical Analysis

2.1 Operational Capacity of Environmental Performance

As a dependent variable, I will use the 2010 EPI, which is available for 163 countries.³⁰ The EPI uses a target-to-proximity methodology to track a country's success in meeting ten environmental policy goals, which are either based on international treaties and agreements or derived from environmental and public health standards developed by international organizations and national governments. The EPI is a weighted average of these environmental policy goals and ranges from 0 to 100, with higher values indicating greater success at meeting environmental targets.³¹

2.2 Operational Capacity of Women's Participation in Environmental Politics

The main independent variable is women's participation in environmental politics, which will be illustrated as the percentage of women in country delegations to the 15th Conference of the Parties, (COP-15) to the UNFCCC. This operational capacity assumes that the percentage of women in a country's delegation to United Nations environmental conferences reflects the gender distribution in other bodies of environmental policymaking. The data was obtained from the List of Participants published by the UNFCCC Secretariat. This list contains the names of all members

³⁰ Emerson et al., "2010 Environmental Performance Index," 13.

³¹ Weights: Environmental Burden of Disease (25%), Water (effects on humans) (12.5%), Air Pollution (effects on humans) (12.5%), Air Pollution (effects on ecosystems) (4.2%), Water (effects on ecosystems) (4.2%), Biodiversity & Habitat (4.2%), Forestry (4.2%), Fisheries (4.2%), Agriculture (4.2%), Climate Change (25%) *ibid.*, 15..

of each country delegation.³² It is easy to recognize which delegates are women and which are men since the appropriate gender-indicative title precedes every name that is listed. For every country, I counted the absolute number of delegates and the number of women delegates and created a variable, which indicates the percentage of women on each country delegation. This data is available for 194 countries and ranges from 0, (Eritrea, Honduras, Jordan, North Korea, Libya, Mauritius, Myanmar, Qatar, Saudi Arabia, Somalia, and Yemen) to 83.3, (Antigua and Barbuda). A full list of the percentages of women in each country delegation can be found in the Annex.

Additionally, I created a variable that measures the percentage points by which the percentage of women on a country's delegation deviates from the "ideal" level of 50 percent in either direction. The inclusion of this variable reflects the idea that gender parity rather than a larger amount of women is the critical variable.

To test the robustness of my results, I performed additional regression analyses using two proxies of women's participation in environmental politics: first, I use a more indirect measurement, namely data on gender equality, which is taken from the International Development Association's 2005 Resource Allocation Index. This variable assesses the extent to which the country has enacted and put in place institutions and programs to enforce laws and policies that promote equal access to human capital development, promote equal access to productive and economic resources and give men and women equal status and protection under the law.³³ The variable ranges from 2 to 4.5 with higher values indicating higher levels of equality. Second, I use the

³² UNFCCC, "FCCC/CP/2009/INF.1 (Part 1). Conference of the Parties. Fifteenth Session. Copenhagen, 8-18 December 2009. List of Participants."

³³ Jan Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute," Accessed November 11th, 2010, <http://www.qog.pol.gu.se>; Emerson et al., "2010 Environmental Performance Index" 49; International Development Association, "IDA Resource Allocation Index (IRAI)," Accessed November 24, 2010, <http://go.worldbank.org/FHNU4A23U0>.

Gender Gap Index, which uses a scale from 0 to 1, with 1 representing a maximum level of gender equality. The index measures the degree to which women have achieved equality in the areas of economic participation, economic opportunity, political empowerment, educational attainment and health and well being.³⁴

To test whether the link between women's participation in environmental politics and improved environmental performance is a causal link or whether the two variables are merely correlated, since both are associated with higher levels of development, I use the year in which women gained the right to vote as an instrumental variable. This variable is obtained from the Organisation for Economic Cooperation and Development (OECD) Gender, Institutions, and Development Database.³⁵ Instrumental variables are a commonly used solution to the problem of an endogenous independent variable such as women's participation in environmental politics. An instrumental variable can establish a causal relationship if it is correlated with the independent variable and it can reasonably be expected to only impact the dependent variable through the independent variable, meaning that it is uncorrelated with the error term.³⁶ The first criterion is easy to establish; the year in which women received the right to vote is negatively correlated with the percentage of women in a countries' delegation to the COP-15 ($r=-0.27$). Thus, the earlier women received the right to vote, the more women are involved in environmental politics today. The second criterion is trickier. It seems reasonable to assume that in countries where women have been able to vote and have been elected into office for a longer period of time, women's participation in environmental politics is better established and norms of gender equali-

³⁴ Jan Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute," Accessed November 11, 2010, <http://www.qog.pol.gu.se>; World Economic Forum, "The Global Gender Gap Report 2005," Accessed November 24, 2010, <http://www.weforum.org/gendergap>.

³⁵ OECD, "The Gender, Institutions and Development Data Base," Accessed November 20, 2010, http://www.oecd.org/document/0/0,3343,en_2649_33731_39323280_1_1_1_1,00.html; Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute."

³⁶ Jeffrey M. Wooldridge, *Econometric Analysis of Cross Section and Panel Data* (Cambridge: The MIT Press, 2002), 83-84.

ty are more ingrained in the system. While it is impossible to prove that women's participation in environmental politics is the only path through which the earlier extension of franchise influences environmental performance, it also seems to be a reasonable assumption. Data is available for 153 countries; among these countries, women's right to vote was first introduced in 1893 (New Zealand) and last in 2005 (Kuwait).

2.3 Control Variables

When considering environmental performance as a dependent variable, other variables, which have been identified to be drivers of environmental performance in prior studies, need to be controlled for. As noted above, these are factors such as income levels, the sophistication of a country's regulatory regime, the broader economic and social context³⁷ and ethnic diversity.³⁸ Additionally, Das and DiRienzo, suggest economic freedom, corruption, democracy, government efficiency and economic development as additional control variables.³⁹ However, including too many control variables exacerbates the small-N problem. Therefore, I will limit the amount of control variables used in this study to the three main drivers of environmental performance found by the authors of the EPI, namely GDP per capita (measured by its logarithm), corruption and government effectiveness.⁴⁰ Additionally, I will control for the level of democracy.

Economic Wealth

According to prior studies, it can be expected that more economically developed countries, as measured by their per capita GDP, tend to be more successful in meeting environmental tar-

³⁷ Esty and Porter, "National environmental performance: an empirical analysis of policy results and determinants," 395.

³⁸ Das and DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis," 105.

³⁹ *Ibid.*, 99-102.

⁴⁰ Emerson et al., "2010 Environmental Performance Index," 34.

gets.⁴¹ Data will be taken from the United Nations Statistics Division, which published GDP per capita at constant 1990 prices in US dollars in 2002 for 192 countries.⁴²

Corruption

Based on previous studies, higher corruption levels can be expected to negatively affect a country's environmental performance. Therefore, this study uses the Corruption Perception Index published by Transparency International for 180 countries.⁴³ This index measures the degree to which politicians and officials are believed to accept illicit payments or bribes in public procurement, embezzle public funds, or commit offenses. It is measured on a scale ranging from 1 to 10, with 10 indicating the lowest level of corruption.⁴⁴

Government Effectiveness

The measure of government effectiveness is taken from the Worldwide Governance Indicators project dataset and combines responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies in 194 countries.⁴⁵ Higher values indicate higher levels of government effectiveness.

⁴¹ Das and DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis," 102.

⁴² Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute."; United Nations Statistics Division, "National Accounts Main Aggregates Database," Accessed November 13, 2010, <http://unstats.un.org/unsd/snaama/>.

⁴³ Das and DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis."; Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute."

⁴⁴ Das and DiRienzo, "Is Ethnic Diversity Good for the Environment? A Cross-Country Analysis," 100.

⁴⁵ Emerson et al., "2010 Environmental Performance Index," 69; Daniel Kaufmann, Aart Kraay, and Massimo Mastruzzi, "The Worldwide Governance Indicators (WGI) project," Accessed November 19, 2010, <http://info.worldbank.org/governance/wgi/index.asp>.

Democracy

The level of democracy is measured by the un-weighted average of political rights and civil liberties as published by Freedom House.⁴⁶ I use the data for the years 2002-2006, which is available for 194 countries and which I recoded in such a way that 1 is the lowest possible degree of democracy and 7 is the highest.

3. Descriptive Statistics

Table 1 below provides a summary of the data used in this analysis as well as the descriptive statistics for each variable.

Table 1: Descriptive Statistics

Variable Name	N	Mean	Std. Dev.	Min	Max
Environmental Performance Index	163	58.37	12.41	32.1	93.5
Percentage of Women Delegates	194	27.21	15.11	0	83.3
Divergence from Gender Parity	194	23.88	13.31	0	50
Gender Equality	76	3.47	0.65	2	4.5
Gender Gap Index	128	0.67	0.06	0.45	0.81
Year of Extension of Franchise	153	1949.10	20.18	1893	2005
GDP per capita	192	6309.03	10711.46	97.77	72924.18
Corruption Perception Index	180	3.99	2.08	1.2	9.7
Government Effectiveness	194	-0.60	0.99	-1.93	2.25
Level of Democracy	194	4.63	1.95	1	7

3.1 Regressions Analyses

Table 2 presents the results of five regression analyses testing my hypothesis. Column (1) suggests that the higher the percentage of women in a countries' delegation to the COP-15, the higher its environmental performance. This supports my hypothesis, which predicts a positive relationship between women's participation in environmental politics and a country's environmental performance. Specifically, my results suggest that for every percentage point, by which the participation of women in environmental politics increases, environmental performance improves by 0.163 on a scale from 0 to 100. As indicated in Table 1, the average percentage of women on

⁴⁶ Teorell et al., "The Quality of Government Dataset, version 27May10. University of Gothenburg: The Quality of Government Institute."

country delegations to the COP-15 was 27.21 percent. Thus, if women's participation was increased to constitute an average of 50 percent, the model would predict an increase in global environmental performance by $(50-27.31)*0.163 \approx 3.7$ points on a scale from 0 to 100. While this increase may not be exceptionally large, it is significant. It strengthens claims for the necessity of increased participation of women delegates and decision-makers in environmental politics.

Table 2: Regression Analysis - Percentage of Women in Country Delegations to the COP-15

	(1)	(2)	(3)	(4)	(5)
	EPI	EPI	EPI	EPI	EPI
Percentage of Women Delegates	0.163* (0.02)				
Divergence from Gender Parity		-0.166* (0.02)			
Gender Equality			6.514*** (0.00)		
Gender Gap Index				65.704** (0.00)	
Year of Extension of Franchise					-0.155*** (0.00)
Government Effectiveness	3.567 (0.08)	3.596 (0.08)	2.293 (0.43)	-0.233 (0.93)	2.747 (0.22)
Level of Democracy	0.752 (0.27)	0.753 (0.27)	-0.460 (0.59)	1.132 (0.13)	0.531 (0.43)
lg(GDP per capita)	2.455* (0.02)	2.441* (0.02)	1.961 (0.21)	3.175** (0.01)	3.513*** (0.00)
Corruption Perception Index	-0.210 (0.81)	-0.224 (0.80)	1.653 (0.19)	-0.236 (0.82)	-0.441 (0.62)
Constant	33.084*** (0.00)	41.499*** (0.00)	14.159 (0.29)	-12.307 (0.43)	332.768*** (0.00)
<i>N</i>	152	152	61	123	141
<i>R</i> ²	0.476	0.476	0.331	0.462	0.543

p-values in parentheses

* *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

Critics may argue that these results do not reflect a positive effect of increased participation of women on environmental performance but rather that both women's participation in environmental decision-making and improved environmental performance are independent consequences of high levels of human and economic development. To counter such arguments, I have included the logarithm of a country's per capita GDP as a control variable in all regression analyses. However, it is interesting to note that the percentage of women in a country's delegation to the COP-15 is not as highly correlated with human and economic development as one might think; the correlation coefficient between the percentage of women on a country's delegation and the 2002 Human Development Index is $r=0.29$.⁴⁷ The correlation coefficient between the percentage of women on a country's delegation and per capita GDP is slightly higher but still only $r=0.34$. The ten countries with the highest percentage of women on their delegations are Trinidad and Tobago, Uzbekistan, Bulgaria, Saint Lucia, Latvia, Saint Kitts and Nevis, Moldova, Cook Islands, Niue, and Antigua and Barbuda, none of which are highly developed and industrialized countries (see Appendix). This reinforces the notion that the increased participation of women in environmental politics is an independent determinant of a country's environmental performance and not simply a covariate of human or economic development and is in line with common criticisms of GDP as a measure of human progress.

Column two (2) suggests that the deviation from gender parity in the composition of a country's delegation in any direction is associated with a decrease in environmental performance. However, it is questionable whether this coefficient gives us any information about the potential effect of having too many women on board, since out of the 194 countries in the sample, only Bulgaria, Saint Lucia, Latvia, Saint Kitts and Nevis, Moldova, Cook Islands, Niue, and Antigua and Barbuda had a delegation that consisted of more than 50 percent women. There-

⁴⁷ Ibid.

fore, the significantly negative coefficient most likely reflects the negative effect of having a low level of participation of women in environmental politics.

Columns three (3) and four (4) suggest that my argument is robust to the use of different measurements such as the more general measures of gender-equality. Column five (5) presents the results of using the year in which women were given the right to vote as an instrumental variable to test whether there is a *causal* relationship between women's participation in environmental politics and environmental performance. The significantly negative coefficient suggests that the later women were given the right the vote, the poorer a country's environmental performance today. This highly significant instrumental variable supports the contention of a causal effect of women's participation in environmental policymaking on a country's environmental performance.

Conclusion

The goal of this paper was to test whether there is quantitative support for the argument made by gender theorists, according to whom an increase in the percentage of women in environmental politics would have a positive effect on environmental performance. While strong support for this argument has emerged from case studies, I argue that quantitative evidence could strengthen the argument put forward. Therefore, the research question that this paper sought to answer was whether there is a causal link between increased participation of women in environmental politics and a country's environmental performance, and if the answer is yes, how strong the effect is. My findings suggest that the percentage of women in a country's delegation to international conferences indeed has a positive influence on environmental performance. Furthermore, the use of an instrumental variable supports the idea that this is a *causal* relationship. Under the assump-

tion of linearity, my results suggest that if the percentage of women at international environmental negotiations would be increased from current levels to constitute an average of 50 percent, global environmental performance would improve by 3.7 points on a scale from 0 to 100. Therefore, the overall results reinforce the importance of increasing women's participation in environmental politics, which is not only an end in its own right but also a means to achieve higher levels of environmental performance.

Once cross-national data on women's participation in other bodies of environmental policymaking, particularly the ministerial level, becomes available, it would be interesting to perform similar analyses using this new data to run further quantitative tests of my hypothesis. Additionally, it would be interesting to take into account the role that women play within such bodies, e.g. whether they are in leading or supporting positions. In addition, a distinction between developing and developed countries might give us insights into whether women's participation has a different impact at different stages of development. Similarly, it would be interesting to look at the sub-indexes of the EPI to determine for which environmental policy goals women's participation matters the most. Since hardly any quantitative empirical evidence on the impact of women's participation in environmental decision-making has been published, much work still needs to be done. This paper made an important first step in this direction.

Environmental problems such as climate change and the rapid decrease in biodiversity urgently need to be addressed to prevent catastrophe. My paper shows that women need to be a crucial part of the solution. My analyses offer evidence for this claim at the level of intergovernmental policymaking. However, an increase women's participation at the level of intergovernmental policymaking needs to be initiated from the ground up—in policymaking processes at the city, state and national level, as well as in the educational system and the private sector. De-

spite this clear evidence, women in many parts of the world still face unequal access to decision-making, formal financial systems, land ownership, education and information, which undermines their way into positions of decision-making power. This needs to change for the well being of women *and* for the well being of the planet.

APPENDIX

Women in Country Delegations to COP 15 in Percentage

Eritrea	0.00	Japan	14.89	Venezuela	26.19
Honduras	0.00	Nauru	15.38	Fiji	26.32
Jordan	0.00	Central African		Papua New	
Korea, North	0.00	Republic	16.13	Guinea	26.39
Libya	0.00	Lebanon	16.39	Azerbaijan	26.67
Mauritius	0.00	Gambia	16.67	Micronesia	26.67
Myanmar	0.00	Ghana	16.67	China	26.73
Qatar	0.00	Guinea	16.67	Zambia	26.79
Saudi Arabia	0.00	Sierra Leone	16.67	Namibia	27.08
Somalia	0.00	Cote d'Ivoire	18.18	Benin	27.27
Yemen	0.00	Djibouti	18.18	Estonia	27.27
Bangladesh	2.44	Congo	19.05	Macedonia	27.27
Chad	2.56	Tunisia	19.05	Grenada	27.78
Bhutan	6.25	Korea, South	19.16	Hungary	28.13
Ethiopia	6.38	Nigeria	19.73	Austria	28.30
Mauritania	6.98	El Salvador	20.00	Luxembourg	28.57
Cuba	7.41	Guatemala	20.00	Marshall Islands	28.57
Algeria	7.69	Liechtenstein	20.00	Brazil	29.55
United Arab		Monaco	20.00	Bahamas, The	30.00
Emirates	7.69	Niger	20.00	Ukraine	30.23
Brunei	8.33	San Marino	20.00	Ireland	30.43
Panama	8.33	Seychelles	20.00	Serbia	30.43
Timor-Leste	8.33	Singapore	20.34	Belgium	31.18
Bahrain	8.70	Malaysia	20.37	Guyana	31.25
Egypt	9.09	Gabon	20.45	Tuvalu	31.58
India	9.09	Maldives	21.88	Kiribati	31.82
Mali	9.64	Sudan	21.95	Bolivia	32.00
Senegal	9.90	Indonesia	21.98	Dominican Re-	
Oman	10.00	Malta	22.22	public	32.00
Vanuatu	10.00	Kenya	22.30	Czech Republic	32.08
Kuwait	10.20	Russia	22.69	Turkey	32.79
Cameroon	10.34	Iraq	22.73	United States	32.91
Zimbabwe	11.63	Angola	22.92	Barbados	33.33
Equatorial Guin-		Liberia	23.08	Bosnia and Her-	
ea	11.76	Palau	23.08	zegovina	33.33
Togo	11.76	Morocco	23.33	Comoros	33.33
Pakistan	11.90	Swaziland	23.33	Georgia	33.33
Afghanistan	12.50	Chile	23.40	Guinea-Bissau	33.33
Nepal	12.77	Switzerland	24.32	Paraguay	33.33
Cambodia	13.04	France	24.45	Samoa	33.33
Vietnam	13.75	Congo, Demo-		Turkmenistan	33.33
Burkina Faso	13.79	cratic Republic	24.47	Finland	33.78
Iran	14.14	Malawi	24.53	Uganda	34.29
Cape Verde	14.29	Haiti	25.00	New Zealand	34.38
Mongolia	14.29	Israel	25.00	Slovakia	34.48
Tajikistan	14.29	Tanzania	25.33	Canada	35.27
Tonga	14.29	Portugal	25.93	Kazakhstan	35.29

European Union	35.39	Sao Tome and		Australia	46.94
Netherlands	35.53	Principe	40.00	Ecuador	47.22
Belarus	35.71	Sri Lanka	40.00	Suriname	47.62
Nicaragua	35.71	Syria	40.00	Sweden	48.31
Costa Rica	35.90	Croatia	40.91	Mozambique	50.00
Botswana	36.00	Argentina	41.18	South Africa	50.00
United Kingdom	36.04	Peru	41.18	Trinidad and To-	
Denmark	36.05	Germany	41.41	bago	50.00
Armenia	36.36	Philippines	41.44	Uzbekistan	50.00
Uruguay	36.36	Jamaica	41.67	Bulgaria	53.33
Laos	36.84	Montenegro	41.67	Saint Lucia	54.55
Albania	37.50	Romania	42.19	Latvia	55.17
Lesotho	37.50	Solomon Islands	42.31	Saint Kitts and	
Cyprus	37.93	Lithuania	42.42	Nevis	55.56
Spain	38.27	Norway	42.69	Moldova	57.14
Madagascar	38.71	Kyrgyzstan	42.86	Cook Islands	66.67
Burundi	38.89	Slovenia	42.86	Niue	80.00
Thailand	38.89	Greece	43.75	Antigua and Bar-	
Iceland	39.29	Saint Vincent and		buda	83.33
Poland	39.51	the Grenadines	44.44		
Colombia	40.00	Italy	45.90		
Dominica	40.00	Belize	46.15		
Mexico	40.00	Rwanda	46.15		

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