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Insight: Drivers of Climate Instrument Adoption in Middle-Income Democracies: Comparative Insights from Colombia, Peru, and Kenya (1995–2024)

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Abstract

This study investigates the determinants of climate instrument adoption in three middle-income democracies—Colombia, Peru, and Kenya—between 1995 and 2024. Using negative binomial regression models, it evaluates the relative influence of domestic resilience, economic and institutional variables, international commitments, and financial resources. Results reveal that external drivers—ratification of international agreements and

climate finance—consistently predict instrument proliferation across all three countries. Domestic factors exert varied influence: resilience paradoxically reduces adoption in Colombia, disasters spur adoption in Kenya, and democracy significantly fosters adoption in Peru. These findings refine resilience and diffusion theories, highlight the enabling role of financial resources, and underscore the context-dependent nature of domestic drivers. Policy recommendations emphasize strengthening institutions, leveraging international commitments, integrating voluntary pledges into binding law, and securing predictable climate finance.

1. Introduction

Climate governance has emerged as one of the defining challenges of the twenty-first century, particularly for countries that must balance economic development, environmental sustainability, and international obligations. Middle-income democracies such as Colombia, Peru, and Kenya face acute climate risks while navigating limited resources and institutional constraints. Over the past three decades, these countries have ratified major international agreements, introduced domestic legal frameworks, and received substantial climate finance. Yet the drivers of instrument proliferation remain contested and insufficiently understood.

This study investigates the factors that explain the adoption of climate instruments in Colombia, Peru, and Kenya between 1995 and 2024. Specifically, it tests the influence of domestic resilience, economic and institutional variables, international commitments, and financial resources. By applying negative binomial regression models, the analysis identifies which dimensions most consistently predict instrument adoption. In doing so, the study contributes to broader debates on the relative importance of external versus internal drivers in shaping climate governance trajectories in middle-income democracies.

2. Literature Review

Scholars have long debated the determinants of climate policy adoption, producing a diverse body of literature that emphasizes domestic institutions, economic development, international agreements, and financial flows.

2.1 Domestic Institutions and Resilience

Strong domestic institutions and adaptive capacity are often seen as facilitators of climate governance. Adger, Lorenzoni, and O'Brien (2009) argue that resilience enables societies to absorb shocks and adapt to changing environmental conditions. However, resilience may also reduce the perceived need for new instruments, as existing systems can manage risks without additional legal or policy frameworks. This duality suggests that resilience can either stimulate or dampen instrument proliferation, depending on context.

2.2 Economic and Political Factors

Economic development and democratic institutions are frequently linked to environmental policy adoption. Dobson (2007) and Agyeman (2013) highlight how wealthier and more democratic societies tend to prioritize environmental quality, as citizens demand higher standards once basic needs are met. Yet findings remain mixed, particularly in middle-income countries, where economic growth and institutional development do not always translate into strong environmental demand. Bernauer and

Koubi (2009) further note that political institutions may shape environmental outcomes in complex ways, with effects varying across regimes and levels of development.

2.3 International Agreements

International commitments have been shown to catalyze domestic action by embedding global norms into national policy frameworks. The Global Commission on the Economy and Climate (2018) emphasizes the role of treaty ratification in accelerating climate legislation worldwide. Von Stein (2008) and Lachapelle and Paterson (2013) similarly argue that binding agreements, such as the Kyoto and Paris Accords, exert significant influence by creating legal obligations and reputational incentives. Voluntary pledges, such as Nationally Determined Contributions (NDCs), may be less effective absent binding enforcement mechanisms.

2.4 Climate Finance

Financial flows are critical enablers of climate action, particularly in developing and middle-income countries. Jackson (2017) and Scott Cato (2012) underscore the importance of external resources in providing governments with the capacity to design and implement instruments. Without adequate finance, even strong commitments may remain symbolic. Climate finance thus emerges as a decisive factor in determining whether policy frameworks are translated into effective governance.

2.5 Contribution of this Study

Building on these debates, the present study tests the relative importance of domestic, economic, institutional, international, and financial factors in Colombia's climate governance trajectory. By focusing on a single-country case over an extended temporal horizon, the analysis provides granular insights into how global and local determinants interact, thereby refining existing theoretical frameworks rather than contradicting them.

3. Methodology

Research Design

The methodological approach builds on the framework pioneered by Fankhauser, Gennaioli, and Collins (2015), who employed large-N quantitative political economy methods to examine climate legislation using the Climate Change Laws of the World (CCLW) database. Retaining this core design, the present analysis focuses exclusively on climate-related instruments in Colombia, Peru, and Kenya rather than extending to other environmental domains. The contribution lies in applying the political economy framework to single-country cases over an extended temporal horizon (1995–2024), thereby allowing for a more granular assessment of domestic resilience, economic and institutional conditions, international commitments, and financial resources.

In doing so, the study situates itself within broader strands of environmental political economy (Bernauer & Koubi, 2009; Lachapelle & Paterson, 2013), the literature on economic policy reform and political institutions (Persson & Tabellini, 2000; Alesina et al., 2006; Besley & Case, 2003; Franzese, 2002), and scholarship on treaty ratification and diffusion (von Stein, 2008; Fredriksson, Neumayer, Damania, & Gates, 2005). This embedding ensures that the cases of Colombia, Kenya, and Peru are

not treated in isolation but rather as part of wider theoretical debates on the drivers of climate governance.

Variables and Data Sources

The *dependent variable* is the annual count of climate instruments adopted in Colombia, Kenya, and Peru, derived from the Climate Change Laws of the World (CCLW) database. *Independent variables* capture four dimensions:

- **Domestic resilience:** NDGAIN Index, oil rents, and disaster frequency.
- **Economic and institutional conditions:** GDP per capita (PPP), industry share, democracy index (V-Dem's *v2x_libdem*), electoral cycles (election year, years to election).
- **International commitments:** ratification of the Kyoto Protocol and Paris Agreement, and submission of Nationally Determined Contributions (NDCs).
- **Financial resources:** climate finance flows (OECD and UNFCCC repositories).

Data were drawn from established sources including V-Dem, World Development Indicators, UNFCCC repositories, and OECD climate finance statistics.

Model Specification

Given the count nature of the dependent variable and evidence of overdispersion, **negative binomial regression models** were specified. Four models were estimated to isolate different explanatory dimensions:

- **Model A: Domestic law and resilience** — Climate Framework Law, NDGAIN Index, oil rents, disaster count.
- **Model B: Economic and institutional factors** — GDP per capita (PPP), industry share, democracy index, election year, years to election.
- **Model D: International agreements** — Kyoto ratified, Paris ratified, NDC submitted.
- **Model E: Financial resources** — climate finance total.

Each model was fitted separately using the **statsmodels package in Python** to isolate the effects of different explanatory dimensions. Results were then compared across specifications to assess the relative importance of domestic versus external drivers.

4. Results

4.1 Colombia

- Model A indicates that the NDGAIN Index is strongly negative and highly significant, suggesting that greater resilience is associated with fewer instruments. This finding supports the hypothesis that vulnerability, rather than strength, stimulates instrument proliferation. Oil rents and disaster frequency were not significant.

- Model B shows weak influence of economic and institutional variables. GDP per capita and industry share were negligible, while democracy displayed a large positive coefficient but lacked statistical robustness. Electoral cycles were insignificant.
- Model D highlights the importance of international agreements: ratification of both Kyoto and Paris significantly increased adoption, while NDC submission was not significant.
- Model E demonstrates the enabling role of financial resources, with climate finance strongly positive and highly significant.

4.2 Kenya

- Model A shows resilience effects are weaker: NDGAIN was negative but insignificant, while disaster count was positive and significant. This suggests shocks, rather than adaptive capacity, triggered instrument adoption. Oil rents had no effect.
- Model B indicates GDP per capita was positive and significant, highlighting the role of economic development in enabling climate governance. Democracy was negative but insignificant.
- Model D confirms the catalytic role of international agreements: Kyoto and Paris ratification were significant, and unlike Colombia, NDC submission was also significant.
- Model E shows climate finance was positive and significant, underscoring the importance of external resources.

4.3 Peru

- Model A reveals resilience effects similar to Kenya: NDGAIN was negative but not significant, disaster count positive but insignificant, and oil rents negligible.
- Model B highlights democracy as a strong and significant driver, underscoring the importance of institutional strength and participatory governance. Industry share was negative and marginally significant.
- Model D shows Paris ratification and NDC submission were both significant, while Kyoto was not. This indicates voluntary pledges can matter when supported by strong institutions.
- Model E demonstrates climate finance was strongly positive and highly significant, confirming its decisive role.

4.4 Comparative Insights

Across all three countries, external drivers—international agreements and climate finance—consistently predict instrument adoption. Domestic factors vary: Colombia illustrates the resilience paradox, Kenya highlights disaster-driven adoption and economic growth, and Peru underscores the importance of democracy and voluntary pledges.

Across all three cases, oil rents did not emerge as a significant driver of climate instrument adoption. In Colombia, despite the fiscal importance of oil revenues, rents did not translate into measurable effects on climate governance. In Kenya, the insignificance of oil rents reflects the limited role of hydrocarbons in the national economy. In Peru, negligible effects suggest that broader extractive dynamics are not captured by oil rents alone. These findings indicate that resource dependence, at

least in the form of oil rents, is not a primary determinant of climate legislation in the studied contexts, contrasting with resource-curse expectations in the political economy literature.

5. Comparative Discussion

External Drivers as Consistent Catalysts

International commitments and financial resources emerge as decisive determinants across all three countries. Ratification of binding treaties catalyzed domestic action, embedding global norms into national frameworks and creating reputational incentives for compliance. Climate finance was strongly significant in each case, underscoring the enabling role of external resources in translating commitments into policy. These findings confirm diffusion and ratification theories and highlight the dependence of developing and middle-income democracies on international support for climate governance.

Divergent Roles of Domestic Resilience

Resilience displayed paradoxical effects across the cases. In Colombia, greater resilience was significantly associated with fewer instruments, suggesting vulnerability stimulates innovation. In Peru, resilience was negative but not significant, while in Kenya, resilience was again negative but insignificant, with disaster frequency emerging as a significant positive predictor. These results complicate conventional resilience theory, suggesting fragility and shocks may be more powerful triggers of legislative activity than adaptive capacity in contexts where external drivers dominate.

Economic and Institutional Variation

Economic and institutional variables exerted varied influences. In Peru, democracy was a strong and significant driver, highlighting the importance of institutional strength and participatory governance. In Kenya, economic development (GDP per capita) was significant, suggesting material capacity enables climate governance, while democracy was not significant. In Colombia, neither democracy nor economic variables reached statistical significance, though democracy displayed a large but non-robust coefficient. These divergences suggest that institutional and economic drivers may be context-dependent, exerting stronger influence where external commitments are embedded in robust domestic frameworks (Peru) or where economic growth provides capacity for policy innovation (Kenya).

International Commitments and Voluntary Pledges

The role of voluntary pledges (NDCs) varied across the cases. In Colombia, NDC submission was not significant, underscoring the limited impact of voluntary commitments absent binding enforcement mechanisms. This finding aligns with Lachapelle and Paterson (2013), who argue that voluntary pledges often lack the institutional force necessary to drive domestic action. In Peru, however, NDC submission was significant, suggesting that voluntary pledges can matter when supported by strong democratic institutions and embedded within broader governance frameworks. Similarly, in Kenya, NDC submission was significant, highlighting the responsiveness of developing democracies to global

norms when combined with external finance. These findings refine diffusion theory by showing that the effectiveness of voluntary commitments depends on domestic institutional context and external support, rather than being universally weak or strong.

Financial Resources as the Most Consistent Determinant

Climate finance emerged as the most consistent and significant determinant across all three countries. In Colombia, Peru, and Kenya alike, external funding enabled governments to translate commitments into instruments, ensuring that international obligations were not merely symbolic. This finding underscores the dependence of climate governance on external resources and raises questions about sustainability and autonomy. Jackson (2017) emphasizes that prosperity without growth requires rethinking economic foundations, while Scott Cato (2012) highlights the bioregional economy as a pathway to resilience. Yet both perspectives acknowledge that without adequate financial flows, commitments remain aspirational. The significance of finance across all three cases confirms that material capacity is indispensable for policy innovation in middle-income democracies.

Synthesis and Implications

Taken together, the comparative analysis highlights the predominance of external drivers—international agreements and financial resources—across diverse contexts. Domestic factors such as resilience, democracy, and economic development exert influence, but their effects vary by country. Colombia illustrates the paradoxical role of resilience, Peru underscores the importance of democratic institutions and voluntary pledges, and Kenya highlights the role of disaster shocks and economic growth.

The policy implications for climate governance are significant. Sustaining climate governance in these countries requires not only continued engagement with international agreements and financial mechanisms but also strengthening domestic institutions, building resilience without complacency, and integrating climate policy into broader development strategies. Comparative insights suggest that while external drivers provide the foundation, domestic conditions shape the pathways through which commitments are translated into action.

6. Conclusion

This comparative study demonstrates that climate instrument adoption in Colombia, Peru, and Kenya between 1995 and 2024 has been shaped primarily by external commitments and financial flows. Ratification of international treaties and access to climate finance consistently predict adoption, while domestic resilience, economic, and institutional variables exert varied influence. Colombia illustrates the resilience paradox, where vulnerability rather than strength drives innovation. Kenya highlights disaster-driven adoption and the enabling role of economic growth, while Peru underscores the importance of democracy and voluntary pledges in fostering climate governance.

These findings contribute to theoretical debates by confirming diffusion and ratification theories (von Stein, 2008; Lachapelle & Paterson, 2013), highlighting the enabling role of financial resources (Jackson, 2017; Scott

Cato, 2012), and complicating resilience theory (Adger, Lorenzoni, & O'Brien, 2009) by showing that fragility, rather than adaptive strength, may stimulate legislative activity.

Policy implications include:

- Translating voluntary pledges into binding domestic legislation to enhance their effectiveness.
- Strengthening democratic institutions and participatory governance to increase legitimacy and public support.
- Ensuring resilience does not lead to complacency but rather complements continuous innovation.
- Securing predictable flows of climate finance to sustain instrument adoption.
- Promoting regional cooperation and knowledge sharing to amplify the impact of international agreements and finance.

Future research should extend this analysis to other middle-income democracies across Latin America, Africa, and Asia to assess whether reliance on external drivers is a broader feature of climate governance. Comparative studies would deepen our understanding of how global and local determinants interact in shaping climate governance, and whether domestic institutions can eventually reduce dependence on external resources.

7. Policy Recommendations

- **Strengthening Domestic Resilience While Maintaining Policy Innovation**
Ensure that resilience does not reduce innovation. Even in strong institutional contexts, continuous development of climate instruments is necessary to address emerging risks.
- **Leverage International Commitments as Catalysts for Domestic Action**
Ratification of Kyoto and Paris Agreements significantly increased instrument adoption. Countries should continue to engage actively in international climate negotiations and ratify future agreements promptly.
- **Translate NDCs into Binding Domestic Policies**
Voluntary pledges need stronger domestic legal frameworks to have impact. Integrating NDC targets into binding legislation and regulatory instruments can enhance their effectiveness.
- **Expand and Target Climate Finance**
Climate finance was the strongest positive predictor of instrument adoption. Countries should prioritize securing international climate finance and ensure funds are directed toward policy design and implementation, not just project-level interventions. Transparent monitoring of finance flows will enhance accountability and effectiveness.
- **Enhancing Democratic Institutions and Participation**
Strengthening participatory governance and ensuring inclusive decision-making may indirectly foster climate instrument adoption by increasing legitimacy and public support.

→ Regional Cooperation and Knowledge Sharing

Collaboration across Latin America and Africa can amplify the impact of international agreements and finance, while also addressing common vulnerabilities.

8. References

- Adger, W. N., Lorenzoni, I., & O’Brien, K. (Eds.). (2009). *Adapting to climate change: Thresholds, values, governance*. Cambridge University Press.
- Agyeman, J. (2013). *Introducing just sustainabilities: Policy, planning, and practice*. Zed Books.
- Alesina, A., Roubini, N., & Cohen, G. D. (2006). *Political cycles and the macroeconomy*. MIT Press.
- Bernauer, T., & Koubi, V. (2009). Effects of political institutions on air quality. *Ecological Economics*, 68(5), 1355–1365. <https://doi.org/10.1016/j.ecolecon.2008.08.021>
- Besley, T., & Case, A. (2003). Political institutions and policy choices: Evidence from the United States. *Journal of Economic Literature*, 41(1), 7–73. <https://doi.org/10.1257/jel.41.1.7>
- Dobson, A. (2007). *Green political thought* (4th ed.). Routledge.
- Fankhauser, S., Gennaioli, C., & Collins, M. (2015). Do international factors shape climate change legislation? *Climate Policy*, 15(4), 447–468. <https://doi.org/10.1080/14693062.2014.937388>
- Franzese, R. J. (2002). *Macroeconomic policies of developed democracies*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511756231>
- Global Commission on the Economy and Climate. (2018). *Unlocking the inclusive growth story of the 21st century: Accelerating climate action in urgent times*. New Climate Economy.
- Jackson, T. (2017). *Prosperity without growth: Foundations for the economy of tomorrow* (2nd ed.). Routledge.
- Lachapelle, E., & Paterson, M. (2013). Drivers of national climate policy. *Climate Policy*, 13(5), 547–571. <https://doi.org/10.1080/14693062.2013.811231>
- Persson, T., & Tabellini, G. (2000). *Political economics: Explaining economic policy*. MIT Press.
- Scott Cato, M. (2012). *The bioregional economy: Land, liberty and the pursuit of happiness*. Routledge.
- von Stein, J. (2008). The international law and politics of climate change: Ratification of the Kyoto Protocol. *Journal of Conflict Resolution*, 52(2), 243–268. <https://doi.org/10.1177/0022002707313692>
- Fredriksson, P. G., Neumayer, E., Damania, R., & Gates, S. (2005). Environmental policy reform: The role of political and economic institutions. *Journal of Environmental Economics and Management*, 50(2), 422–445. <https://doi.org/10.1016/j.jeem.2004.09.001>
- Woodin, M., & Lucas, C. (2004). *Green alternatives to globalization: A manifesto*. Pluto Press.

Annex A: Variables and Data Sources

Variable	Description	Source
Climate Instrument Count	Annual number of climate-related policy instruments adopted in Colombia (dependent variable).	Compiled from national legal and policy records.
Climate Framework Law	Dummy variable (0/1) indicating whether Colombia had enacted a national climate framework law.	Climate Change Laws of the World (CCLW), Grantham Research Institute (LSE).
NDGAIN Index	Composite index measuring vulnerability to climate change and readiness to adapt.	Notre Dame Global Adaptation Initiative (ND-GAIN).
Oil Rents (% of GDP)	Share of GDP derived from oil rents, proxy for resource dependence.	World Bank World Development Indicators.
Disaster Count	Annual number of recorded natural disasters affecting Colombia.	EM-DAT International Disaster Database.
GDP per capita (PPP)	GDP per capita in purchasing power parity terms.	World Bank World Development Indicators.
Industry Share (% of GDP)	Share of industry in GDP, proxy for economic structure.	World Bank World Development Indicators.
v2x_libdem (Democracy Index)	Liberal democracy index capturing electoral, liberal, and institutional dimensions.	Varieties of Democracy (V-Dem) Project.
Election Year / Years to Election	Dummy variable for election years and countdown to next election.	Colombian electoral calendar (Registraduría Nacional del Estado Civil).
GHG Total	Total greenhouse gas emissions (MtCO ₂ e).	Climate Watch (World Resources Institute).
Kyoto Ratified	Dummy variable (0/1) for Colombia's ratification of the Kyoto Protocol.	UNFCCC country records.
Paris Ratified	Dummy variable (0/1) for Colombia's ratification of the Paris Agreement.	UNFCCC country records.
NDC Submitted	Dummy variable (0/1) for submission of Nationally Determined Contributions.	UNFCCC submissions registry.
Climate Finance Total	Annual climate finance flows (USD millions), reported through bilateral and multilateral channels.	OECD Creditor Reporting System (CRS).

Annex B: Regression Results (Negative Binomial Models)

Results for Colombia

Model A: Domestic Law and Resilience

Variable	Coefficient	Std. Error	z-score	p-value	95% CI (Lower–Upper)
Intercept	62.2090	16.778	3.708	0.000	29.325 – 95.093

Climate Framework Law	-0.4649	0.934	-0.497	0.619	-2.296 – 1.367
NDGAIN Index	-142.0458	38.709	-3.670	0.000	-217.915 – -66.177
Oil Rents	-0.2092	0.192	-1.090	0.276	-0.585 – 0.167
Disaster Count	-0.1257	0.161	-0.780	0.435	-0.441 – 0.190

Model B: Economic and Institutional Factors

Variable	Coefficient	Std. Error	z-score	p-value	95% CI (Lower–Upper)
Intercept	-5.5376	3.898	-1.421	0.155	-13.178 – 2.103
GDP per capita PPP	0.0002	0.000	1.148	0.251	-0.000 – 0.001
Industry Share	-0.1668	0.147	-1.133	0.257	-0.455 – 0.122
v2x_libdem	15.9628	12.028	1.327	0.184	-7.611 – 39.536
Election Year	0.9882	1.034	0.955	0.339	-1.039 – 3.016
Years to Election	0.0877	0.402	0.218	0.827	-0.700 – 0.875

Model D: International Agreements

Variable	Coefficient	Std. Error	z-score	p-value	95% CI (Lower–Upper)
Intercept	-1.3863	0.791	-1.754	0.080	-2.936 – 0.163
Kyoto Ratified	1.8659	0.866	2.155	0.031	0.169 – 3.563
Paris Ratified	1.7177	0.825	2.083	0.037	0.101 – 3.334
NDC Submitted	0.0541	0.912	0.059	0.953	-1.734 – 1.842

Model E: Financial Resources

Variable	Coefficient	Std. Error	z-score	p-value	95% CI (Lower–Upper)
Intercept	-0.5095	0.363	-1.404	0.160	-1.221 – 0.202
Climate Finance Total	0.0030	0.001	5.363	0.000	0.002 – 0.004

Results for Kenya

Model A: Domestic Law and Resilience

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	16.0051	29.275	0.547	0.585	-41.374 – 73.384

Climate Framework Law	1.7304	1.293	1.339	0.181	-0.803 – 4.264
NDGAIN Index	-34.4334	56.166	-0.613	0.540	-144.518 – 75.651
Oil Rents	17.2691	34.926	0.494	0.621	-51.184 – 85.722
Disaster Count	0.2138	0.096	2.217	0.027	0.025 – 0.403

Model B: Economic and Institutional Factors

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	-7.3691	3.862	-1.908	0.056	-14.938 – 0.200
GDP per capita PPP	0.0009	0.000	2.001	0.045	0.00002 – 0.002
Industry Share	0.3736	0.276	1.355	0.175	-0.167 – 0.914
v2x_libdem	-5.4455	9.230	-0.590	0.555	-23.536 – 12.645
Election Year	-0.0785	0.940	-0.083	0.933	-1.921 – 1.764
Years to Election	0.0716	0.244	0.293	0.769	-0.407 – 0.551

Model D: International Agreements

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	-1.2040	0.658	-1.829	0.067	-2.494 – 0.086
Kyoto Ratified	1.5141	0.769	1.970	0.049	0.007 – 3.021
Paris Ratified	0.5970	0.301	1.986	0.047	0.008 – 1.186
NDC Submitted	0.5970	0.301	1.986	0.047	0.008 – 1.186

Model E: Financial Resources

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	0.0138	0.346	0.040	0.968	-0.664 – 0.692
Climate Finance Total	0.0014	0.001	2.007	0.045	0.00003 – 0.003

Results for Peru

Model A: Domestic Law and Resilience

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
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Intercept	16.7782	10.380	1.616	0.106	-3.565 – 37.122
Climate Framework Law	0.1446	0.795	0.182	0.856	-1.414 – 1.703
NDGAIN Index	-38.6608	24.431	-1.582	0.114	-86.544 – 9.222
Oil Rents	0.0499	0.890	0.056	0.955	-1.695 – 1.795
Disaster Count	0.2092	0.150	1.399	0.162	-0.084 – 0.502

Model B: Economic and Institutional Factors

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	2.2636	3.162	0.716	0.474	-3.933 – 8.460
GDP per capita PPP	0.0000983	0.000104	0.949	0.343	-0.000105 – 0.000301
Industry Share	-0.1844	0.107	-1.729	0.084	-0.393 – 0.025
v2x_libdem	5.5600	2.583	2.153	0.031	0.498 – 10.622
Election Year	1.4634	0.917	1.596	0.110	-0.334 – 3.261
Years to Election	-0.1029	0.254	-0.405	0.685	-0.601 – 0.395

Model D: International Agreements

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	-0.3365	0.586	-0.575	0.566	-1.484 – 0.811
Kyoto Ratified	0.8329	0.677	1.231	0.218	-0.493 – 2.159
Paris Ratified	0.7915	0.275	2.879	0.004	0.253 – 1.330
NDC Submitted	0.7915	0.275	2.879	0.004	0.253 – 1.330

Model E: Financial Resources

Variable	Coefficient	Std. Error	z score	p value	95% CI (Lower–Upper)
Intercept	-0.0660	0.352	-0.188	0.851	-0.756 – 0.624
Climate Finance Total	0.0043	0.001	3.599	0.000	0.0019 – 0.0066

Annex C: Heatmap Matrix (Comparative Results of Negative Binomial Models)

Model / Variable	Colombia	Kenya	Peru
Model A – Domestic Law & Resilience	NDGAIN Index: Strong negative, significant Oil rents: Not significant Disaster count: Not significant	NDGAIN Index: Negative, not significant Oil rents: Not significant Disaster count: Positive, significant	NDGAIN Index: Negative, not significant Oil rents: Not significant Disaster count: Positive, not significant
Model B – Economic & Institutional Factors	GDP per capita PPP: Not significant Industry share: Not significant Democracy (v2x_libdem): Large positive, not robust Election year: Not significant Years to election: Not significant	GDP per capita PPP: Positive, significant Industry share: Not significant Democracy (v2x_libdem): Negative, not significant Election year: Not significant Years to election: Not significant	GDP per capita PPP: Not significant Industry share: Negative, marginally significant Democracy (v2x_libdem): Strong, significant Election year: Not significant Years to election: Not significant
Model D – International Agreements	Kyoto ratified: Significant Paris ratified: Significant NDC submitted: Not significant	Kyoto ratified: Significant Paris ratified: Significant NDC submitted: Significant	Kyoto ratified: Not significant Paris ratified: Significant NDC submitted: Significant
Model E – Financial Resources	Climate finance total: Strongly positive, highly significant	Climate finance total: Positive, significant	Climate finance total: Strongly positive, highly significant

Annex D: Driver-to-Case Study Matrix

Driver	Colombia	Peru	Kenya	Global Example
Resilience / Vulnerability	<i>Climate Adaptation M&E in Agriculture</i> : Developed monitoring systems to track adaptation outcomes, stimulated by vulnerability in rural sectors.	<i>El Niño Preparedness</i> : Adoption of instruments to manage recurrent climate shocks, showing fragility as a trigger.	<i>Cyclone & Flood Disaster Response</i> : Disaster count significantly drove adoption of instruments (National Disaster Management Authority).	<i>Bangladesh Cyclone Preparedness Programme</i> : Disaster shocks catalyzed early warning systems and shelters.
Democratic Institutions	<i>National Climate Change Law (2010s)</i> : Passed through legislative debate, though democracy was not statistically significant in regression.	<i>Climate Change Framework Law (2018)</i> : Strong democratic debate and civil society participation made democracy a significant driver.	<i>Climate Change Act (2016)</i> : Adopted through parliamentary process, but regression showed democracy not significant.	<i>South Africa's Climate Change Bill</i> : Democratic institutions enabled broad consultation and adoption.
International Commitments	<i>Kyoto & Paris Ratification</i> : Both significantly increased instrument adoption.	<i>Paris Agreement & NDCs</i> : Ratification and voluntary pledges both significant, embedded into domestic frameworks.	<i>National Climate Change Action Plan</i> : Directly linked to Paris ratification and NDC submission.	<i>Mexico's General Climate Change Law</i> : Adopted after Kyoto and Paris commitments.
Financial Resources	<i>REDD+ Initiatives</i> : Climate finance flows enabled forest conservation instruments.	<i>Climate Finance Integration</i> : External funding consistently enabled adoption of new instruments.	<i>Climate Finance Strategy</i> : Regression confirmed finance as significant; external flows supported implementation.	<i>Seychelles Debt-for-Climate Swap</i> : Innovative finance enabled marine conservation instruments.