Shaping multilateral regional governance of climate and forests: Exploring the influence of Forest industry lobbying on state participation

Fredy David Polo-Villanueva [a,*], Simon Schaub [b], Laura Rivadeneira [a], Jale Tosun [b], Lukas Giessen [a], Sarah Lilian Burns [a,c,d]

[a] *Chair of Tropical and International Forestry, Institute of International Forestry and Forest Products, Technische Universität Dresden, Dresden, Germany*
[b] *Institute of Political Science, Universität Heidelberg, Heidelberg, Germany*
[c] *Laboratorio de Investigación de Sistemas Ecológicos y Ambientales (LISEA), Facultad de Ciencias Agrarias y Forestales, Universidad Nacional de La Plata, Argentina*
[d] *National Scientific and Technical Research Council (CONICET), Buenos Aires, Argentina*

A R T I C L E   I N F O

A B S T R A C T

This study aims to characterise the institutional dynamics of Multilateral Regional Governance Arrangements at the Climate-Forest Interface (MRGA-CFI) and investigate the influence of the forest industry lobby groups on state participation in these arrangements. We use an original dataset to characterise the issue scope, spatial ambit, and governance functions of MRGA-CFI. State participation in these arrangements is modelled as a function of the strength of the forest industry lobby groups; measured as the proportion of forest that has been planted in a state, alongside various control variables. Our findings reveal that most MRGA-CFI focus on forests but are relevant for climate issues, have contiguous spatial ambit primarily in Asia and Africa, and focus on knowledge dissemination and capacity building. Quantitative analysis reveals a positive significant association between the strength of the forest industry lobby groups and state participation in MRGA-CFI. The analysis further suggests that states with stronger forest industry lobby groups are more likely to participate in non-centralised arrangements and those that focus on forest but not climate. Conversely, such states are also less likely to participate in governance arrangements that focus on both forest and climate issues. We conclude that while regional cooperation on climate and forests has been designed to capture funds from the climate regime and form negotiating coalitions, the forest industry lobbies governments to prevent such cooperation from overregulating their economic activities.

1. Introduction

International environmental governance has been significantly transformed by the outcomes of the global negotiations at the 1992 United Nations Conference on Environment and Development (Balsiger and Debarbieux, 2011; Humphreys, 2006). However, the results of this transformation have differed between environmental sub-sectors, especially when comparing international climate and forest governance. While the inception of the United Nations Framework Convention on Climate Change (UNFCCC) made climate governance more centralised and global, the United Nation's failure to establish a global forest convention intensified the fragmentation and regionalisation of forest governance (Begemann et al., 2021; Giessen, 2013; Sarker et al., 2024). Nevertheless, there has been an increase in multilateral

governance arrangements addressing climate and forest issues, especially at the regional level (Levin et al., 2008).

The increase in multilateral governance arrangements at the climate-forest interface raised the following questions: What institutional designs do Multilateral Regional Governance Arrangements at the Climate-Forest Interface (MRGA-CFI) exhibit? What explains the level of participation of states in such governance arrangements? These are relevant questions for both theoretical and practical reasons. From a theoretical perspective, the rational design theory argues that states use international governance arrangements to promote their own interests and thus design them accordingly (Koremenos et al., 2001). We aim to test this theoretical argument and thereby contribute to the development of theories on the design of international environmental institutions (Koremenos et al., 2001; Sarker et al., 2024). Empirically, our

---

* Corresponding author at: Technische Universität Dresden, Institute of International Forestry and Forest Products, Chair of Tropical and International Forestry, 01062 Dresden, Germany.
E-mail address: fredy_david.polo_villanueva@mailbox.tu-dresden.de (F.D. Polo-Villanueva).

insights may inform global and regional negotiations on climate and forest issues, such as the ones related to the implementation of the Paris Agreement to the UNFCCC (UNFCCC, 2022). Such an analysis may inform policymakers about the factors that drive states to cooperate on climate-forest issues, as well as provide insights into the institutional features that make climate-forest cooperation more attractive to a larger number of states.

Numerous Studies have estimated the likelihood of states to participate in international environmental governance arrangements (Bernauer et al., 2010b; Bernauer et al., 2013a; Hafner-Burton et al., 2008). Drivers of state participation are mainly related to domestic variables, the institutional design of the arrangements, and the international connectivity of states (Bellelli et al., 2023a). One of the most important domestic drivers of state participation, although scarcely studied quantitatively, is the influence of interest groups or lobby groups (Bernauer et al., 2010b; Berning and Sotirov, 2024). Lobby groups are "organisations that make policy suggestions to governments in order to bring public policies more in line with the interests of their members" (Knill and Tosun, 2020:62). They can exert leverage in different ways such as inside advocacy, providing information to actors inside the policy-making process; outside advocacy, providing information to actors outside the policy-making process; and/or grassroots advocacy, exerting political pressure through mass mobilisation (Knill and Tosun, 2020). Thus, the strength with which interest groups lobby to influence public policy depends mainly on the amount of resources such groups have available for such activities, in terms of budget, staff and expertise; and the extent to which they are consulted by policy-makers (Bruycker and Beyers, 2019).

Some studies have explored the influence of lobby groups on the level of state participation in international environmental governance arrangements (For some examples see Bellelli et al., 2023a; Bellelli et al., 2023b; Bernauer et al., 2010a, 2010b; Bernauer et al., 2013b; Mohrenberg et al., 2019; Seelarbokus, 2014). While scholars found positive correlations between the strength of the environmental conservation lobby groups and the level of participation of states in international environmental governance agreements, there is not yet conclusive evidence on the association between the strength of the industrial lobby groups and such levels of state participation (Bellelli et al., 2023b; Bernauer et al., 2013a; Fredriksson et al., 2007). This lack of conclusive evidence may be due to the industrial lobby groups have only been analysed for industry as a swhole, and have not been broken down into industrial sub-sectors. Hence, it remains to be explored how the strength of industry-specific lobbies, such as the forest industry, influences the level of state participation in multilateral environmental cooperation.

What institutional features characterise Multilateral Regional Governance Arrangements at the Climate-Forest Interface (MRGA-CFI)? Do domestic forest industry lobby groups influence the level of state participation in such arrangements? If so, how? These research questions guide our study, which unfolds as follows. The next section presents our hypotheses. Then we turn to the methods section, where we conceptualise and operationalise our key variables and explain the research design. We subsequently present and discuss our findings. Finally, we draw some conclusions.

2. Theory and hypothesis

MRGA-CFI are the institutional elements populating the regional level of the interface between the climate and forest regime complexes (based on Giessen, 2013; Rodríguez Fernández-Blanco et al., 2019a, 2019b). We therefore conceptualise MRGA-CFI as *multilateral institutions that seek to jointly govern climate and forest issues at the regional level* (based on Abbott and Snidal, 2009; Balsiger and Prys, 2016; Jeon et al., 2019). In this context, multilateral institutions should be understood as formal and informal sets of rules, functions and relationships that define and regulate social practices between state actors in international affairs (based on Abbott and Snidal, 2009). For more details on the

conceptualisation, see Supplementary Material 1.

Qualitative research shows that forest companies can influence multilateral environmental cooperation (Sarker et al., 2018; Tavoni and Winkler, 2021). However, to our knowledge, no quantitative study has systematically analysed the relationship between the strength of the forest industry lobby groups and the level of state participation in multilateral regional cooperation on climate and forests. Thus, based on environmental governance research, we present below three hypotheses on how both variables relate.

Most multilateral institutions governing climate and forest issues focus primarily on conserving the forest sink, that is, the carbon stored in standing forests (Creutzburg and Lieberherr, 2021; Mbatu, 2015).

This is because most countries perceive the timber sink, or the carbon stored in timber (mostly) from forest plantations, only as a supplement to the forest sink and not as an alternative mitigation strategy (Carmenta et al., 2017). This preference for forest sinks is evidenced by the relatively low supply of carbon credits from reforestation and afforestation activities traded through the UNFCCC's Kyoto Protocol's Clean Development Mechanism, compared to the large supply of credits produced by forest conservation projects under the Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative (Lederer, 2011). Given the above, we argue that MRGA-CFI are prone to adopt and enforce forest conservation policies, such as strict forest regulations, which could increase the legal and financial burden of forest management activities (Polo Villanueva et al., 2023).

The forest industry is made up of companies that are responsible for the management and/or harvesting of forest ecosystems, as well as for the trade of timber and non-timber forest products. Therefore, the forest industry often makes attempts to prevent regulation that would increase the burden of their activities (Kröger, 2017). An example of the effect of these activities can be seen in the case of Sweden, where a strong lobby resulted in the deregulation of forest management activities (Bergquist and Keskitalo, 2016; Nylund, 2009). However, this phenomenon is not exclusive to the forest sector, but can also be observed in others such as the financial sector (Hammond and Knott, 1988; Yakovlev and Zhuravskaya, 2007). Based on this reasoning, we formulate our first hypothesis: *the more strongly the forest industry lobbies in a state, the lower is that state's level of participation in MRGA-CFI (H1)*.

Rational design theory argues that multilateral institutions are designed by their member states to further their own interests (Koremenos et al., 2001). Comparative research therefore allows academics to test hypotheses on what institutional designs and features best serve the interests of specific group of states. We therefore hypothesise below which institutional features, in relation to the dimensions of *issue focus* and *centralisation*, best serve the interests of states with a strong forest industry lobby.

Issue focus refers to whether an arrangement focuses on forests and climate issues simultaneously. MRGA-CFI can be classified into two types: focused MRGA-CFI, if they address both issues as main issues and thus link them strongly; or non-focused MRGA-CFI, if they address only one of them as a main issue and the other as a secondary issue and thus link them less strongly (based on Jeon et al., 2019). Given that the link between climate and forest issues is primarily driven by the conservation of forests sinks, focused MRGA-CFI are expected to be more inclined, in comparison to non-focused MRGA-CFI, to adopt forest conservation policies (Creutzburg and Lieberherr, 2021; Mbatu, 2015). Thus, one can also expect that the forest industry lobbies to hinder state participation in focused MRGA-CFI and instead promote state participation in non-focused ones. This leads us to hypothesise that *the more strongly the forest industry lobbies in a state, the lower is that state's level of participation in focused MRGA-CFI and the higher is its level of participation in non-focused MRGA-CFI (H2)*.

Centralisation refers to whether there is a single entity within the organisational structure of an arrangement that is responsible for core institutional tasks, also known as a secretariat, and is both independent and permanent (Koremenos et al., 2001; Westerwinter, 2021). MRGA

can thus be classified as centralised MRGA-CFI, if they have independent and permanent secretariats; or non-centralised MRGA-CFIs, if they do not have a secretariat or if they have one but it is not permanently based in a country and/or depends on an external organisation (Vabulas and Snidal, 2013). Membership in centralised MRGA-CFI is controversial as it entails high sovereignty costs for the member states (Westerwinter, 2021). This is because the members to such agreements often have to concede part of their sovereignty to the bureaucracy of such centralised institutions (Vabulas and Snidal, 2013). Based on this, it is reasonable to presume that centralised MRGA-CFI are more inclined, than non-centralised ones, to comply with forest conservation policies adopted by the governance arrangements (Vabulas and Snidal, 2013). We thus expect that the forest industry will lobby to hinder state participation in centralised MRGA-CFI and rather promote state participation in non-centralised MRGA-CFI (Polo Villanueva et al., 2023). We therefore hypothesise that *the more strongly the forest industry lobbies in a state, the lower is that state's level of participation in centralised MRGA-CFI and the higher is its level of participation in non-centralised MRGA-CFI (H3).*

3. Methods

3.1. A database of multilateral regional governance arrangements at the climate-forest interface

Our composite database draws from four datasets: the Yearbook of International Organisations[1], the Commonwealth of Independent States Legislation Database[2], the International Environmental Agreements Database[3], and the Directory of Commonwealth NGOs related to forestry[4] (Balsiger and Prys, 2016; Balsiger and VanDeveer, 2012; Mitchell, 2006; Westerwinter, 2021). Data were extracted from these sources by searching for forest- and climate-related keywords in the titles and descriptions of the organisations and/or in the text of their inception documents. We complemented this search by adding institutions listed on the website of the Food and Agriculture Organization (FAO)[5] and the list of observer institutions of the Ministerial Conference on the Protection of Forests in Europe[6]. In addition, we reviewed the minutes from the UN Forum of Forests[7], employing the core-institution mapping method (Rodríguez Fernández-Blanco et al., 2019a, 2019b), and relevant scientific literature (i.e., Linser et al., 2018; Pattberg et al., 2015; Rodríguez Fernández-Blanco et al., 2019a, 2019b). We carried out data extraction between January and May 2023. After removing duplicates, we obtained an initial list of 594 institutions.

To narrow down our preliminary list, we operationalized our MRGA-CFI concept as follows. First, we filtered out institutions that lacked the essential characteristics for consideration as multilateral governance arrangements, including : (i) a minimum degree of relevance, which required that they had to publicly present objectives or a mission, (ii) a minimum degree of independence, which meant that if they were embedded in another institution, they had to be based on a different inception document, and (iii) multilateral membership, which required that they have three or more states as members. Our second filter aimed to identify elements that specifically pertain to the regional level. For this purpose, we selected only those multilateral institutions whose (iv) membership and/or spatial ambit was limited by contiguity or other functional criteria (Balsiger and Prys, 2016). Lastly, we selected only the

regional multilateral institutions that (v) mention keywords related to climate (Clima*, Greenhouse gas* and/or Carbon) and forest (i.e., Forest* Deforest*, Silvi* and/or Trees) on their main aims, mission statements, aims of their projects and/or list of main activities (based on Jeon et al., 2019). As a result, we obtained a final list of 21 MRGA-CFI.

3.2. Operationalising institutional features

We measured the following three key institutional features for all active arrangements: *issue scope, spatial ambit, and governance function* (Balsiger and Prys, 2016; Koremenos et al., 2001; Westerwinter, 2021).

For *issue scope*, we considered an arrangement to address an issue only if it mentioned one or more keywords related to climate or forest on its mission statement and/or main goals (Westerwinter, 2021). Second, to measure the *spatial ambit*, we first documented whether the area of application of the arrangement was limited by contiguity or other functional criteria. Next, we recorded whether such area follow political or eco-regional delimitation (Balsiger and Prys, 2016). Then, we coded in which UN world regions these areas are partially or fully located. Third, to measure *governance functions*, we used the list developed by Westerwinter (2021): agenda-setting/lobbying, standard setting, implementation, monitoring, funding, capacity building, and knowledge creation. It should be noted that the above categories are not mutually exclusive: arrangements can address more than one issue, cover various world regions, and/or develop many governance functions.

3.3. Research design

3.3.1. Outcome variables

The main outcome variable is based on counts of the total amount of MRGA-CFI in which a state participates (*total MRGA-CFI*). To code this variable, we used the list of sovereign states participating in international cooperation from the Correlations of War database.[8] We excluded from the participation counts initiatives that were terminated before 2020. Fig. 1 presents a map which captures the level of participation in MRGA-CFI across states. We chose to limit ourselves to data for the year 2020 for two reasons: first, because of the restricted data availability on the main independent variables that we include in the analysis; second, to minimise the effects from major global events that may influence state participation, such as the Coronavirus pandemic and Russia's attack on Ukraine.

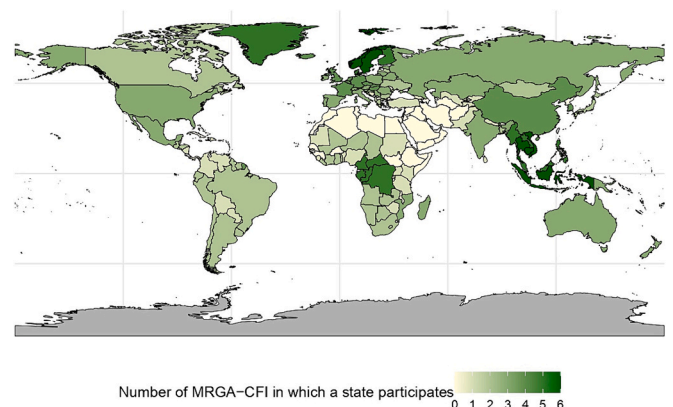In order to analyse how two institutional features of governance

Number of MRGA−CFI in which a state participates 0 1 2 3 4 5 6

Fig. 1. Level of participation in Multilateral Regional Governance Arrangements at the Climate-Forest Governance Interface (MRGA-CFI) across states.

---

arrangements, namely issue focus and centralisation, influence the relationship between domestic factors and state participation in MRGA-CFI, we developed alternative measurements of our outcome variable. First, regarding issue focus, *focused MRGA-CFI* captures the number of MRGA-CFI that focus jointly on climate and forest issues; while *non-focused MRGA-CFI* captures the number of MRGA-CFI that focus on only one of such issues (climate or forest). We consider an arrangement to be focused on an issue only if keywords related to such issues are mentioned in its mission statement and/or main aims (Jeon et al., 2019; Westerwinter, 2021). Second, regarding centralisation, *centralised MRGA-CFI* captures the number of MRGA-CFI that have an independent and permanent secretariat, while *non-centralised MRGA-CFI* captures the number of MRGA-CFI that do not have an independent and permanent secretariat. We consider a secretariat to be any institutional body whose purpose is to assist the initiative by carrying out core institutional tasks (Westerwinter, 2021). Secretariats could also be independent, if they are not hosted by external organisations, and permanent, if their seat does not rotate permanently between member states.

3.3.2. Main independent variable

Data on the strength of the forest industry lobby groups are not readily available. We therefore use the percentage of planted forest as a proportion of total forest area (*%PlantedForest*) as a proxy. This indicator is meant to provide an approximation of the relative importance of the forest industry within the domestic forest sector, as it shows the proportion of forest that is (potentially) being used for industrial forest production. In addition, and to show that the use of a particular variable does not drive our results, we use three alternative proxies. The percentage of planted forest as a proportion of the total land area (*%PlantedTerritory*) provides an approximation of the absolute importance of the forest industry, as it shows the share of national territory that is (potentially) being used to produce raw materials to supply such industry. Similarly, the percentage of forest area that is under independently verified forest management certification as a proportion of the total forest area (*%CertForest*) and as a proportion of the total land area (*%CertTerritory*) provide approximations of the relative and absolute scale of forest industry operations in a state respectively. Other proxies were not used for various reasons. We did not use data on trade of forest products because they are heavily influenced by established international trade routes. Put differently, a state with a high level of forest product exports may have been able to reach these levels only because it is located on international trade routes. Similarly, we abstained from using data on the contribution of the forest sector to the gross domestic product because it is estimated based on other variables already included in our models.

Since we measured the outcome variables for the year 2020 only, the indicators of our explanatory variable are averages of the values given for each state between 2010 and 2020. The data to calculate the main proxy and the first alternative proxy were retrieved from the FAO's Forest Resource Assessment Database[9], while the data of the last two alternative ones were retrieved from the FAO Corporate Statistical Database[10].

3.3.3. Control variables

We control for the main determinants of state participation identified by the theoretical and empirical literature. One of them is income, which we measure as the log value of the gross domestic product per capita (*GDPpc*). Previous research shows that countries with higher income per capita are more willing to preserve their environment and thus participate in international environmental agreements (Bernauer et al., 2013a; Fredriksson et al., 2007; Sauquet, 2014; Seelarbokus, 2014). We account for the states' natural capital by including the logarithm of forest area

(*ForestCover*). Studies show that states rich in environmental assets engage more often in environmental cooperation as they are under stronger international pressure to do so (Bellelli et al., 2023b; Seelarbokus, 2014). We also control for the domestic contribution to climate change by including the logarithm of the total CO_2 emissions in kilotons (*CO2emissions*). While some scholars argue that high-emission countries tend to be under greater public pressure to cooperate on climate/environmental issues, others claim that higher abatement costs deter such states from participating in such cooperation (Bernauer et al., 2010a; Vărzaru and Bocean, 2023). The sign of the coefficient produced by this variable can therefore be either positive or negative. We account for trade intensity, which we measure as the ratio of the sum of exports and imports to the gross domestic product (*Trade*). Research found that the higher the trade intensity of a state, the more reluctant that state is to participate in environmental cooperation (Neumayer, 2002; Seelarbokus, 2014). This is due to environmental regulation increasing the costs of producing exportable products, consequently reducing exports (Neumayer, 2002; Seelarbokus, 2014). Another well studied driver of state participation is the involvement in international organisations, which we measure as the number of highly formal international organisations in which a state partakes (*FIGOs*). Countries that are already members in a large network of international institutions are expected to show cooperative behaviour in other issue areas as well (Bellelli et al., 2023b; Bernauer et al., 2010b). Lastly, we control for whether a country is a democracy and assess it using the polyarchy indicator (*Democracy*). Numerous studies support the argument that democratic countries are more likely to cooperate internationally than non-democratic ones (Bernauer et al., 2013b; Westerwinter, 2021).

We retrieved the data for *GDPpc*, *CO2emissions*, *and Trade* from the World Bank database on development indicators[11]. We obtained the data on *ForestCover* from the FAO's Forest Resource Assessment Database, while the data on participation in *FIGOs* is taken from the most recent version of the Correlations of War IGO database. We extrated data on *Democracy* from the varieties of democracy V-DEM database[12]. We used the mean values between 2010 and 2020 for the indicators of all our control variables, except for the *FIGOs*. As concerns the latter, the latest version of the Correlations of War dataset only provides information up to 2014. Thus, we take the average value of states' participation in international organisations only for the period 2010–2014.

3.3.4. Analytical strategy

Since our outcome variables are measured via the number of MRGA-CFI in which a state participates, we use count regression models. As the sample variance is substantially larger than the sample mean, the outcome variable is likely to be characterised by over-dispersion. We confirmed the presence of this feature by performing a likelihood ratio test, which showed that the over-dispersion parameter was not equal to zero. Prior to the regression analysis, we discarded data from 19 states because their forestry data were estimated and not directly measured. We also ensured that multicollinearity did not distort our results for all models. For more details, see Supplementary Material 2. In addition, to complement our regression analysis, we performed robustness checks using the three previously mentioned alternative proxies. The results of all the models showed the same patterns of significance between the explanatory and outcome variables. For more details on the models, see Supplementary Material 3.

Finally, we conducted 12 semi-structured interviews with representatives from the global north (i.e., Germany, UK, Canada and Japan), the global south (i.e., China, India, Brazil, Pakistan, Peru) and multilateral institutions (i.e., Coalition for Rainforest Nations, G77, and Forest Europe).We did this in June and December 2023 at the 58th meeting of

---

the UNFCCC Subsidiary Body for Implementation in Bonn and the 25th UNFCCC Conference of the Parts in Dubai, respectively. In these interviews, we inquired about states' motivations for engaging in negotiations and governance arrangements that link climate and forest issues as well as into their preferences for the institutional designs of such arrangements. The information collected was then used to discuss our quantitative findings.

4. Results

This section has two parts. First, we present all mapped MRGA-CFI and characterise the institutional design of the ones that are currently active. Second, we present the results of our empirical analysis.

4.1. Mapping the multilateral regional climate-forest governance interface

Through our comprehensive mapping, we found 21 MRGA-CFI. The oldest arrangement in our dataset is the Nordic Forest Research Cooperation Committee founded in 1972 and the most recent is the Agreement on Cooperation for the Prevention and Elimination of Foci of Diseases and Forest Pests in the Border Areas of the Member States of the Commonwealth of Independent States, which came into force in 2019. In addition, we found two MRGA-CFI that are no longer in force: The Agreement Between the Governments of the Member States of the Association of Southeast Asian Nations and the Republic of Korea on Forest Cooperation (2012–2014) and an Extension to the Agreement Between the Governments of the Member States of the Association of Southeast Asian Nations and the Republic of Korea on Forest Cooperation (2014–2016). Both institutions were the prelude to the creation of the Asian Forest Cooperation Organization, which is still in force today and was formally created in 2018. Below are the descriptive statistics of the 19 MRGA-CFI that are currently active.

Regarding the issue scope, we found that 42 % of the arrangements address climate and forest simultaneously as main issues (focused MRGA-CFI), 53 % cover forest but not climate as main issue, and 5 % address climate but not forest as main issue. Fig. 2 gives an impression of the distribution of the arrangements according to their focus on climate and forest issues. The only MRGA-CFI that focuses on climate but not forest issues is the Nordic Development Fund established in 1989. Turning to the scope of non-climate and non-forest issues, we found that 16 % of the arrangements address trade and 11 % address biodiversity, human rights, and development issues. Food security was only addressed by 6 % of the arrangements and technology by none of them.

The spatial ambits of MRGA-CFI are mostly limited by contiguity (63 %). Almost all contiguous ambits are delimited by political boundaries, such as the territories of states belonging to a geographical and/or cultural region (e.g., Asia, Europe, Central Africa or the Scandinavian region), or by broader multilateral regional organisations, such as the Association of Southeast Asian Nations (ASEAN), the Commonwealth of Independent States (CIS) or the Southern African Development Community (SADC). However, one arrangement presents a contiguous ambit delimited by ecoregional boundaries: the Carpathian Mountains. Non-contiguous ambits, on the other hand, are often delimited by both political boundaries (e.g., countries in the Asia-Pacific region, with low income and fragile situations, or with low forest cover) and ecoregional boundaries (i.e., tropical forests around the world, African tropical forests or temperate and boreal forest regions across the globe except for in Europe). The spatial ambits are also more frequently located in Asia (58 %) or Africa (42 %). However, various ambits are also located in Europe, Latin America, and the Caribbean (32 % each), while there are only a few in Oceania (16 %) and North America (11 %).

Regarding the governance functions, most MRFA-CFI display the function of knowledge creation (79 %). This indicates that the arrangements are frequently involved in the production of new knowledge and the dissemination of information. Other functions that the arrangements seek to fulfil are capacity building (47 %), funding and the
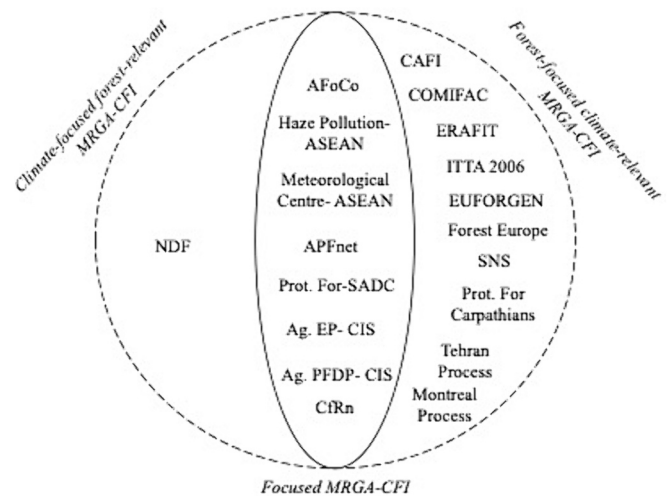
Fig. 2. Distribution of active MRGA-CFI according to their focus on climate and forest issues.
Notes: NDF: Nordic Development Fund; AFoCo: Asian Forest Cooperation Organization; Haze Pollution-ASEAN: ASEAN Agreement on Transboundary Haze Pollution; Meteorological Centre-ASEAN: ASEAN Specialized Meteorological Centre; APFnet: The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation; Prot. For SADC: Protocol on Forestry to the Treaty of The Southern African Development Community; Ag. EP CIS: Agreement on cooperation in the field of environmental protection among the member-states of the Commonwealth of Independent States; Ag. PFDP CIS: Agreement on cooperation for the prevention and elimination of foci of diseases and forest pests in the border areas of the CIS member states; CfRn: Coalition for Rainforest Nations; CAFI: Central African Forest Initiative; COMIFAC: Central African Forests Commission; ERAFIT: Ecole régionale post-universitaire d'aménagement et de gestion intégrés des forêts et territoires tropicaux; ITTA 2006: International Tropical Timber Agreement 2006; EUFORGEN: European Forest Genetic Resources Programme; Forest Europe: Ministerial Conference on the Protection of Forests in Europe; SNS: Nordic Forest Research Cooperation Committee; Prot-For Carpathians: Protocol on Sustainable Forest Management to the Framework Convention on the Protection and Sustainable Development of the Carpathians; Tehran Process: Tehran Process for Low Forest Cover Countries; and the Montreal Process: The Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests.

monitoring of standards (37 % each), agenda setting/lobbying and standard setting (32 % each), and the implementation of standards (26 %).

To summarise, although the institutional characteristics of the agreements vary widely, we could identify some prevailing trends. MRGA-CFI tend to: focus on forest but not climate, have spatial ambits that are contiguous and located in Asia or Africa, and be involved in the production of knowledge and dissemination of information.

4.2. The relationship between the industrial forest lobby and state participation in MRGA-CFI

Table 1 presents the results of our five regression models. Model I tests whether the strength of forest industry lobby groups in a state is negatively associated with the state's level of participation in MRGA-CFI. Models IIa and IIb explore the relationship between the strength of the forest industry lobby groups in a state and the state's level of participation in focused and non-focused MRGA-CFI, respectively. Similarly, models IIIa and IIIb explore the relationship between the strength of the forest industry lobby in a state and the state's level of participation in centralised and non-centralised MRGA-CFI, respectively.

Starting with model I, we observe that the share of planted forest (*% PlantedForest*) is positively and significantly associated with the total

Table 1
Findings of Negative Binomial Logistic regressions.

Variables	Models with robust standard errors				
	Model I	Model IIa	Model IIb	Model IIIa	Model IIIb
	Outcome: part. in total MRGA-CFI	Outcome: part. in focused MRGA-CFI	Outcome: part. in non-focused MRGA-CFI	Outcome: part. in centralised MRGA-CFI	Outcome: part. in non-centralised MRGA-CF
%Planted Forest	0.007***	−0.022***	0.011***	0.000	0.012***
	(0.003)	(0.008)	(0.003)	(0.005)	(0.004)
GDPpc	0.129*	−0.236*	0.273***	0.009	0.308***
	(0.077)	(0.125)	(0.102)	(0.102)	(0.119)
ForestCover	0.276***	0.240***	0.271***	0.296***	0.242***
	(−0.040)	(0.062)	(0.053)	(0.055)	(0.059)
CO2emissions	−0.080*	0.248***	−0.219***	−0.071	−0.070
	−0.043	(0.072)	(0.057)	(0.059)	(0.065)
Trade	0.006***	0.008***	0.005***	0.005***	0.007***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
FIGOs	0.002	−0.029***	0.015***	−0.000	0.002
	(0.004)	(0.006)	(0.005)	(0.005)	(0.006)
Democracy	−0.115	−0.374	0.291	0.139	−0.511
	(0.346)	(0.517)	(0.507)	(0.466)	(0.524)
Constant	−2.599***	−1.288*	−4.105***	−2.240***	−4.770***
	(0.468)	(0.734)	(0.632)	(0.612)	(0.748)
N (MRGA-CFI)	19	8	11	6	13
N (States)	156	156	156	156	156

Standard errors in parentheses. All significance test two-tailed.
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

number of MRGA-CFI in which a state participates.

This finding therefore rejects H1 and instead indicates that the stronger the forest industry lobby groups in a given state, the higher the state's level of overall participation in MRGA-CFI. However, this relationship is not homogeneous across all types of MRGA-CFI, as it varies according to the different types of issue focus and centralisation categories that they present.

Model IIa shows that the share of planted forest (*%PlantedForest*) is negatively and significantly associated with the level of participation of states in focused MRGA-CFI. Complementarily, model IIb indicates that the share of planted forest (*%PlantedForest*) is positively and significantly associated with the level of participation of states in non-focused MRGA-CFI. Both results support H2, as they confirm that the stronger the forest industry lobby groups in a state, the lower is that state's level of participation in focused MRGA-CFI and the higher is its level of participation in non-focused MRGA-CFI.

Turning to H3, Model IIIa shows no significant association between the share of planted forest (*%PlantedForest*) and the level of participation of states in centralised MRGA-CFI. Model IIIb, on the other hand, indicates that the share of planted forest (*%PlantedForest*) is positively and significantly associated with the level of participation of states in non-centralised MRGA-CFI. These results only partially support H3, as they are not conclusive regarding the relationship between the strength of the forest industry lobby groups in a state and the state's level of participation in centralised MRGA-CFI. However, they do show that the stronger the forest industry lobby in a state, the higher the state's level of participation in non-centralised MRGA-CFI.

Lastly, our analysis highlights some additional relationships between the outcome and control variables. We observe that the log value of a state's gross domestic product per capita (*GDPpc*) and the number of highly formal organisations in which a state participates (*FIGOs*) are negatively and significantly associated with the level of participation of states in focused MRGA-CFI (model IIa). This suggests that states with higher income and stronger involvement in multilateral cooperation participate less in focused MRGA-CFI. Similarly, we observe negative and significant relationships between the log value of a state's total CO2 emissions in kilotons (*CO2emissions*) and its level of participation in MRGA-CFI (model I) and non-focused MRGA-CFI (model IIb). This indicates that states emitting higher amounts of carbon dioxide have a lower level of participation in MRGA-CFI and non-focused MRGA-CFI.

On the other hand, we also find positive and significant relationships between all the outcome variables and two of the control variables: the log value of the forest area (*ForestCover)* and the ratio of the sum of exports and imports to the gross domestic product (*Trade)*. Other expected positive and significant relationships are the ones between the log value of the gross domestic product per capita (*GDPpc*) and the level of participation in MRGA-CFI (model I), non-focused MRGA-CFI (model IIb), and non-centralised MRGA-CFI (model IIIb); between the log value of a state's total CO2 emissions in kilotons (*CO2emissions)* and the level of participation in focused MRGA-CFI (model IIa); and between the number of highly formal organisations in which a state participates (*FIGOs)* and the level of state participation in non-focused MRGA-CFI (model IIb).

In sum, the estimation results demonstrate that the strength of the forest industry lobby groups in a state is positively associated with the state's level of participation in MRGA-CFI. However, this relationship varies depending on the institutional features that the arrangements display. In this regard, we find that the stronger the forest industry lobby groups, the lower the level of participation in focused MRGA-CFI and the higher the level of participation in non-focused and non-centralised MRGA-CFI.

5. Discussions

Our results show that the multilateral climate-forest governance interface is mostly populated by institutions that address forest as a main issue, which resonates with previous studies. Such scholars argue that this is due to international (forest) institutions are choosing to engage with climate issues, attracted by the technical and financial incentives offered by the climate regime (Sarker et al., 2019; Singer and Giessen, 2017). In addition, MRGA-CFI also address issues other than forests and climate, namely biodiversity, human rights, development, trade issues, and food security. Except for food security the issues coincide with what other scholars have identified as being closely related to the international forest regime complex (Rodríguez Fernández-Blanco et al., 2019a). We therefore argue that the climate and forest governance interface is composed of forest institutions that adapt their issue scope to access the resources of the climate regime.

We found that the spatial ambits of multilateral regional cooperation on climate and forest are frequently located in Asia and Africa, less

commonly in Europe and Latin American and the Caribbean, and very rarely in North America and Oceania. Asia and Africa often host ambits possibly because already stablished regional organisations, such as CIS, SADC or ASEAN, facilitate the inception of such arrangements (Bezerra et al., 2018; Dooley and Ozinga, 2011; Jeon et al., 2019; Sarker et al., 2019). In contrast, given the supranational character of the European Union (EU), EU Member States do not need to sign individually regional arrangements to govern the climate-forest interface within their territories. Instead, EU Member States govern such interface through climate-focused and forest-related EU policies (Bottaro et al., 2024; De Koning et al., 2014; Edwards and Kleinschmit, 2013; Elomina and Pülzl, 2021). Another similar case is the Amazon Cooperation Treaty Organization (ACTO), which was designed by South American states to function as a regime that restricts environmental cooperation in the Amazon region, thus protecting their national sovereignty over the world's largest rainforest (Dimitrov, 2005; Dimitrov et al., 2007; Tigre, 2017). Lastly, the low number of spatial ambits in North America and Oceania may be because states there prefer governing these issues at other levels, such as national, bilateral or global. Consequently, we interpret our findings to indicate that the frequency with which spatial ambits are located in a given region is strongly influenced by the formal and informal aims of the regional regimes already established there.

Our findings also indicate that multilateral regional cooperation on climate and forest mainly serves to create knowledge and disseminate information (Beck and Mahony, 2018). This is consistent with the fact that the second most frequent function performed by such arrangements is capacity building, which refers to the transfer of (new) knowledge between different actors (Westerwinter, 2021). The next most frequent functions indicated by our data refer to funding, the monitoring of standards, standard setting, and agenda-setting/lobbying. While the first three functions respond to the state interest of facilitating funding, the last one may be driven by their interest in forming coalitions to negotiate at the global level (Brown, 2015; Mohrenberg et al., 2019; Tigre, 2017). This leads us to the conclusion that the selection of governance functions stems from the member states' interest in both facilitating funding and forming coalitions for global negotiations.

Our empirical analysis shows that the strength of the forest industry lobby groups in a given state is positively associated with the state's level of participation in multilateral regional cooperation on climate and forests. This surprising finding may be due to the fact that states with a strong forest industry have an interest in participating in climate forest cooperation to hinder commitments that do not serve their own interests (Giessen and Sahide, 2017). For example, states with a strong forest industry might seek to engage in multilateral forest climate cooperation to hinder the adoption of forest conservation standards that could result in a greater burden on their forest management activities (Lattanzio, 2014). This is in line with what has been expressed by a representative of a multilateral institution, who declared that "Due to the proposals on the carbon market (and forest sinks) are not in our favour, we will now block negotiations until the conditions are different" (interviewee 10). We therefore argue that this positive association, between forest lobby strength and state participation in MRGA-CFI, can be explained by the interest of the forest industry in blocking the adoption of any regional conservation policy that could harm their business.

Our results further show that the more strongly the forest industry lobbies in a state, the lower is that state's level of participation in focused MRGA-CFI as well as the higher is its level of participation in non-focused and non-centralised MRGA-CFI. This suggests that states with strong forest industry lobby groups prefer to engage in governance arrangements that are less likely to adopt forest conservation policies and carry lower sovereignty costs (Nylund, 2009). This resonates with the statement from a interviewee from a country with a strong forestry industry who indicated that "…while forests play a role in climate negotiations as a mitigation strategy, sovereignty over them lies solely in the hands of national governments…" (Interviewee 7). Such a statement complements the declarations of representatives from countries with

weak forest industry lobbies, who argue that climate change has been caused by a handful of industrialised countries and that they are therefore the ones who should fund forest conservation in the tropics (Interviewees 5, 6, and 9). On this basis, we conclude that the effect of forest industry lobbying on state participation varies according to the institutional characteristics of the agreements, with participation generally being promoted in arrangements that encompass fewer risks for the forest industry.

Lastly, we also found many positive associations between most of our control variables and the level of state participation in MRGA-CFI. But while most of our results were in line with the literature, two were not. The levels of income and of a state's participation in formal international organisations showed a negative association with the level of state participation in focused MRGA-CFI. This might be because states with higher income and greater involvement in international organisations do not benefit from participating in arrangements addressing climate (and forest) issues at the regional level, as they have sufficient capabilities to push their climate agenda at the global level (Roberts, 2011; Viola et al., 2012). Overall, it is worth stating that the interviews confirmed the findings we obtained from the regression models. Furthermore, the interviews helped us in interpreting the findings from the quantitative analysis in a meaninful way.

6. Conclusions

Our findings led us to important theoretical and practical conclusions. First, regarding the institutional characteristics of the climate-forest governance interface, we conclude that the multilateral elements comprising it at the regional level: are mostly forest institutions seeking access to climate funds; present spatial ambits conditioned by the interests of previously established regional regimes; and perform governance functions that reflect the interest of their member states in capturing funds and forming negotiating coalitions. Second, with regard to the influence of forest industry lobby groups on state participation, we conclude that the forest industry lobbies governments to prevent its economic activities from being over-regulated by multilateral regional cooperation on climate and forests. Lastly, our study also revealed a set of variables that are positively associated with state participation in multilateral regional cooperation on climate and forests: the strength of the forest industry lobby, the gross domestic product per capita, the forest area, and the trade intensity. Such information may help policy practitioners identify the states most likely to participate in this type of environmental cooperation.

It is necessary, however, to consider these insights against the background of the methodological limitations of this study. First, our data on state participation are only a snapshot from 2020 (Dasandi et al., 2021; Westerwinter, 2021). Due to this limitation, we could not control for other relevant but dynamic variables, such as the states' previous membership of formal regional organisations. In addition, because we only focused on the regional level, our data do not meet the assumption that all states can participate in all arrangements. Consequently, our analysis shows association and not causality. Also, despite being based on several data sources, our list of MRGA-CFI is still a sample of the unknown population of such arrangements. There are some arrangements that could have passed under our radar due to their lack of disclosure, such as the regional forest (and climate) ministerial meetings between German-speaking and Scandinavian states. Furthermore, we calculated our proxies on the strength of the forest industry lobby groups on the basis of data from the FAO, which is produced by self-reporting. Kallio and Solberg, 2018

CRediT authorship contribution statement

Fredy David Polo-Villanueva: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Simon Schaub:** Writing – review &

editing, Validation, Supervision, Formal analysis, Data curation, Conceptualization. **Laura Rivadeneira:** Investigation, Data curation. **Jale Tosun:** Writing – review & editing, Validation, Methodology, Conceptualization. **Lukas Giessen:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Sarah Lilian Burns:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.forpol.2024.103346.

References

Abbott, K.W., Snidal, D., 2009. Strengthening international regulation through transmittal new governance: overcoming the orchestration deficit. Vanderbilt J. Transnat. Law 42 (2), 501–578.

Balsiger, J., Debarbieux, B., 2011. Major challenges in regional environmental governance research and practice. Procedia Soc. Behav. Sci. 14, 1–8. https://doi.org/10.1016/j.sbspro.2011.03.010.

Balsiger, J., Prys, M., 2016. Regional agreements in international environmental politics. Int. Environ. Agreem.: Politics Law Econ. 16 (2), 239–260. https://doi.org/10.1007/s10784-014-9256-3.

Balsiger, J., VanDeveer, S.D., 2012. Navigating regional environmental governance. Glob. Environ. Polit. 12 (3), 1–17. https://doi.org/10.1162/GLEP_e_00120.

Beck, S., Mahony, M., 2018. The IPCC and the new map of science and politics. WIREs Clim. Change 9 (6), e547. https://doi.org/10.1002/wcc.547.

Begemann, A., Giessen, L., Roitsch, D., Roux, J.-L., Lovrić, M., Azevedo-Ramos, C., Boerner, J., Beeko, C., Cashore, B., Cerutti, P.O., de Jong, W., Fosse, L.J., Hinrichs, A., Humphreys, D., Pülzl, H., Santamaria, C., Sotirov, M., Wunder, S., Winkel, G., 2021. Quo vadis global forest governance? A transdisciplinary delphi study. Environ. Sci. Pol. 123, 131–141. https://doi.org/10.1016/j.envsci.2021.03.011.

Bellelli, F.S., Aftab, A., Scarpa, R., 2023a. The participation dilemma: a survey of the empirical literature on international environmental agreement ratification. Rev. Environ. Econ. Policy 17 (1), 3–21. https://doi.org/10.1086/722906.

Bellelli, F.S., Scarpa, R., Aftab, A., 2023b. An empirical analysis of participation in international environmental agreements. J. Environ. Econ. Manag. 118, 102783. https://doi.org/10.1016/j.jeem.2023.102783.

Bergquist, A.-K., Keskitalo, E.C.H., 2016. Regulation versus deregulation. Policy divergence between Swedish forestry and the Swedish pulp and paper industry after the 1990s. Forest Policy Econ. 73, 10–17. https://doi.org/10.1016/j.forpol.2016.07.003.

Bernauer, T., Kalbhenn, A., Koubi, V., Spilker, G., 2010a. A comparison of international and domestic sources of global governance dynamics. Br. J. Polit. Sci. 40 (3), 509–538. https://doi.org/10.1017/S0007123410000098.

Bernauer, T., Kalbhenn, A., Koubi, V., Spilker, G., 2010b. On Commitment Levels and Compliance Mechanisms—Determinants of Participation in Global Environmental Agreements (SSRN Scholarly Paper 1553084). https://papers.ssrn.com/abstract=1553084.

Bernauer, T., Böhmelt, T., Koubi, V., 2013a. Is there a democracy–civil society paradox in global environmental governance? Glob. Environ. Polit. 13 (1), 88–107. https://doi.org/10.1162/GLEP_a_00155.

Bernauer, T., Kalbhenn, A., Koubi, V., Spilker, G., 2013b. Is there a "depth versus participation" dilemma in international cooperation? Rev. Int. Organ. 8 (4), 477–497. https://doi.org/10.1007/s11558-013-9165-1.

Berning, L., Sotirov, M., 2024. The coalitional politics of the European Union regulation on deforestation-free products. Forest Policy Econ. 158, 103102. https://doi.org/10.1016/j.forpol.2023.103102.

Bezerra, J.C., Sindt, J., Giessen, L., 2018. The rational design of regional regimes: contrasting Amazonian, central African and Pan-European Forest governance. Int. Environ. Agreem.: Politics Law Econ. 18 (5), 635–656. https://doi.org/10.1007/s10784-018-9395-z.

Bottaro, G., Liagre, L., Pettenella, D., 2024. The Forest sector in EU member States' National Recovery and resilience plans: a preliminary analysis. Forest Policy Econ. 160, 103157. https://doi.org/10.1016/j.forpol.2024.103157.

Brown, C., 2015. Scale and subnational resource management: transnational initiatives in the Salish Sea region. Rev. Policy Res. 32 (1), 60–78. https://doi.org/10.1111/ropr.12112.

Bruycker, I.D., Beyers, J., 2019. Lobbying strategies and success: inside and outside lobbying in European Union legislative politics. Eur. Polit. Sci. Rev. 11 (1), 57–74. https://doi.org/10.1017/S1755773918000218.

Carmenta, R., Zabala, A., Daeli, W., Phelps, J., 2017. Perceptions across scales of governance and the Indonesian peatland fires. Glob. Environ. Chang. 46, 50–59. https://doi.org/10.1016/j.gloenvcha.2017.08.001.

Creutzburg, L., Lieberherr, E., 2021. To log or not to log? Actor preferences and networks in Swiss forest policy. Forest Policy Econ. 125, 102395. https://doi.org/10.1016/j.forpol.2021.102395.

Dasandi, N., Graham, H., Lampard, P., Mikhaylov, S.J., 2021. Intergovernmental engagement on health impacts of climate change. Bull. World Health Organ. 99 (2), 102–111B. https://doi.org/10.2471/BLT.20.270033.

De Koning, J., Winkel, G., Sotirov, M., Blondet, M., Borras, L., Ferranti, F., Geitzenauer, M., 2014. Natura 2000 and climate change—polarisation, uncertainty, and pragmatism in discourses on forest conservation and management in Europe. Environ. Sci. Pol. 39, 129–138. https://doi.org/10.1016/j.envsci.2013.08.010.

Dimitrov, R.S., 2005. Hostage to norms: states, institutions and global forest politics. Glob. Environ. Polit. 5 (4), 1–24. https://doi.org/10.1162/152638005774785499.

Dimitrov, R.S., Sprinz, D.F., DiGiusto, G.M., Kelle, A., 2007. International nonregimes: a research agenda. Int. Stud. Rev. 9 (2), 230–258. https://doi.org/10.1111/j.1468-2486.2007.00672.x.

Dooley, K., Ozinga, S., 2011. Building on forest governance reforms through FLEGT: the best way of controlling forests' contribution to climate change? Rev. Eur. Comp. Int. Environ. Law 20 (2), 163–170. https://doi.org/10.1111/j.1467-9388.2011.00717.x.

Edwards, P., Kleinschmit, D., 2013. Towards a European forest policy—conflicting courses. Forest Policy Econ. 33, 87–93. https://doi.org/10.1016/j.forpol.2012.06.002.

Elomina, J., Pülzl, H., 2021. How are forests framed? An analysis of EU forest policy. Forest Policy Econ. 127, 102448. https://doi.org/10.1016/j.forpol.2021.102448.

Fredriksson, P.G., Neumayer, E., Ujhelyi, G., 2007. Kyoto protocol cooperation: does government corruption facilitate environmental lobbying? Public Choice 133 (1), 231–251. https://doi.org/10.1007/s11127-007-9187-4.

Giessen, L., 2013. Reviewing the main characteristics of the international forest regime complex and partial explanations for its fragmentation. Int. For. Rev. 15 (1), 60–70. https://doi.org/10.1505/146554813805927192.

Giessen, L., Sahide, M.A.K., 2017. Blocking, attracting, imposing, and aligning: the utility of ASEAN forest and environmental regime policies for strong member states. Land Use Policy 67, 13–26. https://doi.org/10.1016/j.landusepol.2017.05.012.

Hafner-Burton, E.M., von Stein, J., Gartzke, E., 2008. International organizations count. J. Confl. Resolut. 52 (2), 175–188. https://doi.org/10.1177/0022002707313687.

Hammond, T.H., Knott, J.H., 1988. The deregulatory snowball: explaining deregulation in the financial industry. J. Polit. 50 (1), 3–30. https://doi.org/10.2307/2131038.

Humphreys, D., 2006. Logjam: Deforestation and the Crisis of Global Governance. Earthscan.

Jeon, S., Sarker, P.K., Giessen, L., 2019. The forest policies of ASEAN and Montréal process: comparing highly and weakly formalized regional regimes. Forests 10, 10. https://doi.org/10.3390/f10100929.

Kallio, A.M.I., Solberg, B., 2018. On the reliability of international forest sector statistics: problems and needs for improvements. Forests 8 (2). https://doi.org/10.3390/f9070407.

Knill, C., Tosun, J., 2020. Public Policy: A New Introduction. Bloomsbury Publishing.

Koremenos, B., Lipson, C., Snidal, D., 2001. The rational design of international institutions. Int. Organ. 55 (4), 761–799. https://doi.org/10.1162/002081801317193592.

Kröger, M., 2017. Inter-sectoral determinants of forest policy: the power of deforesting actors in post-2012 Brazil. Forest Policy Econ. 77, 24–32. https://doi.org/10.1016/j.forpol.2016.06.003.

Lattanzio, R.K., 2014. International climate change financing: the climate investment funds (CIF). In: New Trends in Environmental Science, pp. 177–193.

Lederer, M., 2011. From CDM to REDD+—what do we know for setting up effective and legitimate carbon governance? Ecol. Econ. 70 (11), 1900–1907. https://doi.org/10.1016/j.ecolecon.2011.02.003.

Levin, K., McDermott, C., Cashore, B., 2008. The climate regime as global forest governance: can reduced emissions from deforestation and Forest degradation (REDD) initiatives pass a dual effectiveness test? Int. For. Rev. 10 (3), 538–549. https://doi.org/10.1505/ifor.10.3.538.

Linser, S., Wolfslehner, B., Bridge, S.R.J., Gritten, D., Johnson, S., Payn, T., Prins, K., Raši, R., Robertson, G., 2018. 25 years of criteria and indicators for sustainable forest management: how intergovernmental C&I processes have made a difference. Forests 9 (9), 9. https://doi.org/10.3390/f9090578.

Mbatu, R.S., 2015. Domestic and international forest regime nexus in Cameroon: an assessment of the effectiveness of REDD + policy design strategy in the context of

the climate change regime. Forest Policy Econ. 52, 46–56. https://doi.org/10.1016/j.forpol.2014.12.012.

Mitchell, R.B., 2006. Problem structure, institutional design, and the relative effectiveness of international environmental agreements. Glob. Environ. Polit. 6 (3), 72–89. https://doi.org/10.1162/glep.2006.6.3.72.

Mohrenberg, S., Koubi, V., Bernauer, T., 2019. Effects of funding mechanisms on participation in multilateral environmental agreements. Int. Environ. Agreem.: Politics Law Econ. 19 (1), 1–18. https://doi.org/10.1007/s10784-018-9423-z.

Neumayer, E., 2002. Does trade openness promote multilateral environmental cooperation? World Econ. 25 (6), 815–832. https://doi.org/10.1111/1467-9701.00464.

Nylund, J.-E., 2009. Forestry Legislation in Sweden. Rapport. (SLU, Institutionen För Skogens Produkter), p. 14. https://res.slu.se/id/publ/24844.

Pattberg, P., Widerberg, O., Isailovic, M., Guerra, F., 2015. Mapping the Institutional Architecture of Global Forest Governance.

Polo Villanueva, F.D., Tegegne, Y.T., Winkel, G., Cerutti, P.O., Ramcilovic-Suominen, S., McDermott, C.L., Zeitlin, J., Sotirov, M., Cashore, B., Wardell, D.A., Haywood, A., Giessen, L., 2023. Effects of EU illegal logging policy on timber-supplying countries: a systematic review. J. Environ. Manag. 327, 116874. https://doi.org/10.1016/j.jenvman.2022.116874.

Roberts, J.T., 2011. Multipolarity and the new world (dis)order: US hegemonic decline and the fragmentation of the global climate regime. Glob. Environ. Chang. 21 (3), 776–784. https://doi.org/10.1016/j.gloenvcha.2011.03.017.

Rodríguez Fernández-Blanco, C., Burns, S.L., Giessen, L., 2019a. Mapping the fragmentation of the international forest regime complex: institutional elements, conflicts and synergies. Int. Environ. Agreem.: Politics Law Econ. 19 (2), 187–205. https://doi.org/10.1007/s10784-019-09434-x.

Rodríguez Fernández-Blanco, C., Burns, S.L., Giessen, L., 2019b. Mapping the fragmentation of the international forest regime complex: institutional elements, conflicts and synergies. Int. Environ. Agreem.: Politics Law Econ. 19 (2), 187–205.

Sarker, P.K., Rahman, M.S., 2018. Regional governance by the South Asia cooperative environment program (SACEP)? Institutional design and customizable regime policy offering flexible political options. Land Use Policy 77, 454–470. https://doi.org/10.1016/j.landusepol.2018.05.009.

Sarker, P.K., Rahman, M.S., Giessen, L., 2019. Regional economic regimes and the environment: stronger institutional design is weakening environmental policy capacity of the south Asian Association for Regional Cooperation. Int. Environ.

Agreem.: Politics Law Econ. 19 (1), 19–52. https://doi.org/10.1007/s10784-018-9422-0.

Sarker, P.K., Giessen, L., Göhrs, M., Jeon, S., Nago, M., Polo-Villanueva, F.D., Burns, S.L., 2024. The forest policy outputs of regional regimes: a qualitative comparative analysis on the effects of formalization, hegemony and issue-focus around the globe. Int. Environ. Agreem.: Politics Law Econ. https://doi.org/10.1007/s10784-024-09641-1.

Sauquet, A., 2014. Exploring the nature of inter-country interactions in the process of ratifying international environmental agreements: the case of the Kyoto protocol. Public Choice 159 (1), 141–158. https://doi.org/10.1007/s11127-012-0033-y.

Seelarbokus, C., 2014. Theorizing state participation in international environmental agreements (IEAs). World Environ. 4, 121–142.

Singer, B., Giessen, L., 2017. Towards a donut regime? Domestic actors, climatization, and the hollowing-out of the international forests regime in the Anthropocene. Forest Policy Econ. 79, 69–79. https://doi.org/10.1016/j.forpol.2016.11.006.

Tavoni, A., Winkler, R., 2021. Domestic pressure and international climate cooperation. Ann. Rev. Resour. Econ. 13, 225–243. https://doi.org/10.1146/annurev-resource-101420-105854.

Tigre, M.A., 2017. Regional Cooperation in Amazonia: A Comparative Environmental Law Analysis. Brill/Nijhoff.

UNFCCC, 2022. COP27: Leaders Boost Sustainable Forest Management. https://unfccc.int/news/cop27-leaders-boost-sustainable-forest-management.

Vabulas, F., Snidal, D., 2013. Organization without delegation: informal intergovernmental organizations (IIGOs) and the spectrum of intergovernmental arrangements. Rev. Int. Organ. 8 (2), 193–220. https://doi.org/10.1007/s11558-012-9161-x.

Vărzaru, A.A., Bocean, C.G., 2023. An empirical analysis of relationships between forest resources and economic and green performances in the European Union. Forests 14 (12), 2327. https://doi.org/10.3390/f14122327.

Viola, E., Franchini, M., Ribeiro, T.L., 2012. Climate governance in an international system under conservative hegemony: the role of major powers. Rev. Bras. Polít. Int. 55, 9–29. https://doi.org/10.1590/S0034-73292012000300002.

Westerwinter, O., 2021. Transnational public-private governance initiatives in world politics: introducing a new dataset. Rev. Int. Organ. 16 (1), 137–174. https://doi.org/10.1007/s11558-019-09366-w.

Yakovlev, E., Zhuravskaya, E., 2007. Deregulation of Business (SSRN Scholarly Paper 1140539). https://papers.ssrn.com/abstract=1140539.