Quantitative analysis of the effectiveness of the Convention on Biological Diversity (CBD)

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ABSTRACT

The Convention on Biological Diversity (CBD), signed in 1993, was designed to secure international interests in the conservation of biological diversity. However, there have been few attempts to evaluate its impact. To provide a quantitative measure of the effectiveness of the CBD, this study investigates the relationship between participation in the CBD and conservation effort in member countries, using an original dataset on 205 countries from 1990 to 2010. The direct measure of conservation effort is protected areas. However, we also consider socioeconomic variables that measure the opportunity cost of conservation. Our results show a positive and significant relation between participation in the CBD and the area under protection. The area under protection is also increasing in forest area, a proxy for species richness and endemism, population density, and GDP. Wealthier, more populous, species rich countries tend to commit more land to protection than poorer, less populous, species-poor countries. The area under protection is, however, negatively related to our proxies for the opportunity cost of conservation, primary and secondary industry. The more land that is committed to industrial production, the less land that is reserved for biodiversity conservation.

Key Words Convention on Biological Diversity; opportunity cost; protected area; quantitative analysis; socioeconomic conditions

1. Introduction

International environmental agreements (IEAs), are the one of the main mechanisms adopted to manage the supply of environmental public goods that span national boundaries(Kaul & Le Goulven 2003). IEAs have increased in number significantly since the 1970s, stimulated by two critical conferences: the United Nations Stockholm Conference on the Human Environment in 1972[1] and the Environmental Summit in Rio de Janeiro in 1992[2]. A number of studies have, however, raised doubts about the effectiveness of IEAs (Barrett, 2003; Böhringer et al., 2001; Kim et al., 2017; Murdoch et al., 1997; Nordhaus & Boyer, 1999; Sandler, 2004). An important factor that limits the effectiveness of IEAs is that international agreements are not binding. They therefore have to be self-enforcing (Barrett, 1994b, 2003). Because of this, IEAs between countries that differ in national environmental circumstances, socioeconomic conditions, and cultural characteristics, tend to have the least impact on national environmental performance (Buttel, 2000; Dupuy, 1990). In many cases,

[1] "The United Nations Conference on the Human Environment, having met at Stockholm from 5 to 16 June 1972, having considered the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment" (United Nations Environment Programme (UNEP, n.d.).

[2] "The United Nations Conference on Environment and Development, Having met at Rio de Janeiro from 3 to 14 June 1992, Reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it, With the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people, Working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system, Recognizing the integral and interdependent nature of the Earth, our home" (UNEP, n.d.).

there is an almost complete disconnect between the terms of IEAs and domestic environmental policies. Harner-Burton and Tsutsui (2005) designate the decoupling of IEAs from domestic policies as the "paradox of empty promises"[3]. There are a number of conditions affecting the likelihood that IEAs will be effectively implemented, including the number of participants, whether or not agreements are revisited on a regular basis, whether or not they include incentives to defect, and—most important—differences in in the cost benefit ratio of compliance to the signatories . IEAs in which compliance costs little relative to the benefits offered for all signatories, like the Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer, are argued to be effective. IEAs in which compliance costs are both high and variable, like the Kyoto Protocol to the 1992 United Nations Framework Convention on Climate Change, are not (Barrett 2005). On first principles, the Convention on Biological Diversity may be expected to be more like the Kyoto Protocol than the Montreal Protocol—and so to be relatively ineffective. It involves a large number of heterogeneous members, facing highly variable costs of compliance, and few disincentives to defect (Barrett 1994a; Harrop & Pritchard 2011). There are also questions about the effectiveness of the main conservation instrument it supports, protected areas (Chape et al. 2005). Whether or not it is effective in terms of this instrument is, however, an open question.

[3] Participants of IEAs treat IEAs as a kind of ceremonial behavior to avoid the costs caused by pollutant reduction (Meyer & Rowan, 1977).

Evaluation of the effectiveness of IEAs requires metrics of the environmental objectives of the agreement, along with the conditions that encourage or discourage compliance (Mitchell, 2002, 2006, 2017; Underdal 2004; Young, 1999).[4] Because most IEAs involve diverse member countries and address complex environmental issues, assembling appropriate data to measure effectiveness is challenging. Quantitative approaches based on enhanced datasets and methodologies have frequently been unable to secure data over a long-enough period or covering enough countries and environmental conditions to reach firm conclusions (Böhmelt & Pilster, 2010; Breitmeier et al., 2006; Mitchell, 2004).

The evidence to date suggests that the specific environmental issues targeted by an IEA impact their effectiveness (Kim et al., 2016; Matsuoka et al., 1998). The domestic measures related to IEAs that aim to reduce or prevent industrial pollution are, for example, easier to implement than those aimed at nature conservation because they can impose more specific regulations and require a monitoring system (Kim et al., 2016). Indeed, a majority of studies on the effectiveness of IEAs has focused on industrial pollutants or air pollution, which have relatively plentiful and accessible datasets (Aakvik & Tjøtta, 2011; Helm & Sprinz, 2000; Levy, 1993; Murdoch et al., 1997; Ringquist & Kostadinova, 2005;

[4] Young (1999) define the effectiveness as "a matter of the contributions that institutions make to solve the problems that motivate actors to invest the time and energy needed to create them" (p. 3). Underdal (2004) provided three critical determinants of effectiveness; the nature of the problem, characteristics of the group of parties, properties of the regime itself.

Vollenweider, 2013). There are fewer analyses of IEAs related to nature conservation. This is partly due to data limitations and partly due to the relatively short time period since those agreements came into force.

In this paper, we focus on the Convention on Biological Diversity (CBD), the agreement established to secure international interests in the conservation of biological diversity (Secretariat of the CBD, 1992; Perrings, 2014). The CBD was opened for signature on June 1992 at the United Nations Conference on Environment and Development (UNCED) and entered into force with three main objectives: The conservation of biological diversity, the sustainable use of the components of biological diversity, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. As it has since developed, the CBD has evolved both a framework of indicators for evaluating biodiversity and a set of targets to achieve the objectives for sustainable development (CBD, 2017) (Groombridge, 1992).

The 2010 Nagoya Protocol to the Convention further elaborated the fair and equitable sharing of the benefits of genetic resources (Secretariat of the CBD, 2011).[5] While the sustainable use, access, and benefit-sharing provisions of the CBD have been evaluated

[5] The Nagoya Protocol clarifies access and benefit-sharing obligations in Article 8 entitled "Special Consideration" and Article 10 entitled "Global Multilateral Benefit-sharing Mechanism." Moreover, Article 14 entitled "The Access and Benefit-sharing Clearing-House and Information Sharing" provides a basis for the establishment of the Access and Benefit-sharing Clearing-House (ABS Clearing-House) and supports its activities (CBD, 2017).

(Buck & Hamilton, 2011; Cock et al., 2010; Richerzhagen, 2011), there are few studies of the relationship between economic development and the effectiveness of the CBD in these areas. Previous assessments of the effectiveness of the CBD have focused on the structure or implementation of the convention or have conducted specific case studies (Le Prestre, 2002a; 2002b; McGeoch et al., 2010). There is little empirical evidence on the conditioning effects of economic development on CBD effectiveness.

The CBD's own evaluation of the implementation of the convention can be found in the Global Biodiversity Outlooks (GBOs) (Secretariat of the CBD, 2006, 2010, 2014). These reports employ a range of metrics, including (a) the national biodiversity index; (b) the extent of *ex situ* collections, including natural history, botanical, and zoological museums; zoological and botanical gardens; (c) the International Union for the Conservation of Nature (IUCN) Red List; and (d) the establishment of protected areas. In the most recent study, GBO 4, various metrics are used to assess performance against the CBDs Aichi targets (Pereira, et al., 2013; Secretariat of the CBD, 2014). In the absence of enforcement mechanisms, the effectiveness of the agreement is limited both by the resources available at the national level and by the parties' commitment to the terms of the convention. We therefore expect compliance to be positively correlated with per capita income.

To evaluate the effectiveness of the CBD under these conditions, we investigate the relationship between participation in the CBD, conservation effort, and the economic and

institutional conditions in the member countries. We use changes in the size of the protected areas as a metric for the implementation of the terms of the CBD. While this is only one of many possible metrics, it is the one that is most closely connected to the *in situ* conservation of endangered wild species, the principal focus of the convention. We established a dataset for 205 countries for the period 1990 to 2010. This dataset includes CBD ratification status, size of protected areas, and selected socioeconomic characteristics for each country. The study contributes empirical evidence on the impacts of the CBD as a function of the conditions that limit the capacity of nations to undertake costly conservation measures.

The remainder of this paper is organized as follows. The next section describes the methodology and dataset used to investigate the effectiveness of the CBD. Section 3 reports our results. A final section discusses the implications of these findings, and concludes the paper.

2. Research design

2.1. Methods

Existing analyses of the effectiveness of IEAs (Miles, 2002; Underdal, 2004; Young, 1999) tend to measure the "impact" of the agreement in improving environmental quality (Hisschemöller & Gupta, 1999; Mitchell, 2002). That is, the effectiveness of IEAs is measured by the degree to which they eliminate or reduce the environmental problem

addressed by the agreement. The approach is in line with the Oslo-Potsdam Solution (OPS) for measuring regime effectiveness (Helm & Sprinz, 2000).[6]

The approach requires (a) the specification of a model relating the environmental goals of an IEA to the characteristics of the agreement, as well as the biophysical and socio-economic conditions under which it operates, and (b) establishment of a reliable database on the factors associated with IEA effectiveness.

The target of the CBD is taken to be the establishment of protected areas. As Pereira, et al. (2013) demonstrated, because reports of the CBD lack evidence-based information on biodiversity changes, it is not an easy task to find better proxies for the biodiversity status of all parties. The CBD encourages the establishment and improvement of protected areas, and previous studies have shown that protected areas do contribute to the conservation of biodiversity (Coad et al., 2013; Leverington et al., 2010; Venter et al., 2014). We used the size of the protected areas to reflect conservation effort by CBD membership. Factors influencing the effectiveness of the agreement in these terms include: the number of parties to the agreement, the environmental conditions in which the parties operate, the opportunity cost of land committed to conservation, and the resources available to the parties.

[6] The OPS method is generated from Helm and Sprinz (2000) who estimated the effectiveness of the Helsinki and Sofia Protocols. They suggested the simple effectiveness model can be evaluated by the distance between the collective optimum and actual policies.

We adopted the impact model for evaluating a single regime's effects, proposed by Mitchell (2002). This can be estimated within a regression framework. Amongst the independent variables describing the characteristics of the agreement, the number of signatories is captured through a membership or signatory dummy (Kim et al., 2017; Mitchell, 2002). The CBD dummy indicates whether or not a country has ratified the CBD, and so starts as 0 for all countries and changes to 1 in the ratification year. The recession dummy reflects the global economic situation and takes the value of 1 after 2008.

To measure the effect of environmental conditions, we used habitat most strongly associated with high levels of species richness, endemism, and threat – forest area (% of land area). To measure the opportunity cost of land designated as protected areas, we used two variables: population density (people per square kilometer of land area) and agricultural and industrial gross domestic product (GDP).[7] For the agricultural and industrial value, we applied either the nominal value of agricultural and industrial GDP (in constant 2010 US dollars) or their share of total GDP. To proxy the financial resources available to invest in protected areas, we used GDP per capita (in constant 2010 US dollars).[8] All variables, with

[7] The opportunity cost of land use has been investigated by many scholars. The economic model of land use typically considers the possible cost advantages of economic activities such as agriculture, pasturing, industry, or urbanized area over forest area (Barbier & Burgess, 1997; Lubowski et al., 2006).

[8] We incorporate the results of the analyses into the nominal value model and the ratio model based on agricultural and industrial GDP usage.

the exception of the dummy variables, share variables, and forest area, were expressed in logarithmic terms.

The most complete of the six estimated models took the following form:

$$\ln(\text{Protected Area}) = \alpha_0 + \alpha_1 \text{CBD} + \alpha_2 \text{Forest} + \alpha_3 \ln(\text{Popdens}) + \alpha_4 \ln(\text{GDPP}) + \alpha_5 \ln(\text{Industry}) + \alpha_6 \ln(\text{Agriculture}) + \alpha_7 \text{Recession} + \epsilon. \quad (1)$$

We opted to use a fixed-effects estimator after applying the Wu–Hausman test for country-specific, time-invariant, unobserved variables (Wooldridge, 2009). This accommodates country-level institutional and environmental conditions that are time invariant during the panel interval period. Thus, the fixed-effect models can control time-varying covariates and unobserved time-invariant individual heterogeneity with the country-based panel data. The fixed effects model was estimated using generalized least squares. All empirical models are estimated using STATA/SE 14 for Windows.

2.2. Data description

To investigate the relationship between participation in the CBD and conservation effort in member countries, we established an original dataset on 205 countries from 1990 to

2010. The extent of protected areas in each country was obtained from the World Database on Protected Areas (WDPA), a part of the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre (UNEP-WCMC). This database reports on all protected areas designated by each nation and contains both terrestrial and marine protected areas (IUCN and UNEP-WCMC, 2016).[9] Protected areas includes national parks, wilderness areas, community conserved areas, and nature reserves (IUCN, 2017).

The independent variables include two binary indicators: a dummy indicating whether or not a country has ratified the CBD, and a dummy marking the onset of the 2008-2009 recession. Information on ratification by each of the 205 countries was obtained from the CBD (2017).[10] The number of parties that ratified the CBD is 196, while 168 parties have signed the convention (CBD, 2017). Appendix 1 presents a list and the status of the parties to the CBD. The remaining variables were obtained from the World Development Indicators (WDI) (World Bank, 2016). Table 1 displays the descriptive statistics for all variables.

[9] The WDPA is a joint project between the UNEP and the IUCN and is managed by UNEP-WCMC. The protected areas in the WDPA include sites under the Ramsar Convention, the World Heritage Convention, and the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Man and the Biosphere Programme (MAB) (IUCN and UNEP-WCMC, 2016).

[10] Regarding to the Nagoya Protocol, 100 parties have ratified and 92 of the 96 eligible parties have signed (CBD, 2017). Appendix 1 presents a list and the status of the parties to the CBD.

Table 1. Descriptive statistics

Variable	Unit	N	PROP	Mean	S.D.	Min.	Max.
Protected area	Area in Km^2	4,155	-	9.090	2.861	0.000	15.573
CBD	Dummy	3,843	74.421%	-	-	-	-
Forest	% of land area	4,176	-	32.623	24.283	0.000	99.000
Popdens	People	4,228	-	4.215	1.513	0.000	9.821
GDP	USD	3,736	-	8.288	1.521	4.745	11.886
Industry	USD	3,173	-	22.431	2.727	13.572	28.794
Agriculture	USD	3,172	-	21.272	2.148	15.607	27.086
Industry share	% of GDP	3,316	-	28.937	12.488	1.900	96.700
Agriculture share	% of GDP	3,315	-	15.773	14.541	0.000	94.000
Recession	Dummy	4,305	14.286%	-	-	-	-

Note: This table provides proportions for binary variables, and mean, median, standard deviation, minimum, and maximum for continuous variables.

3. Results

We estimated six models of the size of protected areas in the countries included in our dataset. Table 2 summarizes the results from these models. The first three columns are the nominal value models. These include the nominal value of agricultural and industrial GDP as a proxy for the opportunity cost of protection. The last three columns are the ratio models. These use the share of the total GDP in agriculture and industry. The overall R^2 indicates that the nominal value models are a better fit than the ratio models. However, the two models show similar results.

Table 2. Estimated results

Model	Nominal value model			Ratio model		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-1.194** (0.550)	6.807*** (1.375)	8.010*** (1.366)	-1.194** (0.550)	0.946 (0.697)	2.761*** (0.764)
CBD	0.374*** (0.031)	0.321*** (0.030)	0.355*** (0.030)	0.374*** (0.031)	0.322*** (0.034)	0.347*** (0.034)
Forest	0.039*** (0.006)	0.027*** (0.006)	0.030*** (0.006)	0.039*** (0.006)	0.041*** (0.007)	0.040*** (0.007)
Ln(Popdens)	1.668*** (0.103)	1.625*** (0.129)	1.251*** (0.135)	1.668*** (0.103)	1.508*** (0.122)	1.286*** (0.127)
Ln(GDP)	0.308*** (0.050)	0.972*** (0.107)	0.679*** (0.111)	0.308*** (0.050)	0.237*** (0.067)	0.110 (0.070)
Ln(Industry)	-	-0.259*** (0.071)	-0.171** (0.071)	-	-	-
Ln(Agriculture)	-	-0.324*** (0.068)	-0.295*** (0.067)	-	-	-
Industry Share	-	-	-	-	-0.010*** (0.002)	-0.008*** (0.002)
Agriculture Share	-	-	-	-	-0.026*** (0.003)	-0.025*** (0.003)
Recession	-	-	0.254*** (0.030)	-	-	0.192*** (0.034)
Overall R^2	0.148	0.406	0.386	0.148	0.129	0.119
Number of sample	3,485	2,977	2,977	3,485	3,041	3,041
Number of groups	176	165	165	176	166	166

Note 1: The dependent variables are the logarithm of the size of protected areas.

Note 2: ***, **, and * reflect 1%, 5%, and 10% significance, respectively.

In all models, we found a positive and significant relation between the size of protected areas and membership of the CBD. The coefficient on ratification of the CBD is positive and significant at the 1% level. More specifically, if a country signs and ratifies the CBD, it would be expected to protect 30% more land than if it did not sign, or signed but

failed to ratify the convention.

We also found a positive and statistically significant relation between the size of protected areas and our proxy for species richness and endemism – forest area. A slightly unexpected result is the strong positive relation between the size of the protected areas and population density because the latter was thought to be an indirect measure of the opportunity cost of the protected areas (the number of people who may be displaced through the designation of protected areas) and because forest cover and population density tend to be negatively correlated (Köthke et al., 2013).

With regard to economic variables, we found a positive and statistically significant relation between the degree of economic development, measured by per capita GDP, and protected areas in the models (except model (6)). This was as expected. In models (1) and (4), which do not include our main proxies for the opportunity cost of protection, agricultural or industrial GDP, or the effects of the recession, we found the constant to be negative. In other models ((2), (3), (5), and (6)), which include these variables, the agricultural and industrial production GDP are negatively related to protected areas, and the sign of the constant is reversed. This is in line with previous studies that have found an inverse relation between protection and productivity (Köthke et al., 2013). This implies a negative and significant effect of the opportunity cost of protection. In all models, we found the coefficient of the recession dummy to be positive and statistically significant, indicating that a slowdown in the

growth of agriculture and industry was positively related to an increase in the size of protected areas.

4. Discussion

The most recent CBD report on biodiversity status and trends, GBO 4, reports that the Aichi Target for conservation through protected areas, Target 11, which calls for 17% of terrestrial areas to be protected by 2020, is likely to be met globally (Secretariat of the CBD, 2014). At the same time, it reports that protected area networks are largely ecologically unrepresentative, that many critical sites are poorly conserved, and that the average risk of extinction for birds, mammals, and amphibians is still increasing. There is a gap between protection on paper and protection in practice. Our findings confirm that CBD membership is indeed positively correlated with the designation of protected areas, but because our data do not include the outcomes of direct conservation measures, we are unable to say what impact this has on biodiversity.

What we are able to say is that there is a strongly negative correlation between protected areas and the opportunity cost of land use. In economies that are still heavily dependent on agriculture and primary industry, the designation of protected areas has a high opportunity cost. This is also consistent with the findings of a recent study on the relation between threats to biodiversity and the growth of agriculture in Sub-Saharan Africa (Perrings

& Halkos, 2015). That study investigated the impact of agricultural productivity growth and agricultural land conversion on threats to mammal, bird, and plant species in 27 countries in the region. It found that the extensive growth of agriculture was associated with increasing threats to biodiversity but also that intensification reduced the threat for all species, at least on long-term scales. In so far as protection is a necessary condition for reducing the threat to biodiversity, this paper suggests that the growth of agriculture and (to a lesser degree) industry are both still implicated in biodiversity losses.

The results reported in models 3 and 6 are interesting for a related reason. Typically, we expect environmental protection expenditures to be procyclical – to rise when economic activity levels are high and to fall when economic activity levels are low. In this case, we found, unexpectedly, that the extent of protected areas increased with the onset of the recession. We are unable to determine whether this is a consequence of delays in the designation of new protected areas. However, one explanation may be that the downturn in agriculture and industry during the recession reduced the opportunity cost of protected areas.

From a longer-term perspective, the environmental Kuznets curve (EKC) hypothesis—that there is an inverted-U shaped relationship between environmental degradation and per capita GDP—suggests that we might expect pressure on biodiversity to be first increasing and then decreasing as per capita GDP rises. By implication, the effectiveness of conservation effort would be first decreasing and then increasing as per

capita GDP rises. We have no direct test of this, but we did estimate models that included the square of per capita GDP among the independent variables. However, not only was per capita GDP itself positive and significant in all models, but per capita GDP squared was not significant in any model. The implication is that willingness to commit resources to protected areas is monotonically increasing in per capita income.

Our central finding is that the extent of protected areas is increasing in membership in the CBD, income, and species richness and abundance, and is decreasing in the opportunity cost of committing land to protection. The commitment of land is not a perfect proxy for biodiversity conservation, as we have already observed. That said, the CBD, along with the major conservation NGOs, has made the effectiveness of protected areas a priority. Specifically, the CBD has established the Programme of Work on Protected Areas to improve the effectiveness of management. This includes actions for planning, selecting, establishing, strengthening, and managing, protected areas, and for improving their governance.

The relation between CBD membership and the commitment of land to protected areas suggests that the agreement has been effective in at least this dimension of its work. However, our findings on the opportunity cost of land use indicate that willingness to commit land to conservation was weakest where primary production accounted for the greatest share of GDP. This was not unexpected. What was unexpected was that the global recession had significant and positive effects on the establishment of protected areas. We conjecture that

this may be because the recession also saw a decline in the demand for land for alternative uses.

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Appendix 1. List and Status of Parties of CBD

No.	Country Name	Signed	Ratification	Party
1.	Afghanistan	1992-06-12	2002-09-19	2002-12-18
2.	Albania		1994-01-05	1994-04-05
3.	Algeria	1992-06-13	1995-08-14	1995-11-12
4.	Andorra		2015-02-04	2015-05-05
5.	Angola	1992-06-12	1998-04-01	1998-06-30
6.	Antigua and Barbuda	1992-06-05	1993-03-09	1993-12-29
7.	Argentina	1992-06-12	1994-11-22	1995-02-20
8.	Armenia	1992-06-13	1993-05-14	1993-12-29
9.	Australia	1992-06-05	1993-06-18	1993-12-29
10.	Austria	1992-06-13	1994-08-18	1994-11-16
11.	Azerbaijan	1992-06-12	2000-08-03	2000-11-01
12.	Bahamas	1992-06-12	1993-09-02	1993-12-29
13.	Bahrain	1992-06-09	1996-08-30	1996-11-28
14.	Bangladesh	1992-06-05	1994-05-03	1994-08-01
15.	Barbados	1992-06-12	1993-12-10	1994-03-10
16.	Belarus	1992-06-11	1993-09-08	1993-12-29
17.	Belgium	1992-06-05	1996-11-22	1997-02-20
18.	Belize	1992-06-13	1993-12-30	1994-03-30
19.	Benin	1992-06-13	1994-06-30	1994-09-28
20.	Bhutan	1992-06-11	1995-08-25	1995-11-23
21.	Bolivia (Plurinational State of)	1992-06-13	1994-10-03	1995-01-01
22.	Bosnia and Herzegovina		2002-08-26	2002-11-24
23.	Botswana	1992-06-08	1995-10-12	1996-01-10
24.	Brazil	1992-06-05	1994-02-28	1994-05-29
25.	Brunei Darussalam		2008-04-28	2008-07-27
26.	Bulgaria	1992-06-12	1996-04-17	1996-07-16
27.	Burkina Faso	1992-06-12	1993-09-02	1993-12-29
28.	Burundi	1992-06-11	1997-04-15	1997-07-14
29.	Cabo Verde	1992-06-12	1995-03-29	1995-06-27
30.	Cambodia		1995-02-09	1995-05-10
31.	Cameroon	1992-06-14	1994-10-19	1995-01-17
32.	Canada	1992-06-11	1992-12-04	1993-12-29
33.	Central African Republic	1992-06-13	1995-03-15	1995-06-13
34.	Chad	1992-06-12	1994-06-07	1994-09-05

35.	Chile	1992-06-13	1994-09-09	1994-12-08
36.	China	1992-06-11	1993-01-05	1993-12-29
37.	Colombia	1992-06-12	1994-11-28	1995-02-26
38.	Comoros	1992-06-11	1994-09-29	1994-12-28
39.	Congo	1992-06-11	1996-08-01	1996-10-30
40.	Cook Islands	1992-06-12	1993-04-20	1993-12-29
41.	Costa Rica	1992-06-13	1994-08-26	1994-11-24
42.	Côte d'Ivoire	1992-06-10	1994-11-29	1995-02-27
43.	Croatia	1992-06-11	1996-10-07	1997-01-05
44.	Cuba	1992-06-12	1994-03-08	1994-06-06
45.	Cyprus	1992-06-12	1996-07-10	1996-10-08
46.	Czech Republic	1993-06-04	1993-12-03	1994-03-03
47.	Democratic People's Republic of Korea	1992-06-11	1994-10-26	1995-01-24
48.	Democratic Republic of the Congo	1992-06-11	1994-12-03	1995-03-03
49.	Denmark	1992-06-12	1993-12-21	1994-03-21
50.	Djibouti	1992-06-13	1994-09-01	1994-11-30
51.	Dominica		1994-04-06	1994-07-05
52.	Dominican Republic	1992-06-13	1996-11-25	1997-02-23
53.	Ecuador	1992-06-09	1993-02-23	1993-12-29
54.	Egypt	1992-06-09	1994-06-02	1994-08-31
55.	El Salvador	1992-06-13	1994-09-08	1994-12-07
56.	Equatorial Guinea		1994-12-06	1995-03-06
57.	Eritrea		1996-03-21	1996-06-19
58.	Estonia	1992-06-12	1994-07-27	1994-10-25
59.	Ethiopia	1992-06-10	1994-04-05	1994-07-04
60.	European Union	1992-06-13	1993-12-21	1994-03-21
61.	Fiji	1992-10-09	1993-02-25	1993-12-29
62.	Finland	1992-06-05	1994-07-27	1994-10-25
63.	France	1992-06-13	1994-07-01	1994-09-29
64.	Gabon	1992-06-12	1997-03-14	1997-06-12
65.	Gambia (the)	1992-06-12	1994-06-10	1994-09-08
66.	Georgia		1994-06-02	1994-08-31
67.	Germany	1992-06-12	1993-12-21	1994-03-21
68.	Ghana	1992-06-12	1994-08-29	1994-11-27
69.	Greece	1992-06-12	1994-08-04	1994-11-02
70.	Grenada	1992-12-03	1994-08-11	1994-11-09

71.	Guatemala	1992-06-13	1995-07-10	1995-10-08
72.	Guinea	1992-06-12	1993-05-07	1993-12-29
73.	Guinea-Bissau	1992-06-12	1995-10-27	1996-01-25
74.	Guyana	1992-06-13	1994-08-29	1994-11-27
75.	Haiti	1992-06-13	1996-09-25	1996-12-24
76.	Honduras	1992-06-13	1995-07-31	1995-10-29
77.	Hungary	1992-06-13	1994-02-24	1994-05-25
78.	Iceland	1992-06-10	1994-09-12	1994-12-11
79.	India	1992-06-05	1994-02-18	1994-05-19
80.	Indonesia	1992-06-05	1994-08-23	1994-11-21
81.	Iran (Islamic Republic of)	1992-06-14	1996-08-06	1996-11-04
82.	Iraq		2009-07-28	2009-10-26
83.	Ireland	1992-06-13	1996-03-22	1996-06-20
84.	Israel	1992-06-11	1995-08-07	1995-11-05
85.	Italy	1992-06-05	1994-04-15	1994-07-14
86.	Jamaica	1992-06-11	1995-01-06	1995-04-06
87.	Japan	1992-06-13	1993-05-28	1993-12-29
88.	Jordan	1992-06-11	1993-11-12	1994-02-10
89.	Kazakhstan	1992-06-09	1994-09-06	1994-12-05
90.	Kenya	1992-06-11	1994-07-26	1994-10-24
91.	Kiribati		1994-08-16	1994-11-14
92.	Kuwait	1992-06-09	2002-08-02	2002-10-31
93.	Kyrgyzstan		1996-08-06	1996-11-04
94.	Lao People's Democratic Republic		1996-09-20	1996-12-19
95.	Latvia	1992-06-11	1995-12-14	1996-03-13
96.	Lebanon	1992-06-12	1994-12-15	1995-03-15
97.	Lesotho	1992-06-11	1995-01-10	1995-04-10
98.	Liberia	1992-06-12	2000-11-08	2001-02-06
99.	Libya	1992-06-29	2001-07-12	2001-10-10
100.	Liechtenstein	1992-06-05	1997-11-19	1998-02-17
101.	Lithuania	1992-06-11	1996-02-01	1996-05-01
102.	Luxembourg	1992-06-09	1994-05-09	1994-08-07
103.	Madagascar	1992-06-08	1996-03-04	1996-06-02
104.	Malawi	1992-06-10	1994-02-02	1994-05-03
105.	Malaysia	1992-06-12	1994-06-24	1994-09-22
106.	Maldives	1992-06-12	1992-11-09	1993-12-29
107.	Mali	1992-09-30	1995-03-29	1995-06-27

108.	Malta	1992-06-12	2000-12-29	2001-03-29
109.	Marshall Islands	1992-06-12	1992-10-08	1993-12-29
110.	Mauritania	1992-06-12	1996-08-16	1996-11-14
111.	Mauritius	1992-06-10	1992-09-04	1993-12-29
112.	Mexico	1992-06-13	1993-03-11	1993-12-29
113.	Micronesia (Federated States of)	1992-06-12	1994-06-20	1994-09-18
114.	Monaco	1992-06-11	1992-11-20	1993-12-29
115.	Mongolia	1992-06-12	1993-09-30	1993-12-29
116.	Montenegro		2006-10-23	2006-06-03
117.	Morocco	1992-06-13	1995-08-21	1995-11-19
118.	Mozambique	1992-06-12	1995-08-25	1995-11-23
119.	Myanmar	1992-06-11	1994-11-25	1995-02-23
120.	Namibia	1992-06-12	1997-05-16	1997-08-14
121.	Nauru	1992-06-05	1993-11-11	1994-02-08
122.	Nepal	1992-06-12	1993-11-23	1994-02-21
123.	Netherlands	1992-06-05	1994-07-12	1994-10-10
124.	New Zealand	1992-06-12	1993-09-16	1993-12-29
125.	Nicaragua	1992-06-13	1995-11-20	1996-02-18
126.	Niger	1992-06-11	1995-07-25	1995-10-23
127.	Nigeria	1992-06-13	1994-08-29	1994-11-27
128.	Niue		1996-02-28	1996-05-28
129.	Norway	1992-06-09	1993-07-09	1993-12-29
130.	Oman	1992-06-10	1995-02-08	1995-05-09
131.	Pakistan	1992-06-05	1994-07-26	1994-10-24
132.	Palau		1999-01-06	1999-04-06
133.	Panama	1992-06-13	1995-01-17	1995-04-17
134.	Papua New Guinea	1992-06-13	1993-03-16	1993-12-29
135.	Paraguay	1992-06-12	1994-02-24	1994-05-25
136.	Peru	1992-06-12	1993-06-07	1993-12-29
137.	Philippines	1992-06-12	1993-10-08	1994-01-06
138.	Poland	1992-06-05	1996-01-18	1996-04-17
139.	Portugal	1992-06-13	1993-12-21	1994-03-21
140.	Qatar	1992-06-11	1996-08-21	1996-11-19
141.	Republic of Korea	1992-06-13	1994-10-03	1995-01-01
142.	Republic of Moldova	1992-06-05	1995-10-20	1996-01-18
143.	Romania	1992-06-05	1994-08-17	1994-11-15
144.	Russian Federation	1992-06-13	1995-04-05	1995-07-04

145.	Rwanda	1992-06-10	1996-05-29	1996-08-27
146.	Saint Kitts and Nevis	1992-06-12	1993-01-07	1993-12-29
147.	Saint Lucia		1993-07-28	1993-12-29
148.	Saint Vincent and the Grenadines		1996-06-03	1996-09-01
149.	Samoa	1992-06-12	1994-02-09	1994-05-10
150.	San Marino	1992-06-10	1994-10-28	1995-01-26
151.	Sao Tome and Principe	1992-06-12	1999-09-29	1999-12-28
152.	Saudi Arabia		2001-10-03	2002-01-01
153.	Senegal	1992-06-13	1994-10-17	1995-01-15
154.	Serbia	1992-06-08	2002-03-01	2002-05-30
155.	Seychelles	1992-06-10	1992-09-22	1993-12-29
156.	Sierra Leone		1994-12-12	1995-03-12
157.	Singapore	1992-06-12	1995-12-21	1996-03-20
158.	Slovakia	1993-05-19	1994-08-25	1994-11-23
159.	Slovenia	1992-06-13	1996-07-09	1996-10-07
160.	Solomon Islands	1992-06-13	1995-10-03	1996-01-01
161.	Somalia		2009-09-11	2009-12-10
162.	South Africa	1993-06-04	1995-11-02	1996-01-31
163.	South Sudan		2014-02-17	2014-05-18
164.	Spain	1992-06-13	1993-12-21	1994-03-21
165.	Sri Lanka	1992-06-10	1994-03-23	1994-06-21
166.	State of Palestine		2015-01-02	2015-04-02
167.	Sudan	1992-06-09	1995-10-30	1996-01-28
168.	Suriname	1992-06-13	1996-01-12	1996-04-11
169.	Swaziland	1992-06-12	1994-11-09	1995-02-07
170.	Sweden	1992-06-08	1993-12-16	1994-03-16
171.	Switzerland	1992-06-12	1994-11-21	1995-02-19
172.	Syrian Arab Republic	1993-05-03	1996-01-04	1996-04-03
173.	Tajikistan		1997-10-29	1998-01-27
174.	Thailand	1992-06-12	2003-10-31	2004-01-29
175.	The former Yugoslav Republic of Macedonia		1997-12-02	1998-03-02
176.	Timor-Leste		2006-10-10	2007-01-08
177.	Togo	1992-06-12	1995-10-04	1996-01-02
178.	Tonga		1998-05-19	1998-08-17
179.	Trinidad and Tobago	1992-06-11	1996-08-01	1996-10-30
180.	Tunisia	1992-06-13	1993-07-15	1993-12-29

181.	Turkey	1992-06-11	1997-02-14	1997-05-15
182.	Turkmenistan		1996-09-18	1996-12-17
183.	Tuvalu	1992-06-08	2002-12-20	2003-03-20
184.	Uganda	1992-06-12	1993-09-08	1993-12-29
185.	Ukraine	1992-06-11	1995-02-07	1995-05-08
186.	United Arab Emirates	1992-06-11	2000-02-10	2000-05-10
187.	United Kingdom of Great Britain and Northern Ireland	1992-06-12	1994-06-03	1994-09-01
188.	United Republic of Tanzania	1992-06-12	1996-03-08	1996-06-06
189.	Uruguay	1992-06-09	1993-11-05	1994-02-03
190.	Uzbekistan		1995-07-19	1995-10-17
191.	Vanuatu	1992-06-09	1993-03-25	1993-12-29
192.	Venezuela (Bolivarian Republic of)	1992-06-12	1994-09-13	1994-12-12
193.	Viet Nam	1993-05-28	1994-11-16	1995-02-14
194.	Yemen	1992-06-12	1996-02-21	1996-05-21
195.	Zambia	1992-06-11	1993-05-28	1993-12-29
196.	Zimbabwe	1992-06-12	1994-11-11	1995-02-09

Source: CBD (2017)