Global Biodiversity Outlook

- Status and Trends of Global Biodiversity
- The Convention on Biological Diversity
- The Operations of the Convention
- Review of Implementation of the Convention at the National Level
- Global Implementation of the Convention and Cooperation with other Conventions and Processes
- Outlook

Secretariat of the
Convention on Biological Diversity

CBD

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Convention on
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The Convention on Biological Diversity is an international treaty whose objectives are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The Convention was opened for signature at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and entered into force on 29 December 1993. It has been ratified by 180 countries and one regional economic integration organization (1 August 2001). The Secretariat of the Convention on Biological Diversity is provided by the United Nations Environment Programme (UNEP) and is located in Montreal, Canada. The United Nations has declared 22 May as the International Day for Biological Diversity.

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ANNEX 1: BIODIVERSITY INFORMATION BY COUNTRY

Country	NBI[i]	*ex situ* collections[ii]			National RDBs[iii]		Protected areas[iv]	
		NHM	Zoo	Bot	Animals	Plants	No.	Area (km²)
Afghanistan	0.459	1	1	–	–	–	7	2,186
Albania	0.531	2	–	1	–	•	52	1,029
Algeria	0.308	1	2	3	•	•	18	58,910
Andorra		–	–	–	–	–	0	0
Angola	0.641	2	–	1	–	–	13	81,812
Antigua and Barbuda		–	–	–	–	–	11	66
Argentina	0.615	41	8	9	•	–	250	125,394
Armenia	0.559	–	1	3	•	•	5	2,135
Australia	0.853	3	21	63	•	•	4,072	1,025,880
Austria	0.469	11	20	11	•	•	695	24,514
Azerbaijan	0.534	–	1	3	–	–	34	4,778
Bahamas	0.443	–	4	–	•	•	38	1,458
Bahrain		–	1	–	–	–	3	9
Bangladesh	0.538	–	1	3	•	•	10	981
Barbados		–	2	2	–	–	6	3
Belarus	0.368	1	1	8	•	•	903	13,043
Belgium	0.445	8	8	16	•	•	72	862
Belize	0.643	–	1	1	•	–	51	9,132
Benin	0.618	1	–	1	–	–	5	12,625
Bhutan	0.607	–	–	–	–	–	9	10,513
Bolivia	0.724	–	4	4	•	•	30	150,987
Bosnia and Herzegovina	0.532	–	–	–	–	–	21	271
Botswana	0.461	–	–	–	–	–	12	104,988
Brazil	0.877	16	73	24	•	•	657	557,700
Brunei Darussalam	0.777	–	2	–	–	–	31	1,214
Bulgaria	0.493	5	3	9	•	•	127	5,001
Burkina Faso	0.526	–	–	–	–	–	12	28,552
Burundi	0.683	1	–	1	–	–	13	1,462
Cambodia	0.568	–	–	–	–	–	23	32,672
Cameroon	0.689	–	–	2	–	–	18	20,978
Canada	0.299	26	57	18	•	•	3,226	925,227
Cape Verde		–	–	2	–	–	0	0
Central African Republic	0.509	2	–	–	–	–	14	54,456
Chad	0.364	1	–	–	–	–	9	114,940
Chile	0.570	6	3	8	•	•	87	141,421
China	0.839	7	133	73	•	•	885	686,806
Colombia	0.935	9	6	13	–	–	95	94,670
Comoros		–	–	–	–	–	0	0
Congo	0.649	1	1	–	–	–	12	17,000
Congo, DR	0.651	–	2	2	–	–	42	146,374
Cook Islands		–	–	–	–	–	2	3
Costa Rica	0.820	–	1	2	•	–	130	11,755
Côte d'Ivoire	0.632	–	1	1	–	–	11	19,855
Croatia	0.538	6	3	7	–	–	195	4,211
Cuba	0.703	3	5	8	•	•	81	19,092
Cyprus	0.451	–	1	–	–	–	10	782
Czech Republic	0.498	26	13	26	•	•	1,789	12,470
Denmark	0.403	3	16	8	•	•	222	996,298
Djibouti	0.430	–	–	–	–	–	2	100
Dominica		–	–	1	–	–	8	171
Dominican Republic	0.661	–	2	1	–	–	45	15,545
Ecuador	0.873	3	2	3	–	•	25	128,548
Egypt	0.326	3	2	6	–	•	23	10,084
El Salvador	0.616	–	1	1	•	•	2	52
Equatorial Guinea	0.714	–	–	–	–	–	0	0
Eritrea	0.587	–	–	–	–	–	3	5,006
Estonia	0.436	–	1	3	•	•	219	4,997
Ethiopia	0.593	1	–	1	–	–	39	186,998
Fiji	0.520	–	–	2	–	–	15	202
Finland	0.290	12	4	8	•	•	270	28,408

Country	NBI[i]	*ex situ* collections[ii]			National RDBs[iii]		Protected areas[iv]	
		NHM	Zoo	Bot	Animals	Plants	No.	Area (km²)
France	0.423	50	40	68	•	•	1,521	84,505
FYR Macedonia	0.550	–	–	7	–	–	26	1,815
Gabon	0.641	–	1	1	–	–	5	7,230
Gambia	0.602	–	–	–	•	–	6	225
Georgia	0.553	2	3	5	–	–	18	1,954
Germany	0.365	66	215	75	•	•	7,317	111,577
Ghana	0.646	–	1	3	–	–	16	12,686
Greece	0.554	3	–	4	•	•	88	4,696
Grenada		–	1	1	–	–	1	6
Guatemala	0.744	2	3	1	•	•	42	21,668
Guinea	0.603	1	–	–	–	–	3	1,635
Guinea Bissau	0.592	–	–	–	–	–	0	0
Guyana	0.685	–	1	2	–	–	1	586
Haiti	0.680	–	–	1	–	–	8	97
Honduras	0.653	–	1	3	•	–	71	7,188
Hungary	0.441	5	6	17	•	•	186	6,492
Iceland	0.113	5	–	2	–	•	79	9,807
India	0.732	33	72	72	•	•	495	154,508
Indonesia	1.000	2	13	5	•	•	1,072	357,425
Iran (Islamic Republic)	0.471	2	1	3	–	–	78	83,034
Iraq	0.431	1	1	1	–	–	8	5
Ireland	0.279	3	2	8	•	•	72	655
Israel	0.601	6	5	7	–	•	188	3,258
Italy	0.512	71	32	48	•	•	423	22,051
Jamaica	0.665	–	1	4	–	•	143	9,159
Japan	0.638	26	160	54	•	•	96	25,610
Jordan	0.468	–	–	–	–	–	11	2,980
Kazakhstan	0.435	–	3	8	•	•	73	73,375
Kenya	0.643	1	4	6	–	•	68	45,473
Kiribati		–	–	–	–	–	10	267
Korea, DPR	0.370	–	1	1	–	–	31	3,159
Korea, Republic	0.423	2	4	5	•	•	30	6,839
Kuwait	0.224	1	1	–	–	–	5	273
Kyrgyzstan	0.414	–	–	3	•	–	78	6,939
Lao PDR	0.615	–	–	–	•	–	17	27,563
Latvia	0.420	–	1	2	•	•	209	8,288
Lebanon	0.569	1	–	–	•	•	3	48
Lesotho	0.416	–	–	–	–	•	1	68
Liberia	0.555	–	1	–	–	–	1	1,292
Libyan Arab Jamahiriya	0.240	1	2	1	–	–	8	1,730
Liechtenstein		–	–	–	•	•	10	62
Lithuania	0.420	–	2	5	•	•	79	6,456
Luxembourg		1	–	–	•	•	19	373
Madagascar	0.813	1	3	1	–	–	45	12,316
Malawi	0.627	–	1	4	–	–	9	10,585
Malaysia	0.809	1	6	9	•	•	184	15,584
Maldives		–	–	–	–	–	0	0
Mali	0.381	1	–	–	–	–	13	45,320
Malta		1	–	1	•	•	7	3
Marshall Islands		–	–	–	–	–	0	0
Mauritania	0.341	–	–	–	–	–	9	17,460
Mauritius		2	1	2	–	•	25	158
Mexico	0.928	4	16	35	•	•	212	183,075
Micronesia (Fed. States)		–	–	–	–	–	0	0
Moldova, Republic	0.454	–	1	2	•	•	63	473
Monaco		–	1	1	–	–	2	1
Mongolia	0.358	1	–	1	–	–	42	179,912
Morocco	0.459	1	5	2	–	•	12	3,175
Mozambique	0.522	1	–	2	–	–	12	66,020
Myanmar	0.628	1	1	2	–	–	3	1,736

Country	NBI[i]	*ex situ* collections[ii]			National RDBs[iii]		Protected areas[iv]	
		NHM	Zoo	Bot	Animals	Plants	No.	Area (km²)
Namibia	0.553	3	–	1	–	•	21	112,160
Nauru		–	–	–	–	–	0	0
Nepal	0.642	1	1	1	•	•	14	12,705
Netherlands	0.412	28	13	39	•	•	89	4,901
New Zealand	0.520	5	8	17	•	•	235	63,341
Nicaragua	0.643	–	1	1	•	–	73	21,550
Niger	0.412	–	–	–	–	–	6	96,941
Nigeria	0.548	2	7	5	–	•	27	30,216
Niue		–	–	–	–	–	1	54
Norway	0.297	7	7	6	•	•	200	101,692
Oman	0.358	1	1	–	–	–	3	34,280
Pakistan	0.495	8	3	5	–	–	83	37,449
Palau		–	–	–	–	–	7	12
Panama	0.793	2	1	1	•	•	31	15,474
Papua New Guinea	0.775	–	2	4	–	–	29	10,549
Paraguay	0.613	4	3	1	–	–	20	14,011
Peru	0.843	1	1	6	•	•	35	68,203
Philippines	0.786	4	4	9	•	•	43	17,031
Poland	0.367	26	9	25	•	•	578	37,713
Portugal	0.511	3	3	12	•	•	58	6,027
Qatar	0.189	–	2	–	–	–	4	17
Romania	0.424	9	3	10	•	•	157	10,896
Russian Federation	0.447	10	16	74	•	•	10,835	1,259,286
Rwanda	0.726	–	–	1	–	–	6	3,624
Samoa		–	–	1	–	–	7	116
Sao Tome and Principe		–	–	–	•	•	0	0
Saudi Arabia	0.281	–	3	2	–	•	78	825,717
Senegal	0.512	1	1	3	–	–	14	22,422
Seychelles		1	–	1	•	•	19	450
Sierra Leone	0.652	–	–	1	–	–	6	1,534
Singapore		–	3	1	•	•	5	30
Slovakia	0.589	13	3	7	•	•	1,039	10,852
Slovenia	0.558	1	2	3	•	•	32	1,203
Solomon Islands	0.599	–	–	1	–	–	1	83
Somalia	0.527	–	–	–	–	–	10	5,246
South Africa	0.714	8	16	19	•	•	405	66,454
Spain	0.486	12	19	13	•	•	328	42,402
Sri Lanka	0.656	1	1	5	•	•	110	8,695
St. Kitts and Nevis		–	–	–	–	–	2	26
St. Lucia		–	1	–	–	–	46	99
St. Vincent and Grenadines		–	–	1	–	–	25	83
Sudan	0.539	2	1	1	–	–	27	122,490
Suriname	0.623	1	–	1	–	–	14	8,043
Swaziland	0.609	–	–	–	–	•	5	601
Sweden	0.304	7	15	9	•	•	361	34,760
Switzerland	0.497	31	35	22	•	•	2,177	11,856
Syrian Arab Republic	0.469	–	–	–	–	–	0	0
Tajikistan	0.456	–	1	5	•	•	19	5,870
Tanzania, United Rep.	0.674	5	–	3	–	–	91	264,582
Thailand	0.670	2	6	5	•	•	158	70,773
Togo	0.693	–	–	1	–	–	9	4,292
Tonga		–	–	–	–	–	8	37
Trinidad and Tobago	0.691	–	2	1	–	–	26	308
Tunisia	0.408	–	2	1	–	–	7	445
Turkey	0.572	2	3	6	•	•	78	11,968
Turkmenistan	0.445	–	1	1	•	•	23	19,775
Tuvalu		–	–	–	–	–	1	33
Uganda	0.655	5	–	2	–	–	54	49,156
Ukraine	0.415	14	8	33	•	•	5,183	22,854
United Arab Emirates	0.392	–	2	–	–	–	2	0

Country	NBI[i]	*ex situ* collections[ii]			National RDBs[iii]		Protected areas[iv]	
		NHM	Zoo	Bot	Animals	Plants	No.	Area (km²)
United Kingdom	0.320	40	104	64	•	•	706	51,317
USA	0.677	182	396	270	•	•	3,532	2,357,977
Uruguay	0.487	4	3	1	–	–	13	477
Uzbekistan	0.436	–	2	4	•	•	11	8,185
Vanuatu	0.393	–	–	–	–	–	1	35
Venezuela	0.850	2	13	7	•	–	195	563,057
Viet Nam	0.682	–	1	3	•	•	54	9,953
Yemen	0.387	–	–	–	–	–	0	0
Yugoslavia	0.510	7	2	16	–	•	104	3,390
Zambia	0.537	–	–	–	–	–	68	226,491
Zimbabwe	0.586	1	1	4	–	–	69	49,970

[i] NBI = National Biodiversity Index. This index is based on estimates of country richness and endemism in four terrestrial vertebrate classes and vascular plants; vertebrates and plants are ranked equally; index values range between 1.000 (maximum: Indonesia) and 0.000 (minimum: Greenland, not shown in table). The NBI includes some adjustment allowing for country size. Countries with land area less than 5,000 sq km are excluded. Overseas territories and dependencies are excluded from this column.

[ii] NHM = natural history, botanical and zoological museums; Zoo = zoological gardens; Bot = botanical gardens; Extracted from multiple sources, first collated in WCMC, 1994. *Biodiversity Data Sourcebook.* World Conservation Press.

[iii] These columns indicate, for animals and plants, whether an official or quasi-official national assessment of country-level species status (e.g. a national Red Data Book or similar compilation) exists. Based on data first collated in WCMC, 1994. *Biodiversity Data Sourcebook.* World Conservation Press. Partially revised in 1999 and 2001. It is not always possible to distinguish official RDBs from unofficial compilations. Absence of a symbol may indicate that no national RDB exists or that UNEP-WCMC has no record of it.

[iv] These columns show the number and total area of established protected areas in IUCN/WCPA categories I-VI. A zero in these columns indicates that the database contains no record of protected areas in these categories in the country concerned. From UNEP-WCMC database, maintained in collaboration with IUCN World Commission on Protected Areas.

Country	Contracting Party?*						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Afghanistan	[S]	✔	–	–	✔	–	✔
Albania	✔	–	–	✔	✔	✔	✔
Algeria	✔	✔	–	✔	✔	✔	✔
Andorra	–	–	–	–	✔	–	–
Angola	✔	–	–	–	✔	✔	✔
Antigua and Barbuda	✔	✔	–	–	✔	✔	✔
Argentina	✔	✔	✔	✔	✔	✔	✔
Armenia	✔	–	–	✔	✔	✔	✔
Australia	✔	✔	✔	✔	✔	✔	✔
Austria	✔	✔	–	✔	✔	✔	✔
Azerbaijan	✔	✔	–	[a]	✔	✔	✔
Bahamas	✔	✔	–	✔	–	✔	✔
Bahrain	✔	–	–	✔	✔	✔	✔
Bangladesh	✔	✔	–	✔	✔	✔	✔
Barbados	✔	✔	–	–	–	✔	✔
Belarus	✔	✔	–	✔	✔	✔	–
Belgium	✔	✔	✔	✔	✔	✔	✔
Belize	✔	✔	–	✔	✔	✔	✔
Benin	✔	✔	✔	✔	✔	✔	✔
Bhutan	✔	–	–	–	–	✔	–
Bolivia	✔	✔	–	✔	✔	✔	✔
Bosnia and Herzegovina	–	–	–	–	✔	✔	–
Botswana	✔	✔	–	✔	✔	✔	✔
Brazil	✔	✔	–	✔	✔	✔	✔
Brunei Darussalam	–	✔	–	–	–	–	–

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Bulgaria	✔	✔	✔	✔	✔	✔	✔
Burkina Faso	✔	✔	✔	✔	✔	✔	✔
Burundi	✔	✔	–	–	✔	✔	✔
Cambodia	✔	✔	–	✔	✔	✔	✔
Cameroon	✔	✔	✔	–	✔	✔	✔
Canada	✔	✔	–	✔	✔	✔	✔
Cape Verde	✔	–	–	–	✔	✔	✔
Central African Republic	✔	✔	[S]	–	✔	✔	✔
Chad	✔	✔	✔	✔	✔	✔	✔
Chile	✔	✔	✔	✔	✔	✔	✔
China	✔	✔	–	✔	✔	✔	✔
Colombia	✔	✔	–	✔	✔	✔	✔
Comoros	✔	✔	–	✔	✔	✔	✔
Congo	✔	✔	✔	✔	✔	✔	✔
Congo, DR	✔	✔	✔	✔	✔	✔	✔
Cook Islands	✔	–	–	–	–	✔	✔
Costa Rica	✔	✔	–	✔	✔	✔	✔
Côte d'Ivoire	✔	✔	[S]	✔	✔	✔	✔
Croatia	✔	✔	✔	✔	✔	✔	✔
Cuba	✔	✔	–	✔	✔	✔	✔
Cyprus	✔	✔	–	–	✔	✔	✔
Czech Republic	✔	✔	✔	✔	✔	✔	✔
Denmark	✔	✔	✔	✔	✔	✔	✔
Djibouti	✔	✔	–	–	–	✔	✔
Dominica	✔	✔	–	–	✔	✔	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Dominican Republic	✔	✔	–	–	✔	✔	✔
Ecuador	✔	✔	–	✔	✔	✔	✔
Egypt	✔	✔	✔	✔	✔	✔	✔
El Salvador	✔	✔	–	✔	✔	✔	✔
Equatorial Guinea	✔	✔	–	–	–	✔	✔
Eritrea	✔	✔	–	–	–	✔	✔
Estonia	✔	✔	–	✔	✔	✔	–
Ethiopia	✔	✔	–	–	✔	✔	✔
European Community	✔	–	✔	–	–	✔	✔
Fiji	✔	✔	–	–	✔	✔	✔
Finland	✔	✔	✔	✔	✔	✔	✔
FYR Macedonia	✔	✔	✔	✔	✔	✔	–
France	✔	✔	✔	✔	✔	✔	✔
Gabon	✔	✔	–	✔	✔	✔	✔
Gambia	✔	✔	–	✔	✔	✔	✔
Georgia	✔	✔	✔	✔	✔	✔	✔
Germany	✔	✔	✔	✔	✔	✔	✔
Ghana	✔	✔	✔	✔	✔	✔	✔
Greece	✔	✔	✔	✔	✔	✔	✔
Grenada	✔	✔	–	–	✔	✔	✔
Guatemala	✔	✔	–	✔	✔	✔	✔
Guinea	✔	✔	✔	✔	✔	✔	✔
Guinea Bissau	✔	✔	✔	✔	–	✔	✔
Guyana	✔	✔	–	–	✔	✔	✔
Haiti	✔	–	–	–	✔	✔	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Honduras	✔	✔	–	✔	✔	✔	✔
Hungary	✔	✔	✔	✔	✔	✔	✔
Iceland	✔	✔	–	✔	✔	✔	✔
India	✔	✔	✔	✔	✔	✔	✔
Indonesia	✔	✔	–	✔	✔	✔	✔
Iran (Islamic Republic of)	✔	✔	–	✔	✔	✔	✔
Iraq	–	–	–	–	✔	–	–
Ireland	✔	[S]	✔	✔	✔	✔	✔
Israel	✔	✔	✔	✔	✔	✔	✔
Italy	✔	✔	✔	✔	✔	✔	✔
Jamaica	✔	✔	[S]	✔	✔	✔	✔
Japan	✔	✔	–	✔	✔	✔	✔
Jordan	✔	✔	✔	✔	✔	✔	✔
Kazakhstan	✔	✔	–	[a]	✔	✔	✔
Kenya	✔	✔	✔	✔	✔	✔	✔
Kiribati	✔	–	–	–	✔	✔	✔
Korea, DPR	✔	–	–	–	✔	✔	–
Korea, Republic of	✔	✔	–	✔	✔	✔	✔
Kuwait	[S]	[S]	–	–	–	✔	✔
Kyrgyzstan	✔	–	–	[a]	✔	✔	✔
Lao PDR	✔	–	–	–	✔	✔	✔
Latvia	✔	✔	✔	✔	✔	✔	–
Lebanon	✔	–	–	✔	✔	✔	✔
Lesotho	✔	[S]	–	–	–	✔	✔
Liberia	✔	✔	–	–	–	–	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Libyan Arab Jamahiriya	✔	–	–	✔	✔	✔	✔
Liechtenstein	✔	✔	✔	✔	–	✔	✔
Lithuania	✔	–	–	✔	✔	✔	–
Luxembourg	✔	✔	✔	✔	✔	✔	✔
Madagascar	4	4	[S]	✔	✔	✔	✔
Malawi	✔	✔	–	✔	✔	✔	✔
Malaysia	✔	✔	–	✔	✔	✔	✔
Maldives	✔	–	–	–	✔	✔	–
Mali	✔	✔	✔	✔	✔	✔	✔
Malta	✔	✔	✔	✔	✔	✔	✔
Marshall Islands	✔	–	–	–	–	✔	✔
Mauritania	✔	✔	✔	✔	✔	✔	✔
Mauritius	✔	✔	–	–	✔	✔	✔
Mexico	✔	✔	–	✔	✔	✔	✔
Micronesia (Federated States of)	✔	–	–	–	–	✔	✔
Moldova, Republic of	✔	✔	✔	✔	–	✔	✔
Monaco	✔	✔	✔	✔	✔	✔	✔
Mongolia	✔	✔	✔	✔	✔	✔	✔
Morocco	✔	✔	✔	✔	✔	✔	✔
Mozambique	✔	✔	–	–	✔	✔	✔
Myanmar	✔	✔	–	–	✔	✔	✔
Namibia	✔	✔	–	✔	✔	✔	✔
Nauru	✔	–	–	–	–	✔	✔
Nepal	✔	✔	–	✔	✔	✔	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Netherlands	✔	✔	✔	✔	✔	✔	✔
New Zealand	✔	✔	✔	✔	✔	✔	✔
Nicaragua	✔	✔	–	✔	✔	✔	✔
Niger	✔	✔	✔	✔	✔	✔	✔
Nigeria	✔	✔	✔	✔	✔	✔	✔
Niue	✔	–	–	–	✔	✔	✔
Norway	✔	✔	✔	✔	✔	✔	✔
Oman	✔	–	–	–	✔	✔	✔
Pakistan	✔	✔	✔	✔	✔	✔	✔
Palau	✔	–	–	–	–	✔	✔
Panama	✔	✔	✔	✔	✔	✔	✔
Papua New Guinea	✔	✔	–	✔	✔	✔	✔
Paraguay	✔	✔	✔	✔	✔	✔	✔
Peru	✔	✔	✔	✔	✔	✔	✔
Philippines	✔	✔	✔	✔	✔	✔	✔
Poland	✔	✔	✔	✔	✔	✔	–
Portugal	✔	✔	✔	✔	✔	✔	✔
Qatar	✔	✔	–	–	✔	✔	✔
Romania	✔	✔	✔	✔	✔	✔	✔
Russian Federation	✔	✔	–	✔	✔	✔	–
Rwanda	✔	✔	–	–	✔	✔	✔
St. Kitts and Nevis	✔	✔	–	–	✔	✔	✔
St. Lucia	✔	✔	–	–	✔	✔	✔
St. Vincent and the Grenadines	✔	✔	–	–	–	✔	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Samoa	✔	–	–	–	–	✔	✔
San Marino	✔	–	–	–	✔	✔	✔
Sao Tome and Principe	✔	–	–	–	–	✔	✔
Saudi Arabia	–	✔	✔	–	✔	✔	✔
Senegal	✔	✔	✔	✔	✔	✔	✔
Seychelles	✔	✔	–	–	✔	✔	✔
Sierra Leone	✔	✔	–	✔	–	✔	✔
Singapore	✔	✔	–	–	–	✔	✔
Slovakia	✔	✔	✔	✔	✔	✔	–
Slovenia	✔	✔	✔	✔	✔	✔	✔
Solomon Islands	✔	–	–	–	✔	✔	✔
Somalia	–	✔	✔	–	–	–	–
South Africa	✔	✔	✔	✔	✔	✔	✔
Spain	✔	✔	✔	✔	✔	✔	✔
Sri Lanka	✔	✔	✔	✔	✔	✔	✔
Sudan	✔	✔	–	–	✔	✔	✔
Suriname	✔	✔	–	✔	✔	✔	✔
Swaziland	✔	✔	–	–	–	✔	✔
Sweden	✔	✔	✔	✔	✔	✔	✔
Switzerland	✔	✔	✔	✔	✔	✔	✔
Syrian Arab Republic	✔	–	–	✔	✔	✔	✔
Tajikistan	✔	–	✔	[a]	✔	✔	✔
Tanzania, United Republic of	✔	✔	✔	✔	✔	✔	✔
Thailand	[S]	✔	–	✔	✔	✔	✔

Country	Contracting Party?						
	Biodiversity-related Conventions					Rio Conventions	
	CBD	CITES	CMS	Ramsar	WHC	UNFCCC	UNCCD
Togo	✔	✔	✔	✔	✔	✔	✔
Tonga	✔	–	–	–	–	✔	✔
Trinidad and Tobago	✔	✔	–	✔	–	✔	✔
Tunisia	✔	✔	✔	✔	✔	✔	✔
Turkey	✔	✔	–	✔	✔	–	✔
Turkmenistan	✔	–	–	[a]	✔	✔	✔
Tuvalu	[S]	–	–	–	–	✔	✔
Uganda	✔	✔	✔	✔	✔	✔	✔
Ukraine	✔	✔	✔	✔	✔	✔	–
United Arab Emirates	✔	✔	–	–	✔	✔	✔
United Kingdom	✔	✔	✔	✔	✔	✔	✔
United States of America	[S]	✔	–	✔	✔	✔	✔
Uruguay	✔	✔	✔	✔	✔	✔	✔
Uzbekistan	✔	✔	✔	[a]	✔	✔	✔
Vanuatu	✔	✔	–	–	–	✔	✔
Venezuela	✔	✔	–	✔	✔	✔	✔
Viet Nam	✔	✔	–	✔	✔	✔	✔
Yemen	✔	✔	–	–	✔	✔	✔
Yugoslavia	[S]	–	–	✔	✔	✔	–
Zambia	✔	✔	–	✔	✔	✔	✔
Zimbabwe	✔	✔	–	–	✔	✔	✔

* as of August 2001

[S] signifies the country has signed but has not yet ratified the convention

[a] awaiting confirmation by these members of the Commonwealth of Independent States of their status as Parties

Annex 3: GEF Biodiversity Projects

The Global Environment Facility (GEF) operates the financial mechanism of the Convention on Biological Diversity. By January 2001, GEF had allocated US$1.3 billion to 416 biodiversity projects and enabling activities, matched by US$2.3 billion in cofinancing.

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Global	Biodiversity Country Studies – Phase I (Bahamas, Cuba, China, Egypt, Ghana, Guinea, Jordan, Lebanon, Malaysia, Morocco, Syria, Mozambique, Nigeria, Papua New Guinea, Peru, Philippines, Tunisia)	UNEP	5.00	5.22
Global	Biodiversity Country Studies – Phase II (Burkina Faso, Colombia, Estonia, Georgia, Madagascar, Namibia, Tanzania, Congo DR)	UNEP	2.00	2.10
Global	Biodiversity Data Management Capacitation in Developing Countries and Networking Biodiversity Information (Bahamas, Chile, China, Costa Rica, Egypt, Ghana, Kenya, Papua New Guinea, Poland, Thailand)	UNEP	4.00	5.39
Global	Biodiversity Planning Support Programme	UNDP/UNEP	3.43	4.23
Global	Development of Best Practices and Dissemination of Lessons Learned for Dealing with the Global Problem of Alien Species that Threaten Biological Diversity (Côte d'Ivoire, Czech Republic, Kenya, Malawi, Mauritius, New Zealand, Poland, South Africa)	UNEP	0.75	3.98
Global	Development of National Biosafety Frameworks	UNEP	26.09	38.43
Global	Global Biodiversity Assessment	UNEP	3.30	3.48
Global	Global Biodiversity Forum Phase II	UNEP	0.75	1.64
Global	Millennium Ecosystem Assessment	UNEP	7.31	24.92
Global	People, Land Management, and Environmental Change (PLEC) (Brazil, China, Ghana, Guinea, Kenya, Papua New Guinea, Tanzania, Uganda)	UNEP	6.28	11.09
Global	Promoting Best Practices for Conservation and Sustainable Use of Biodiversity of Global Significance in Arid and Semi-arid Zones (Burkina Faso, Mali, Nigeria, Senegal, Egypt, Jordan, Kuwait, Morocco, Syria, Tunisia, Mongolia, Pakistan, Brazil, Jamaica, Mexico)	UNEP	0.75	0.90
Regional	Conservation of Wetland and Coastal Ecosystems in the Mediterranean Region (Albania, Egypt, Lebanon, Morocco, Palestinian Authority, Tunisia)	UNDP	13.44	39.76
Regional	Coral Reef Monitoring Network in Member States of the Indian Ocean Commission (COI), within the Global Reef Monitoring Network(GCRMN)	World Bank	0.74	1.36
Africa	Africa Community Outreach Programme for Conservation and Sustainable Use of Biological Resources (Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe)	World Bank	0.75	0.94

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Africa	African NGO-Government Partnership for Sustainable Biodiversity Action (Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Sierra Leone, South Africa, Tanzania, Tunisia, Uganda)	UNDP	4.52	11.64
Africa	Biological Diversity Conservation through Participatory Rehabilitation of the Degraded Lands of the Arid and Semi-Arid Transboundary Areas of Mauritania and Senegal (Senegal, Mauritania)	UNDP/UNEP	8.00	12.37
Africa	Central Africa Region: Regional Environment and Information Management Project (REIMP) (Cameroon, Central African Republic, Congo, Equatorial Guinea, Gabon, Congo DR)	World Bank	4.35	15.67
Africa	Conservation Priority-Setting for the Upper Guinea Forest Ecosystems, West Africa (Côte d'Ivoire, Ghana, Guinea, Liberia, Sierra Leone)	UNDP	0.74	0.95
Africa	Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa (Côte d'Ivoire, Ghana, Kenya, Mozambique, Nigeria, Seychelles, South Africa)	UNEP	0.75	0.75
Africa	Institutional Support for the Protection of East African Biodiversity (Kenya, Tanzania, Uganda)	UNDP	10.00	10.00
Africa	Inventory, Evaluation and Monitoring of Botanical Diversity in Southern Africa: A Regional Capacity and Institution Building Network (Botswana, Lesotho, Malawi, Mozambique, Swaziland, South Africa, Zambia, Zimbabwe)	UNDP	4.73	9.41
Africa	Maloti-Drakensberg Conservation and Development Project (Lesotho, South Africa)	World Bank	15.50	33.20
Africa	Management of Indigenous Vegetation for the Rehabilitation of Degraded Rangelands in the Arid Zone of Africa (Botswana, Kenya, Mali)	UNDP/UNEP	9.05	13.38
Africa	Participatory Management of Plant Genetic Resources in Oases of the Maghreb (Algeria, Morocco, Tunisia)	UNDP	3.08	6.58
Africa	Reducing Biodiversity Loss at Cross-Border Sites in East Africa (Kenya, Tanzania, Uganda)	UNDP	12.90	18.43
Africa	Southern Africa Biodiversity Support Programme (Angola, Lesotho, Botswana, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe)	UNDP	4.48	8.87
Africa	West Africa Pilot Community-Based Natural Resource and Wildlife Management (Burkina Faso, Côte d'Ivoire)	World Bank	7.00	13.19
Asia/Pacific	Biodiversity Strategy and Action Plan (BSAP) and Report to the CBD (Jordan, Palestinian Authority)	UNDP	0.35	0.35
Asia/Pacific	Clearing House Mechanism Enabling Activity (Jordan, Palestinian Authority)	UNDP	0.01	0.01
Asia/Pacific	Conservation and Sustainable Use of Dryland Agro-Biodiversity of the Fertile Crescent (Lebanon, Jordan, Syria)	UNDP	8.18	18.47
Asia/Pacific	Conservation Strategies for Rhinos in South East Asia (Indonesia, Malaysia)	UNDP	2.00	2.00

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Asia/Pacific	South Pacific Biodiversity Conservation Programme (Palau, Micronesia, Nauru, Vanuatu, Solomon Islands, Tuvalu, Kiribati, Marshall Islands, Fiji, Tonga, Niue, Cook Islands, Samoa, Tokelau, Papua New Guinea)	UNDP	10.00	14.29
CE Europe/ Former Soviet Union	Central Asia Transboundary Biodiversity Project (Kyrgyzstan, Kazakhstan, Uzbekistan)	World Bank	10.49	14.00
Latin America/ Caribbean	Action for a Sustainable Amazonia (Bolivia, Colombia, Venezuela, Brazil, Ecuador, Peru, Guyana)	UNDP	3.80	3.80
Latin America/ Caribbean	An Indicator Model for Dryland Ecosystems in Latin America (Chile, Brazil, Mexico)	UNEP	0.75	1.07
Latin America/ Caribbean	Catalyzing Conservation Action in Latin America: Identifying Priority Sites and Best Management (Bolivia, Colombia, Ecuador, Panama, Paraguay, Peru)	UNEP	0.75	1.43
Latin America/ Caribbean	Central American Fund for Environment and Development: Account for the Global Environment (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama)	UNDP	15.00	50.00
Latin America/ Caribbean	Conservation and Sustainable Use of the Mesoamerican Barrier Reef (Belize, Guatemala, Honduras, Mexico)	World Bank	10.62	17.78
Latin America/ Caribbean	Conservation of Biodiversity in the Lake Titicaca Basin (Bolivia, Peru)	UNDP	3.11	4.00
Latin America/ Caribbean	Establishment of a Programme for the Consolidation of the Meso-American Biological Corridor (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama)	UNDP/UNEP	10.94	23.55
Latin America/ Caribbean	Regional Support for the Conservation and Sustainable Use of Natural Resources in the Amazon (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela)	UNDP	4.50	4.50
Latin America/ Caribbean	Terra Capital Biodiversity Enterprise Fund for Latin America (IFC)	World Bank	5.00	30.00
Albania	Biodiversity Enabling Activity	World Bank	0.10	0.10
Albania	Clearing House Mechanism Enabling Activity	World Bank	0.01	0.01
Algeria	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Algeria	Biodiversity Enabling Activity	UNDP	0.23	0.23
Algeria	Biodiversity Conservation and Sustainable Natural Resource Management	UNDP	0.75	2.12
Algeria	El Kala National Park and Wetlands Management	World Bank	9.20	11.56
Antigua and Barbuda	Biodiversity Enabling Activity	UNDP	0.14	0.14
Antigua and Barbuda	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Argentina	Patagonian Coastal Zone Management Plan	UNDP	2.80	2.80
Argentina	Biodiversity Conservation Project	World Bank	10.39	47.89
Argentina	Consolidation and Implementation of the Patagonia Coastal Zone Management Programme for Biodiversity Conservation	UNDP	5.20	12.50

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Argentina	Biodiversity Enabling Activity	UNDP	0.35	0.35
Armenia	Biodiversity Enabling Activity	UNDP	0.17	0.18
Bahamas	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Bahamas	Biodiversity Enabling Activity	UNEP	0.15	0.15
Bangladesh	Coastal and Wetland Biodiversity Management at Cox's Bazar and Hakakuki Haor	UNDP	6.20	13.28
Bangladesh	Aquatic Biodiversity Conservation	World Bank	5.00	60.84
Bangladesh	Bangladesh Biodiversity Strategic Action Plan	UNDP	0.28	0.33
Bangladesh	Biodiversity Conservation in the Sundarbans Reserved Forest	World Bank	12.20	75.50
Barbados	Biodiversity Enabling Activity	UNEP	0.14	0.14
Belarus	Biodiversity Enabling Activity	UNEP	0.08	0.08
Belarus	Biodiversity Protection	World Bank	1.00	1.25
Belize	Biodiversity Enabling Activity	UNDP	0.18	0.18
Belize	Community-managed Sarstoon Temash Conservation Project	World Bank	0.81	0.81
Belize	Creating a Co-Managed Protected Areas System	UNDP	0.75	1.13
Belize	Conservation and Sustainable Use of the Barrier Reef Complex	UNDP	5.36	7.37
Belize	Sustainable Development and Management of Biologically Diverse Coastal Resources	UNDP	3.00	3.00
Belize	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Belize	Northern Belize Biological Corridors Project	World Bank	0.77	3.90
Benin	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Benin	National Parks Conservation and Management Project	World Bank	6.24	23.34
Benin	Biodiversity Enabling Activity	UNDP	0.23	0.23
Bhutan	Biodiversity Enabling Activity	UNDP	0.12	0.12
Bhutan	Integrated Management of Jigme Dorji National Park	UNDP	1.50	2.53
Bhutan	Trust Fund for Environmental Conservation	World Bank	10.00	17.57
Bolivia	Biodiversity Conservation	World Bank	4.50	8.35
Bolivia	Biodiversity Enabling Activity	UNDP	0.25	0.25
Bolivia	Sustainability of the National System of Protected Areas	World Bank	15.30	46.70
Brazil	Establishment of Private Natural Heritage Reserves in the Brazilian Cerrado	UNDP	0.75	0.85
Brazil	Biodiversity Enabling Activity	UNDP	0.94	0.94
Brazil	National Biodiversity Project	World Bank	10.00	20.00
Brazil	Brazilian Biodiversity Fund	World Bank	20.00	25.00
Brazil	Amazon Region Protected Areas Program (ARPA)	World Bank	30.35	89.35
Bulgaria	Biodiversity Enabling Activity	UNDP	0.16	0.16
Burkina Faso	Biodiversity Enabling Activity	UNDP	0.23	0.23
Burkina Faso	Optimizing Biological Diversity within Wildlife Ranching Systems; A Pilot Demonstration in a Semi-arid Zone	UNDP	2.50	3.50
Burkina Faso	Natural Ecosystem Management	World Bank	18.68	43.50
Burkina Faso	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Burundi	Biodiversity Enabling Activity	UNDP	0.23	0.23
Burundi	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Cambodia	Biodiversity and Protected Area Management Pilot Project for the Virachey National Park	World Bank	2.75	5.00

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Cambodia	Biodiversity Enabling Activity	UNDP	0.35	0.35
Cameroon	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Cameroon	Biodiversity Enabling Activity	UNEP	0.30	0.30
Cameroon	Biodiversity Conservation and Management	World Bank	5.96	12.39
Cameroon	Community Based Conservation in the Bamenda Highlands	UNDP	1.00	3.09
Cape Verde	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Cape Verde	Biodiversity Enabling Activity	UNDP	0.21	0.21
Central African Republic	A Highly Decentralized Approach to Biodiversity Protection and Use: The Bangassou Dense Forest	UNDP	2.50	3.50
Central African Republic	Biodiversity Enabling Activity	UNDP	0.16	0.16
Central African Republic	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Chad	Biodiversity Enabling Activity	UNDP	0.22	0.22
Chad	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Chile	Valdivian Forest Zone: Private-Public Mechanisms for Biodiversity Conservation	World Bank	0.75	0.75
Chile	National Biodiversity Strategic Action Plan, Report to the CBD, CHM	UNDP	0.27	0.27
China	Biodiversity Enabling Activity	UNEP	0.06	0.06
China	Nature Reserves Management	World Bank	17.80	23.50
China	Wetland Biodiversity Conservation and Sustainable Use	UNDP	12.03	35.05
China	Lop Nur Nature Sanctuary Biodiversity Conservation	UNEP	0.73	1.51
China	Multi-agency and Local Participatory Cooperation in Biodiversity Conservation in Yunnan Upland's Ecosystem	UNDP	0.75	0.75
Colombia	Conservation of Biodiversity in the Choco Region	UNDP	6.00	9.00
Colombia	Conservation and Sustainable Use of Biodiversity in the Andes Region	World Bank	15.35	30.35
Colombia	Sustainable Use of Biodiversity in the Western Slope of the Serrania del Baudo	World Bank	0.75	2.96
Colombia	Caribbean Archipelago Biosphere Reserve: Regional Marine Protected Area System	World Bank	1.00	4.18
Colombia	Conservation of Biodiversity in the Sierra Nevada de Santa Marta	World Bank	9.38	20.49
Colombia	Biodiversity Enabling Activity	UNEP	0.25	0.25
Comoros	Island Biodiversity and Participatory Conservation in the Federal Islamic Republic of Comoros	UNDP	2.44	3.28
Comoros	Biodiversity Enabling Activity	UNDP	0.13	0.13
Congo	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Congo	Biodiversity Enabling Activity	UNDP	0.25	0.25
Congo	Wildlands Protection and Management	World Bank	10.00	16.80
Congo DR	Emergency Response to the Refugee Driven Biodiversity Crisis in Congo DR	UNDP	0.25	0.25
Congo DR	Biodiversity Enabling Activity	UNDP	0.33	0.33
Congo DR	Rehabilitation of Protected Areas in the Democratic Republic of the Congo	UNDP	6.30	19.94
Congo DR	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Cook Islands	Biodiversity Enabling Activity	UNDP	0.20	0.20
Costa Rica	Biodiversity Enabling Activity	UNDP	0.20	0.20
Costa Rica	Conservation of Biodiversity in the Talamanca-Caribbean Biological Corridor	UNDP	0.75	1.27
Costa Rica	Biodiversity Resources Development	World Bank	7.28	20.28

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Costa Rica	Conservation of Biodiversity and Sustainable Development in La Amistad and La Osa Conservation Areas	UNDP	8.00	8.00
Costa Rica	Ecomarkets	World Bank	8.33	60.23
Côte d'Ivoire	National Protected Area Management Program	World Bank	16.50	68.22
Côte d'Ivoire	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Côte d'Ivoire	Control of Exotic Aquatic Weeds in Rivers and Coastal Lagoons to Enhance and Restore Biodiversity	UNDP	3.00	4.90
Côte d'voire	Biodiversity Enabling Activity	UNEP	0.24	0.24
Croatia	Biodiversity Enabling Activity	World Bank	0.10	0.10
Croatia	Kopacki Rit Wetlands Management Project	World Bank	0.75	1.86
Cuba	Biodiversity Enabling Activity	UNEP	0.21	0.21
Cuba	Protecting Biodiversity and Establishing Sustainable Development of the Sabana-Camaguey Region	UNDP	2.00	2.00
Cuba	Priority Actions to Consolidate Biodiversity Protection in the Sabana-Camaguey Ecosystem	UNDP	3.89	19.91
Czech Republic	Biodiversity Protection	World Bank	2.00	2.75
Czech Republic	Biodiversity Enabling Activity	World Bank	0.10	0.10
Djibouti	Biodiversity Enabling Activity	UNDP	0.56	0.56
Dominica	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Dominica	Biodiversity Enabling Activity	UNDP	0.10	0.10
Dominican Republic	Biodiversity Enabling Activity	World Bank	0.23	0.23
Dominican Republic	Biodiversity Conservation and Management in the Coastal Zone of the Dominican Republic	UNDP	3.00	3.00
Ecuador	Biodiversity Enabling Activity	UNDP	0.29	0.29
Ecuador	Biodiversity Protection	World Bank	7.20	8.80
Ecuador	Albarradas in Coastal Ecuador: Rescuing Ancient Knowledge on Sustainable Use of Biodiversity	World Bank	0.75	0.75
Ecuador	Wetland Priorities for Conservation Action	World Bank	0.74	0.93
Ecuador	Monitoring System for the Galapagos Islands	World Bank	0.94	1.59
Ecuador	Control of Invasive Species in the Galapagos Archipelago	UNDP	18.68	41.54
Ecuador	Choco-Andean Corridor	World Bank	1.00	2.35
Egypt	Biodiversity Enabling Activity	UNEP	0.29	0.29
Egypt	Red Sea Coastal and Marine Resource Management	World Bank	4.75	5.73
Egypt	Conservation and Sustainable Use of Medicinal Plants in Arid and Semi-arid Ecosystems	UNDP	4.29	9.05
Egypt	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
El Salvador	Biodiversity Enabling Activity	UNDP	0.20	0.20
El Salvador	Promotion of Biodiversity Conservation within Coffee Landscapes	World Bank	0.75	3.84
Equatorial Guinea	Biodiversity Enabling Activity	UNDP	0.30	0.30
Eritrea	Biodiversity Enabling Activity	World Bank	0.28	0.28
Eritrea	Conservation Management of Eritrea's Coastal, Marine and Island Biodiversity	UNDP	5.39	6.23
Estonia	Biodiversity Enabling Activity	UNEP	0.17	0.17
Ethiopia	A Dynamic Farmer-Based Approach to the Conservation of African Plant Genetic Resources	UNDP	2.46	2.46

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Ethiopia	Conservation and Sustainable Use of Medicinal Plants	World Bank	1.91	6.81
Ethiopia	Biodiversity Enabling Activity	UNDP	0.33	0.33
Fiji	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Fiji	Biodiversity Enabling Activity	UNDP	0.20	0.20
Gabon	Conservation of Biodiversity through Effective Management of Wildlife Trade	UNDP	1.00	1.00
Gabon	Biodiversity Enabling Activity	UNDP	0.23	0.23
Gabon	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Gambia	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Gambia	Biodiversity Enabling Activity	UNEP	0.24	0.24
Georgia	Conservation of Forest Ecosystems	World Bank	9.05	33.15
Georgia	Biodiversity Enabling Activity	World Bank	0.12	0.12
Georgia	Arid and Semi-Arid Ecosystem Conservation in the Caucasus	UNDP	0.75	0.88
Georgia	Integrated Coastal Management Project	World Bank	1.30	8.10
Ghana	Natural Resource Management	World Bank	8.93	53.63
Ghana	Northern Savanna Biodiversity Conservation (NSBC) Project	World Bank	7.90	47.80
Ghana	Coastal Wetlands Management	World Bank	7.20	8.30
Ghana	Biodiversity Conservation of Lake Bosumtwe Basin	UNDP	0.52	0.62
Global	Critical Ecosystems Partnership Fund	World Bank	25.00	100.00
Grenada	Dry Forest Biodiversity Conservation	World Bank	0.75	1.13
Grenada	Biodiversity Enabling Activity	UNDP	0.13	0.13
Guatemala	Management and Protection of Laguna del Tigre National Park	World Bank	0.75	1.66
Guatemala	Integrated Biodiversity Protection in the Sarstun-Motagua Region	UNDP	4.00	9.70
Guatemala	Biodiversity Enabling Activity	UNDP	0.21	0.21
Guinea	Biodiversity Enabling Activity	UNDP	0.22	0.22
Guinea-Bissau	Biodiversity Enabling Activity	UNDP	0.20	0.20
Guyana	Programme for Sustainable Forestry (Iwokrama Rain Forest Programme)	UNDP	3.00	3.40
Guyana	National Protected Areas System	World Bank	6.00	8.10
Guyana	Biodiversity Enabling Activity	UNDP	0.08	0.08
Haiti	Biodiversity Enabling Activity	World Bank	0.26	0.26
Honduras	Biodiversity Enabling Activity	UNDP	0.25	0.25
Honduras	Honduras Biodiversity Project	World Bank/UNDP	7.30	49.00
Hungary	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Hungary	Biodiversity Enabling Activity	UNEP	0.17	0.17
India	India Ecodevelopment	World Bank	20.21	74.21
India	First National Report to the CBD	UNDP	0.03	0.03
India	Biodiversity Enabling Activity	UNDP	0.97	0.97
India	Conservation and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity	UNDP	7.84	26.93
Indonesia	Clearing House Mechanism Enabling Activity	World Bank	0.01	0.01
Indonesia	Maluku Conservation and Natural Resources Management	World Bank	6.00	10.60
Indonesia	Indonesian Biodiversity Strategy and Action Plan (IBSAP)	World Bank	0.44	0.44
Indonesia	Biodiversity Collections	World Bank	7.20	11.40
Indonesia	Kerinci Seblat Integrated Conservation and Development	World Bank	14.40	39.90
Indonesia	Coral Reef Rehabilitation and Management Project (COREMAP)	World Bank	12.28	60.28
Indonesia	Conservation of Elephant Landscapes in Aceh	World Bank	0.74	1.03

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Indonesia	The Greater Berbak-Sembilang Integrated Coastal Wetlands Conservation Project	World Bank	0.73	0.73
Iran	Biodiversity Enabling Activity	UNDP	0.35	0.35
Iran	Conservation of the Asiatic Cheetah, its Natural Habitat and Associated Biota	UNDP	0.75	0.75
Jamaica	Biodiversity Enabling Activity	UNDP	0.19	0.19
Jordan	Conservation of the Dana and Azraq Protected Areas	UNDP	6.30	6.30
Jordan	Final Consolidation and Conservation of Azraq Wetlands and Dana Wildlands by RSCN to Address New Pressures	UNDP	1.95	3.30
Kazakhstan	Integrated Conservation of Priority Globally Significant Migratory Bird Wetland Habitat	UNDP	8.85	38.41
Kazakhstan	Biodiversity Enabling Activity	UNDP	0.13	0.13
Kenya	Biodiversity Enabling Activity	World Bank/UNEP	0.16	0.16
Kenya	Tana River National Primate Reserve	World Bank	6.20	7.14
Kenya	Lake Baringo Community-based Integrated Land and Water Management Project	UNEP	0.75	0.98
Kenya	Lewa Wildlife Conservancy	World Bank	0.75	3.94
Kiribati	Biodiversity Enabling Activity	UNDP	0.20	0.20
Kiribati	Participation in the Clearing House Mechanism of the CBD	UNDP	0.01	0.01
Korea DPR	Biodiversity Enabling Activity	UNDP	0.30	0.30
Korea DPR	Conservation of Biodiversity at Mount Myohyang	UNDP	0.75	1.66
Kyrgyzstan	Biodiversity Enabling Activity	World Bank	0.11	0.11
Lao PDR	Wildlife and Protected Areas Conservation	World Bank	5.00	20.30
Latvia	Biodiversity Enabling Activity	UNDP	0.17	0.17
Lebanon	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Lebanon	Strengthening of National Capacity and Grassroots *In situ* Conservation for Sustainable Biodiversity Protection	UNDP	2.53	3.29
Lebanon	Biodiversity Enabling Activity	UNDP	0.15	0.15
Lesotho	Conserving Mountain Biodiversity in Lesotho	UNDP	2.51	7.14
Lesotho	Biodiversity Enabling Activity	UNDP	0.11	0.11
Lithuania	Biodiversity Enabling Activity	World Bank	0.07	0.07
Madagascar	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Madagascar	Environment Program Support	World Bank/UNDP	21.30	156.50
Madagascar	Biodiversity Enabling Activity	UNEP	0.03	0.03
Malawi	Lake Malawi/Nyasa Biodiversity Conservation	World Bank	5.00	5.44
Malawi	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Malawi	Biodiversity Enabling Activity	UNEP	0.29	0.29
Malawi	Mulanje Mountain Biodiversity Conservation Project	World Bank	5.30	6.83
Malaysia	Conservation and Sustainable Use of Tropical Peat Swamp Forests and Associated Wetland Ecosystems	UNDP	6.30	12.97
Malaysia	Biodiversity Enabling Activity	UNDP	0.04	0.04
Maldives	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Maldives	Biodiversity Enabling Activity	UNDP	0.15	0.15
Mali	Biodiversity Enabling Activity	UNDP	0.25	0.25
Mali	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Marshall Islands	Biodiversity Enabling Activity	UNDP	0.23	0.23
Mauritania	Biodiversity Enabling Activity	UNEP	0.23	0.23

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Mauritania	Rescue Plan for the Cap Blanc Colony of the Mediterranean Monk Seal	UNEP	0.15	0.23
Mauritania	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Mauritius	Biodiversity Enabling Activity	UNEP	0.24	0.24
Mauritius	Restoration of Highly Degraded and Threatened Native Forests in Mauritius	UNDP	0.20	0.20
Mauritius	Biodiversity Restoration	World Bank	1.20	1.60
Mauritius	Restoration of Round Island	World Bank	0.75	1.54
Mauritius	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Mexico	Biodiversity Enabling Activity	UNDP	0.20	0.20
Mexico	Consolidation of the Protected Areas Program (SINAP II)	World Bank	16.45	76.75
Mexico	Protected Areas Program	World Bank	25.00	42.20
Mexico	Biodiversity Conservation in the Sierra Gorda Biosphere Reserve	UNDP	6.73	20.66
Mexico	Indigenous and Community Biodiversity Conservation (COINBIO)	World Bank	7.50	18.70
Mexico	Mesoamerican Biological Corridor	World Bank	15.20	93.31
Mexico	El Triunfo Biosphere Reserve: Habitat Enhancement in Productive Landscapes	World Bank	0.75	2.12
Mexico	Integrated Ecosystem Management in 3 Priority Ecoregions	UNDP	15.65	77.37
Micronesia	Community Conservation and Compatible Enterprise Development on Pohnpei	UNDP	0.75	2.20
Micronesia	Biodiversity Enabling Activity	UNDP	0.28	0.28
Moldova	Biodiversity Enabling Activity	World Bank	0.13	0.13
Mongolia	Biodiversity Enabling Activity	UNDP	0.03	0.03
Mongolia	Biodiversity Conservation and Sustainable Livelihood Options in the Grasslands of Eastern Mongolia	UNDP	5.16	12.03
Mongolia	Strengthening Conservation Capacity and Development and Institution of a National Biodiversity Conservation Plan (Implementation Phase I)	UNDP	1.50	1.85
Mongolia	Enabling Activity	World Bank	0.20	0.20
Mongolia	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Morocco	Transhumans for Biodiversity Conservation in the Southern High Atlas	UNDP	4.37	10.44
Morocco	Protected Areas Management	World Bank	10.10	13.50
Morocco	Biodiversity Enabling Activity	UNEP	0.19	0.19
Morocco	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Mozambique	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Mozambique	Transfrontier Conservation Areas Pilot and Institutional Strengthening	World Bank	5.00	8.10
Mozambique	Coastal and Marine Biodiversity Management Project	World Bank	4.08	9.21
Mozambique	Biodiversity Enabling Activity	UNEP	0.22	0.22
Namibia	Biodiversity Enabling Activity	UNEP	0.24	0.24
Nepal	Biodiversity Conservation in Nepal	UNDP	3.80	8.40
Nepal	Upper Mustang Biodiversity Project	UNDP	0.75	1.73
Nepal	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Nicaragua	Atlantic Biodiversity Corridor	World Bank	7.43	51.03
Nicaragua	Biodiversity Enabling Activity	UNDP	0.25	0.25
Niger	Biodiversity Enabling Activity	UNDP	0.23	0.23
Niger	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Nigeria	Biodiversity Enabling Activity	UNDP	0.31	0.31

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Niue	Biodiversity Enabling Activity	UNDP	0.13	0.13
Niue	Enabling Activity	UNDP	0.01	0.01
Oman	Biodiversity Enabling Activity	UNDP	0.27	0.27
Pakistan	Mountain Areas Conservancy Project	UNDP	10.60	16.80
Pakistan	Biodiversity Enabling Activity	UNEP	0.04	0.04
Pakistan	Maintaining Biological Diversity with Rural Community Development	UNDP	2.50	2.50
Pakistan	Protected Areas Management Project	World Bank	11.14	26.84
Palau	Enabling Activity	UNDP	0.31	0.31
Panama	Atlantic Biological Corridor Project	World Bank	8.60	39.50
Panama	Biodiversity Conservation in the Darien Region	UNDP	3.00	3.00
Panama	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Panama	Effective Protection with Community Participation of the New Protected Area of San Lorenzo	World Bank	0.73	2.23
Panama	Biodiversity Enabling Activity	UNEP	0.22	0.22
Papua New Guinea	Biodiversity Conservation and Resource Management	UNDP	5.00	5.00
Papua New Guinea	Biodiversity Enabling Activity	World Bank	0.18	0.18
Papua New Guinea	Forestry and Conservation Project	World Bank	17.30	55.50
Paraguay	Biodiversity Enabling Activity	UNDP	0.14	0.14
Paraguay	Paraguayan Wildlands Protection Initiative	UNDP	9.20	12.70
Peru	Biodiversity Enabling Activity	UNDP	0.22	0.22
Peru	Participatory Conservation and Sustainable Development with Indigenous Communities in Vilcabamba	World Bank	0.73	1.14
Peru	Collaborative Management for the Conservation and Sustainable Development of the Northwest Biosphere Reserve	World Bank	0.75	2.08
Peru	*In situ* Conservation of Native Cultivars and Their Wild Relatives	UNDP	5.22	6.42
Peru	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Peru	National Trust Fund for Protected Areas	World Bank	5.00	7.86
Peru	Indigenous Management of Protected Areas in the Amazon	World Bank	10.35	24.35
Philippines	Conservation of the Tubbahata Reefs National Marine Park and World Heritage Site	UNDP	0.75	1.76
Philippines	Biodiversity Enabling Activity	UNDP	0.04	0.04
Philippines	Coastal and Marine Biodiversity Conservation in Mindanao	World Bank	1.25	6.05
Philippines	Samar Island Biodiversity Project: Conservation and Sustainable Use of the Biodiversity of a Forested Protected Area	UNDP	6.11	13.31
Philippines	Conservation of Priority Protected Areas	World Bank	20.00	22.86
Philippines	Sustainable Management of Mount Isarog	UNDP	0.75	2.23
Poland	Forest Biodiversity Protection	World Bank	4.50	6.20
Poland	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Poland	Biodiversity Enabling Activity	UNEP	0.21	0.21
Romania	Danube Delta Biodiversity	World Bank	4.50	4.80
Romania	Integrated Protected Areas and Conservation Management	World Bank	5.30	6.90
Russian Federation	Biodiversity Conservation	World Bank	20.10	26.00
Russian Federation	Biodiversity Enabling Activity	UNEP	0.05	0.05

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Rwanda	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Rwanda	Biodiversity Enabling Activity	UNDP	0.17	0.17
Samoa	Marine Biodiversity Protection and Management	World Bank	0.90	1.58
Samoa	Enabling Activity	UNDP	0.01	0.01
Samoa	Biodiversity Enabling Activity	UNDP	0.17	0.17
Sao Tome and Principe	Biodiversity Strategy, Action Plan and First National Report and Clearing House Mechanism	World Bank	0.16	0.16
Senegal	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Senegal	Biodiversity Enabling Activity	UNDP	0.21	0.21
Seychelles	Biodiversity Conservation and Marine Pollution Abatement	World Bank	1.80	2.00
Seychelles	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Seychelles	Management of Avian Ecosystems	World Bank	0.74	1.06
Seychelles	Biodiversity Enabling Activity	UNEP	0.19	0.19
Seychelles	Marine Ecosystem Management Project	World Bank	0.75	1.40
Slovak Republic	Central European Grasslands – Conservation and Sustainable Use	World Bank	0.75	1.10
Slovak Republic	Biodiversity Enabling Activity	World Bank	0.08	0.08
Slovak Republic	Biodiversity Protection	World Bank	2.30	3.17
Slovenia	Biodiversity Enabling Activity	World Bank	0.09	0.09
Solomon Islands	Biodiversity Enabling Activity	UNEP	0.12	0.12
Solomon Islands	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
South Africa	Conservation Planning for Biodiversity in the Thicket Biome	World Bank	0.74	0.86
South Africa	Conservation of Globally Significant Biodiversity in Agricultural Landscapes through Conservation Farming	World Bank	0.75	1.72
South Africa	Biodiversity Enabling Activity	UNDP	0.03	0.03
South Africa	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
South Africa	Sustainable Protected Area Development in Namaqualand	World Bank	0.76	5.39
South Africa	Cape Peninsula Biodiversity Conservation Project	World Bank	12.40	93.20
Sri Lanka	Conservation of Globally Threatened Species in the Rainforests of Southwest Sri Lanka	UNDP	0.75	0.98
Sri Lanka	Wildlife Conservation and Protected Areas Management	UNDP	4.10	4.10
Sri Lanka	Conservation of Biodiversity through Integrated Collaborative Management in Rekawa, Ussangoda, and Kalametiya Coastal Ecosystems	UNDP	0.75	0.77
Sri Lanka	Protected Areas and Wildlife Management	World Bank	10.20	34.70
Sri Lanka	Conservation and Sustainable Use of Medicinal Plants	World Bank	5.42	25.82
Sri Lanka	Participation in the Clearing House Mechanism of the CBD	UNDP	0.01	0.01
St. Kitts and Nevis	Biodiversity Enabling Activity	UNDP	0.10	0.10
St. Lucia	Biodiversity Enabling Activity	UNEP	0.17	0.17
St. Vincent and Grenadines	Biodiversity Enabling Activity	UNDP	0.12	0.12

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Sudan	Conservation and Management of Habitats and Species, and Sustainable Community Use of Biodiversity in Dinder National Park	UNDP	0.75	1.70
Sudan	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Sudan	Biodiversity Enabling Activity	UNDP	0.33	0.33
Suriname	Conservation of Globally Significant Forest Ecosystems in Suriname's Guayana Shield	UNDP	9.54	18.33
Suriname	Biodiversity Enabling Activity	UNDP	0.09	0.09
Swaziland	Participation in the Clearing House Mechanism of the CBD	UNDP	0.01	0.01
Swaziland	Biodiversity Enabling Activity	UNDP	0.17	0.17
Syria	Conservation of Biodiversity and Protected Areas Management	World Bank	0.75	1.43
Syria	Additional Enabling Activity Support for Participation in the Clearing House Mechanism of the CBD	UNDP	0.01	0.01
Syria	Biodiversity Enabling Activity	UNDP	0.19	0.19
Tanzania	Jozani Chwaka Bay National Park Development	UNDP	0.75	1.59
Tanzania	Development of Mnazi Bay Marine Park	UNDP	1.62	3.69
Togo	Biodiversity Enabling Activity	World Bank	0.24	0.24
Trinidad and Tobago	Protected Areas and Wildlife Management Project	World Bank	4.20	16.80
Trinidad and Tobago	Biodiversity Enabling Activity	UNDP	0.13	0.13
Tunisia	Biodiversity Enabling Activity	World Bank	0.09	0.09
Turkey	*In situ* Conservation of Genetic Biodiversity	World Bank	5.10	5.70
Turkey	Integrated Protected Areas and Conservation Management	World Bank	8.55	10.55
Turkmenistan	Biodiversity Strategy, Action Plan and National Report with Clearing House Mechanism	UNDP	0.30	0.33
Uganda	Biodiversity Enabling Activity	World Bank	0.12	0.12
Uganda	Kibale Forest Wild Coffee Project	World Bank	0.75	4.15
Uganda	Protected Areas Management and Sustainable Use (PAMSU)	World Bank	10.29	107.09
Uganda	Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation	World Bank	4.00	6.31
Ukraine	Danube Delta Biodiversity	World Bank	1.50	1.74
Ukraine	Biodiversity Enabling Activity	World Bank	0.11	0.11
Ukraine	Biodiversity Conservation in the Azov-Black Sea Ecological Corridor	World Bank	7.15	33.30
Ukraine	Clearing House Mechanism Enabling Activity	World Bank	0.01	0.01
Ukraine	Transcarpathian Biodiversity Protection	World Bank	0.50	0.58
Uruguay	Conservation of Biodiversity in the Eastern Wetlands	UNDP	3.00	3.00
Uruguay	Biodiversity Enabling Activity	UNDP	0.12	0.12
Uruguay	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Uruguay	Consolidation of the Banados del Este Biosphere Reserve	UNDP	2.50	4.00
Uzbekistan	Biodiversity Enabling Activity	UNDP	0.18	0.18
Uzbekistan	Establishment of the Nuratau-Kyzylkum Biosphere Reserve as a Model for Biodiveristy Conservation	UNDP	0.75	0.75
Vanuatu	Enabling Activity	UNEP	0.13	0.13

COUNTRY	PROJECT NAME	IMPLEMENTING AGENCY	ALLOCATION BY GEF (US$ MILLION)	TOTAL COSTS (US$ MILLION)
Vanuatu	Biodiversity Enabling Activity	UNEP	0.21	0.21
Vanuatu	Clearing House Mechanism Enabling Activity	UNEP	0.01	0.01
Venezuela	Biodiversity Enabling Activity	UNDP	0.27	0.27
Venezuela	Conservation of the Biological Diversity of the Orinoco Delta Biosphere Reserve and Lower Orinoco River Basin	UNDP	9.79	33.07
Venezuela	Conservation and Sustainable Use of Biodiversity in the Llanos Ecoregion	World Bank	0.96	2.45
Viet Nam	Enabling Activity for the Clearing House Mechanism of the Convention on Biological Diversity	UNDP	0.01	0.01
Viet Nam	Conservation Training and Biodiversity Action Plan	UNDP	3.00	3.00
Viet Nam	Viet Nam PARC – Creating Protected Areas for Resources Conservation (PARC) in Viet Nam Using a Landscape Ecology Approach	UNDP	6.04	6.70
Viet Nam	Hon Mun Marine Protected Area Pilot Project	World Bank	0.97	2.18
Yemen	Protected Areas Management	World Bank	0.75	1.41
Yemen	Conservation and Sustainable Use of the Biodiversity of Socotra Archipelago	UNDP	4.97	12.98
Yemen	Clearing House Mechanism Enabling Activity	UNDP	0.01	0.01
Yemen	Coastal Zone Management along the Gulf of Aden	World Bank	0.75	1.29
Yemen	Biodiversity Enabling Activity	UNDP	0.29	0.29
Zambia	Biodiversity Enabling Activity	UNDP	0.29	0.29
Zimbabwe	Biodiversity Enabling Activity	UNDP	0.30	0.30
Zimbabwe	Biodiversity Conservation in Southeast Zimbabwe	World Bank	4.80	55.00

Annex 4: Information Sources and Further Reading

The *Handbook of the Convention on Biological Diversity*, a companion volume to this *Outlook*, provides a comprehensive reference guide to COP decisions and continuing activities:

Secretariat of the Convention on Biological Diversity. 2001. *Handbook of the Convention on Biological Diversity*. Earthscan Publications, London.

The website of the Convention on Biological Diversity (http://www.biodiv.org/) is the key resource for documentation of COP decisions, SBSTTA recommendations, national reports, programmes and issues, and a wide range of ancillary material. Further background information on the United Nations Conference on Environment and Development and the Convention on Biological Diversity can be found in the following sources:

Glowka, L. et al. 1994. *A Guide to the Convention on Biological Diversity*. IUCN, Gland and Cambridge.

McConnell, F. 1996. *The Biodiversity Convention; A Negotiating History*. Kluwer Law International, London and The Hague.

United Nations. 1992. *Agenda 21: The United Nations Programme of Action from Rio*. New York.

World Commission on Environment and Development. 1987. *Our Common Future.* Oxford University Press, Oxford and New York.

Other publications of relevance include:

Loh, J. *et al. 2000. WWF Living Planet Report 2000*. WWF International, Gland, Switzerland.

Reaka-Kudla, M.L. *et al.* 1997. *Biodiversity II: Understanding and Protecting Our Biological Resources*. National Academy Press. Washington DC, USA.

UNEP. 1995. *Global Biodiversity Assessment.* Cambridge University Press, Cambridge, UK.

UNEP. 1999. *Cultural and Spiritual Values of Biodiversity*. Intermediate Technology Publications, London, UK.

UNEP. 1999. *Global Environmental Outlook 2000: UNEP's Millennium Report on the Environment*. Earthscan Publications, London, UK.

UNEP, NASA and The World Bank. 1998. *Protecting Our Planet – Securing Our Future.* Washington, DC, USA.

WCMC. 1992. *Global Biodiversity: Status of the Earth's Living Resources*. Chapman and Hall, London, UK.

WCMC. 2000. *Global Biodiversity: Earth's living resources in the 21st Century.* World Conservation Press, Cambridge, UK.

Wilson, E. O. (editor), Frances M. Peter (associate editor).1989. *Biodiversity*. National Academy Press. Washington DC, USA.

World Resources Institute. 2000. *World Resources 2000-2001: People and Ecosystems: The Fraying Web of Life*. UNDP, UNEP, World Bank, World Resources Institute, Washington, DC, USA.

World Resources Institute. 2000. *Pilot Analysis of Global Ecosystems (PAGE)*. Washington, DC, USA. (A series of five technical reports – Agroecosystems, Coastal Ecosystems, Forest Ecosystems, Freshwater Ecosytems, and Grassland Ecosystems – also available online at http://www.wri.org/wr2000).

The information summarised in chapter 1 of this report is derived mainly from WCMC 2000 (above). UNEP (1995) provides a broad technical overview of biodiversity. Parts of chapters 2 and 5 are drawn from an information package on the Convention on Biological Diversity for Pacific Island Countries (2000) produced by the South Pacific Regional Environment Programme (SPREP), the Foundation for International Environmental Law and Development (FIELD) and the World Wide Fund for Nature-South Pacific Program (WWF-SPP) as part of a UK Darwin Initiative project. The other sources listed below are concerned with the status of species and genetic resources, and area-based assessments.

BirdLife International. 2000. *Threatened birds of the world*. Lynx Edicions, Barcelona, Spain & BirdLife International, Cambridge, UK.

FAO. 1998. *The state of the world's plant genetic resources for food and agriculture*. Food and Agriculture Organization of the United Nations, Rome, Italy.

Hilton-Taylor, C. (compiler). 2000. *2000 IUCN Red List of Threatened Species*. IUCN, Gland, Switzerland and Cambridge, UK.

International Pollinators Initiative. 1999. *The São Paulo Declaration on Pollinators*. Government of Brazil, Ministry of the Environment (MMA), Brasília, Brazil.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. and Kent, J. 2000. *Biodiversity hotspots for conservation priorities.* Nature 403: 853-858.

Oldfield, S., Lusty, C. and MacKinven, A. 1998. *The World List of Threatened Trees*. World Conservation Press, Cambridge, UK.

Scherf, B D. 1995. *World Watch List for domestic animal diversity*. 2nd edition. Food and Agriculture Organization of the United Nations, Rome, Italy.

Stattersfield, A.J., Crosby, M.J. and Wege, D.C. 1998. *Endemic Bird Areas of the World – Priorities for Biodiversity Conservation*. BirdLife International, Cambridge, UK.

WWF and IUCN. 1994-1997. *Centres of Plant Diversity. A Guide and Strategy for their Conservation.* 3 vols. IUCN Publications Unit, Cambridge, UK.

For an introduction to global environmental issues and to biodiversity and its importance, the following are highly recommended:

Baskin, Y. 1998. *The Work of Nature: How the Diversity of Life Sustains Us*. Island Press, San Francisco CA, USA.

McNeill, J.R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth-Century World.* W.W. Norton and Co., New York NY, USA.

Wilson, E.O. 1999. *The Diversity of Life*. W.W. Norton and Co., New York NY, USA.

Information on the other biodiversity-related conventions and of other organizations referred to in the *Global Biodiversity Outlook* can be found on their websites, which are listed in Annex 5: Terminology, Acronyms and Abbreviations

1: Organizations

ACC	Administrative Committee on Coordination (United Nations)	http://acc.unsystem.org/
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (CMS)	http://www.accobams.mc/
AEWA	African-Eurasian Migratory Waterbird Agreement (CMS)	http://www.unep-wcmc.org/AEWA/index2.html
ARCOS	Albertine Rift Conservation Society	http://www.unep-wcmc.org/arcos/
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (CMS)	http://www.ascobans.org/
ASEAN	Association of Southeast Asian Nations	http://www.asean.or.id/
BGCI	Botanic Gardens Conservation International	http://www.bgci.org.uk/
BPSP	Biodiversity Planning Support Programme (UNDP-UNEP)	http://www.undp.org/bpsp/
CABI	CAB International	http://www.cabi.org/
CAFF	Program for the Conservation of Arctic Flora and Fauna (Arctic Council)	http://www.grida.no/caff/
CBD	Convention on Biological Diversity	http://www.biodiv.org/
CCD	See UNCCD	
CEC	Commission for Environmental Cooperation (North American Agreement on Environmental Cooperation)	http://www.cec.org/
CEC	Commission on Education and Communication (IUCN)	http://info.iucn.org/iucncec/
CGIAR	Consultative Group on International Agricultural Research	http://www.cgiar.org/
CGRFA	Commission on Genetic Resources for Food and Agriculture (FAO)	http://www.fao.org/ag/cgrfa/default.htm
CIFOR	Centre for International Forestry Research	http://www.cifor.org/
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	http://www.cites.org/
CMS	Convention on Migratory Species of Wild Animals	http://www.unep-wcmc.org/cms/
CODATA	Committee on Data for Science and Technology (ICSU)	http://www.nrc.ca/codata/welcome.html
COFO	Committee on Forestry (FAO)	http://www.fao.org/forestry/fo/statbod/cofo/COFO-e.stm
COGENT	International Coconut Genetic Resources Network	http://www.ipgri.cgiar.org/networks/cogent/
CPAN	Circumpolar Protected Areas Network (CAFF)	http://www.grida.no/caff/cpanstratplan.htm
CSD	Commission for Sustainable Development (ECOSOC)	http://www.un.org/esa/sustdev/csd.htm
CTE	Committee on Trade and Environment (WTO)	http://www.wto.org/english/tratop_e/envir_e/issu1_e.htm

DADIS	Domestic Animal Diversity Information System (FAO)	http://www.fao.org/dad-is/
DIVERSITAS	A partnership of ICSU, IUBS, SCOPE, IGBP, IUMS and UNESCO to promote, facilitate and catalyse scientific research on biodiversity	http://www.icsu.org/DIVERSITAS/index.html
EBRD	European Bank for Reconstruction and Development	http://www.ebrd.org/index.htm
EC	European Community	http://europa.eu.int/
ECNC	European Centre for Nature Conservation	http://www.ecnc.nl/
ECOSOC	Economic and Social Council (United Nations)	http://www.un.org/esa/coordination/ecosoc/
EEA	European Environment Agency	http://www.eea.eu.int/
EIONET	European Environment Information and Observation Network (EEA)	http://eionet.eea.eu.int/index.shtml
EUROBATS	Agreement on the Conservation of Bats in Europe (CMS)	http://www.eurobats.org/
FAO	Food and Agriculture Organization of the United Nations	http://www.fao.org/
FIELD	Foundation for International Environmental Law and Development	http://www.field.org.uk/
FRA 2000	Global Forest Resources Assessment 2000 (FAO)	http://www.fao.org/forestry/fo/fra/index.jsp
FSC	Forest Stewardship Council	http://www.fscoax.org/index.html
GA	General Assembly (United Nations)	http://www.un.org/ga/
GATT	General Agreement on Tariffs and Trade (WTO)	http://www.wto.org/english/tratop_e/gatt_e/gatt_e.htm
GBIF	Global Biodiversity Information Facility	http://www.gbif.org/index.html
GCRMN	Global Coral Reef Monitoring Network	http://coral.aoml.noaa.gov/gcrmn/
GEF	Global Environment Facility	http://www.gefweb.org/
GISP	Global Invasive Species Programme	http://jasper.stanford.edu/GISP/home.htm
GIWA	Global International Waters Assessment (UNEP)	http://www.giwa.net/
GLASOD	Global Assessment of Soil Degradation	http://www.isric.nl/GLASOD.htm
GRID	Global Resource Information Database (UNEP)	http://www.grid.no
GTI	Global Taxonomy Initiative	http://www.biodiv.org/spec-tax/GTI/index.html
IABIN	Inter-American Biodiversity Information Network	http://www.iabin.org/
IACSD	Inter-Agency Committee on Sustainable Development (ACC)	http://www.un.org/esa/sustdev/iacsd.htm
IAIA	International Association for Impact Assessment	http://www.iaia.org/
IBOY	International Biodiversity Observation Year	http://www.nrel.colostate.edu/IBOY/
ICARDA	International Center for Agricultural Research in the Dry Areas	http://www.icarda.cgiar.org/

ICBG	International Cooperative Biodiversity Groups	http://www.nih.gov/fic/programs/icbg.html
ICES	International Council for the Exploration of the Sea	http://www.ices.dk/
ICLARM	International Centre for Living Aquatic Resources Management	http://www.cgiar.org/iclarm/
ICPR	International Commission for the Protection of the Rhine	http://www.iksr.org/icpr/welcome.html
ICRAF	International Centre for Research in Agroforestry	http://www.icraf.cgiar.org/
ICRAN	International Coral Reef Action Network	http://www.unep.ch/earthw/icran.htm
ICRI	International Coral Reef Initiative	http://www.environnement.gouv.fr/icri/index.html
ICRIN	International Coral Reef Information Network	http://www.environnement.gouv.fr/icri/index.html
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics	http://www.icrisat.org/
ICSU	International Council for Science	http://www.icsu.org/
IFAD	International Fund for Agricultural Development	http://www.ifad.org/
IFF	International Forum on Forests (CSD)	http://www.un.org/esa/sustdev/forests.htm
IGBP	International Geosphere-Biosphere Programme (ICSU)	http://www.igbp.kva.se/
IITA	International Institute of Tropical Agriculture	http://www.iita.org/Index3.htm
IMO	International Maritime Organization	http://www.imo.org/
IOC	Intergovernmental Oceanographic Commission (UNESCO)	http://ioc.unesco.org/iocweb/
IPCC	Intergovernmental Panel on Climate Change	http://www.ipcc.ch/index.html
IPF	Intergovernmental Panel on Forests (CSD)	http://www.un.org/esa/sustdev/forests.htm
IPGRI	International Plant Genetic Resources Institute	http://www.ipgri.org/
IPIECA	International Petroleum Industry Environmental Conservation Association	http://www.ipieca.org/
IPPC	International Plant Protection Convention	http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPP/PQ/Default.htm
ITTO	International Tropical Timber Organization	http://www.itto.or.jp/Index.html
IU	International Undertaking on Plant Genetic Resources for Food and Agriculture (FAO)	http://www.fao.org/ag/cgrfa/IU.htm
IUBS	International Union of Biological Sciences	http://www.iubs.org/
IUCN	World Conservation Union	http://www.iucn.org/
IUMS	International Union of Microbiological Sciences	http://www.iums.org/
MAB	Man and the Biosphere Programme (UNESCO)	http://www.unesco.org/mab/index.htm
MSC	Marine Stewardship Council	http://www.msc.org/
NAFTA	North American Free Trade Agreement	http://www.nafta-sec-alena.org/

OAU	Organization of African Unity	http://www.oau-oua.org/
OECD	Organization for Economic Cooperation and Development	http://www.oecd.org/
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic	http://www.ospar.org/
PEBLDS	Pan-European Biological and Landscape Diversity Strategy	http://www.strategyguide.org/
PHARE	The Phare programme is the European Community's main instrument of financial and technical cooperation with the central and eastern European countries which are candidates for EU membership	http://europa.eu.int/scadplus/leg/en/lvb/e50004.htm
RAFI	Rural Advancement Foundation International	http://www.rafi.org/
RAMSAR	The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, Iran, 1971), also referred to as "The Convention on Wetlands" and "The Ramsar Convention"	http://www.ramsar.org/
REC	Regional Environmental Centre for Central and Eastern Europe	http://www.rec.org/Default.shtml
REFORGEN	FAO Global Information System on Forest Genetic Resources	http://www.fao.org/montes/for/form/FOGENRES/reforgen/
RIVM	National Institute of Public Health and the Environment (The Netherlands)	http://www.rivm.nl/index_en.html
SADC	South African Development Community	http://www.sadc.int/
SBSTA	Subsidiary Body for Scientific and Technological Advice (UNFCCC)	http://www.unfccc.de/index.html
SCOPE	Scientific Committee on Problems of the Environment (ICSU)	http://www.iscu-scope.org/
SINGER	System-wide Information Network on Genetic Resources (CGIAR)	http://singer2.cgiar.org/
SOCA	Sub-Committee on Oceans and Coastal Areas (ACC)	http://www.un.org/esa/sustdev/iacsd.htm
SPAW	Protocol Concerning Specially Protected Areas and Wildlife (Cartagena Convention)	http://www.cep.unep.org/law/cartnut.html
SPREP	South Pacific Regional Environment Programme	http://www.sprep.org.ws/
SPS	Agreement on Sanitary and Phytosanitary Measures (WTO)	http://www.wto.org/english/tratop_e/sps_e/sps_e.htm
SSC	Species Survival Commission (IUCN)	http://iucn.org/themes/ssc/index.htm
STAP	Scientific and Technical Advisory Panel (GEF)	http://www.gefweb.org/participants/Scietific___Technical/scietific___technical.html
SWR	Sub-Committee on Water Resources (ACC)	http://www.un.org/esa/sustdev/iacsd.htm
TACIS	The TACIS programme is the European Community's main instrument of financial and technical cooperation with the Newly Independent States (former republics of the USSR) and Mongolia	http://europa.eu.int/comm/external_relations/ceeca/tacis/index.htm

TBT	Agreement on Technical Barriers to Trade (WTO)	http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm8_e.htm
TRAFFIC	TRAFFIC is the joint wildlife trade monitoring programme of WWF and IUCN	http://www.traffic.org/
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights (WTO)	http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm6_e.htm
UNCCD	United Nations Convention to Combat Desertification	http://www.unccd.int/main.php
UNCED	United Nations Conference on Environment and Development (Rio de Janeiro, June 1992)	http://www.un.org/esa/sustdev/agenda21.htm
UNCLOS	United Nations Convention on the Law of the Sea	http://www.un.org/Depts/los/index.htm
UNCTAD	United Nations Conference on Trade and Development	http://www.unctad.org/
UNDESA	United Nations Department of Economic and Social Affairs	http://www.un.org/esa/
UNDP	United Nations Development Programme	http://www.undp.org/
UNECE	United Nations Economic Commission for Europe	http://www.unece.org/
UNEP	United Nations Environment Programme	http://www.unep.org/
UNESCO	United Nations Educational, Scientific and Cultural Organization	http://www.unesco.org/
UNFCCC	United Nations Framework Convention on Climate Change	http://www.unfccc.de/index.html
UNFF	United Nations Forum on Forests	http://www.un.org/esa/sustdev/forests.htm
UNGASS	Special Session of the General Assembly to Review and Appraise the Implementation of Agenda 21 (1997)	http://www.un.org/esa/earthsummit/
UNIDO	United Nations Industrial Development Organization	http://www.unido.org/
UPOV	International Union for the Protection of New Varieties of Plants (Union internationale pour la protection des obtentions végétales)	http://www.upov.int/eng/index.htm
WAICENT	World Agricultural Information Centre (FAO)	http://www.fao.org/waicent/search/default.htm
WCD	World Commission on Dams	http://www.dams.org/
WCMC	World Conservation Monitoring Centre (since July 2000: UNEP-WCMC)	http://www.unep-wcmc.org
WCPA	World Commission on Protected Areas (IUCN)	http://wcpa.iucn.org/
WDCM	World Data Centre for Microorganisms	http://wdcm.nig.ac.jp/index.html
WFCC	World Federation for Culture Collections	http://wdcm.nig.ac.jp/wfcc/index.xml
WHC	World Heritage Convention (Convention Concerning the Protection of the World Cultural and Natural Heritage)	http://www.unesco.org/whc/index.htm
WIEWS	World Information and Early Warning System on Plant Genetic Resources (FAO)	http://apps3.fao.org/wiews/
WIPO	World Intellectual Property Organization	http://www.wipo.int/index.html.en
WRI	World Resources Institute	http://www.wri.org/wri/

WSSD	World Summit on Sustainable Development (Johannesburg, September 2002)	http://www.johannesburgsummit.org/
WTO	World Trade Organization	http://www.wto.org/
WWF	World Wide Fund for Nature	http://www.panda.org/

2: Scientific terms

AI	Aridity index
CO_2	Carbon dioxide
DNA	Deoxyribonucleic acid
EIA	Environmental impact assessment
GM/GMO	Genetically modified/genetically modified organism
GURT	Genetic use restriction technologies
IBA	Important Bird Area
IPM	Integrated pest management
LMO	Living modified organism
NPP	Net primary production
PET	Potential evapotranspiration

3: Intergovernmental terminology

CEE/NIS	Central and Eastern Europe/Newly Independent States	
CHM	Clearing-house mechanism	http://www.biodiv.org/chm/
COP	Conference of the Parties	http://www.biodiv.org/convention/cops.asp
G77	The Group of 77	http://www.g77.org/
GBO	Global Biodiversity Outlook	http://www.biodiv.org/outreach/gbo/
GRULAC	Group of Latin American and the Caribbean	
ICCP	Intergovernmental Committee for the Cartagena Protocol	http://www.biodiv.org/biosafety/iccp.asp?lg=0
IGO	Intergovernmental organization	
INC	Intergovernmental Negotiating Committee for a Convention on Biological Diversity (1991-1992)	
JUSSCANNZ	Non-EU members of WEOG – Japan, United States of America, Switzerland, Canada, Australia, Norway, New Zealand	
LDC	Least developed country	http://www.unctad.org/en/pub/ldcprofiles2001.en.htm

Nairobi Act	Final Act of the Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity (Nairobi, 22 May 1992)	
NBSAP	National biodiversity strategy and action plan	
NEAP	National environmental action plan	
NGO	Non-governmental organization	
PGRFA	Plant genetic resources for food and agriculture	
SBSTTA	Subsidiary Body for Scientific, Technical and Technological Advice (CBD)	http://www.biodiv.org/
SIDS	Small island developing States	http://www.sidsnet.org/
WEOG	Western European and Others Group	

STATUS AND TRENDS OF GLOBAL BIODIVERSITY

INTRODUCTION

The purpose of this chapter is to provide an overview of the changing status of the world's biological diversity. The first sections below provide general information on the nature and scope of biological diversity, and broad trends at genetic and species level. Subsequent sections outline the status of the general ecosystem types that are the subject of thematic programmes established by the Convention, and brief remarks are given on other important habitat types.

The Convention's approach to biodiversity

The key objectives of the Convention, as set out in Article 1, and outlined in chapter 2 below, are simple in summary but in practice all-encompassing: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from use of genetic resources. Article 2 of the Convention provides a short description of the term "biodiversity", which refers essentially to the diversity of living organisms, the genes they contain, and the communities to which they contribute.

In addressing the boundless complexity of biological diversity, it has become conventional to think in hierarchical terms, from the genetic material within individual cells, building up through individual organisms, populations, species and communities of species, to the biosphere overall.

The dimensions of biodiversity

This term is used by the Convention to refer to all aspects of variability evident within the living world, including diversity within and between individuals, populations, species, communities, and ecosystems. Differences in pest resistance among rice varieties, the range of habitats within a forest ecosystem, or the global extinction of species of lake fish, all illustrate different aspects of biological diversity. The term is commonly used loosely to refer to all species and habitats in some given area, or even on the Earth overall.

Genes provide the blueprint for the construction and functioning of organisms, and their diversity is thus clearly fundamental. The Convention puts due emphasis on genetic resources, i.e. the genetic diversity responsible for key properties of organisms used by humans, for food, medicine or other purposes, and which provides the potential for future modifications to these organisms. However, genes in nature are expressed only through the form and differential survival of organisms, and if attempts are made to manipulate genes, for example in bioengineering, it is important to focus on the requirements of whole organisms if this is to be undertaken successfully. Accordingly, the diversity of organisms tends to be central to biodiversity studies, and species diversity is a generally useful and practicable measure of biodiversity.

At the same time, in seeking to make management intervention as efficient as possible, it is essential to take an holistic view of biodiversity and address the interactions that species have with each other and their non-living environment, i.e. to work from an ecological perspective. By several of its decisions,[1] the Conference of the Parties has explicitly recognized the need for this approach. In particular, decision V/6 and its annex provide a description and discussion of the ecosystem approach, which in effect becomes the paradigm within which the Convention's activities are undertaken.[2]

It is often useful to address biodiversity issues in sectoral or other non-hierarchical terms. Agricultural biodiversity, for example, comprises those elements at all levels of the biological hierarchy, from genes to ecosystems, involved in agriculture and food production. The Convention has established a work programme on agricultural biodiversity, in recognition of the pivotal role this sector has in the complex area where biodiversity conservation and sustainable development intersect.

Attention may be focused on the biodiversity of a particular class of habitats, such as freshwaters, marine waters, mountains, soil or caves. The Convention has taken this approach in developing programmes of work on the biodiversity of inland waters, marine and coastal waters, forests, and dry and sub-humid lands.

The extent and occurrence of global biodiversity

The defining feature of the planet Earth is that it supports living organisms, and the entire space occupied by such organisms is termed the biosphere.

The biosphere

The part of the planet occupied by living organisms can be pictured as a thin and irregular envelope around the Earth's surface, at most just a few kilometres deep on the globe's radius of more than 6,000 km. Because most organisms depend directly or indirectly on sunlight, the regions reached by sunlight form the core of the biosphere: i.e. the land surface, the top few millimetres of the soil, and the upper waters of lakes and the ocean. Bacteria occur almost everywhere, even kilometres deep within the Earth's rocky crust. Active living organisms are usually absent where liquid water is absent, but the dormant spores of bacteria and fungi are ubiquitous, from polar icecaps to many kilometres above the surface of the Earth.

The living organisms in the biosphere are organized in discrete groups. Those that reproduce sexually typically exist as species, i.e. distinctive groups of similar populations that are isolated reproductively from other such groups. Bacteria and many plants spread and reproduce vegetatively, i.e. without sexual reproduction, and the classic species concept is difficult to apply in such cases. The diversity of species, broadly defined, is nevertheless a useful general measure of the biodiversity of an area, country or the world. Globally,

[1] Full information on the decisions adopted by the Conference of the Parties can be found in the *Handbook of the Convention on Biological Diversity* published simultaneously with the *Global Biodiversity Outlook*.

[2] See Table 3.4 in chapter 3.

around 1.75 million species have been described and formally named to date, and there are good grounds for believing that several million more species exist but remain undiscovered and undescribed (Table 1.1).[3]

Table 1.1 **Estimated numbers of described species, and possible global total**

Kingdoms	Described species	Estimated total species
Bacteria	4,000	1,000,000
Protoctists (algae, protozoa, etc.)	80,000	600,000
Animals	1,320,000	10,600,000
Fungi	70,000	1,500,000
Plants	270,000	300,000
TOTAL	1,744,000	ca.14,000,000

Notes: The "Described species" column refers to species named by taxonomists. These estimates are inevitably incomplete, because new species will have been described since publication of any checklist and more are continually being described; most groups of organisms lack a list of species and numbers are even more approximate. Most animal species, including around 8 million of the more than 10 million animal species estimated to exist, are insects. Almost 10,000 bird species and 4,640 mammals are recognized, and probably very few of either group remain to be discovered. The "Exstimated total" column includes provisional working estimates of described species plus the number of unknown and undescribed species; the overall estimated total figure may be highly inaccurate.
Source: UNEP-WCMC, adapted from tables 3.1-1 and 3.1-2 of the *Global Biodiversity Assessment*.

Nearly three quarters (71%) of the Earth's surface is covered by marine waters. These have an average depth of 3.8 km, and the whole of this region, comprising virtually all the water on the planet, is theoretically capable of supporting active life. Oceans and seas thus make up the vast majority of the volume of the biosphere and by far the most extensive, if most poorly known, main ecosystem type. However, the amount of living material in most of the sea, i.e. that part of the open ocean below the upper hundred or so metres, is low compared with many terrestrial habitats.

Only two to three percent of the total world water volume is non-saline: around two thirds of this is locked away as ice and around on -third is groundwater in the upper layers of the Earth's crust. Surface freshwaters, i.e. the world's lakes, rivers and wetlands, hold the vanishingly small volume of water remaining, but this supports an important sector of global biodiversity. For example, about 40% of the more than 25,000 fish species known in the world occur in freshwaters, and many isolated water systems, large old lakes in particular, have a large number of species found nowhere else. Land, bearing the wide diversity of terrestrial ecosystems that humans are most familiar with, as well as surface freshwaters, covers less than one third (29%) of the Earth's surface. About half of this is below 500 m elevation and the global average elevation is only about 800 m. Most of the world land surface is situated in the northern hemisphere, and the amount north of the Tropic of Cancer slightly exceeds that in the rest of the world combined.

[3] See UNEP (1995) *Global Biodiversity Assessment* (henceforth *Global Biodiversity Assessment*), chapter 3.

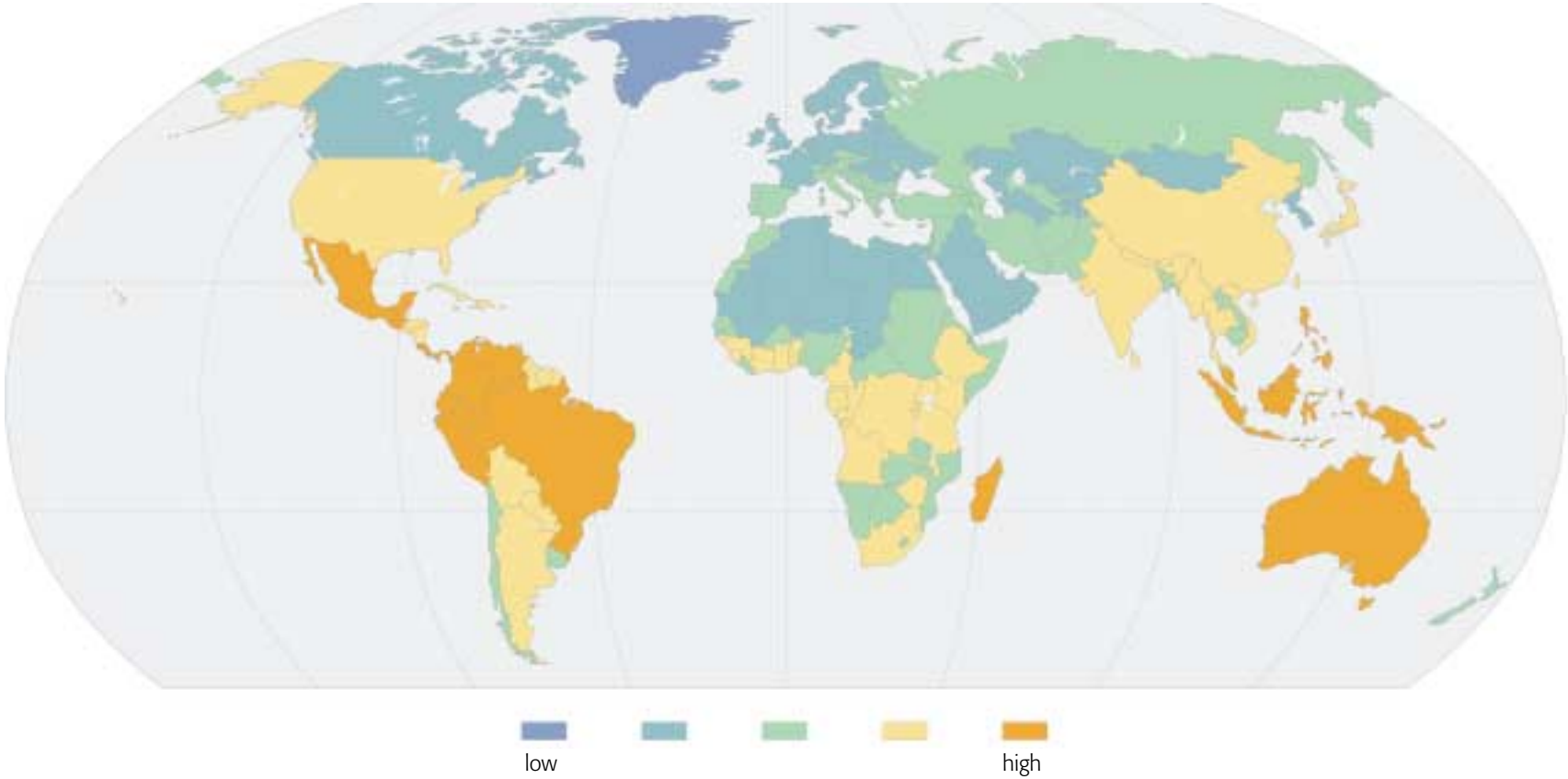
A familiar but important feature of biodiversity is that species are not evenly distributed over the planet. Although the information available on the distribution of the world's species is uneven and incomplete, the single most obvious pattern in global biodiversity is that overall species richness tends to increase toward the equator. At its simplest, this means that there are more species in total and per unit area in the tropics than in temperate regions, and more here than in polar regions. This variation in species number is strongly correlated with global variation in incident energy and water availability. These factors potentially lead to increased net primary production (NPP) by photosynthetic organisms, and a possible explanation for variation in species number is that this broader resource base may allow more species to coexist.

Species-rich habitats

Moist forests in the tropics are in general the most species-rich environments on Earth. If recent estimates of the number of as yet unknown species, mainly insects, in tropical forests are accepted, these regions, which extend over perhaps 7% of the world's surface, may hold up to 90% of the world's species. If tropical forest small insects are discounted, then coral reefs and, especially for flowering plants, areas of Mediterranean climate in South Africa and southwest Australia, may be similarly rich in species.

Map 1 represents an index of diversity based on richness and endemism in the four terrestrial vertebrate classes and vascular plants in most countries of the world. Further details of this National Biodiversity Index are provided in Annex 1. Map 2 shows selected regions of importance for both birds and plants.

MAP 1



Biodiversity at country level

This map represents an index of diversity derived from a database of richness and endemism in the four terrestrial vertebrate classes and vascular plants in most countries of the world, adjusted according to country area. Countries at the high end of the scale have more diversity than expected on area alone. The index is less reliable for the smallest countries.

Source: UNEP-WCMC National Biodiversity Index.

MAP 2

Selected regions of high biodiversity value

Many studies have attempted to define areas high in biodiversity, partly to guide investment in conservation. The BirdLife International study of restricted-range birds generated the first comprehensive and quantitative map of endemic-rich areas (Endemic Bird Areas) in a large group of organisms. The WWF/IUCN Centres of Plant Diversity project collated information on areas of special importance for plant diversity. This map shows in simplified form the areas identified by these two studies, and highlights regions apparently of importance for both birds and plants.

Source: data originally provided by BirdLife International and WWF/IUCN.

TRENDS IN GENETIC DIVERSITY

Genetic diversity is based on variation between genes, i.e. in the functional units of heredity in organisms. Not all the genetic material has a role in heredity, and in some organisms a large proportion of DNA is highly repetitive in sequence and has no known function. The features of an organism are determined fundamentally by the genes received from the previous generation, by the way these genes are expressed and interact, and to an extent by environmental effects on the organism.

The gene

A gene is a sequence of DNA (deoxyribonucleic acid) that constitutes the coded information for manufacture of proteins and other key substances in cells. This genetic material is copied and passed on between generations and copied to all cells of an organism, and the substances produced are responsible for the organization, development and maintenance of structure and life processes. Different genes are active at different phases and, in multicellular organisms, in different kinds of cell. Different forms of a gene are termed "alleles." The complete set of genes in an organism is "the genome."

New genetic diversity arises when chromosomes are not copied with absolute accuracy (i.e. undergo mutation) and through reassortment of genes on chromosomes when sex cells (sperm and egg cells) are being produced. In this latter process, different forms of genes at corresponding positions on maternal and paternal chromosomes can become exchanged, and entire chromosomes of maternal and paternal origin become sorted into different combinations. If the features determined by new mutations and new permutations of genetic material improve survival of individuals bearing them, the frequency of these genes in the population will increase.

Genetic diversity is important as it provides the raw material of evolution and because it enables adaptation and change in organisms. High levels of genetic diversity should allow species to be flexible in the face of environmental change, whereas low genetic diversity, for example in a small isolated population, tends to increase the risk of extinction.

Genetic diversity is also critically important for the continuing ability of human societies to derive economic and social benefits from biodiversity. The variability is an insurance policy that protects against risks that could reduce such benefits, for example widespread pest outbreaks or fluctuations in crop production from year to year.

Complex biochemical techniques can be used to measure the frequency and distribution of different gene products in species' populations, or genetic diversity may be assessed at organism level, for example in terms of the measurable production or pest resistance qualities of different crop varieties.

Bacteria differ from other organisms in that they can reproduce at a very high rate by dividing in two. They also exchange genetic material, but this sexual process is not associated with reproduction as it is in other organisms; instead, two bacteria in contact may directly exchange genetic material, or a single bacterium may take in DNA deposited in the environment by another bacterium. These exchanges, the latter in particular, are not always constrained by the kind of barriers that in higher organisms restrict exchange of genetic material to members of the same species. Genetic material can also be passed

Botswana*

"In recent years, declines have been observed in the numbers of many wildlife species. There is widespread replacement of diverse crop varieties by homogeneous modern cultivars that has resulted in genetic vulnerability."

between bacteria by viral infection. The apparent frequency with which genes move between populations of bacteria means that these organisms are able to generate high levels of new genetic diversity for natural selection to act upon, and favourable genetic material can spread very quickly in rapidly reproducing populations. This explains why resistance to antimicrobial substances can arise so readily in bacteria.

Declining genetic diversity

Human activities readily lead to change in the genetic diversity of populations of wild or domestic organisms. In extreme cases, genetic diversity is reduced to zero when a species is rendered extinct. More usually, it is reduced to some extent when populations of species are reduced in abundance or distribution. Such loss of genetic diversity, particularly if brought about by human activity, is often termed *genetic erosion*. The extent of reduction depends on the amount of diversity in the declining population and the way it is distributed geographically. Although levels of genetic diversity within such species would in some circumstances be expected to recover over time, particular genetic material that might be important for future adaptation may well be lost completely.

It would be possible, although not practicable routinely, to demonstrate genetic erosion at gene level. More usually it is evident at the species level, when measurably distinct populations (perhaps some local variety of crop plant) are lost or reduced in abundance, or is simply assumed to have occurred when an area of species-rich habitat is cleared. Because of the prevailing high rate of habitat modification, it can safely be assumed that genetic erosion is a very common and widespread phenomenon; however, not every loss of a local population is an instance of genetic erosion, because that population may have held no elements or combinations of genetic diversity not found elsewhere.

Manipulating genetic diversity

Human activity can also increase genetic diversity in species populations. By a process of artificial selection, humans have been indirectly but purposefully promoting genetic change in species during a period of more than 10,000 years, resulting in the current world diversity of domesticated crops and livestock.

Artificial selection involves managing the reproduction and survival of individuals within populations of useful plants and animals so as to preserve and make abundant those lineages that possess particularly useful features, such as high pest resistance or milk yield. The process is indirect in that it is focused on tangible features rather than on the genetic material from which such features originate.

* The quotations in the page margins have been taken from the first national reports on the implementation of the Convention (available at http://www.biodiv.org/world/reports.asp).

Biotechnology

Biotechnology
...is the general term applied to the use of living organisms or their components in agricultural, industrial or medical production processes. The role of selected strains of yeast in brewing and bread making is familiar, but micro-organisms are also used, for example, in the industrial-scale production of antibiotics, vitamins, and enzymes for food and drink manufacture.

Genetic Engineering
...or genetic modification, is a special form of biotechnology in which a section of DNA from one organism is introduced into another, in which it does not naturally occur, in order to produce a genetically modified organism (GMO) with favourable properties based on the new combination of genes. The new genes in the transgenic organism may be from an entirely different type of organism, or from a closely related lineage.

The activities collectively known as *genetic engineering* also involve manipulation of existing genetic material, creating new gene combinations with the aim of improving key features of organisms used by humans (see Table 1.2 for some examples). Genetic engineering is in one sense only an extension of traditional breeding practices, in that it relies on naturally occurring elements of diversity. However, it is fundamentally different in other important respects. Not only does it involve making direct modifications to the actual genetic material of organisms, but also genetic material from different kinds of organism usually isolated reproductively from each other, can be brought together and perpetuated in new lineages.

The more radical forms of genetic engineering have only been developed during the 1990s but already have had considerable social impact. The techniques may have great potential to improve efficiency, volume or quality in agricultural and other production processes, and these potential benefits could be of particular value to countries at risk of food insecurity. However, they also raise significant ethical and practical concerns, which have been expressed by scientists and by public opinion in both developed and developing countries.

Among the practical concerns, attention has focused on the possible effects of genetic material moving from genetically modified (GM) sources, particularly field crops, into other organisms. Regarding plants, the risk of this occurring depends partly on whether the crop is an inbreeding or outbreeding species (whether plants are self-fertile, for example rice and soya, or must be fertilised by pollen from another individual, for example oilseed rape), and whether wild relatives of the crop are grown in the area (for example maize or potatoes grown in the UK have no close wild relatives in the country).
The evidence available on possible effects at other levels in the food chain, for example on plant-feeding insects, is sparse but indicates that concern may be warranted. The use of genes conferring resistance to antibiotics as marker genes (to confirm presence of target genes) has caused concern because of the potential for increasing resistance in naturally occurring bacteria.

Table 1.2 **A selection of genetically modified living organisms**

Modified organisms	Source or property of added gene	New features in GMO	Scale of field use
Soya	Gene from *Salmonella* bacteria for enzyme EPSP (enolpyruvyl shikimate phosphate synthase) insensitive to glyphosate.	EPSP is essential for amino acid synthesis but inhibited by glyphosate, the active ingredient in Roundup herbicide. New enzymes confer herbicide resistance by disabling inhibition.	Major commercial significance in USA.
Maize	Gene for protein toxins *(Cry 1Ac and Cry 2Aa)* from *Bacillus thuringiensis* inserted by *Agrobacterium* Ti-plasmid.	Toxins confer insect resistance on host plants, e.g. to Stem Borer in maize.	Major commercial significance in USA.
Tomato	DNA modified to inhibit production of enzyme polygalacturonase (PG) responsible for plant cell wall breakdown.	Fruit life prolonged by slowing natural softening and ripening, without interrupting development of desirable flavour and colour.	Sold since 1995 in Canada, Mexico and USA. Cleared or sale in UK in 1996 but withdrawn by 1999 due to consumer pressure.
Rice *japponica* variety T309	Two genes from a daffodil and one from a bacterium.	Develop a variety of rice rich in beta-carotene, which is most common source for vitamin A.	Trials, much interest in developing countries in Asia.
Oilseed Rape	Gene for enzyme thio-esterase from bay laurel.	Increases level of lauric acid in oil by inhibiting synthesis of longer-chain fatty acids.	Important in detergent manufacture.
Atlantic Salmon	Gene from other fishes (flounder or ocean pout) prolongs period of hormone secretion.	Increased growth rate.	Research project in USA, other work in Canada, New Zealand, Scotland.

It is widely believed that some movement of genetic material from GM sources into other organisms is inevitable in the long term; the level of risk that can be tolerated depends on the balance of benefits and costs. These questions of responsible management of GM resources and technology have given rise to the new field of "biosafety."

Biosafety

Article 8(g) of the Convention calls on Parties to establish or maintain means to regulate, manage or control risk to the conservation and sustainable use of biodiversity associated with the use and release of living modified organisms produced by biotechnology, and to take account of risk to human health. The objective of the Convention's Cartagena Protocol on Biosafety is to ensure an adequate level of protection in the safe transfer, handling and use of such living modified organisms, specifically focusing on transboundary movements. The Protocol was adopted in January 2000 and will enter into force once it has been ratified by fifty countries (see chapter 2).

Human activity has also unintentionally led to increased genetic diversity, particularly among bacteria. In such cases a form of artificial selection is imposed on bacterial populations when they are exposed to antibiotics. It has been shown, for example, that routine use of antibiotics as prophylactic or growth promoting agents in intensive agriculture, i.e. not just for therapeutic purposes, has led to emergence of bacterial strains that are resistant to antibiotics, and these strains can infect humans. Table 1.3 provides selected examples.

Table 1.3 **Examples of human-induced antibiotic resistance in pathogenic bacteria**

Bacterial pathogen	Resistance	Emergence
Salmonella typhimurium DT 104	Multidrug resistant	Recorded 1988 in cattle in England and Wales, increased in humans during 1990s in North America and UK, drug resistance broadening.
Enterobacter & Campylobacter	Flouroquinolone resistant	Resistant strains emerged after flouroquinolone approved for veterinary use.
Escherichia coli O157:H7	Multidrug resistant	Increased occurrence in humans in North America and Europe linked with therapeutic and sub-therapeutic veterinary use and phytosanitisation on fruit farms.

Austria

"Nearly 3000 animal species (2300 are insects) are listed as being threatened. Approximately 40% of ferns and angiosperms have been classified as being threatened to one degree or another."

Belarus

"Since the 1800s, 238 species of terrestrial vertebrates have either vanished from Belarus or can no longer be detected on its territory."

Despite the fundamental practical importance of trends in genetic diversity, biodiversity change has mainly been assessed in terms of declining populations and species, either individually, or collectively, when manifest as loss of habitats or reduction in area of ecosystems. Historically, the impetus for much conservation activity has been the drive to prevent the decline and extinction of individual species, with significant emphasis on species that are large and charismatic. The primary benefit of this approach may be that large organisms, terrestrial vertebrates in particular, generally require large areas of suitable habitat, and if such areas can be managed to minimise risk, other species in the system may be safeguarded.

Extinction

There has always been special concern about extinction because of its irreversibility, and the loss of a species will entail loss of unique elements or combinations of diversity at gene and organism level. In this regard, the fossil record demonstrates two important facts. Firstly, that although relative rates have varied greatly, over geological time as a whole there has been a net excess of species originations over species extinctions (i.e. biodiversity has increased). Secondly, that virtually all the species that have ever existed are now extinct, and the extinction of every species is a natural and expected event. Self-evidently there must always have been species at risk of extinction, i.e. "threatened species."

It is difficult for many reasons to keep track of species extinction in recent time. The species involved may be unknown; it may be unclear whether some population represents a separate species or not; the individuals may be too small to be noticed without special sampling procedures; and the entire process of decline and extinction may extend over much more than an average human lifespan. Positive evidence of extinction (i.e. direct observation of the death of the known last individuals) is unlikely to be available; typically, negative evidence (i.e. failure to find the species despite repeated searches) accumulates to the point where extinction is the most probable explanation.

In other words, unless circumstances are exceptional, monitoring of recent extinction events has a resolution limit measured in decades, and it is thus impossible to state with precision how many species have gone extinct in any given period or to predict exactly how many species are going to become extinct by some point in the future.

From the imperfect evidence that is available, it appears that around 300-350 vertebrates and nearly 400 invertebrates have become extinct during the past 400 years (see Table 1.4 and Map 3). The number of plant extinctions is thought to be in the hundreds, although some believed to be extinct in the wild have survived in botanic gardens and seed collections. Because mammals and birds tend to be relatively well recorded, and leave recognizable skeletal remains, it is principally among these groups that known extinctions may be reasonably representative of actual extinctions. In these two groups the known rate of extinction over the past 400 years averages around 20-25 species per hundred years.

[4] For further discussion and for sources, see WCMC (2000) ***Global Biodiversity: Earth's living resources in the 21st Century*** (henceforth ***Global Biodiversity***), chapter 3. See also ***Global Biodiversity Assessment***, chapter 4.

Finland

"One in eight species of plant and animal in Finland are endangered."

Zambia

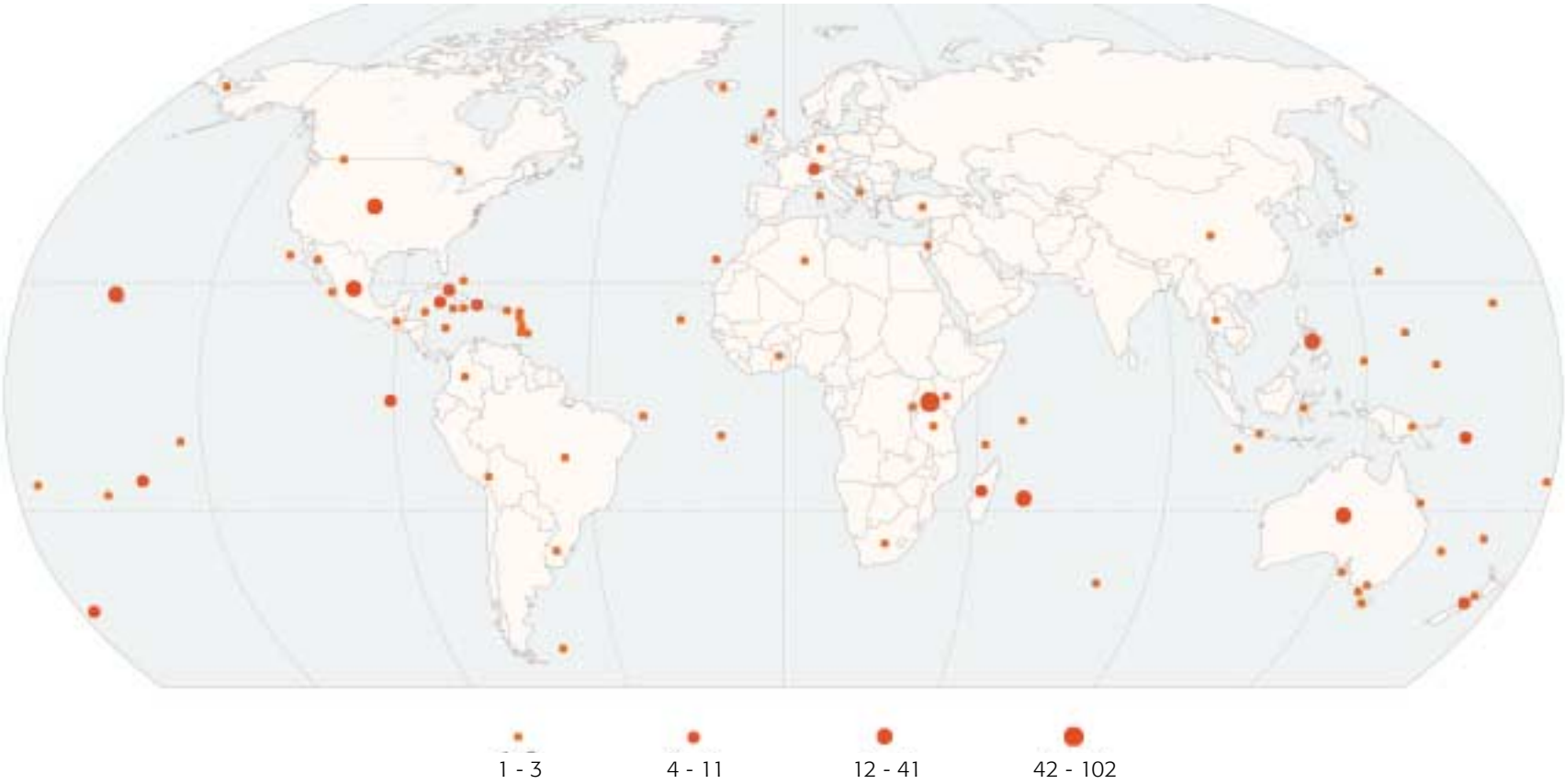
"Elephant population have fallen from 100,000 in 1980 to less than 22,000 in 1993. Rhino populations have also declined from 15,000 in 1980 to less than 100 by 1993."

The key question then is: how does this compare with the average "normal" extinction rate indicated in the fossil record? Extinction rates have varied greatly, and species that are rare or otherwise prone to extinction must be poorly represented by fossils and so bias the record, but the average lifespan of a fossil species appears to be about four million years. Given this average, if 10 million species existed at any one time, the extinction rate would have been about 2.5 species annually. Applying this factor to recent birds and mammals (numbering about 10,000 and 5,000 living species respectively) the expected background extinction rate would be around one species every four hundred years and eight hundred years, respectively. The known recent extinction rate appears to be some 100 or 200 times higher than background. Bias inherent in the fossil record makes it difficult to achieve greater precision in such estimates, but the general direction of the trend is well supported.[4]

Because scientific knowledge of the world's species is incomplete and highly vertebrate-centred, it is virtually certain that more extinctions are occurring than currently known. Most predictions of the contemporary extinction rate are based on combining estimates of species richness in tropical forest with estimates of rate of loss of these forests; species extinction is then predicted on the basis of the general species-area relationship, under which species richness will decline as area declines. Projections of this sort suggest the contemporary extinction rate is very high. On a direct numerical basis, most extinctions predicted by calculations based on forest area reduction should involve beetles, because these species make up the great majority of all species in tropical forests. As a cautionary note, it should be observed that very few extinctions have to date been recorded in continental tropical moist forests, although monitoring species in these habitats presents great difficulty.

Most known animal and plant extinctions have occurred on islands, and most known continental extinctions have been among freshwater organisms (most of these being river-endemic molluscs and lake-endemic fishes). From the incomplete information available on the timing of extinction, it appears that the extinction rate (in molluscs, birds and mammals) has risen overall since about 1600 AD to near the middle of the past century (i.e. 1930-1960) and declined thereafter. The apparent decline after mid-century is probably caused in part by the time lag inherent in recording extinction, and in part by the conservation measures that many countries have taken during the latter half of the 20th century. It could also be due to the fact that extinction-prone species in the well-known groups (birds and mammals) have now been lost.

MAP 3



Vertebrates extinct since 1600 AD

Size of symbol indicates number of extinct vertebrate species. Numbers are approximate because of differences in taxonomy and criteria. In many cases, including most islands and lakes, the position of the symbol indicates former range or last record. Where several species ranged more widely over a country, the symbol is positioned at the centre of that country.

Source: UNEP-WCMC. 2000. *Global Biodiversity: Earth's living resources in the 21st century*.

Armenia

"Between 100 and 700 plant species are supported by steppe ecosystems, however after intensive overgrazing the number drops to around 15."

Australia

"Many species are no longer found throughout their former ranges, and may only occur in reduced numbers. Elephant seals, southern blue-fin tuna, whales and some native fishes and frogs have drastically declined in numbers."

Threatened species

Various national and international programmes have developed methods to assess the relative severity of risks faced by living species, and to label species with an indicative category name. Conservation activities can then be prioritised on the basis of relative risk, taking account of other relevant factors, such as feasibility, cost and benefits, as appropriate. The system developed by IUCN–The World Conservation Union and collaborators in conjunction with its Red Data Book and Red List programme provides a standard at the global level.[5] To be classified as threatened with extinction, a species is assessed against a set of five quantitative criteria that form the heart of the system. These criteria are based on biological factors related to extinction risk and include: rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation. Maps 4 and 5 represent threatened birds and mammals at global and country level.

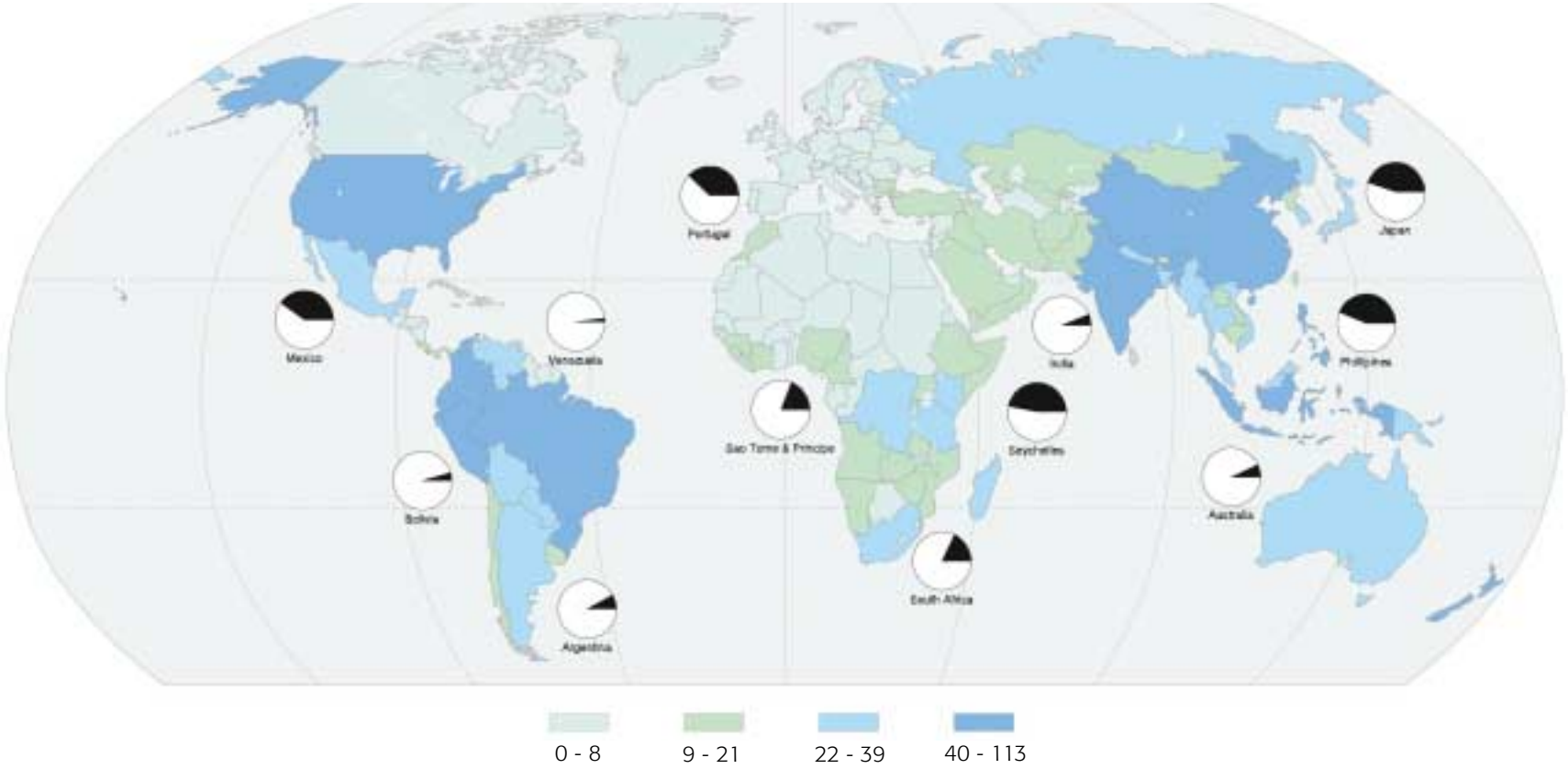
[5] There are eight categories in the IUCN Red List system: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Lower Risk, Data Deficient, and Not Evaluated. Species that fall into the categories of Vulnerable, Endangered or Critically Endangered are classified as threatened species. The Red List is produced by the IUCN Species Survival Commission (SSC) – a worldwide network of some 7,000 species experts, and data from a number of partner organisations. So far, countries have not used a standard set of criteria to assess levels of threat to species at country level, with the consequence that it is not straightforward to compare trends in species diversity between countries. It is anticipated that the IUCN/SSC system, used initially at the global level, will increasingly be applied at national level.

Extinct and threatened species: some key points

- Every species will become extinct at some point; virtually all species that have existed are extinct.
- In geological time, origination of species has proceeded at a higher rate than extinction of species, i.e. biodiversity has increased.
- In recent time, the known rate of extinction among mammals and birds is far higher than the estimated average rate through geological time.
- It is possible to estimate the relative risk of extinction among recent species on the basis of demography and distribution.
- All mammals and birds have been assessed for extinction risk: 24% of mammal species and 12% of birds were considered globally threatened in 2000.

In general, small isolated populations will be more sensitive than larger connected ones to demographic factors (for example random events affecting the survival and reproduction of individuals) or environmental factors (for example hurricanes, spread of disease, changes in food availability). Human activities tend to promote fragmentation of natural and often species-rich habitats (for example primary tropical forest or temperate meadow grassland), and the spread of highly managed species-poor habitats (for example teak plantations or cereal croplands). As a result, many species occur in just the kind of fragmented pattern that increases the risk of extinction.

MAP 4

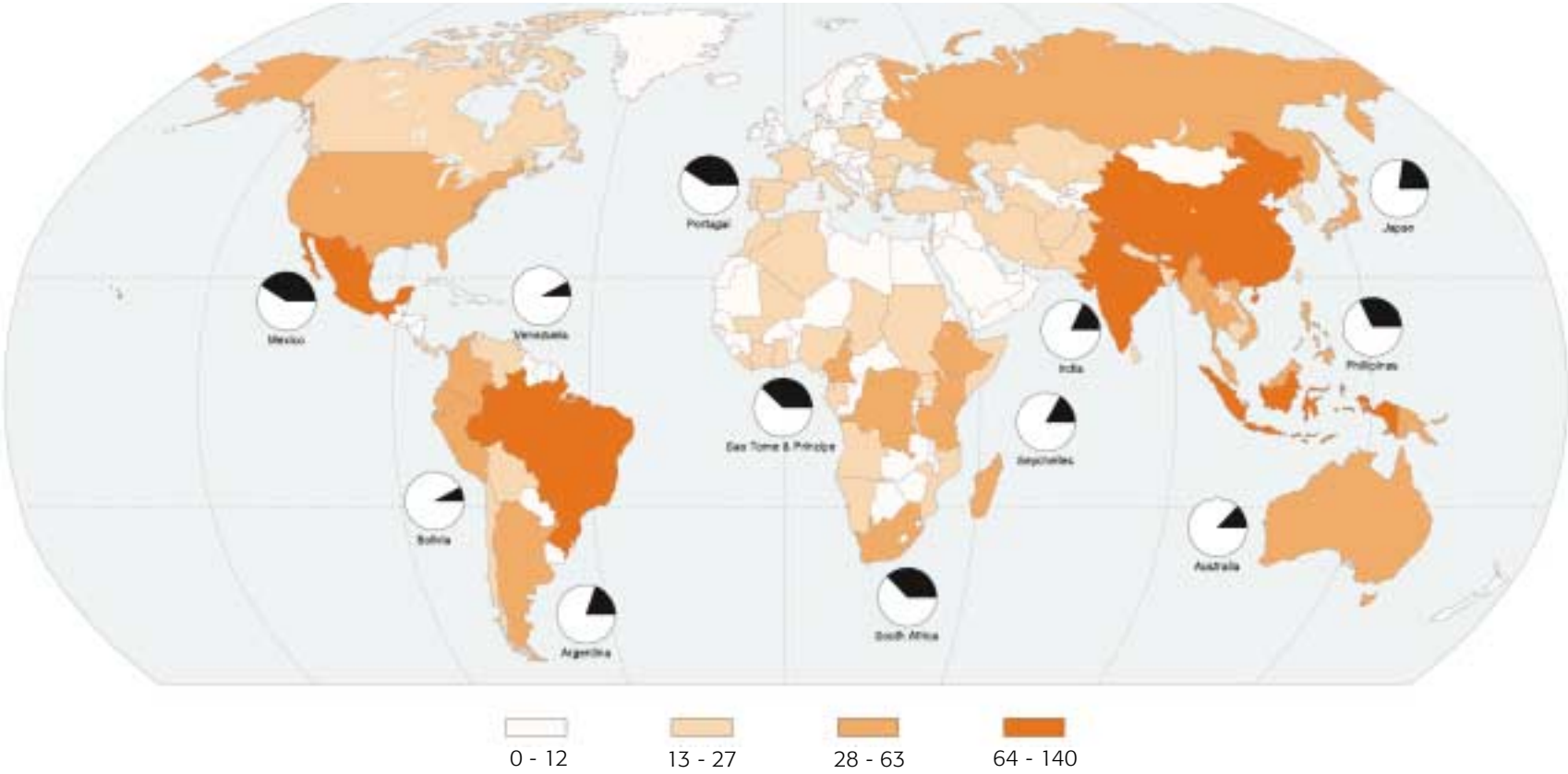


Threatened birds at global and country level

Colour represents number of globally threatened bird species in each country in 2000. Pie charts represent the proportion of the bird fauna assessed as threatened at national level in a small sample of countries. This is a highly generalised comparison because of differences in status assessment.

Source: global data from 2000 *IUCN Red List of Threatened Species*, country data from selection of national Red Data Books.

MAP 5



Threatened mammals at global and country level

Colour represents number of globally threatened mammal species in each country in 2000. Pie charts represent the proportion of the mammal fauna assessed as threatened at national level in a small sample of countries. This is a highly generalised comparison because of differences in status assessment.

Source: global data from 2000 *IUCN Red List of Threatened Species*, country data from selection of national Red Data Books.

The conservation status of most species is not known in detail, and this certainly applies to the many million as yet undescribed species, but two large animal groups – the mammals and birds – have been comprehensively assessed. Approximately 24% (1,130) of the world's mammals and 12% (1,183) of the world's bird species are regarded on the basis of IUCN criteria as globally threatened. Proportions are much lower in other vertebrates, but none of these has been assessed fully. Empirical observations such as these give grounds for serious concern for biodiversity maintenance, regardless of any hypotheses that have been proposed regarding the contemporary and future rate of extinction.

Colombia

"103 species of animal are considered threatened to some degree."

Fiji

"116 species have been categorized as potentially rare, threatened or endangered."

Table 1.4 **Threatened and extinct species**

	Number of species in group	Approx. proportion of group assessed	Threatened species in 2000	% of total in group threatened	Extinct species
Vertebrates					
Mammals	**4,763**	**100%**	**1,130**	**24%**	**87**
Birds	**9,946**	**100%**	**1,183**	**12%**	**131**
Reptiles	7,970	<15%	296	4%	22
Amphibians	4,950	<15%	146	3%	5
Fishes	25,000	<10%	752	3%	92
Invertebrates					
Insects	950,000	<0.1%	555	0.06%	73
Molluscs	70,000	<5%	938	1%	303
Crustaceans	40,000	<5%	408	1%	9
Others	>100,000	<0.1%	27	0.02%	4
Plants					
Mosses	15,000	<1%	80	0.5%	3
Conifers, cycads, etc.	876	72%	141	16%	1
Flowering plants	138,000	<9%	5,390	3.5%	86

Note: The two groups that have been comprehensively assessed (mammals, birds) are shown in bold. The plant data refer to the relatively small number of species that have been assessed using the current IUCN system of threat categorisation; the 1997 plants Red List covered approximately 20% of plant species using the former (pre-1994) IUCN system under which 30,827 taxa (11%) were regarded as threatened. The "Extinct" column includes species believed to have become total extinct since around 1500 AD, and species extinct in the wild but extant in captivity or cultivation; overall the "extinct in the wild" species form about 6% of the total numbers shown in this column.
Source: adapted from Table 5.2 in *Global Biodiversity* using revised data from Hilton-Taylor, C (Compiler). 2000. *2000 IUCN Red List of Threatened Species*. IUCN, Gland, Switzerland and Cambridge.

Oman

"Many high value fish have shown considerable declines. Kingfish contributed only 15% of the large pelagic catch in 1995, compared with 39% in 1988."

Japan

"A survey in 1993 showed that 38% of the 19,134 km coastline of the four main islands in Japan are artificial coastline. Since 1978, 3875 hectares of tidal flat have disappeared."

Biodiversity of Marine and Coastal Ecosystems

The major zones of the oceans

The area of the ocean most influenced by human activity, and best known scientifically, is the continental shelf – the area of shallow water lying around the major landmasses that may be anything from a few kilometres to several hundred kilometres wide. The most landward part of this is the intertidal or littoral zone, where the bottom is periodically exposed to air and water depth varies from zero to several metres. Seaward of this the shelf slopes gently from shore to depths of one hundred to several hundred metres, forming the sublittoral or shelf zone. At the outer edge of the shelf there is an abrupt steepening of the sea bottom, forming the continental slope, which descends to depths of 3-5 km. At this level there are immense abyssal plains, which form the floor of much of the world's oceans. The plains are punctuated by numerous submarine ridges and seamounts, which may break the sea surface to form islands. The deepest parts of the ocean are ocean trenches, which are seismically highly active, and reach depths of from 7,000 to 11,000 metres.

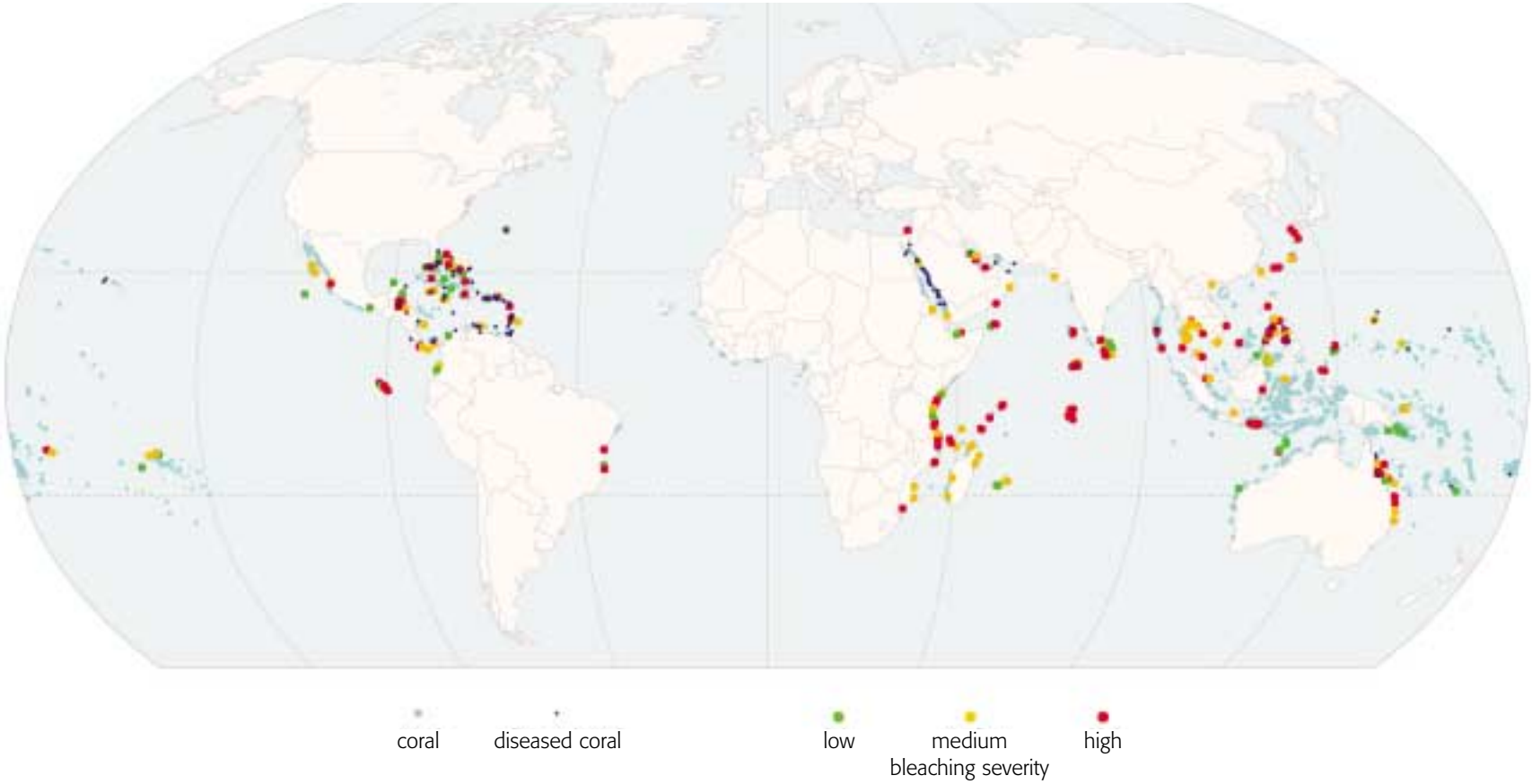
In the sea, as on land, photosynthesis based on sunlight is the driving force behind the maintenance of life. Because seawater absorbs sunlight strongly, photosynthesis is limited to the topmost layers of the sea, the so-called euphotic zone, which rarely reaches depths of more than 200 m in the open ocean, although at depths between 200 m and one kilometre blue light may still penetrate sufficiently to allow limited photosynthesis. Primary producers, largely in the form of photosynthesising bacteria and algae, are effectively confined to this zone. The few exceptions include bacteria living around hydrothermal vents associated with rift zones in the ocean floor. These bacteria use hydrogen sulphide as an energy source and support a unique community of other organisms. They are scientifically of enormous interest, but make a negligible contribution to overall productivity in the oceans. Areas of high productivity are associated with upwelling zones, where nutrient-rich bottom water is brought to the surface.

Major marine communities

Mangroves or mangals are truly hybrid terrestrial/marine ecosystems. They are a diverse collection of shrubs and trees (including ferns and palms) which live in or adjacent to the intertidal zone and are thus unusual amongst vascular plants in that they are adapted to having their roots at least periodically submerged in sea water. Mangrove communities are predominantly tropical and are rarely found beyond the latitudes 30°N and 30°S. They are only able to grow on shores that are sheltered from wave action. Diversity in mangrove ecosystems is usually relatively low, particularly when compared with other tropical ecosystems such as tropical moist forests and coral reefs. The most diverse mangrove systems are found in Southeast Asia (Map 12).

Coral reefs are calcium carbonate structures developed very largely by stony corals in the order Scleractinia of the phylum Cnidaria. They are essentially tropical, shallow water ecosystems largely restricted to the area between latitudes 30°N and 30°S and most abundant in shallow, well flushed marine environments characterised by clear, warm, low-nutrient waters that are of average oceanic salinity (Map 6). It is difficult to measure the global area of coral reefs, although it is believed to exceed 600,000 km^2. Near-surface reefs (the most productive and diverse) are estimated to cover around 255,000 km^2. They are among the most productive and diverse of all natural ecosystems, although it appears that their diversity is generally lower than that of the tropical moist forests often regarded as their terrestrial analogues. As with mangroves, the centre of diversity of reef-building corals is Southeast Asia, with an estimated minimum of 450 species of corals found associated with reefs around the Philippines, Borneo, Sulawesi and associated islands.

MAP 6



Coral reefs

This map represents the general occurrence of coral reefs and the relative severity of observed coral bleaching, a process associated with high temperature and other stressors in which algal symbionts in coral are killed leading to coral death or growth reduction.

Source: compiled from multiple sources.

United Kingdom

"Many fish stocks are at worryingly low levels because of over-exploitation."

Thailand

"The recorded number of fishing vessels in Thai waters has increased from 4000 vessels in 1972 to 13,000 vessels in 1980. The reduced harvests of demersal and pelagic fishes would indicate that the fisheries have long since reached their carrying capacity and can no longer support any more vessels."

Seagrasses are flowering plants (not true grasses) that are adapted to live submerged in seawater. There are approximately 48 species found in shallow coastal areas between the Arctic and Antarctic, down to depths of around 60 m. The most extensive areas are on soft substrates. Seagrass beds have high productivity and contribute significantly to the total primary production of inshore waters, being an important source of food for many organisms. The total global area is unknown.

Algae are the major large photosynthesising organisms in marine environments. There are three main groups: the red algae or Rhodophyta with around 4,000 marine species, the green algae or Chlorophyta with around 1,000 species, and the brown algae or Phaeophyta with about 1,500. In many of the colder regions of the world, hard subtidal substrates are occupied by very large brown algae collectively known as kelps (order Laminariales), which form extensive kelp beds or forests. The cooler regions of the world are rich in algal species.

Pelagic or open-ocean communities occupy a greater area than any other major community type on Earth. They are dominated by the activity of plankton in the euphotic zone near the surface. The plankton support a large number of free-swimming organisms or nekton, predominantly fishes but also cetaceans and cephalopod molluscs (squid). The marked vertical gradients within the pelagic zone – of light, temperature, pressure, nutrient availability and salinity – lead to strong vertical structuring of pelagic species assemblages. This vertical stratification is not static, but fluctuates seasonally and, often, daily, with variations in the physical and chemical characteristics of the seawater and vertical migrations of mid-water organisms. Until recently it was assumed that biomass in the pelagic zone everywhere below the euphotic zone was low. Recent studies have indicated that in some areas (for example the northern Indian Ocean), biomass of tropical mid-water or mesopelagic animals may be surprisingly high.

Deep-sea communities are prevalent on around half of the world's surface area, where the ocean is over 3,000 m deep. All such areas are in permanent darkness (other than light generated by bioluminescence and tectonic activity). Biomass is very low but new sampling techniques indicate that the diversity of small organisms in or on the sea bottom is often relatively high.

Major values and uses of marine and coastal ecosystems

The world ocean plays a crucial role in the regulation of climate and in the carbon cycle and other biogeochemical cycles. Much of this role can be ascribed to the ocean as a physical entity, that is as a vast, circulating body of water whose high specific heat capacity buffers atmospheric changes in temperature and which is capable of dissolving very large amounts of carbon dioxide. It does seem however that marine organisms also play a very important role in the major biogeochemical cycles, although one which is difficult to quantify.

Marine fisheries provide by far the largest source of wild protein, this being of critical importance to many subsistence communities around the world, making use of fin fishes, crustaceans and molluscs, with marine algae increasing in importance in Asia. Mangroves and seagrass beds fulfil an important function as nursery areas for juvenile fish and shellfish.

Belize

"Concerns that fisheries stocks are being affected by overfishing of commercial species, and coastal based development related activities that may permanently damage mangroves and reef ecosystems which the fisheries rely on."

Marine capture fisheries have increased in volume nearly five-fold in the past 50 years, rising to nearly 90 million tonnes in the late 1990s, this making up more than 70% of the total world production of aquatic resources (Map 7). Analysis by FAO and others indicates that marine stocks are widely overexploited and in urgent need of remedial management. Other major uses of the marine sphere include:

- waste disposal;
- recreation, chiefly in coastal zones;
- coastal stabilisation;
- transportation.

Major impacts on marine and coastal ecosystems

Impacts can be grouped into five main categories:

- chemical pollution and eutrophication;
- fisheries operations;
- global climate change;
- alterations of physical habitat;
- invasions of exotic species.

Chemical pollution with eutrophication is a widespread problem, most pronounced in semi-enclosed seas such as the Mediterranean and the Black Sea.

In addition to the potential for over-fishing, fishery operations can have a destructive physical impact on the seabed, and affect population levels of non-target species through incidental catch, such problems being of particular significance for cetaceans, sea turtles and seabirds such as albatross, in different parts of the world. All commercial bottom fishing disturbs sea-floor organisms and the seabed, with impacts on both habitats and species.

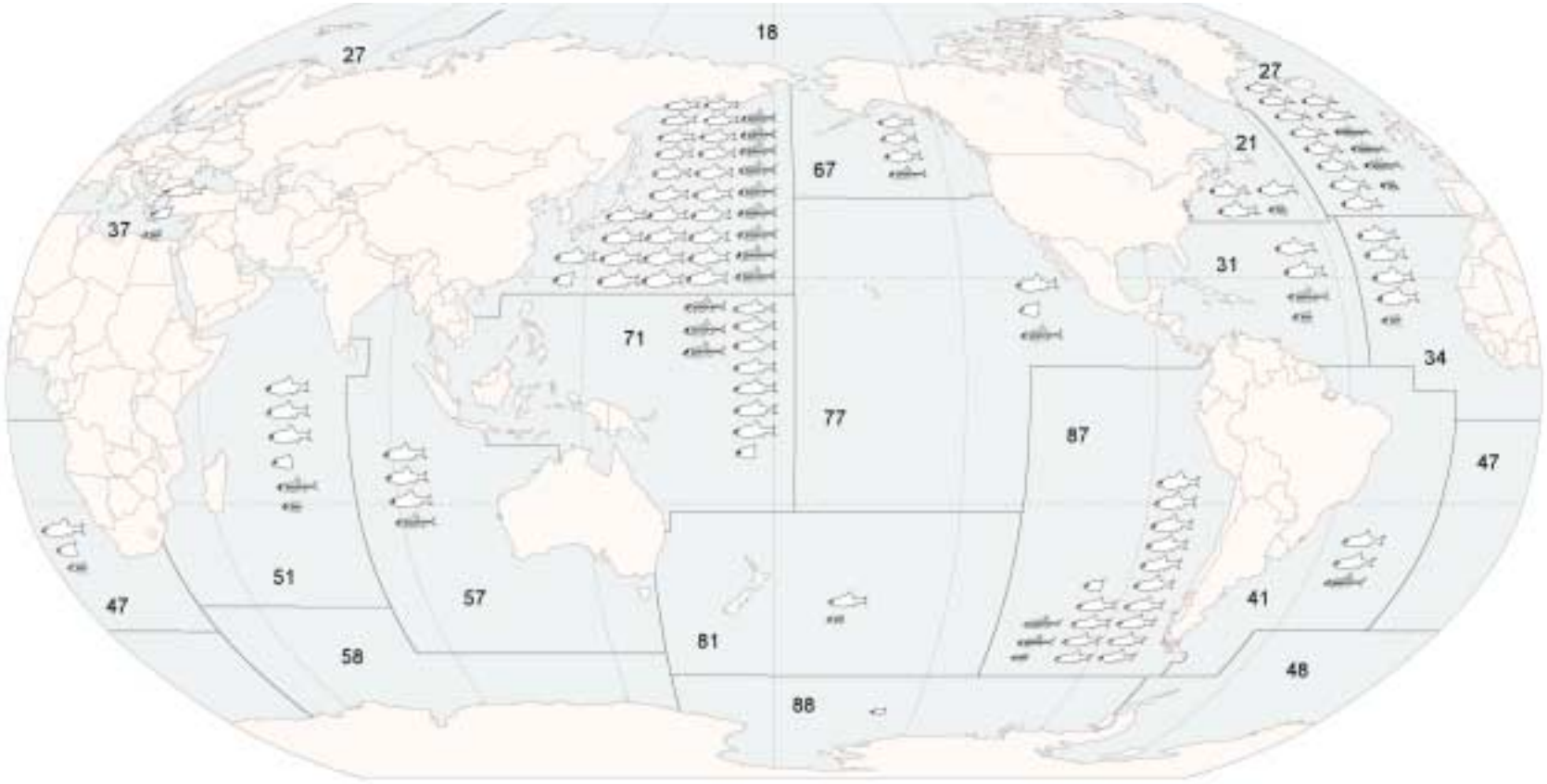
Coral bleaching related to periodic climatic events is the primary threat to coral reefs on the global scale. The increase in sea-surface temperature associated with the major El Niño and La Niña climate switches in 1997-1998 resulted in extensive coral bleaching and mortality over large portions of the Indian Ocean and Southeast and East Asia. On some reefs, there were mortality levels greater than 90% leaving some reefs almost bare of corals and with early indication of major shifts in the population structures.

The critical feature of recent coral-bleaching events is that areas have been struck indiscriminately, irrespective of the status of reef health; impacts have been felt both on pristine, remote reefs and on reefs already under major human-induced stresses. Some of the changes recently caused by periodic climate events, including coral bleaching, are not necessarily permanent, however human-induced stresses causing physical degradation and destruction to coral-reef organisms often exacerbate the effects of these events or limit the recovery capability of reef ecosystems.

Status and trends of species in marine and coastal ecosystems

As a gross generalisation, marine species appear to be somewhat less prone to extinction than inland water or terrestrial ones. Certainly, available information indicates that far few marine species are known to have become extinct since 1600 than either terrestrial or freshwater ones. Part of this difference may be because marine species are in general much less readily observable than those in terrestrial habitats, and, to a lesser extent, inland water species. It is possible therefore that a higher proportion of marine than terrestrial or inland water species has become extinct without our knowing. However, it seems likely that the difference is in large part a real one, and can be ascribed to two main factors. First, because of the size of the oceans, and the fact that people do not live permanently in them, they are as a whole considerably more buffered from human impacts than terrestrial or

MAP 7



Marine fisheries catch

This map represents the volume of landed catch and discarded catch in each Fishery Area as defined for statistical purposes by the FAO. Each symbol represents approximatery one million tonnes.

Source: data from the FAO relating to 1995, as represented in UNEP-WCMC. 2000. *Global Biodiversity: Earth's living resources in the 21st century.*

Mozambique

"Current estimates indicate that mangroves cover 396,080 hectares of coastline, which represents a reduction of 3.9% since 1972."

inland water areas. Second, marine species appear on the whole to be more widespread than terrestrial or inland water ones. This makes them generally less vulnerable to extinction. There are, of course, many exceptions to this.

Notes on a selection of the marine species that are categorised as Critically Endangered in the 2000 IUCN Red List, i.e. at highest risk of extinction, are provided in Table 1.5 below.

Table 1.5 **Some Critically Endangered marine species**

Mammals	
Vaquita *Phocoena sinus*	A small porpoise restricted to the Gulf of California, Mexico. The vaquita is threatened by accidental entanglement and drowning in fishing nets.
Mediterranean Monk Seal *Monachus monachus*	Formerly widespread throughout the Mediterranean and North African coast; now mostly restricted to islands in the Aegean Sea and the coast of Mauritania. Threatened by entanglement in fishing nets, disturbance of breeding sites and illegal killing.
Birds	
Amsterdam Albatross *Diomedea amsterdamensis*	A large seabird nesting only on Amsterdam Island in the Southern Indian Ocean. The small population (approximately 70 individuals in 1990) was previously threatened by habitat loss, and is at risk from entanglement in fishing gear.
Fiji Petrel *Pseudobulweria macgillivrayi*	Until 1984 known from a single specimen collected in 1855 from Gau Island, Fiji. Nesting is believed to occur in mature forest on the island, though nests have yet to be located. Feral cats are a potential threat to this little-known seabird.
Galápagos Petrel *Pterodroma phaeopygia*	Breeds only in the highlands of the Galápagos Islands, Ecuador. Destruction of nest sites and predation by introduced animals have resulted in a steady population decline.
Reptiles	
Kemp's Ridley *Lepidochelys kempii*	Mainly occurs in the waters of the western Atlantic and nests almost exclusively at a single beach in Mexico. Predation of eggs, illegal catch of adults and entanglement in fishing gear have led to the species decline. The species is now recovering through intensive conservation measures.
Fishes	
Spotted Handfish *Brachionichthys hirsutus*	Endemic to the Derwent estuary, Tasmania, Australia. Causes of decline not clear but predation of handfish eggs by an introduced starfish species and increases in soil runoff from surrounding agricultural land may be the principal factors.
Totoaba *Totoaba macdonaldi*	A large fish restricted to the Gulf of California, Mexico. Threatened by excess fishing, mortality of juveniles in shrimp fishery bycatch and possibly by a reduction of freshwater discharge into the Gulf.
Largetooth Sawfish *Pristis perotteti*	These large unusual fish occur mainly in the shallow estuarine waters of the Atlantic, eastern Pacific and possibly the Mediterranean. Decline of this slow maturing species attributed to excess fishing.

Finland

"In southern Finland 23.4% of various natural-state spruce mires survived in the 1950s, but by 1985 only 3.8% remained in its natural state."

Biodiversity of Inland Water Ecosystems

Freshwaters make up less than 3% of the total volume of water on Earth. They consist largely of water in the form of polar ice (mostly Antarctica) and groundwater, i.e. water below the Earth's surface held within rocks or between rock strata and constituting perhaps 30% of global freshwater resources. Water in lakes and rivers constitutes less than one hundredth of one percent (<0.01) of the world's total water volume, and around a quarter of one percent (<0.27) of global freshwater volume. Lake water is the largest component in this vanishingly small subtotal.

Table 1.6 **The world water resource**

	Area million km²	% total area	Volume million km³	% total water	% fresh water
Earth surface	510				
Land	149	29			
World ocean	361	71	1,338	97.5	
Fresh water:	–	–	35	2.5	
Ice	16	–	24	1.75	69
Ground water	–	–	10.5	0.75	30
Wetlands *	2.6	–	0.01	0.0008	0.03
Lakes **	1.5	–	0.09	0.007	0.26
Rivers	–	¬	0.02	0.0002	0.006

Note: all estimates are approximations and vary according to the methods used to derive them; for consistency we have taken data from a single source. * in the traditional sense, i.e. marshes, swamps, mires, lagoons, floodplains etc; ** excluding saline lakes.
Source: Anon. (USSR Committee for the International Hydrological Decade) 1978.

The more superficial groundwater deposits are linked to the global water cycle, and are used for human consumption or agricultural purposes, whereas the deeper layers tend to be somewhat saline and do not (except over geological time scales) participate in exchanges with other parts of the system.

Inland aquatic habitats show far more variety in their physical and chemical characteristics than marine habitats. They range from vast, permanent lakes and rivers to geothermal springs, temporary puddles and minute pools and from almost pure water to highly concentrated solutions of mineral salts, toxic to all but a few specialised organisms.

Inland aquatic habitats can be divided into running or *lotic* and standing or *lentic* systems. They may also be divided into permanent water bodies, periodically (usually seasonally) inundated and transient or ephemeral. There is no rigid dividing line between an inland aquatic habitat on the one hand and a terrestrial or marine habitat on the other. Seasonally inundated areas, such as river floodplains, are effectively hybrid or transitional systems. There are also many areas that consist of shifting mosaics of land and shallow water, or areas of saturated vegetation, such as sphagnum moss bogs, that are neither strictly land nor water. There areas are often termed "wetlands."

Uzbekistan

"Between 1992 and 1995 there has been a significant decline in fisheries production, approximately 51%."

Major inland water systems

Rivers and other lotic systems are essentially linear bodies of water draining under the influence of gravity from elevated areas of land toward sea level. River systems typically branch into ever smaller and more numerous channels with increasing elevation. The volume of water and speed of flow usually varies greatly from one part of a river system to another. These factors also vary seasonally; in some arid areas rivers flow for only part of the year, or in extreme cases only once in several years. Variations in water flow and in underlying geology create a wide range of habitats within any river, often within a short distance. Large river systems may also span many degrees of latitude and pass through a wide range of climatic conditions within their catchments. This variation creates a wide range of niches for different organisms within any given river system. Although river systems are constantly changing their courses, sometimes radically, through deposition and erosion of channels and the uplift and erosion of watershed uplands, evidence suggests that many larger river systems are extremely old, with some having been in continuous existence for tens of millions of years.

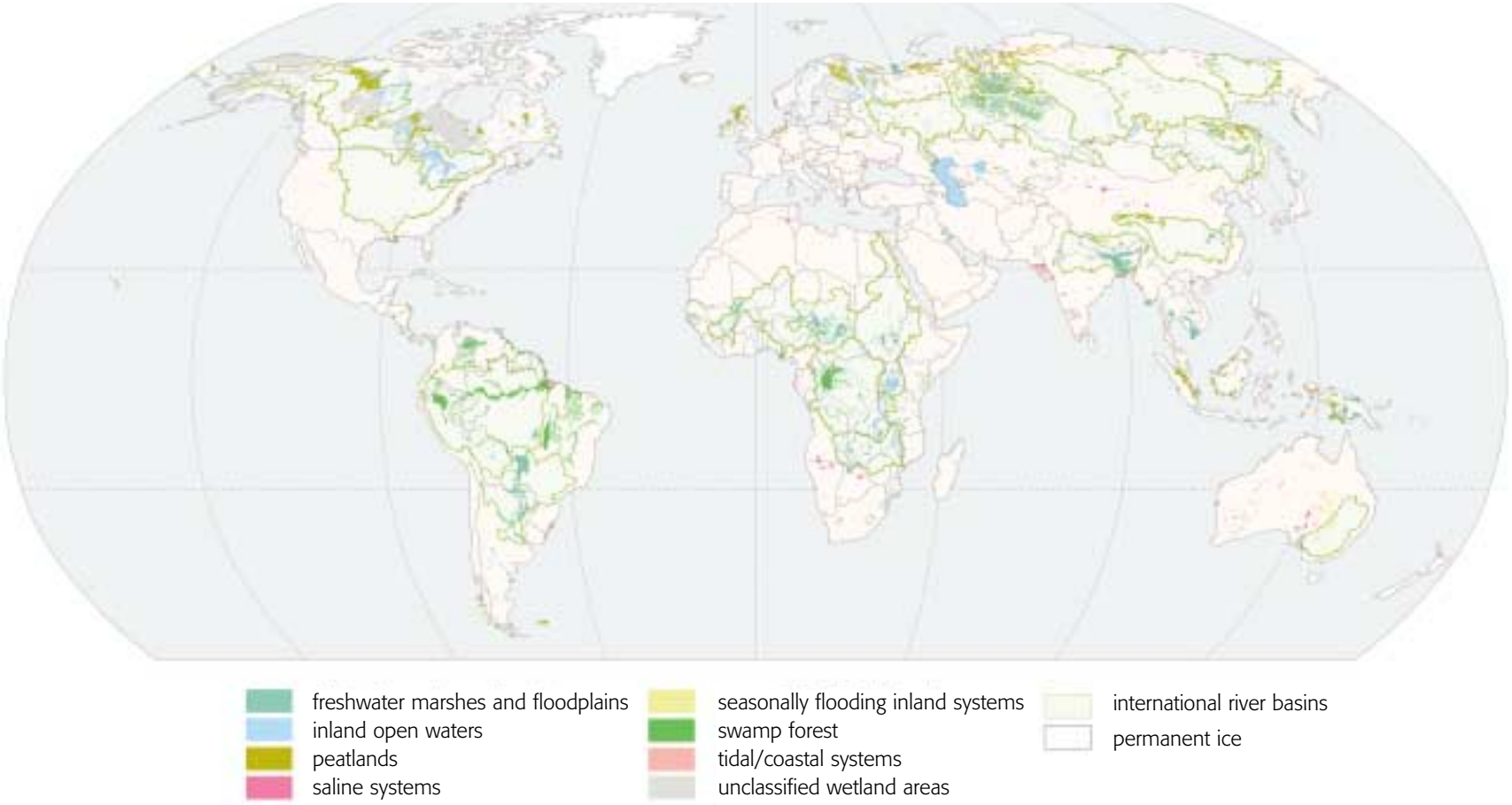
Lakes, of which around 10,000 exceed 1 km^2 in extent, are mainly glacial in origin and geologically very young, dating from the retreat of the continental ice-sheets at the start of the Holocene, some 11,500 years before present. All such lakes are expected to fill slowly with sediment and plant biomass and to disappear within perhaps the next 100,000 years, along with any isolated biota. Most other lakes are caused by tectonic activity, either through faults caused by deep crustal activity or through vulcanism. Lakes may also be formed by dissolution of soluble rocks (for example limestone in karst regions) or by changes in the course of rivers in floodplain regions. Only around ten existing lakes are known with certainty to have origins much before the Holocene. Most of these occupy basins formed by large-scale subsidence of the Earth's crust, dating back to at most 20 million (Lake Tanganyika) or 30 million (Lake Baikal) years before present.

Wetlands are traditionally understood as heterogeneous habitats of permanent or seasonal shallow water dominated by large aquatic plants and broken into diverse microhabitats. The four major habitat types are:

- Bogs, which are peat-producing wetlands in moist climates where organic matter has accumulated over long periods. Water and nutrient input is entirely through precipitation. Bogs are typically acid and deficient in nutrients and are often dominated by sphagnum moss. They are also important habitats for carnivorous plants. In many places they are endangered by the extraction of peat for horticulture.
- Fens are peat-producing wetlands that are influenced by soil nutrients flowing through the system and are typically supplied by mineral-rich groundwater. They are usually more productive and less acidic than bogs.
- Marshes are inundated areas with herbaceous emergent vegetation, commonly dominated by grasses, sedges or reeds. They may be either permanent or seasonal and are fed by ground or river water, or both.
- Swamps are forested wetlands on waterlogged or inundated soils where little or no peat accumulation occurs. Like marshes they may be either seasonal or permanent.

Map 8 portrays the major inland water areas of the world.

MAP 8



Inland waters

This map portrays in highly generalised form the occurrence of major water bodies and wetlands. The river basins shown are the twenty largest only.

Source: compiled from multiple sources, from UNEP-WCMC. 2000. *Global Biodiversity: Earth's living resources in the 21st century.*

Belarus

"Since the 1950s the total area of bogland in Belarus has decreased from 4.13 million ha to 2.3 million ha."

Germany

"Between 1950 and 1985, 57% of all wetlands disappeared in West Germany."

Diversity in inland water ecosystems

At higher taxonomic levels, the diversity of organisms in inland waters is considerably lower than on land or in the sea. The number of species overall is also low compared with marine or terrestrial habitats; however, species richness compared to habitat extent may be very high. For example, of known fish species around 40% (ca 10,000) are freshwater forms and 60% marine, despite the fact there is around 10,000 times as much seawater as there is water in inland water habitats. This high diversity of inland water fishes relative to habitat extent is undoubtedly promoted by the extent of isolation between inland water systems. As is the case with terrestrial habitats, species richness overall increases strongly toward the equator, so that there are far more species in tropical than in temperate or polar regions (Map 9). Among river systems, the Amazon-Ucayali is both by far the largest river catchment in the world, holding the greatest volume of water, and is also wholly within the tropics. Unsurprisingly, it is the major repository of the world's inland water biodiversity, although it remains very incompletely catalogued. Among lentic systems, the most diverse are the large African rift valley lakes, notably Tanganyika, Victoria and Malawi.

Major values and uses of inland water ecosystems

Freshwater – as precipitation, groundwater or in inland water ecosystems – is essential for human survival, chiefly because humans must drink and also because it is needed, in far greater quantity, to produce food. Inland fisheries, particularly in land-locked less-developed countries, are extremely important to human nutrition, and fish protein may be critical in times of food stress (Map 10). The relative contribution of inland fisheries is, however, impossible to assess accurately because so much of the catch is consumed locally and not reported in official statistics.

Major uses of inland waters include:

- provision of freshwater for drinking, agriculture, industrial production, cleaning and other purposes;
- harvest of species for food, clothing, medicines, building material, horticulture and live animal trade;
- waste disposal;
- transportation;
- generation of hydroelectric power;
- recreation.

Major impacts on inland water ecosystems

Inland waters have in many areas suffered as a result of the conflicting interests of different sectors. Physical change to freshwater habitats is a prime cause of decline and extinction of fish species, but may provide benefits, such as hydroelectric power, to human populations. Dam construction is the chief cause of extinction in the formerly large gastropod fauna in Mobile Bay (USA), for example. The introduction of alien species is a second prime cause of decline: the impact of Nile Perch on the native cichlid fauna in Lake Victoria is well documented. Overall, the major kinds of impact on inland waters are:

- physical alteration and destruction of habitat through abstraction of water, drainage, canalisation, and flood-control systems;
- construction of dams and reservoirs;
- sedimentation;
- introduced species;
- pollution, including: eutrophication, acid deposition, salinisation, heavy metals.

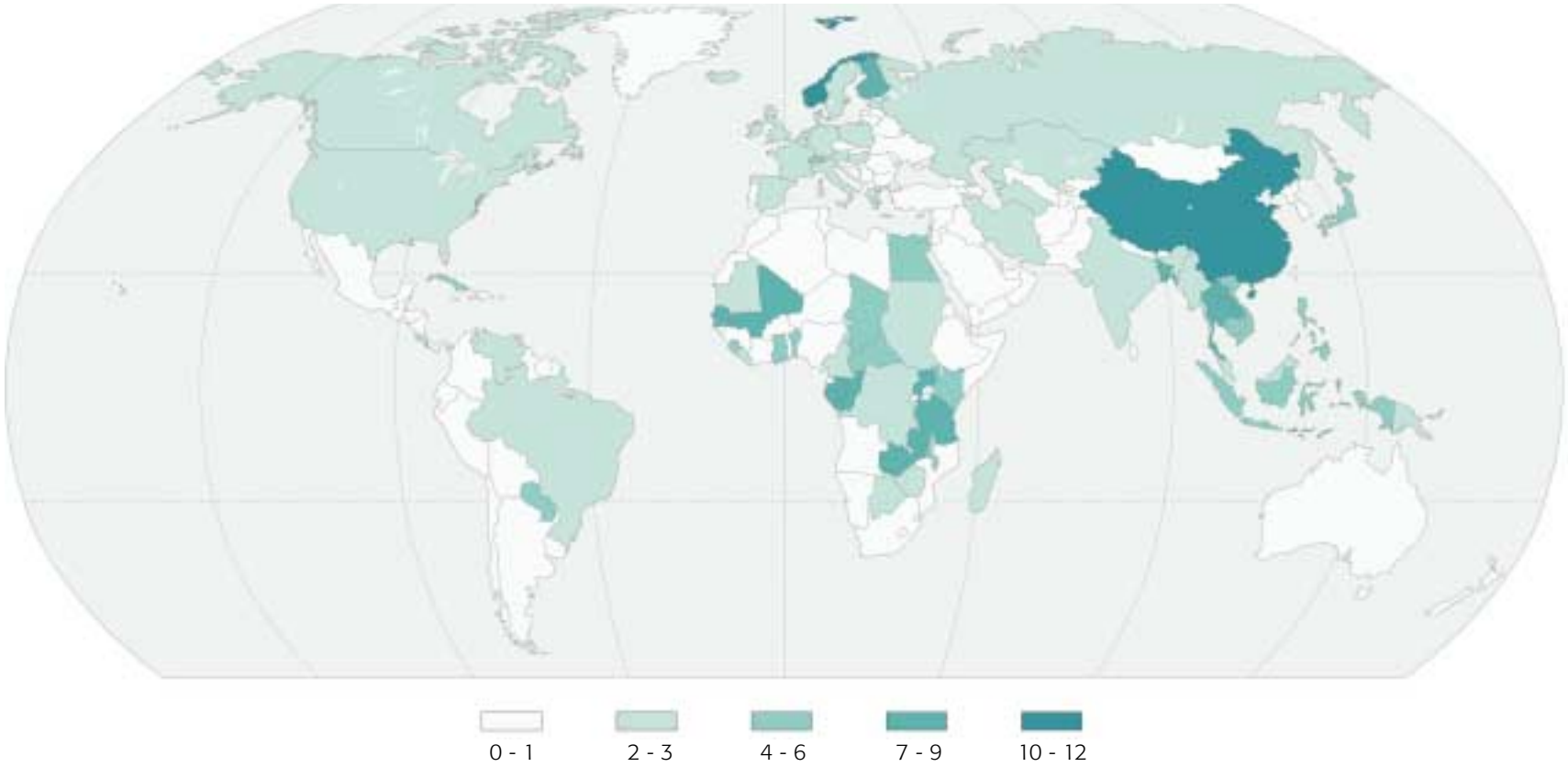
MAP 9

Freshwater fish biodiversity

This map represents an informal synthesis of documented expert opinion on globally important areas for freshwater fish diversity, taking into account species richness and endemism. Two categories are shown: discrete areas and systems known to be of high diversity, and areas where diversity is globally important but less concentrated.

Source: compiled with the help of members of relevant IUCN/SSC Specialist Groups; from UNEP-WCMC. 2000. *Global Biodiversity: Earth's living resources in the 21st century.*

MAP 10



Freshwater fish food supply

This map indicates approximate per capita annual supply (kg) of freshwater fish for food purposes.

Source: FAOSTAT statistical database, December 2000.

Ireland

"Irish bogs once covered approximately 1.3 million hectares, or 16% of the land area of the country. Presently only 19% (220,000 ha) of the original area remains intact. There has been a 92% loss of raised bogs and an 82% loss of blanket bog."

Israel

"Lake Hula was drained in the 1950s causing the destruction of a unique wetlands ecosystem."

Status and trends of species in inland waters

In those relatively few cases where detailed studies have been carried out, it has been found that the status of inland water faunas has been considerably worse than originally suspected. Of the 20 or so countries that have been reasonably comprehensively assessed, on average just under 20% of the inland water fish fauna has been found to be threatened. The proportion of inland water chelonians (tortoises and turtles) threatened is even higher, with more than 30% of species having been assessed as critically endangered, endangered or vulnerable. Amongst birds and mammals the proportions are considerably lower, probably because many semi-aquatic species are able to disperse relatively easily from one inland water body to another.

The two major documented extinction events in the 20th century both took place in inland water ecosystems. Lake Victoria, shared by Kenya, Tanzania and Uganda, was until recently the home of a species flock of around 300 halpochromine cichlid fishes, of exceptional scientific interest, as well as of a number of other fish species. Following introduction of the Nile Perch *Lates niloticus*, and possibly also as a result of a range of other factors, at least half and up to two thirds of the native species are now believed extinct or nearly so, with virtually no chance of recovery. In the Mobile Bay drainage in the USA, dam construction has had a catastrophic impact on what was probably the most diverse freshwater snail fauna in the world. Nine families and around 120 species were known from the drainage basin. At least 38 species are believed to have become extinct in the 1930s and 1940s following extensive dam construction in the basin: the system now has 33 major hydroelectric dams and many smaller impoundments, as well as locks and flood control structures. These patterns are likely to have been repeated at a smaller scale in many other less well-documented parts of the world.

A common finding among global assessments of the status and trends of biological diversity is that inland waters are those suffering the greatest deleterious impact from human activities at present. Notes on a selection of the species that occur in inland waters and are categorised in the 2000 IUCN Red List as Critically Endangered, i.e. at highest risk of extinction, are provided in Table 1.7.

Colombia

"The Magdalena river has lost about 78% of its production over the last 20 years – the catch being down from 78,847 tons in 1974 to 16,998 tons in 1994."

Table 1.7 **Some Critically Endangered inland water animal species**

Mammals	
Baiji *Lipotes vexillifer*	A freshwater dolphin endemic to the Yangtze River, China. The fewer than 200 remaining individuals are threatened by entanglement in fishing gear, collisions with boats, pollution, and hydroelectric schemes.
Birds	
Brazilian Merganser *Mergus octosetaceus*	This little-known duck inhabits shallow, fast flowing rivers of eastern South America. Occurs in a few widely scattered populations, threatened by deforestation, hydroelectric development and hunting.
Reptiles	
Orinoco Crocodile *Crocodylus intermedius*	Restricted to the middle and lower reaches of the Orinoco River. Severely affected by commercial exploitation for skins from the 1930s through the 1960s; threatened by illegal hunting, pollution and loss of habitat.
Striped Narrow-headed Softshell Turtle *Chitra chitra*	Restricted to the Mae Klong River basin (Thailand). Only a single population of 16 turtles is now believed to exist. Threatened by the domestic pet trade.
Amphibians	
Mount Glorious Torrent Frog *Taudactylus diurnus*	Known only from few mountain rainforest streams in southeast Queensland, Australia. Not found in recent searches, possibly extinct. Reason for decline not known.
Fishes	
Common Sturgeon *Acipenser sturio*	A large anadromous fish previously widespread in large European river basins. Following habitat loss, pollution and overfishing the species now spawns only in the Gironde-Garonne-Dardogne basin of France and the Rioni basin of Georgia.
Cave Catfish *Clarias cavernicola*	Endemic to Aigamas Cave lake, near Otavi, Namibia. The small population of catfish (<400 individuals) is threatened by a decrease in water level resulting from the depletion of local aquifers.
Lake Victoria cichlid *Macropleurodus bicolor*	One of the many cichlid fishes endemic to Lake Victoria, east Africa. The introduction of the predatory Nile Perch, together with intensified fishing efforts appear to be responsible for the decline in this particular species.
Crustaceans	
Shasta Crayfish *Pacifastacus fortis*	A small crayfish limited to the Pit River basin, California, USA. The few remaining populations are threatened by introduced crayfishes, stream modification and pollution.
Molluscs	
Rough Pigtoe *Pleurobema plenum*	Formerly present in larger river systems of the eastern United States, this mussel is now restricted to a few sites in Alabama, Kentucky and Tennessee. Decline attributed to pollution and habitat loss.

Armenia

"8% forest cover has been destroyed between 1992 and 1995. A number of regions in Armenia are now totally deforested. Between 1930s and 1950s around 450,000 m^3 of wood was extracted from Armenian forests."

Poland

"In 1945 forest covered just under 6.5 million hectares of Poland, since then the forest cover has increased to 8.78 million hectares. The amount of forest under State protection has also risen from 22.5% in 1957 to 47.3% in 1996."

Biodiversity of Forest Ecosystems

Forests are ecosystems in which trees are the predominant life forms. A more precise definition than this remains surprisingly elusive, because trees occur in many different ecosystems, at different densities and in different forms. Most definitions of forest refer to canopy or crown cover, which is essentially the percentage of ground area shaded by the crowns of the trees when they are in full leaf.

Clearly, estimates of the area of forest both globally and in any given place must vary enormously depending on the definition of forest adopted. In this discussion a threshold of 30% canopy cover is generally used as defining a forest.

What is a forest?

The FAO has defined natural or semi-natural forests as "ecological systems with a minimum of 10% crown cover of trees and/or bamboo, generally associated with wild flora and fauna and natural soil conditions and not subject to agricultural practices." This is an extremely wide definition, and includes many open vegetation systems that would not normally be regarded as forests. A more rigorous definition, which accords much more closely with wider perceptions of what constitutes a forest, is that of closed-canopy forest. Thresholds for defining closed-canopy forest range from as low as 30% to as high as 75% crown cover.

Where are forests?

The factors determining the distribution of forests are largely climatic: tree establishment and growth requires a minimum number of days in the year with adequate moisture and warmth for active growth. Substrate characteristics are also important as trees require access to enough soil for supply of nutrients and water, and to provide anchorage. Trees are therefore absent from areas that are too dry, or too cold or have inadequate soil cover. Other natural factors that may limit the distribution of forests include fire, flooding, the presence of toxic minerals in the substrate, and the impact of large herbivores. Around one half of the Earth's land surface is climatically suitable for forest, but as a result of human actions, around one half of this area is not forested, so that current forest cover amounts to just under 40 million square kilometres (Map 11).

Major forest types

Classifying forests is in some ways an even more difficult task than defining forest. A number of global classification systems have been proposed, some extremely complex, but as yet none has gained universal acceptance. All such systems are more or less artificial as in nature forests rarely form homogenous units clearly separable from other such units; instead species composition and forest structure tend to change gradually or irregularly with, for example, changing altitude, exposure and latitude.

Nevertheless simplified global level classification systems can be a useful guide to the world's major forest types. Table 1.8 provides a breakdown of 22 forest types in five major categories: temperate needleleaf; temperate broadleaf and mixed; tropical moist; tropical dry; and sparse trees and parkland. Map 12 shows forest types broadly classified by ten types.

MAP 11

Present forest cover

This map provides an overview of the global distribution of forest, including plantation and other secondary types, at the end of the 20th century.

Source: compiled by UNEP-WCMC from numerous national and international sources.

Bhutan

"Bhutan has the highest fraction of land in protected areas and the highest proportion of forest cover of any Asian country. 8% of the forest is considered degraded. Bhutan has managed to increase the area under forest cover from 64% in the early sixties to 73%. Most ecosystems remain substantially intact."

Brazil

"About 15% of the Amazon forest has been destroyed. There has been a 40% loss of native Cerrado vegetation. The Caatinga has lost 50% of its native vegetation. Only 8.75% of the Atlantic Forest remains."

Table 1.8 **Global areas of 22 main forest types**

Forest Type	Area (km²)	Forest Type	Area (km²)
Boreal and Temperate Needleleaf	12,511,062	Fresh water swamp	516,142
Evergreen needleleaf	8,894,690	Semi-evergreen moist broadleaf	1,991,013
Deciduous needleleaf	3,616,372	Mixed needleleaf and broadleaf	17,848
Temperate Broadleaf and Mixed	6,557,026	Needleleaf	61,648
Mixed broadleaf/needleleaf	1,803,222	Mangrove	121,648
Broadleaf evergreen	342,892	Disturbed	842,269
Deciduous broadleaf	3,738,323	Tropical Dry	3,701,883
Freshwater swamp forest	126,963	Deciduous/semideciduous broadleaf	3,034,038
Sclerophyllous dry forest	485,093	Sclerophyllous	405,553
Disturbed	60,533	Thorn	262,292
Tropical Moist	11,365,672	Sparse Trees and Parkland	4,748,694
Lowland evergreen broadleaf rainforest	6,464,455	Temperate	2,407,735
Lower montane forest	620,014	Tropical	2,340,959
Upper montane forest	730,635	**TOTAL**	**38,808,671**

Source: Global Biodiversity, table 7.4

Boreal and temperate needleleaf forests cover a larger area of the world than any other forest type. They occur mostly in the higher latitudes of the northern hemisphere as well as high altitude zones and some warm temperate areas (particularly on soils poor in nutrients or otherwise unfavourable). Conifer canopies are efficient light absorbers, so limiting opportunity for extensive development of lower strata of vegetation, and the structure of these forests is often fairly simple. Species diversity is usually relatively low, and vast expanses of such forest in the northern hemisphere are dominated by a very small number of tree species. However, diversity amongst some groups of organisms, such as mosses and lichens, may be surprisingly high. These forests are of great importance in the carbon cycle, acting as major reservoirs of organic carbon both above and below ground.

Temperate broadleaf and mixed forests are generally characteristic of the warmer temperate latitudes but extend to cool temperate ones, particularly in the southern hemisphere. These forests tend to be structurally more complex than needleleaf forests, and to have considerably higher species diversity. Aboveground biomass tends to be lower than in temperate needleaf or tropical moist forests, while that below ground tends to be intermediate.

Tropical moist forests include many different forest types. They are without doubt overall the most diverse ecosystems on earth. Some estimates suggest that at least 60% of all species (and possibly near 90%) occur in them, despite the fact that they cover little more than 7% of the world's land surface, and around 2% of the surface of the globe. Diversity is usually extremely high at all spatial scales; in some parts of the western Amazon and of the Atlantic coastal forest of Brazil

Fiji

"An estimated 11-16% (90-140,000 ha) of the nations forest have been converted to non-forest landuse."

Greece

"Coastal and lowland forests have been degraded to a significant extent due to urbanisation and conversion to agricultural land as the Mediterranean region has become exposed to human activities."

(*Mata Atlântica*) there may be as many as 300 tree species per hectare. Notable exceptions are mangrove ecosystems, which have low tree species diversity, and forests on very nutrient-poor soils. Diversity also tends to decrease with increasing altitude and with increasing seasonality of climate. Lowland tropical moist forests can have very high aboveground biomass, although not as high as some needleleaf forests. Belowground biomass, however, with the exception of some peat-swamp forests, tends to be relatively low. Tropical moist forests are estimated to account for nearly one third of global terrestrial annual net primary production.

Tropical dry forests are characteristic of areas in the tropics affected by seasonal drought. Seasonality of rainfall often results in a largely deciduous forest canopy; however, under some conditions, such a low fertility soils or unpredictable rainfall regimes, the canopy may become dominated by evergreen sclerophyllous species (i.e. those with typically small, thick-skinned leaves). On very poor soils and especially where fire is a recurrent phenomenon, woody savannas may develop. In general dry tropical forests have lower species diversity than tropical moist forests; however they appear to be characterised by high levels of local endemism.

Sparse trees and parkland are forests with open canopies of 10-30% crown cover. They occur principally in areas of transition from forested to non-forested landscapes. The two major zones where these formations occur are the boreal region (i.e. at very high latitudes) and the seasonally dry tropics.

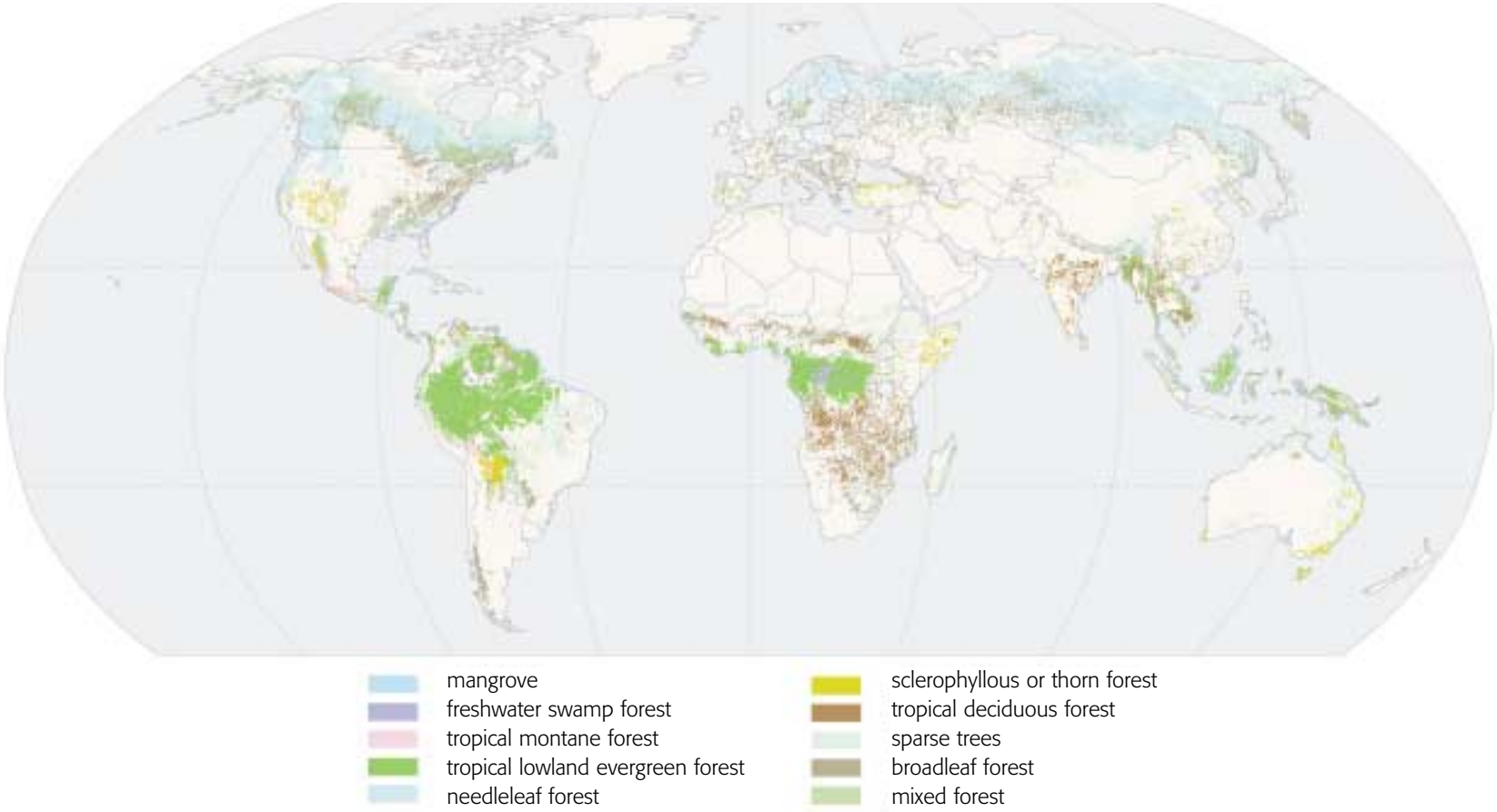
Forest plantations, generally intended for the production of timber and pulpwood, are believed to cover well over one million square kilometres worldwide. Commonly composed of only one species, often non-native, plantations are not generally important as habitat for native species. However, they can be managed in ways that enhance the role they play in maintaining biodiversity. They may also be important providers of ecosystem services, such as maintaining nutrient capital and soil structure as well as protecting watersheds. They may also alleviate pressure on natural forests for timber and fuelwood production.

Changes in forest cover

The Earth's climate has been extremely unstable for the past two million years and for most of this time much colder than today's. The extent and distribution of forests during the cold periods were very different from today, not least because much of the northern hemisphere was covered in thick ice, but also because the climate in much of the tropics was apparently drier.

The beginning of the Holocene, which followed the last major glacial period between 11,000 and 12,000 years ago, would undoubtedly have been a period of major forest expansion as the ice retreated and wetter conditions began to prevail in much of the tropics. However, it also evidently marked the emergence of agriculture and the spread of humans through almost all the habitable world, including the Americas. Human impact on forest cover undoubtedly dates back at least to this period, but because these impacts started at a time when forest extent and distribution would have been rapidly changing also for climatic reasons, it is extremely difficult to determine just how much land has been permanently deforested by human hands. In other words, it is very difficult, and perhaps of little value, to seek a precise global baseline of "original forest cover" against which to measure human impact. Such a baseline could theoretically be established before the start of the Pleistocene ice ages, over two million years ago, but the climate at that time is not sufficiently well known to make this feasible.

Map 12



Present forest types

This map shows forests broadly classified by type.

Source: compiled by UNEP-WCMC from numerous national and international sources.

Iran

"During the last 30 years 40% of Iran's deciduous temperate forest has been destroyed, almost 1.2 million hectares. Today forest areas cover 12.4 million hectares of the country, 40 years ago the figure was estimated at 18 million hectares. Caspian broadleaf deciduous forest has lost 1.5 million hectares in the last 45 years. Only 60,000 hectares of the original 500,000 hectares of Arasbaran broadleaf deciduous forest remain. Zagros broadleaf deciduous forest has been reduced from 12 million hectares to 5.5 million hectares in the last 50 years. Irano-Touranian evergreen juniper forest has been reduced from 3.4 million hectares to 500,000 hectares in the last 50 years."

Despite these problems, it is possible to make some general observations on the history of forest loss, which differs markedly between different regions and different forest types. In Western Europe it seems that forest clearance has an extremely long history, with, for example, much of the British Isles deforested in the Neolithic, between 7,000 and 5,000 years ago. In Europe as a whole, forest cover continued to decline until the 19th century when it stabilised. Since the early 20th century, forest cover in Europe has expanded, often through the establishment of conifer plantations although latterly also through reestablishment of mixed and broadleaf forests. Similarly, in eastern North America, forest cover reached a minimum around 1860, but has since expanded. Forests west of the Appalachians in North America suffered the most severe impacts in the late 19th and early 20th centuries, but are still under pressure from demand for timber and pulp.

It has been widely assumed that large-scale forest clearance outside of Europe had only taken place following European colonisation. However, there is increasing evidence that indigenous peoples in some areas (for example the Yucatan region of Central America, parts of the Andes in South America and present day Cambodia in Southeast Asia) may have had major impacts on forest cover before the arrival of Europeans. Nevertheless, in most areas European colonisation undoubtedly precipitated a major phase of deforestation, which appears to have reached unprecedentedly high levels in the last half-century or so. Table 1.9 shows that rates of deforestation continue to be high in the developing countries of the tropics, in both absolute and proportional terms. In contrast, temperate (mostly developed) countries are losing forests at lower rates, or indeed showing an increase in forest area.

Table 1.9 **Estimated annual change in forest cover 1990-1995**

Region	Annual change (km^2)	Annual change rate (%)
Africa – tropical	-36,950	-0.7
Africa – non-tropical	-530	-0.3
Asia – tropical	-30,550	-1.1
Asia – non-tropical	1,540	0
Oceania – tropical	-1,510	-0.4
Oceania – temperate	600	0.1
Europe	5,190	0
North America	7,630	0.2
Central America, Mexico and Caribbean	-10,370	-1.3
South America – tropical	-46,550	-0.6
South America – temperate	-1,190	-0.3

Source: FAO 1999. Note – forest cover change data are not available for the former USSR.

Kenya

"Average annual forest loss is approximately 5,000 hectares per year. The Mau forest has been degraded by 30% in the last 10 years"

Norway

"The area of virgin forest has been reduced to less than 0.5% of the total forested area of the country."

France

"Since the early 1980s forest coverage has increased by 3%."

Major values and uses of forests

Goods

- Timber and other wood products
- Fuelwood and charcoal
- Non-wood forest products (bushmeat, rattans and fibres, honey, edible plants, medicinals, aromatics, dyes)

Services

- Climate amelioration
- Regulation of local and regional hydrological cycles
- Mediators in the carbon cycle, chiefly as carbon sinks
- Soil stabilisation and watershed protection
- Cultural values (aesthetic, spiritual, recreational)

Major impacts on forests

- Conversion, chiefly to cropland (including plantation forestry) but also for a range of other purposes, including road building, mining, urban and industrial development,
- Fragmentation,
- Changing fire regimes,
- Invasive alien species,
- Logging,
- Extraction of non-timber forest products,
- Fuelwood extraction,
- Hunting,
- Unsustainable shifting cultivation,
- Climate change,
- Pollutants, including acid rain.

Status and trends of species in forests

Because forests occur over such a wide area and encompass such a wide range of ecological conditions, it is difficult to generalise about the status of forest species as a whole. Most temperate and boreal forest species in the northern hemisphere are widespread and generally not highly threatened with extinction. Forests of warmer temperate and subtropical areas have a higher diversity of species, many of which are localised and therefore in general more vulnerable to extinction. A higher proportion of these is threatened. Similarly, southern hemisphere temperate forests are generally isolated from each other and have a high proportion of localised and threatened species. For those groups, namely mammals and birds, that have been analysed in any detail, far more tropical forest species are considered threatened than species from any other habitat. It is unclear, however, whether this is merely a reflection of the fact that tropical forests contain far more species in these groups than any other habitat, or whether a higher proportion of these species is threatened than of temperate and boreal forest species. In tropical and subtropical regions, there are clear differences between insular and continental biotas. The former appear far more extinction-prone and have a far higher proportion of threatened species than the latter.

Notes on a selection of the species that occur in forest, mainly in the tropics, and that are categorised as Critically Endangered, i.e. at highest risk of extinction, are provided in Table 1.10.

Philippines

"Forest cover has been reduced from more than 50% to less than 24% over a 40 year period.."

Slovenia

"Forest area has increased from 47% in 1961 to 53% in 1990. 85% of the forests regenerate naturally, thus supporting conservation of native populations of tree species and enhancing genetic diversity."

Table 1.10 **Some Critically Endangered forest species**

Mammals	
Black-faced Lion Tamarin *Leontopithecus caissara*	Discovered early 1990 on Superagüi island, south Brazil, where restricted to around 300 km^2 of forest, with a total population of about 300 individuals.
Golden Bamboo Lemur *Hapalemur simus*	Discovered in 1987. Patchily distributed in a few areas of rainforest in southeast Madagascar. The small population of a few hundred animals is threatened by deforestation.
Sumatran Rhinoceros *Dicerorhinus sumatrensis*	Formerly widespread in upland forests of Southeast Asia. Reduced by deforestation and hunting to a few hundred animals, mostly in Indonesia and Malaysia.
Birds	
Djibouti Francolin *Francolinus ochropectus*	Restricted to forests of the Goda and Mabla Mountains, Djibouti. Fewer than 1,000 birds, and declining because of habitat degradation and hunting.
Philippine Eagle *Pithecophaga jefferyi*	A large eagle endemic to the Philippines. Remains mostly on Luzon and Mindanao, where threatened by forest loss, hunting and trapping.
Reptiles	
Jamaican Iguana *Cyclura collei*	Believed extinct until rediscovered in 1990. Restricted to the Hellshire Hills where threatened by predation from mongooses, dogs and cats and habitat loss through deforestation.
Amphibians	
Peppered Tree Frog *Litoria piperata*	Recorded from a few localities in the eucalypt forest of the New England Tableland, NSW, Australia. Reasons for decline not clear.
Eleutherodactylus karlschmidti	Endemic to the mountain forests of Puerto Rico. Not recorded for a number of years and possibly now extinct.
Crustaceans	
Tree Hole Crab *Globonautes macropus*	Restricted to closed canopy rainforest in the Upper Guinea region of West Africa. Estimated to total less than 250 mature individuals in several fragmented populations.
Plants	
Chisos Oak *Quercus graciliformis*	A small isolated population exists in riparian oak woodland in the Chisos Mountains, Texas, USA. The locality is threatened by the activities of tourists and occasional drought.
Saucos *Sambucus palmensis*	Known from a few scattered individuals in cloud forest of the Canary Islands, Spain. With a very poor regenerative capacity, the few remaining populations are threatened by fire, grazing and exploitation of the medicinal bark.
Palm *Ptychosperma bleeseri*	Scattered in the lowland rainforests near Darwin, Australia. The entire population consists of approximately 500 mature individuals and is believed to have stabilised since feral pigs and water buffaloes were excluded.

Source: UNEP-WCMC

Syria

"Wind and water erosion has degraded 2,678 thousand hectares of land. Desertification has encroached on 480,000 hectares and salting of irrigated land has spoiled a further 125,000 hectares of land. Causing losses in biological diversity."

Biodiversity of Dry and Sub-humid Land Ecosystems

All life requires water. On land the abundance and diversity of life as well as the kinds of life-form that exist in any given area are overwhelmingly influenced by two major factors: the amount of available moisture and the temperature. Variability in these factors, on daily, seasonal and inter-annual scales, is as important as long-term averages. Aridity is defined on the basis of the ratio of rainfall (and other precipitation) per unit area to the potential loss of water from that area through plant use and evaporation (see Box).

What is a dryland?

Some 60% of the world's land surface may be considered as arid to some degree. In such areas shortage of available liquid water is a major constraint on living systems. Aridity may be defined, and measured, in a variety of ways. Probably the most useful at a global level is a measure of the ratio of precipitation – rain, snow, fog, dew, etc. – (P) to potential evapotranspiration (PET). The latter is essentially a function of temperature and number of daylight hours and represents the potential rate of loss of water from a unit area though evaporation from the soil and transpiration by plants. P/PET ratios are typically calculated on a monthly basis and then averaged over a year to produce a single P/PET ratio, known as an aridity index (AI). AI values greater than 0.65 are generally counted as humid.

Humid areas, defined by an aridity index of 0.65 or above, extend over more than 39% of the Earth's land surface. The remaining non-humid 61% is made up of the cold regions, and the drylands. The former include polar and tundra areas, and certain high mountains and plateaus, together covering nearly 14% of the land. They differ ecologically from other non-humid areas, mainly by having temperatures below freezing for a period long enough to restrict or prevent plant growth, although they are "dry" in the sense that liquid water is unavailable for a significant part of the year. The true drylands extend over nearly half (47%) of the Earth's land surface, and can be subdivided into a number of zones on the basis of the aridity index (Table 1.11).

The hyperarid regions have very low biological productivity, and little or no opportunity for human occupation and human-induced land degradation. The less extreme and more productive arid, semiarid and dry sub-humid areas are liable to become degraded by human activity, and are collectively known as the susceptible drylands.

Drylands contain a very wide range of natural habitats, including barren desert with virtually no visible signs of life, semi-desert dominated by succulents and other xerophytic plants, grassland, savannah, and many different kinds of scrub- or shrubland, woodlands and forests. However, in contrast to humid areas, where the dominant natural vegetation is usually forest, many drylands are characterised by sparse or absent tree cover. This may be because the climate is simply too dry to support closed forest ecosystems, or because the area is too severely affected by fire or grazing.

Dry and sub-humid ecosystems are the centres of origin of many major crops. Some of the most important categories are described briefly below and presented in Map 13.

Egypt

"Land reclamation for agriculture and the development of desert tourism has led directly to habitat destruction of numerous species of wild plants and animals."

Table 1.11 **World dryland areas**

Aridity zone zone	AI	Area (million km²)	% global land area	
Hyperarid	<0.05	9.7	7.5	True deserts. Rainfall irregular, may not rain at all for period of several years. The Sahara forms near 70% of the global hyperarid total.
Arid	<0.20 >0.05	15.7	12.1	Annual average rainfall is almost invariably less than 200 mm, although there is considerable variation between years.
Semiarid	<0.50 >0.20	23.0	17.7	Highly seasonal rainfall regimes, with maximum average annual rainfall of 800 mm and considerable variation between years.
Dry sub-humid	<0.65 >0.50	12.9	9.9	Typically have highly seasonal rainfall regimes with relatively little variation between years.

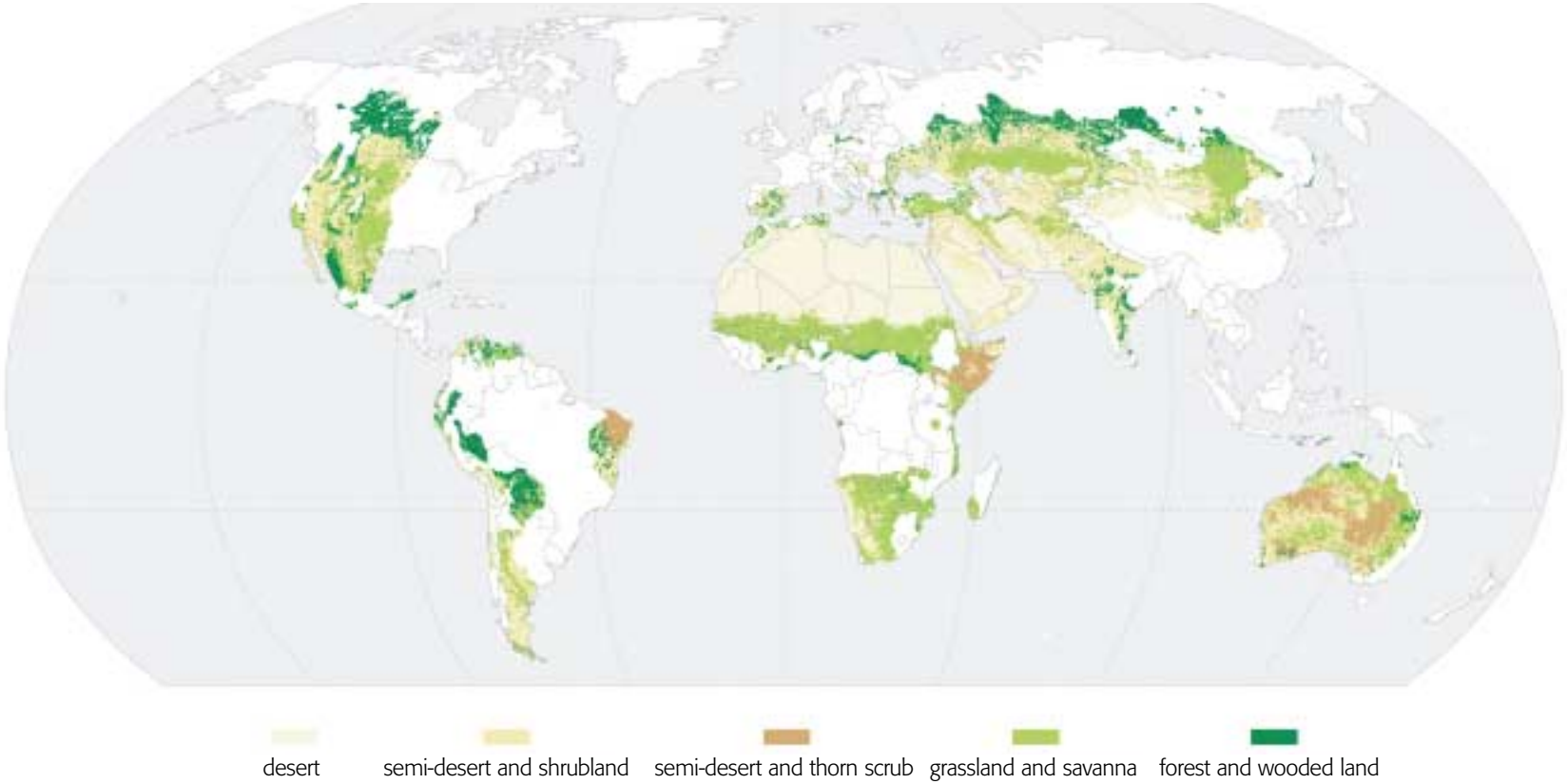
Source: UNEP-WCMC

Major types of dry and sub-humid lands

Mediterranean ecosystems are typified climatically by generally cool, wet winters and warm or hot dry summers. However, no single climatic or bioclimatic definition of a Mediterranean ecosystem has yet been established. Mediterranean ecosystems encompass a wide range of habitat types including forest, woodland and grassland, but are typified by a low, woody, fire-adapted sclerophyllous shrubland (variously known as *maquis*, *chaparral*, *fynbos*, *mallee*) on relatively nutrient-poor soils. These systems occur in five distinct parts of the world: the Mediterranean basin, California (USA), central Chile, Cape Province (South Africa), and southwestern and south Australia. Each of these regions occurs on the west side of a continent and to the east of a cold ocean current that generates winter rainfall. They cover around 2.5 million km² in total, or between 1% and 2% of the Earth's surface (according to definition), more than three quarters of which is within the Mediterranean basin. They are disproportionately rich plant species compared with most other parts of the world. In most parts of the world where they are found, a proportion of ecosystems generally classified as Mediterranean occur within dryland areas according to the definition given above. Elsewhere, including those regions generally associated with the typical Mediterranean high diversity sclerophyllous vegetation, Mediterranean-type ecosystems occur in humid climatic zones and are therefore not classifiable as drylands.

Grassland ecosystems may be loosely defined as areas dominated by grasses (members of the family Gramineae excluding bamboos) or grass-like plants with few woody plants. Natural grassland ecosystems are typically characteristic of areas with three main features: periodic drought; fire; and grazing by large herbivores. In addition, they are often associated with soils of low fertility. The relative importance of different factors in maintaining grasslands varies locally and regionally.

MAP 13



Land cover in world drylands

This map shows a simplified classification of land cover types within the world's drylands. Drylands here include dry sub-humid, semiarid, arid and hyperarid zones, defined by an aridity index (AL) calculated as the ratio of precipitation to potential evapotranspiration. Drylands have an AL of <0.65.

Source: compiled by UNEP-WCMC; dryland boundary from UNEP-GRID, land cover from USGS EROS Data Centre.

Spain

"18% of Spain is affected by serious erosive problems."

Savannas are tropical ecosystems characterised by dominance at the ground layer of grasses and grass-like plants. They form a continuum from treeless plains through open woodlands to virtually closed-canopy woodland with a grassy understorey.

Most, but by no means all, of the world's natural grasslands and savannas are found in dryland regions. Around 20% of the Earth's land surface (excluding Antarctica) supports grasslands of varying degrees of naturalness; temperate grasslands make up approximately one fourth of this area, and savannas the remainder.

Seasonally flooded grassland areas are found in many river basins and may be of considerable ecological and biotic importance. Such areas may be considered grassland ecosystems or inland water (wetland) ecosystems; there is no clear dividing line between the two.

Major values and uses of drylands

Drylands are home to over 2 billion people, or around 35% of the global population, a high proportion of whom are subsistence farmers or fishers. Major uses of dryland biological diversity include:

- Existing crops and livestock and their wild relatives. Drylands, grasslands and Mediterranean ecosystems are centres or origin of a significant proportion of the world's major crop plants. Populations of wild relatives of many existing crops are potentially very valuable genetic resources.
- Potential new crops, for example salt-tolerant or halophytic species, such as *Salicornia* spp. and some *Atriplex and Distichlis* spp.
- Wild foods, particularly as famine foods.
- Medicinals.
- Aromatics and stimulants. Drylands have a high diversity of plants rich in secondary compounds such as terpenes, which may have aromatic properties (for example frankincense *Boswellia* sacra and myrrh *Commiphora* spp.) and may be of considerable economic importance.
- Ornamentals. Arid and semi-arid, and Mediterranean-type, ecosystems have proven important sources of ornamental plants, with many thousand species now in cultivation outside their natural ranges.
- Pastoralism. Grazing of domestic or semi-domestic livestock is a major land use in most of the world's drylands; extensive pastoral systems generally have negligible artificial inputs in the form of fertilisers or other chemicals, and are therefore reliant on natural ecosystem productivity and resilience.
- Soil stabilisation and prevention of erosion. Dryland soils are particularly prone to erosion, which is one of the major causes of land degradation. Natural vegetation cover plays a major part in reducing the erodibility of soils and in preventing or mitigating land degradation.
- Wildlife tourism. Grassland and savannah areas with major concentrations of large, wild mammals include many of the most important sites globally for wildlife-based tourism.

Belarus

"Since 1750 forest cover has decreased from 80% to 35%."

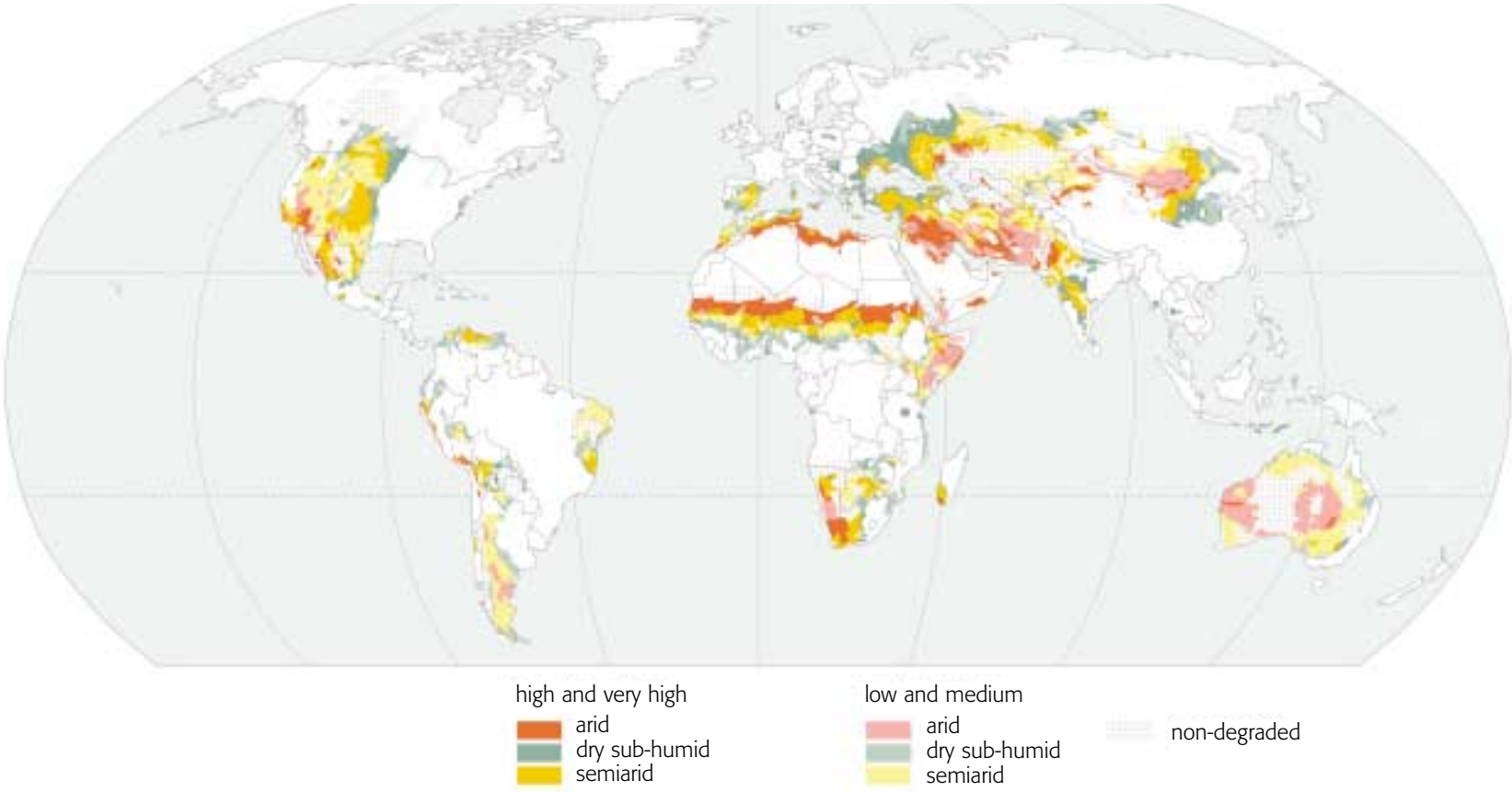
Major impacts on drylands

Humans have had enormous impact on dryland, grassland and Mediterranean ecosystems, often with major negative impacts on biological diversity (Map 14). These impacts are often complex and interrelated. The following are among the major categories of activities that have or can have an adverse impact:

- Conversion, particularly to cropland. Large-scale transformation to cropland in drylands is dependent on availability of freshwater, either as surface waters (lakes, rivers, reservoirs) or in aquifers. In many areas, conversion is followed by abandonment as soil becomes degraded, often through salinisation or waterlogging.
- Changing fire regimes. Many dryland ecosystems are naturally adapted to some degree to fire. However, in many areas fires caused by humans (often as deliberate burning to produce new growth for livestock) are far more frequent and extensive than natural fires, and have very different impact on ecosystems and their biodiversity.
- Impact of introduced herbivores, particularly livestock, through trampling, removal of plant biomass, introduction of pathogens and alteration of plant species composition through selective grazing and competition with native species.
- Introduction of non-native plants. Grassland ecosystems have been routinely modified by deliberate introduction of non-native species, particularly other grasses and leguminous plants.
- Water. By definition, water is a limiting resource in dryland ecosystems. Human use of existing water resources in these systems therefore has often a disproportionately extreme impact. Abstraction of water for irrigation from freshwater systems such as lakes and rivers has an often extreme impact on the biodiversity of these ecosystems. Depletion of groundwater resources may have a less obvious direct impact but is likely to affect natural ground-fed springs and deep-rooted vegetation where the aquifer is relatively near the surface. Creation of artificial water sources for livestock leads to the creation of virtually barren "sacrifice zones" around the water source as a result of extremely heavy trampling by livestock.
- One of the most significant human impacts in natural or semi-natural dryland and savannah ecosystems in developing countries is through harvest of wood for fuel. Quantifying this, and assessing its long-term impact on ecosystems, has proved problematic, although in some areas the impact is undoubtedly severe.
- Overharvest of wild species. Excess hunting of wildlife and collection of plants, whether for subsistence use or national or international trade, can have severe impacts, in some cases driving species to extinction. Because dryland species tend to have relatively low population growth rates, and in the case of plants, individual growth rates, they may be particularly sensitive to overharvest.
- Chemical inputs. In many grassland ecosystems, highest biological diversity seems to be associated with poorer soils. Artificial enrichment of grasslands, particularly through application of nitrogenous fertiliser, generally leads to a very marked decrease in plant species diversity.
- Long-term impacts of climate change. The potential impacts on dryland ecosystems of human-induced climate change remain to be quantified but are likely to be significant.

These various impacts interact in a complex and sometimes unpredictable way. In drylands, the collective effect of factors, mainly of human origin, leading to land degradation make up a process often termed *desertification*. According to the United Nations Environment Programme (UNEP), desertification directly affects some 36 million km^2 of the world's drylands, i.e. about 70% of the total dryland area, and one-sixth of the world's people. The effects of desertification

MAP 14



Land degradation in susceptible drylands

A preliminary expert Global Assessment of the Severity of Soil Degradation (GLASOD), emphasising human impacts, was released in 1990. This map summarises the data within the limit of susceptible drylands (ie. excluding hyperarid regions by definition not subject to degradation).

Source: World Map of the Status of Human-Induced Soil Degradation; an Explanatory Note (October 1990), available at UNEP-GRID.

promote poverty among rural people, and by placing greater stress on natural resources, poverty tends to reinforce any existing trend toward desertification.

Desertification

Under the UN Convention to Combat Desertification, desertification is defined explicitly as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities."

Land degradation is further defined as "reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:

- soil erosion caused by wind and/or water;
- deterioration of the physical, chemical and biological or economic properties of soil;
- long-term loss of natural vegetation."

Brazil

"Between 1977 and 1994 deforestation rates in the Brazilian Amazon showed a tendency to stabilize at around 0.4%. It peaked in 1994 but has since fallen. In 1995/96 deforestation rate was 18161 km² a year."

Status and trends in species in dry and sub-humid lands

Summary analysis of the habitat distribution of globally threatened mammals and birds shows clearly that while the majority of species occupy forest habitats (particularly lowland tropical moist forest), dryland, scrub and grasslands made up the second most important group of habitats (being somewhat more critical for mammals than for birds, in which group wetlands were significant). There are generally insufficient data overall at present to determine whether species in the ecosystem types under discussion are relatively more or less prone to extinction than those elsewhere – that is whether a higher or lower than average proportion of species in these ecosystems can be classified as threatened. However, for some groups and some ecosystems there is more detailed information.

With respect to mammals, a high percentage of continental (as opposed to island or marine) species believed or known to have become extinct since 1600 occurred in dryland ecosystems, most notably in Australia. In general, dryland mammals tend to be relatively wide-ranging but to occur at low population densities because of the low primary productivity of these areas. Larger species are also more conspicuous (and in the case of ungulates more gregarious) than forest dwelling species and thus more vulnerable to overhunting. These factors have meant that a notable number of large dryland mammals are either highly endangered or extinct in the wild.

The Mediterranean-type ecosystems in general have a relatively high proportion of their species categorised as threatened. This is in part a consequence of human land-use development in agriculture, industry and housing, and, especially in Cape Province (South Africa) and in California, of the spread of non-native plant species (some 10% of the flora in parts of California consists of naturalised alien species, and some perennial grasslands have been replaced by annual alien-dominated grassland). The Cape flora, largely within a Mediterranean-type ecosystem, occupies only 4% of the land area of southern Africa, but accounts for nearly 70% of the region's threatened species. Around 10% of the California flora is considered threatened (equivalent to approximately one quarter of all threatened plants in the USA). The main threats are: urban coastal development, pollution, agriculture, tourism, water shortages and fire.

Forests and woodlands, and inland water ecosystems within drylands tend to be placed under disproportionate pressure. This is chiefly because they are inherently scarce resources but also, in the case of forests and woodlands, because they tend to be found in areas within drylands with somewhat more favourable conditions (microclimate and soil fertility) than normal. These areas are therefore most likely to be settled by people and suffer extensive habitat conversion. Mediterranean ecosystems in particular are noted for their amenable climates and therefore come under particular pressure for permanent settlement and tourism.

Notes on a selection of dryland species that are categorised as Critically Endangered, i.e. at highest risk of extinction, are provided in Table 1.12.

Colombia

"Timber production affects 40,000-68,000 ha of wood each year."

Table 1.12 **Some Critically Endangered dryland species**

Mammals	
Addax *Addax nasomaculatus*	Formerly occurred through much of the Sahara. Reduced by uncontrolled hunting to a few remnant populations in inaccessible areas.
Northern Hairy-nosed Wombat *Lasiorhinus krefftii*	Restricted to a single colony of some 70 animals at Epping Forest Station, Queensland, Australia. Decline attributed to habitat loss and competition with introduced grazing animals.
Birds	
Bulo Burti Bush-shrike *Laniarius liberatus*	Discovered during the late 1980s in fragmented acacia scrub of central Somalia. Despite searches, known only from a single individual.
Night Parrot *Geopsittacus occidentalis*	An extremely rare bird from central Australia, probably threatened by habitat degradation, predation by introduced species and loss of available water.
Reptiles	
Anegada Rock Iguana *Cyclura pinguis*	Formerly present on several islands of the Puerto Rico Bank, now restricted to Anegada (British Virgin Islands). Threatened by predation and grazing pressure from introduced species.
Bulgar Dagh Viper *Vipera bulgardaghica*	Restricted to open grassland and thorn habitats in the Cilician Taurus mountains of southern Turkey. Susceptible to habitat change and excess collection of specimens.
Fishes	
Cachorrito de Mezquital *Cyprinodon meeki*	A desert fish endemic to the upper Rio Mezquital drainage, Mexico. Threatened by pollution, introduction of exotic species and habitat modification.
Insects	
Prairie Sphinx Moth *Euproserpinus wiesti*	A moth confined to high prairies of central USA threatened by insecticide use and perhaps collection.
Plants	
Sicilian Fir *Abies nebrodensis*	A coniferous tree known from a small population of fewer than 20 individuals in Sicily (Italy), most of which are non-reproductive.
Aloe helenae	A tree-like succulent known from two or three populations in southern Madagascar, potentially threatened by habitat loss and collection.

Biodiversity of Agricultural Ecosystems

What is agricultural biodiversity?

Agricultural biodiversity is the diversity at all levels of the biological hierarchy, from genes to ecosystems, that is involved in agriculture and food production.

The diverse range of organisms making up agricultural biodiversity can be divided into three major groups, based on the way they contribute to or affect agricultural production (Table 1.13).

Table 1.13 **Agricultural biodiversity: functional groups**

Producers	the domestic, cultivated, farmed and semi-wild species (mainly flowering plants, fishes, birds and mammals) whose production provides human food, together with the varieties and wild relatives that expand the genetic resource base for future breeding improvements.
Support services	the wild and semi-managed species (mainly micro-organisms and invertebrates) that provide services supporting agricultural production, notably the soil biota, pollinators and the predators that affect pest species.
Pests, pathogens, predators	the wild species (mainly micro-organisms and invertebrates) that decrease agricultural production by causing disease or damage to producers.

The fundamental and distinct property of agricultural biodiversity is that it is largely created, maintained and managed by humans, originally by subsistence farming communities, but more recently also by biotechnologists, in part using material in *ex situ* genetic resource collections. In this regard, agricultural biodiversity stands in total contrast to wild biodiversity, which is most valued *in situ* and as a product of natural evolution.

Although agricultural ecosystems provide some of the environmental services provided by wild ecosystems, in that they can, for example, protect soil structure and affect air and water quality, the magnitude of such benefits from converted ecosystems will generally not exceed those provided by natural ecosystems. The cultural and spiritual benefits that are often associated with traditional agricultural landscapes provide an important exception to this generalisation.

Wild species and their products used for food are not usually regarded as part of agricultural biodiversity unless there is some degree of resource management involved, so, for example, species involved in coastal or inland fish farming come within the scope of agricultural biodiversity, but (for most purposes) high seas fishery species do not.

Where does agricultural biodiversity occur?

The components of agricultural biodiversity variously occur in protected areas, seed banks, laboratories, and the stores of industrial seed producers, but their primary habitat is land supporting agricultural production. Although most crop production is rainfed and based in the cool to warm humid regions of the world, production is extended into drylands by irrigation. Domestic livestock can thrive under a variety of climatic conditions. The ability of sheep, goats and camels to exist on sparse vegetation with little water allows humans to occupy marginal drylands, and the semi-domestic reindeer ranges into arctic regions.

Republic of Korea

"74% of endemic crop species in Korea were lost in the ten years following 1985."

At the close of the Pleistocene, some 11,500 years before present, domestication of plants and animals had just begun and the area of agricultural land would have been imperceptibly small. The history of agriculture is a history of experimentation with plant and animal genetic resources by human communities, and the dispersion of these resources by trade and the migration of peoples. Map 15 shows possible centres of origin of major crop plants. Map 16 presents the high dependence that most countries have on food crops that originated in distant centres of origin.

Agricultural land now forms a significant proportion, some 38%, of the world's total land area. Table 1.14 shows global level estimates of the recent area of land use types relating to agriculture, based on aggregated national data collated by the FAO. In this classification, permanent pastures, which include wild and cultivated forage crops, grassland and rangelands, make up the largest area of agricultural land. Land regularly cultivated for mainly annual crops, ranging from kitchen gardens to the cereal plains of industrial farming, i.e. arable lands in the usual sense, form 11% of the total.

Clearly, at global level, the habitat of agricultural biodiversity has increased enormously during the past ten millennia. Although some care is needed in interpreting these data, a graph of estimates of agricultural land area shows the rate of increase from the 1960s to the present (apart from an anomalous datum for 1970) (Figure 1.1). An increase in area attributed to one classification unit must entail a decrease in some other land cover type; in this case, the increase in agricultural land is accompanied by a decrease in forest and woodland area, and a decrease in the category "all other land."

Table 1.14 **Agricultural land in relation to total world land area**

	Area in 1998 (million km^2)	% world land area
World land, excluding inland waters	130.5	100
Agricultural land:	49.4	38
Arable land (mainly annual crops)	13.8	11
Permanent crops (e.g. fruit and nut trees)	1.3	1
Permanent pasture (incl. rangeland)	34.3	26

Source: estimates rounded from FAO land-cover data for 1998, available at http://apps.fao.org

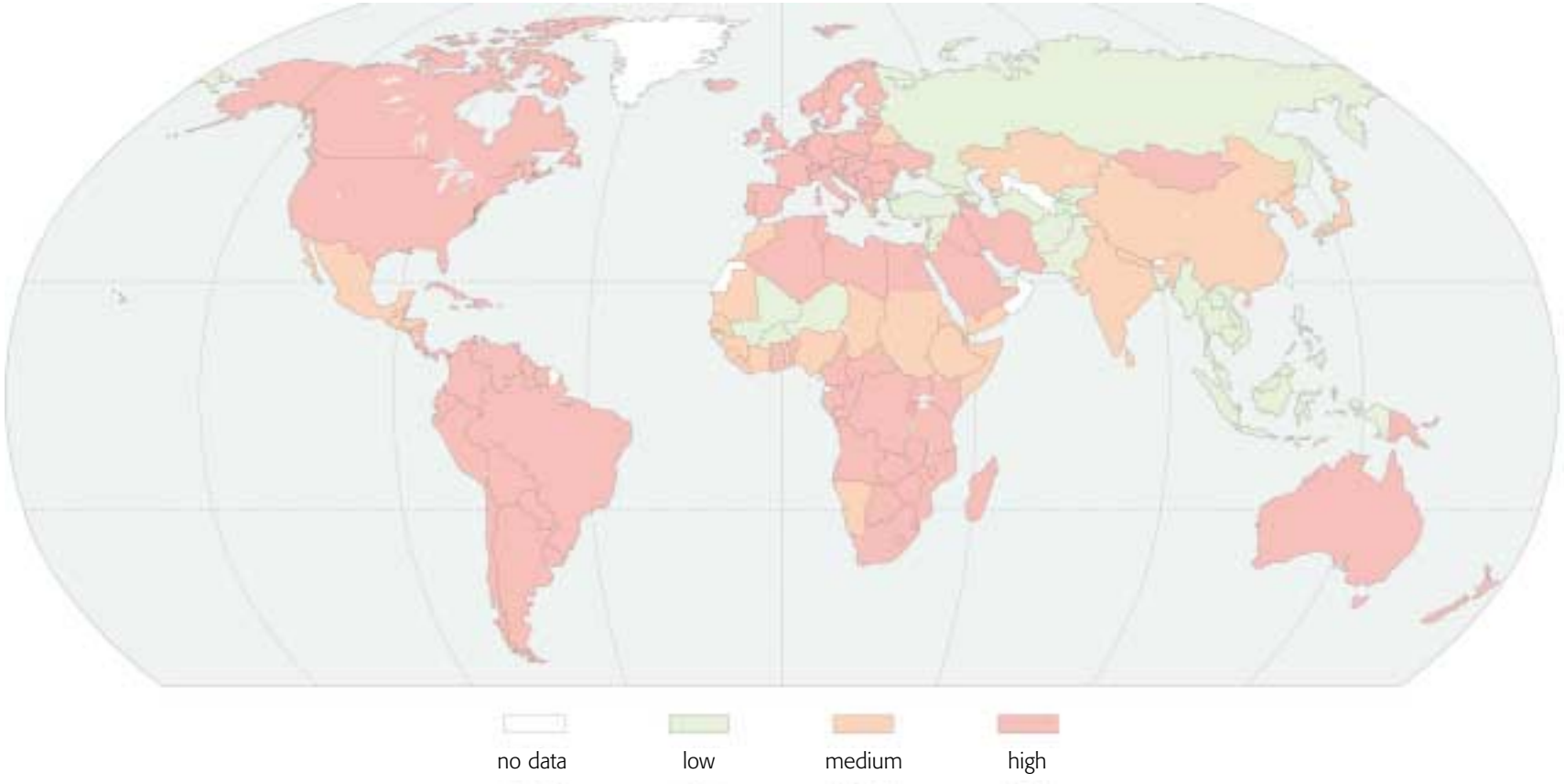
MAP 15

Centres of crop plant diversification

This map represents in simplified form the possible areas of origin of major crop plants (Vavilov centres), together with other regions of importance for crop diversification.

Source: based on multiple sources.

MAP 16

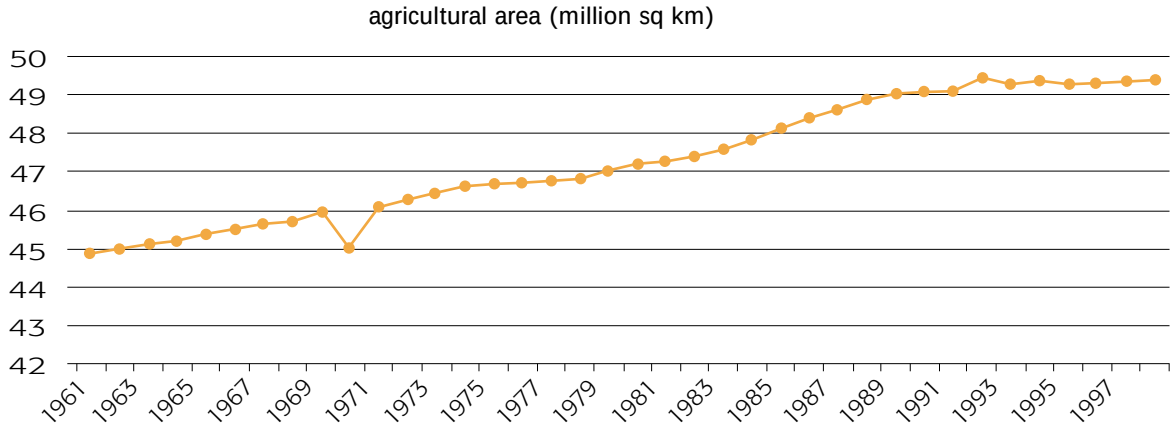


Food crop interdependence

The three classes represent in general terms the high dependence most countries have on food crops that originated in distant centres of diversity.

Source: from data in FAO Commission on Genetic Resources for Food and Agriculture. Background study paper No. 7. Rev. 1.
Contribution to the estimation of countries' interdependence in the area of plant genetic resources.

Figure 1.1 **World area of land classed as "agricultural" 1961-1998**



Source: FAO (FAOSTAT Agricultural database on www.fao.org)

El Salvador

"Forest originally covered 90 to 95% of the country. Today it has been reduced to less than 7%, half of which is degraded mangroves and pines."

Although the area of land used for agricultural purposes has increased during the latter half of the 20th century, by some measures the quality of that land has declined. According to the FAO's Global Assessment of the Status of Human Induced Soil Degradation (GLASOD), about 35 million km^2 of the world total land surface (26%) has suffered degradation severe enough to destroy its productive capacity. The majority of this degradation will have affected agricultural land, and on more than 12 million km^2 (9% of world land area) it is attributed to agricultural activities. At local level, however, it appears that previous global studies may have exaggerated the severity of degradation or its impact on productivity. It is expected that the rate of forest clearance for agriculture is likely to slow, but steep slopes and wetlands will increasingly undergo conversion to agricultural land, and this will have undesirable impacts on non-agricultural biodiversity.

The status of living agricultural resources

A very large variety of species are used for human food, some harvested directly from the wild, some subject to modest management intervention (for example replanting, predator protection, restocking), and some produced by intensive industrial-scale methods. There are few quantitative data available relating to the status of wild and low-management food resources, but indications are that they have in very many instances been adversely affected by land conversions, or by excess harvesting (many marine and some inland fisheries).

More information is available on the status of agricultural plant genetic resources, where a large number of varieties and landraces have been lost, although it remains difficult to derive a quantified view of the situation globally because the basic resource documentation is incomplete. There is, however, abundant evidence at national level of the enormous scale of genetic erosion in crop plants (Table 1.15).

Cuba

"From 1900s forest cover has been reduced by 53.2% due to expansion of agriculture. From 1959 deforestation was more drastic, and the forest was reduced to 14% cover. However now with afforestation 19% coverage by forest has been achieved."

There are far fewer livestock breeds, and documentation is more complete, so that among domestic mammals and birds it is possible to give numerical minimum estimates of the large number of varieties regarded as extinct or at risk of extinction (Table 1.16 and Map 17).

Although some locally distributed plant genetic resources, particularly among the wild relatives of crop plants, have been lost as a result of land conversion, many resources once actively used have been lost because other varieties have proved to have superior production qualities. The former is the second most frequently cited cause of genetic erosion in country reports collated by the FAO, while the latter is the predominant cause. Replacement by modern, genetically more uniform breeds specialised for intensive systems is the main cause of loss of livestock breeds.

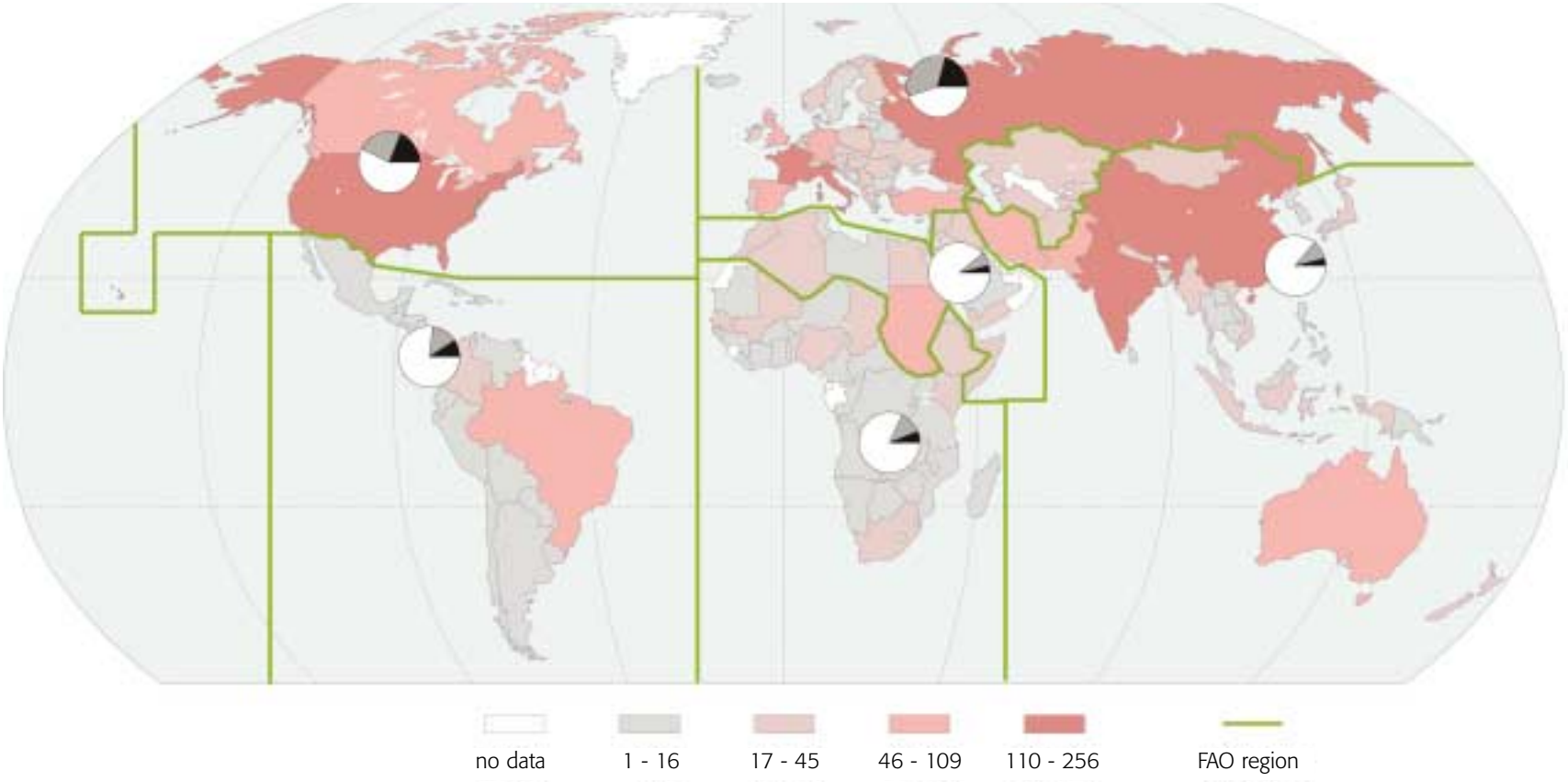
The full significance of the loss of varieties of crop plants and livestock, and their wild relatives, is difficult to evaluate. The loss of a cultivated plant variety might entail little or no loss of individual genes not present in other varieties although a particular pattern of gene regulation or interaction may be lost. It can be assumed, on the basis of much evidence, often anecdotal, that many local varieties possessed features of adaptive value in a local context, and their continued existence presents the opportunity for using the genes responsible in breeding improvements more generally. The precautionary principle implies that such diversity should be conserved.

Table 1.15 **Loss of crop plant genetic resources: examples at country level**

Country	resource	varieties lost	notes
China	wheat varieties	90% loss	of 10,000 varieties used in 1949 about 1000 (10%) remained in 1970s
Korea (S)	garden landraces	74% loss	of 14 crops in home gardens, 26% of landraces present in 1985 remained in 1993
Mexico	maize varieties	80% loss	only 20% of maize varieties planted in 1930s remain; maize being replaced by more profitable crops
USA	Varieties of apple, cabbage, field maize, pea, tomato	80-95% loss	percent loss comparing varieties grown 1804-1904 and present

Source: FAO. 1998. The state of the world's plant genetic resources for food and agriculture. FAO, Rome.

MAP 17



Livestock breeds

Colour represents the number of mammal breeds in each country. Recording of breeds is incomplete globally. Pie charts represent the proportion of all mammal breeds associated with each FAO region (green line) assessed as threatened (grey) or extinct (black).

Source: country-level data calculated from FAO *World Watch List for Domestic Animal Diversity* (2nd edition, 1995); charts calculated from data in 3rd edition (2000).

Germany

"Total forest cover in West Germany increased by 0.5 million hectares between 1960 and 1993."

Table 1.16 **The global status of major plant and animal genetic resources for food**

No. species known in total (approx.)	No. species domesticated (approx.)	Most important to global-level food supply	No. domestic breeds and varieties	No. domestic breeds and varieties at risk	No. domestic breeds and varieties extinct
Plants					
270,000	200	Bananas/plantains, beans, cassava, maize, millet, potatoes, rice, sorghum, soybean, sugar cane, sweet potatoes, wheat	Many thousands	Thousands	Not known
Mammals					
5,000	20	cattle, pigs	> 3,000	>500	238
Birds					
10,000	10	chickens	>860	>370	25

Source: data on livestock breed status from Scherf, B. D. 1995. World Watch List for domestic animal diversity. 2nd edition. FAO, Rome.

Soil degradation can include impairment of ecological services mediated by soil organisms, such as bacteria, fungi and small invertebrates, but there is little detailed information available on the overall status of soil biodiversity, or the resilience of these species following environmental change.

There is, however, an increasing amount of information relating to declines in abundance of some pollinators. It is estimated that twothirds of the world's species of agricultural crops require animals for pollination.[8] Species responsible for this service include birds, wasps, beetles, butterflies, bats, moths, giraffes, opossums and flies, but by far the greatest part is provided by bees. Although most estimates of the economic value of crop pollinators give credit to the honeybee (*Apis mellifera*), many other species of bee are involved.

However the numbers of native bees are dwindling. The losses are due mostly to the use of agrochemicals and monocultures, and to deforestation. The chemicals kill bees and, with the removal of wild vegetation and crop specialisation, the bees find neither places to nest nor alternative flowers while they wait for the crop to bloom.
In addition, honeybees in many parts of the world have contracted a serious disease and the numbers of honeybee colonies have decreased dramatically.

We have little or no information on most of the world's crops that will permit us to say whether they receive adequate visits of pollinators to effect maximum yields, yet research on numerous crops has demonstrated clearly that pollination can be a limiting factor to yields. The rapid development of transgenic crops raises additional causes for concern, as the employment of a herbicide or pesticide coupled with a variety of crop resistant to this could eradicate all alternative forage for pollinators, leading to devastation in their numbers.

[8] "The São Paulo Declaration on Pollinators" (see Annex 4).

Israel

"Over the last 50 years Israel has increased its forest area from less than 1% to nearly 10% of its territory. To date the Jewish National Fund has planted over 200 million trees."

IMPACTS OF GLOBAL ENVIRONMENTAL PROBLEMS ON BIOLOGICAL DIVERSITY

The strong scientific linkages between global environmental issues – such as loss of biological diversity, climate change, stratospheric ozone depletion, water degradation, or the accumulation of persistent organic pollutants – are becoming increasingly apparent.

The issue that may pose one of the greatest threats to biodiversity is climate change. For this reason, one of the most critical tasks is to identify the scientific and policy interlinkages between biodiversity loss and climate change. This section will look at those links.

Climate change

The weight of scientific evidence suggests that the observed changes in climate are caused, at least in part, by human activities, primarily the burning of fossil fuels and changes in land cover. These activities are modifying the concentration of CO_2 and other greenhouse gases which absorb heat radiating from the earth as well as the properties of the surface which absorbs or scatters radiant energy (the *albedo effect*).

Climate change may directly affect species through changes in phenology (e.g., earlier flowering of trees and egg-laying in birds), lengthening of the growing season, and changes in distribution (e.g. pole-ward and altitudinal shifts in insect ranges). In many cases the observed changes are consistent with well-known biological responses to climate. Changes in such characteristics of organisms may thus serve as indicators or early warnings of climate change.

Climate change

Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is addition to natural climate variability observed over comparable time periods.

Adverse effects of climate change means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

United Nations Framework Convention on Climate Change, Article 1

Climate change is an additional stress on ecosystems and species that are, often, already under stress from other pressures such as: habitat change resulting from land-use change; overharvesting; pollution; and the effects of invasive species. Such pressures thus make biodiversity more vulnerable to climate change. For example:

- Habitat fragmentation poses barriers to dispersal, thereby reducing the possibility that species can adapt by moving as the climate changes. (Such barriers to dispersal may also exist naturally, in areas such as small islands or mountain tops.);
- Habitat fragmentation and overharvesting may result in small isolated populations with low genetic diversity. With low genetic adaptability such populations will be more vulnerable to extinction;

- Ecosystem degradation, which may result from unsustainable use of ecosystem components, pollution, pest outbreaks, or changes in fire regimes, can decrease the resilience of ecosystems to climate change.

Addressing such exacerbating factors may be an important component of adaptation to climate change.

The expected result of these interactions is that climate change will lead to reduced biological diversity. At the species level, those that are most likely to be adversely affected are those that can only tolerate a narrow range of climatic conditions and that have limited capacity to disperse. This is likely to include a significant proportion of already threatened species.

At the ecosystem level, established natural communities may be broken up as the constituent species shift at different rates in response to climate change. For example, a substantial fraction of the world's forested area is expected to undergo major changes in broad vegetation types with the greatest changes at high latitudes. New assemblages of species and hence new ecosystems may be established. As noted below, this may have major implications for the role of forests as carbon stores.

Differential responses to climate change by species in ecosystems may lead to disruption of important functional interactions, with potentially highly serious consequences for the provision of ecosystem services such as pest control, pollination, seed dispersal, decomposition and soil nutrient cycling. In addition to the effects on natural ecosystems, these could have socio-economic consequences for agriculture.

The impact of climate change on biological diversity is expected to be non-linear. The impact may be particularly severe when certain critical thresholds are crossed. Ecosystem types that are vulnerable to such thresholds include:

- Wetlands overlying permafrost. These are likely to be severely affected when the ice melts;

- Coral reefs. As already noted by the Conference of the Parties, there is significant evidence that climate change is a primary cause of the recent and severe extensive coral bleaching. Bleaching is reversible when the increases are short-term and of no more than 1-2ºC. However, sustained increases in water temperatures of 3-4ºC above normal maxima can cause significant coral mortality. Severe bleaching events were triggered, for example, by the El Niño events of 1982-83 and 1997-98.

Climate change may also increase threats from invasive alien species:

- Climate change may result in extension or changes in the ranges suitable to certain invasive species. An example may be the increased prevalence of vector-borne infectious diseases transmitted by blood-feeding mosquitoes and ticks;

- Environments may become more favourable to weedy species because of climate change induced ecosystem disruptions.

In short, and as the Intergovernmental Panel on Climate Change (IPCC) has concluded, ecosystems vital to human development and well-being are vulnerable to climate change. There are likely to be reductions in biological diversity and in the goods and services that ecosystems provide to society, e.g. sources of food, fibre, medicines, recreation and tourism, and ecological services such as controlling

nutrient cycling, waste quality, water runoff, soil erosion, pollination services, detoxification and air quality. Additionally there may be an increased provision of ecosystem "bads" such as pests, diseases and other invasive species.

MONITORING TRENDS IN BIODIVERSITY

Present patterns in global biodiversity reflect the many and extensive changes brought about by the human species. No natural habitats are free from human impact, and large areas have been totally transformed. Many wild species have declined in distribution and abundance; some are known to have become extinct. With human help, domestic livestock and crops occupy large areas of land, along with introduced game animals and a host of accidental introductions, including many weeds and animal pests.

The objectives of the Convention are to conserve biodiversity, to use its components sustainably, and to ensure that benefits arising from the use of genetic resources are shared equitably. Core tasks, as set out in Article 7 of the Convention, are to identify important components of biodiversity and to monitor trends in their status. While it is usually feasible to assess national biodiversity at a general level in terms of species and broad ecosystem types, and this is evident in the national reports submitted to the Secretariat (see chapter 4), effective monitoring is a greater challenge.

Monitoring implies repeated assessment in order that change and long-term trends over time can be identified. All kinds of evidence may be admissible, but for scientific dialogue a quantitative and structured monitoring framework is preferred, and for comparative purposes, for example seeking to build a comprehensive continental or global picture from national data, it is desirable that similar parameters are measured in similar terms. Until recently, however, change in biodiversity at species and habitat level has very often been identified retrospectively on an *ad hoc* basis, by means of largely anecdotal evidence, and using terms and units of measurement that are highly case-specific.

Knowledge of biodiversity at local and regional levels is embedded in cultural practices and languages. The knowledge, innovations and practices of indigenous and local communities are key human components of sustainability. They are the result of long periods of use, observation and experimentation. The decline of cultural diversity brings with it the concomitant loss of biodiversity knowledge. This is especially the case when languages are lost.

During the past decade, considerable effort has been devoted to the assessment of change in the environment, often at national or regional level, and to the development of indicators to represent environmental change. An indicator is a value, perhaps an index derived from a set of observational data, that can be taken to represent some broader issue beyond the indicator value itself. The central purpose is to communicate real-world complexity in a simplified and readily understood numerical or graphic form.

Economic indicators rely mainly on time-series of quantitative numerical data, as do the most effective environmental indicators, for example those relating to trends in readily measurable factors such as temperature or carbon dioxide emissions. One of the principal obstacles to the development of good biodiversity indicators is that time-series of numerical data, especially if applicable above local or national level, are scarce. For this reason, most existing biodiversity indicators are based on static status assessments, for example the proportion of the mammal fauna that is threatened with extinction, the number of national-endemic species, or amount of protected forest.

Kenya

"Average annual forest loss is approximately 5,000 hectares per year. The Mau forest has been degraded by 30% in the last 10 years."

Now that a large number of countries have begun to implement the Convention, and the period since relevant measures have been in place is lengthening, it is increasingly desirable to develop tools to monitor the actual on-the-ground impacts of compliance. The Parties have explicitly recognised this need in their several calls for development of a core set of biodiversity indicators, and in their efforts to improve and harmonise national reporting.

However, it is not yet possible to build a reliable and comprehensive picture of the effectiveness of measures adopted in compliance with the CBD, in terms of change in the status of the components of biodiversity. This is in part because insufficient time has passed since implementation of the Convention at national level began so that it is in many instances not realistic to expect a clear response, i.e. recovery or restoration of species and habitats is generally a protracted process. It is in part also because reliable monitoring tools, with the appropriate resolution, have not been developed and widely implemented.

THE CONVENTION ON BIOLOGICAL DIVERSITY

INTRODUCTION

The Convention on Biological Diversity is probably the most all-encompassing international agreement ever adopted. It seeks to conserve the diversity of life on Earth at all levels – genetic, population, species, habitat, and ecosystem – and to ensure that this diversity continues to maintain the life support systems of the biosphere overall. It recognizes that setting social and economic goals for the use of biological resources and the benefits derived from genetic resources is central to the process of sustainable development, and that this in turn will support conservation.

Achieving the goals of the Convention will require progress on many fronts. Existing knowledge must be used more effectively; a deeper understanding of human ecology and environmental effects must be gained and communicated to those who can stimulate and shape policy change; environmentally more benign practices and technologies must be applied; and unprecedented technical and financial cooperation at international level is needed.

International environmental agreements

Throughout history human societies have established rules and customs to keep the use of natural resources within limits in order to avoid long-term damage to the resource. Aspects of biodiversity management have been on the international agenda for many years, although early international environmental treaties were primarily concerned with controlling the excess exploitation of particular species.

The origins of modern attempts to manage global biological diversity can be traced to the United Nations Conference on Human Environment held in Stockholm in 1972, which explicitly identified biodiversity conservation as a priority. The Action Plan in Programme Development and Priorities adopted in 1973 at the first session of the Governing Council of UNEP identified the "conservation of nature, wildlife and genetic resources" as a priority area. The international importance of conservation was confirmed by the adoption, in the same decade, of the Convention on Wetlands (1971), the World Heritage Convention (1972), the Convention on International Trade in Endangered Species (1973), and the Convention on Migratory Species (1979) as well as various regional conventions.

Making the connections

By the 1980s, however, it was becoming apparent that traditional conservation alone would not arrest the decline of biological diversity, and new approaches would be needed to address collective failure to manage the human environment and to achieve equitable human development. Important declarations throughout the 1980s, such as the World Conservation Strategy (1980) and the resolution of the General Assembly of the United Nations on the World Charter for Nature (1982), stressed the new challenges facing the global community. In 1983 the General Assembly of the United Nations approved the establishment of a special independent commission to report on environment and development issues, including proposed strategies for sustainable development. The 1987 report

of this World Commission on Environment and Development, entitled *Our Common Future* (also known as the *Brundtland Report*), argued that "the challenge of finding sustainable development paths ought to provide the impetus – indeed the imperative – for a renewed search for multilateral solutions and a restructured system of cooperation. These challenges cut across the divides of national sovereignty, of limited strategies for economic gain, and of separated disciplines of science."

A growing consensus was emerging among scientists, policy-makers and the public, that the biosphere had to be seen as a single system, and that its conservation required multilateral action, since global environmental problems cannot by definition be addressed in isolation by individual States, or even by regional groupings.

By the end of the 1980s, international negotiations were under way that would lead to the United Nations Conference on Environment and Development (the "Earth Summit", or UNCED), held in Rio de Janeiro in June 1992. At this pivotal meeting, Agenda 21 (the "Programme of Action for Sustainable Development"), the Rio Declaration on Environment and Development, and the Statement of Forest Principles were adopted, and both the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity were opened for signature.

Financial resources for global environmental protection

During the same period there was an increasing interest in international mechanisms for environmental funding. With the debt crisis, commercial flows for development had become scarce, and the role of multilateral assistance had assumed greater importance in discussions on financial flows and debt rescheduling. Simultaneously, concern with new funding for environmental issues was growing – the Brundtland Report argued for a significant increase in financial support from international sources; the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer established a financial mechanism to provide financial and technical assistance to eligible Parties for the phasing-out of chlorofluorocarbons (CFCs); and the concept of debt-for-nature swaps, that would promote "win-win" situations allowing developing countries to ease their debt burdens and finance environmental protection, was being examined.

A number of proposals for funds and mechanisms were made. Donor country readiness to increase the supply of funds was low and their willingness to support new international agencies even lower, but nevertheless recognition of the principle that additional environment-related funding would have to be provided to developing countries was emerging. During 1989 and 1990 discussions took place within the framework of the World Bank's Development Committee on a new funding mechanism for the environment. At the end of 1990 agreement was reached on the establishment of the Global Environment Facility under a tripartite agreement between the World Bank, UNDP and UNEP. The GEF would be a pilot initiative for a three-year period (1991-1994) to promote international cooperation and to foster action to protect the global environment. The grants and concessional funds disbursed would complement traditional development assistance by covering the additional costs (also known as "agreed incremental costs") incurred when a national, regional or global development project also targets global environmental objectives.

The GEF was given four focal areas, one of which was to be biological diversity.[1] One of the first initiatives taken under the pilot phase was to support preparation of Biodiversity Country Studies in twenty-four developing countries and countries in transition. The primary objective

[1] The other three are climate change, international waters and depletion of the Earth's ozone layer.

of the Biodiversity Country Studies was to gather and analyse the data required to drive forward the process of developing national strategies, plans, or programmes for the conservation and sustainable use of biological diversity and to integrate these activities with other relevant sectoral or cross-sectoral plans, programs, or policies. This anticipated the provisions of key articles of the Convention on Biological Diversity, in particular the requirements in Article 6 for each country to have a national biodiversity strategy and to integrate the conservation and sustainable use of biodiversity into all sectors of national planning and in Article 7 to identify components of biological diversity important for its conservation and sustainable use.

Madagascar

"More than 200,000 hectares of natural forests are burnt or cut down each year."

The negotiation of the Convention on Biological Diversity

The World Conservation Union (IUCN) had been exploring the possibilities for a treaty on the conservation of natural resources, and between 1984 and 1989 had prepared successive drafts of articles for inclusion in a treaty. The IUCN draft articles concentrated on the global action needed to conserve biodiversity at the genetic, species and ecosystem levels, and focused on *in situ* conservation within and outside protected areas. It also included the provision of a funding mechanism to share the conservation burden between the North and the South.

In 1987 the Governing Council of UNEP established an *Ad Hoc Working Group of Experts* on Biological Diversity to investigate "the desirability and possible form of an umbrella convention to rationalise current activities in this field, and to address other areas which might fall under such a convention."

The Group of Experts concluded that while existing global and regional conventions addressed different aspects of biological diversity, the specific focus and mandates of these conventions did not constitute a regime that could ensure global conservation of biological diversity. On the other hand, it also concluded that the development of an umbrella agreement to absorb or consolidate existing conventions was legally and technically impossible. By 1990 the Group had reached a consensus on the need for a new global treaty on biological diversity, in the form of a framework treaty building on existing conventions.

The scope of such a convention was broadened to include all aspects of biological diversity, including *in situ* and *ex situ* conservation of wild and domesticated species, sustainable use of biological resources, access to genetic resources and to relevant technology, including biotechnology, access to benefits derived from such technology, safety of activities related to living modified organisms, and provision of new and additional financial support.

In February 1991 the Group of Experts became the *Intergovernmental Negotiating Committee for a Convention on Biological Diversity* (INC). The INC held seven negotiating sessions, aiming to have the Convention adopted in time for it to be signed by States at the Earth Summit in June 1992.

The relationship between the objectives of the Convention and issues relating to trade, to agriculture and to the emerging biotechnology sector were key issues in the minds of the negotiators. Part of the novelty of the Convention on Biological Diversity lies in the recognition that, to meet its objectives, the Convention would need to make sure that these objectives were acknowledged and taken account of by other key legal regimes. These included the trade regime that would enter into force in 1994 under the World Trade Organization; the FAO Global System on Plant Genetic Resources, in particular the International Undertaking on Plant Genetic Resources adopted in 1983; and the United Nations Convention on the Law of the Sea which was concluded in 1982 and would enter into force in 1994.

Panama

"Deforestation in Panama is at a rate of 5000 hectares per year. 35% of this is caused by conversion for agricultural use."

Those involved in negotiating the Convention on Biological Diversity, as well as those involved in the parallel negotiations on the United Nations Framework Convention on Climate Change, were consciously developing a new generation of environmental conventions. These conventions recognized that the problems they sought to remedy arose from the collective impacts of the activities of many major economic sectors and from trends in global production and consumption. They also recognized that, to be effective, they would need to make sure that the biodiversity and climate change objectives were taken into account in national policies and planning in all sectors, national legislation and relevant international legal regimes, the operations of relevant economic sectors, and by citizens of all countries through enhanced understanding and behavioural changes.

The text of the Convention was adopted in Nairobi on 22 May 1992, and between 5 and 14 June 1992 the Convention was signed in Rio de Janeiro by the unprecedented number of 156 States and one regional economic integration organization (the European Community). The early entry into force of the Convention only 18 months later, on 29 December 1993, was equally unprecedented, and by August 2001 the Convention had 181 Contracting Parties (Annex 2 and Map 18).

THE OBJECTIVES AND APPROACH OF THE CONVENTION

The objectives of the Convention on Biological Diversity are "the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources" (Article 1). These are translated into binding commitments in its normative provisions, contained in Articles 6 to 20.

Objectives of the Convention

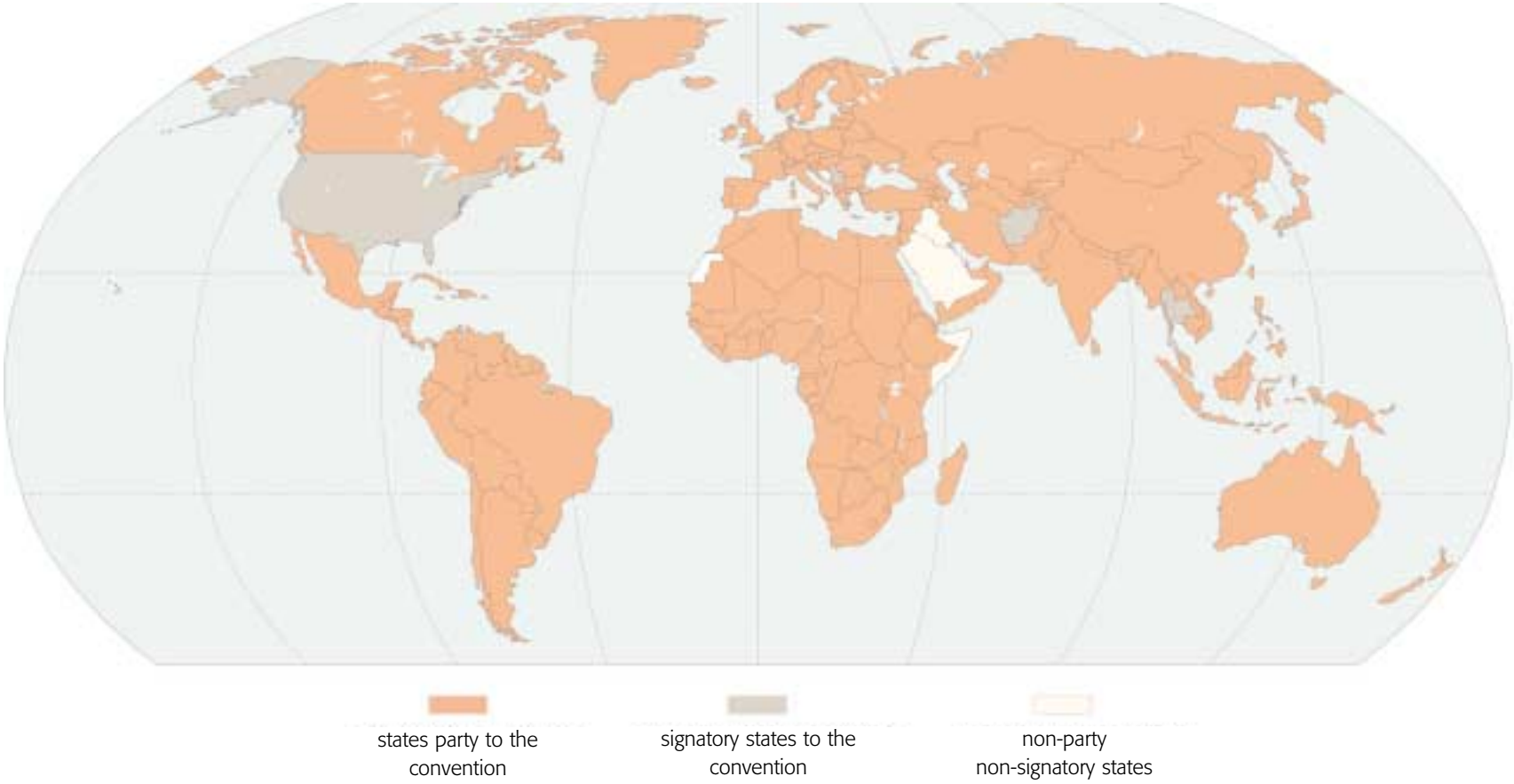
- Conservation of biological diversity
- Sustainable use of components of biological diversity
- Fair and equitable sharing of the benefits arising out of the use of genetic resources

A central purpose of the Convention on Biological Diversity, as with Agenda 21 and the Convention on Climate Change, is to promote sustainable development, and the underlying principles of the Convention are consistent with those of the other "Rio Agreements". The Convention stresses that the conservation of biological diversity is a common concern of humankind, but recognizes that nations have sovereign rights over their own biological resources, and will need to address the overriding priorities of economic and social development and the eradication of poverty.

The Convention recognises that the causes of the loss of biodiversity are diffuse in nature, and mostly arise as a secondary consequence of activities in economic sectors such as agriculture, forestry, fisheries, water supply, transportation, urban development, or energy, particularly activities that focus on deriving short-term benefits rather than long-term sustainability. Dealing with economic and institutional factors is therefore key to achieving the objectives of the Convention. Management objectives for biodiversity must incorporate the needs and concerns of the many stakeholders involved, from local communities upward.

A major innovation of the Convention is its recognition that all types of knowledge systems are relevant to its objectives. For the first time in an international legal instrument, the Convention recognises the

MAP 18



Parties and signatories to the Convention on Biological Diversity

This map shows which nations are full parties to the CBD, which are signatory only, and which are neither.

Source: data from CBD website, 6 August 2001.

Peru

"Estimates reveal that of the original 75 million hectares of forests, by 1990, 7 million had been deforested. At this rate by the year 2000, deforestation will affect about 9,559,817 hectares."

importance of traditional knowledge – the wealth of knowledge, innovations and practices of indigenous and local communities that are relevant for the conservation and sustainable use of biological diversity. It calls for the wider application of such knowledge, with the approval and involvement of the holders, and establishes a framework to ensure that the holders share in any benefits that arise from the use of such traditional knowledge.

The Convention therefore places less emphasis on a traditional regulatory approach. Its provisions are expressed as overall goals and policies, with specific action for implementation to be developed in accordance with the circumstances and capabilities of each Party, rather than as hard and precise obligations. The Convention does not set any concrete targets, there are no lists, no annexes relating to sites or protected species, thus the responsibility of determining how most of its provisions are to be implemented at the national level falls to the individual Parties themselves.

INSTITUTIONAL STRUCTURE OF THE CONVENTION

The Convention establishes the standard institutional elements of a modern environmental treaty: a governing body, the Conference of the Parties; a Secretariat; a scientific advisory body; a clearing-house mechanism and a financial mechanism. Collectively, these translate the general commitments of the Convention into binding norms or guidelines, and assist Parties with implementation. The roles of the institutions are summarised here and discussed in more detail in chapter 3.

Because the Convention is more than a framework treaty, many of its provisions require further collective elaboration in order to provide a clear set of norms to guide States and stakeholders in their management of biodiversity. Development of this normative basis centres around decisions of the ***Conference of the Parties (COP)***, as the governing body of the Convention process. The principal function of the COP is to regularly review implementation of the Convention and to steer its development, including establishing such subsidiary bodies as may be required. The COP meets on a regular basis and held five meetings in the period 1994 to 2000. At its fifth meeting (2000) the COP decided that it would henceforth meet every two years.

The ***Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)*** is the principal subsidiary body of the COP. Its mandate is to provide assessments of the status of biological diversity, assessments of the types of measures taken in accordance with the provisions of the Convention, and advice on any questions that the COP may put to it. SBSTTA met five times in the period 1995 to 2000 and, in the future, will meet twice in each two-year period between meetings of the COP.

The principal functions of the ***Secretariat*** are to prepare for and service meetings of the COP and other subsidiary bodies of the Convention, and to coordinate with other relevant international bodies. The Secretariat is provided by UNEP and is located in Montreal, Canada.

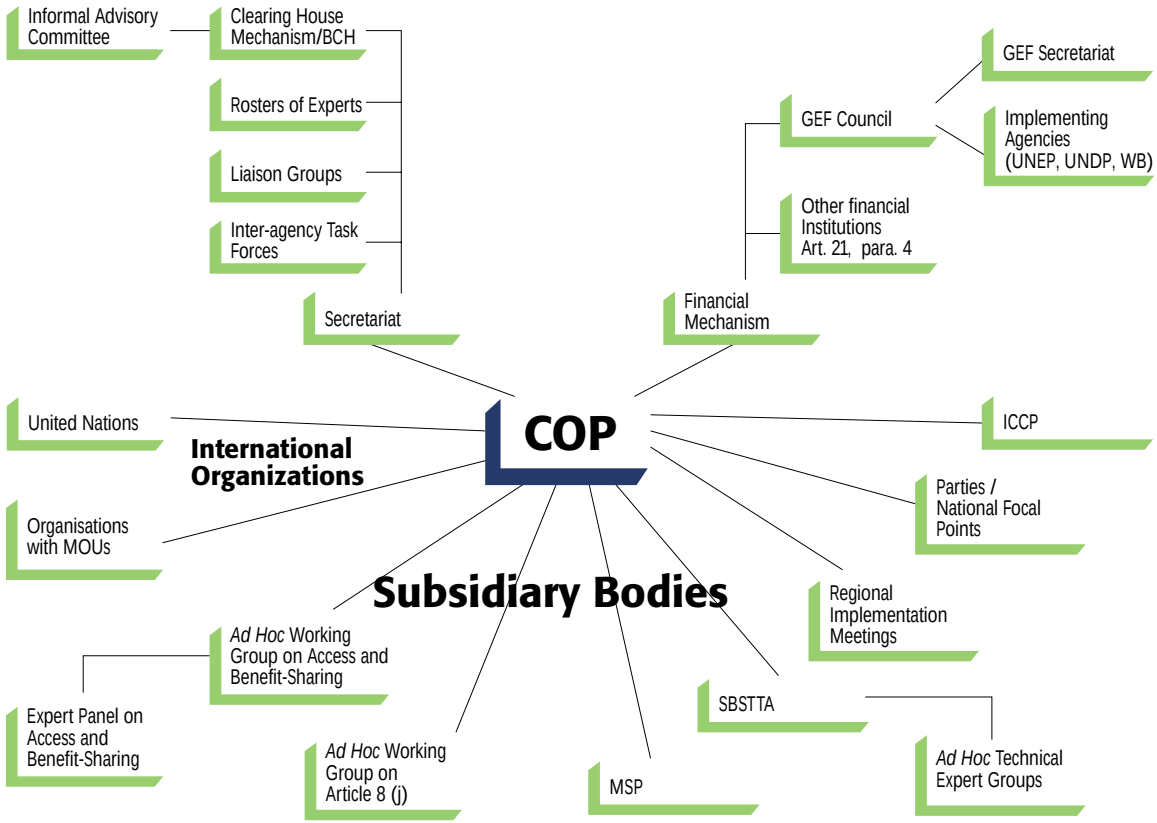
The Convention provides for the establishment of a ***clearing-house mechanism*** to promote and facilitate technical and scientific cooperation (Article 18). A pilot phase of the clearing-house mechanism took place from 1996 to 1998 and, following evaluation of this, the COP has approved a clearing-house mechanism strategic plan and a programme of work until 2004.

The Convention establishes a ***financial mechanism*** for the provision of resources to developing countries for the purposes of the Convention. The financial mechanism is operated by the Global Environment Facility (GEF) and functions under the authority and guidance of, and is accountable to, the COP. GEF activities are implemented by the United Nations Development Programme (UNDP), UNEP and the World Bank. Under the provisions of the Convention, developed country Parties undertake to provide "new and additional financial resources to enable developing country Parties to meet the agreed full incremental cost of implementing the obligations of the Convention" (Article 20) and, in addition to the provision of resources through the GEF, these Parties may also provide financial resources through bilateral and multilateral channels.

The COP is able, if it deems it necessary, to establish ***intersessional bodies and meetings*** to carry out work and provide advice between ordinary meetings of the COP. Those open-ended meetings that have been constituted so far include:

- *Open ended Ad Hoc Working Group on Biosafety (met six times from 1996-1999 – see below)*
- *Workshop on Traditional Knowledge and Biological Diversity (met in 1997)*
- *Intersessional Meeting on the Operations of the Convention (ISOC) (met in 1999)*
- *Ad Hoc Working Group on Article 8(j) and Related Provisions (met in 2000, will meet again in 2002)*
- *Ad Hoc Open-ended Working Group on Access and Benefit Sharing (will meet in 2001)*
- *Meeting on the Strategic Plan, National Reports and Implementation of the Convention (MSP) (will meet in 2001).*

Figure 2.1 **Institutions of the Convention**



Cartagena Protocol on Biosafety

The Convention requires the Parties to "consider the need for and modalities of a protocol setting out appropriate procedures, including, in particular, advance informed agreement, in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity" (Article 19(3)).

At its second meeting, the COP established a negotiating process and an *Ad Hoc* Working Group on Biosafety that met six times between 1996 and 1999 to develop a draft protocol. The draft submitted by the Working Group was considered by an Extraordinary Meeting of the COP held in Cartagena, Colombia in February 1999 and in Montreal, Canada in January 2000, and on 29 January 2000 the text of the ***Cartagena Protocol on Biosafety to the Convention on Biological Diversity*** was adopted. The Protocol was opened for signature during the fifth meeting of the COP in May 2000 where it was signed by

68 States. The number of signatures had risen to 103 by 1 August 2001, and five States had ratified the Protocol. It will enter into force after the fiftieth ratification.

The COP will serve as the meeting of the Parties to the Protocol. The meetings will however be distinct, and only Parties to the Convention who are also Parties to the Protocol may take decisions under the Protocol (States that are not a Party to the Convention cannot become Party to the Protocol). Pending the entry into force of the Protocol, an *Intergovernmental Committee for the Cartagena Protocol (ICCP)* has been established to undertake the preparations necessary for the first meeting of the Parties. The first meeting of the Intergovernmental Committee was held in Montpellier, France in December 2000 and the second in Nairobi, Kenya in September-October 2001.

Samoa

"Approximately one third (23,885 hectares) of the country's forests were cleared between 1977 and 1990. In the last 5 years the rate of deforestation has been 3% per annum, one of the highest in the world."

THE DECISION-MAKING PROCESS

The activities of the COP have been organized through programmes of work that identify the priorities for future periods. The first medium-term programme of work (1995 to 1997) saw a focus on developing the procedures and *modus operandi* of the institutions, determining priorities, supporting national biodiversity strategies, and developing guidance to the financial mechanism. At its fourth meeting, the COP adopted a programme of work for its fifth, sixth and seventh meetings (1999-2004), and, at its fifth meeting, approved a longer-term programme of work for SBSTTA, and began the development of a strategic plan for the Convention.

The following are the key steps in the decision-making process.

Identification The programme of work establishes a timetable indicating when the COP will consider in detail biological themes or ecosystems, or specific provisions of the Convention contained in the operative Articles. In addition to such ecosystem based programmes, the COP has addressed a number of key substantive issues in a broadly comprehensive manner. Such issues are collectively known as "cross-cutting issues", and these have an important role to play in bringing cohesion to the work of the Convention by linking the thematic programmes.

Submissions and Compilation of Information The procedures by which the COP comes to adopt its decisions are broadly similar in each case. Firstly, current activities are reviewed to identify synergies and gaps within the existing institutional framework, or an overview of the state of knowledge on the issue under examination is developed. At the same time, Parties, international organizations, specialist scientific and non-governmental organizations are invited to provide information, such as reports or case studies. This review mechanism is coordinated by the Secretariat, supported in some cases by informal inter-agency task forces or liaison groups of experts.

Current ecosystem themes

- Marine and coastal biological diversity
- Forest biological diversity
- Biological diversity of inland water ecosystems
- Agricultural biological diversity
- Biological diversity of dry and sub-humid lands
- Mountain ecosystems (to be considered at COP-7 in 2004)

Current cross-cutting issues

- Identification, monitoring and assessment of biological diversity, and development of indicators
- Access to genetic resources
- Knowledge, innovations and practices of indigenous and local communities
- Sharing the benefits arising from the utilisation of genetic resources
- Intellectual property rights
- The need to address a general lack of taxonomic capacity worldwide
- Alien species that threaten ecosystems, habitats or species
- Sustainable use, including tourism
- Protected areas (to be considered at COP-7 in 2004)
- Transfer of technology and technology cooperation (to be considered at COP-7 in 2004).

Preparation of synthesis The Secretariat then prepares a preliminary synthesis of these submissions for consideration by SBSTTA. Where appropriate the Secretariat may use a liaison group to assist with this. In other cases SBSTTA may have established an *ad hoc* technical expert group, with members drawn from rosters of experts nominated by Parties, to assist with the preparation of the synthesis. Where appropriate, the Secretariat may also identify relevant networks of experts and institutions, and coordinate their input to the preparation of the synthesis.

Scientific, Technical or Technological Advice On the basis of the work of the Secretariat, of any *ad hoc* technical expert group, and the findings of specialist meetings such as the Global Biodiversity Forum, SBSTTA will assess the status and trends of the biodiversity of the ecosystem in question or the relationship of the cross-cutting issue to the implementation of the Convention and develop its recommendation to the COP accordingly.

Supplementary Preparations for the COP The advice of SBSTTA may be complemented by the work of the Secretariat in the intersessional period between the meeting of the SBSTTA and that of the COP. Such work may comprise issues not within the mandate of the SBSTTA, such as financial and legal matters, development of guidance to the financial mechanism, or relations with other institutions and processes that could contribute to implementation of the future decision of the COP.

Programmes The COP considers the recommendations of the SBSTTA and any other advice put before it. It will then advise Parties on the steps they should take to address the issue, in light of their obligations under the Convention. It may also establish a process or programme to develop the issue further. Such a programme would establish goals and identify the expected outcomes, including a timetable for these and the means to achieve them. The types of output to be developed could include: guidelines, codes of conduct, manuals of best practice, guidance for the institutions of the Convention, criteria, and so forth. The programme would proceed to develop these products, under the guidance of SBSTTA, and report results to the COP for review.

Slovakia

"It is assumed that as much as 90% of the territory of Slovakia was covered with woods before intensive human activities and interference into vegetation cover started. Since 1950, the area of forest land has been continuously increasing, by 12% in total. This increase was caused by the afforestation of less productive and infertile agricultural lands."

OBLIGATIONS ON PARTIES TO THE CONVENTION

The Convention constitutes a framework for action that will take place mainly at the national level. It places few precise binding obligations upon Parties, but rather provides goals and guidelines, and these are further elaborated by decisions of the COP. Most of the commitments of Parties under the Convention are qualified, and their implementation will depend upon the particular national circumstances and priorities of individual Parties, and the resources available to them. Nevertheless, Parties are obliged to address the issues covered by the Convention, the chief of which are outlined in the following sections.

Article 6: National strategies and plans

The implementation of the Convention requires the mobilisation of both information and resources at the national level. As a first step, the Convention requires Parties to develop national strategies, plans or programmes for the conservation and sustainable use of biodiversity, or to adapt existing plans or programmes for this purpose (Article 6(a)). This may require a new planning process, or a review of existing environmental management or other national plans.

The Convention also requires Parties to integrate conservation and sustainable use of biodiversity into relevant sectoral or cross-sectoral plans, programmes and policies, as well as into national decision-making (Article 6(b)). This is clearly a more complex undertaking, requiring an assessment of the impacts of other sectors on biodiversity management. It will also require coordination among government departments or agencies. A national biodiversity planning process can identify the impacts and opportunities for integration.

National biodiversity strategies and action plans

For most Parties, developing a national biodiversity strategy will involve:

- establishing the institutional framework for developing the strategy, including designating leadership and ensuring a participative approach
- allocating or obtaining financial resources for the strategy process
- assessing the status of biological diversity within its jurisdiction
- articulating and debating the vision and goals for the strategy through a national dialogue with relevant stakeholders
- comparing the actual situation to the objectives and targets
- formulating options for action that cover key issues identified
- establishing criteria and priorities to help choose from among options
- matching actions and objectives

Developing and implementing national biodiversity action plans will involve:

- assigning roles and responsibilities
- agreeing the tools and approaches to be used
- establishing timeframes and deadlines for completion of tasks
- obtaining the budget
- agreeing indicators and measurable targets against which progress can be assessed
- determining reporting responsibilities, intervals and formats
- establishing procedures for incorporating lessons learned into the revision and updating of the strategy

Given the importance of stakeholder involvement in the implementation of the Convention, national planning processes should provide plenty of scope for public consultation and participation. The COP has recommended the guidance for the development of national strategies found in: *Guidelines for Preparation of Biodiversity Country Studies* (UNEP) and *National Biodiversity Planning: Guidelines Based on Early Country Experiences* (World Resources Institute, UNEP and IUCN). The financial mechanism has supported 125 countries in the preparation of their national biodiversity strategies and action plans (see chapter 3).

Article 7: Identification and monitoring of biodiversity

In contrast to some previous international or regional agreements on conservation, the Convention does not contain an internationally agreed list of species or habitats subject to special measures of protection. This is in line with the country-focused approach of the Convention. Instead, the Convention requires Parties to identify for themselves components of biodiversity important for conservation and sustainable use (Article 7).

Information provides the key for the implementation of the Convention, and Parties will require a minimum set of information in order to be able to identify national priorities. Whilst it contains no lists, the Convention does indicate, in Annex I, the types of species and ecosystems that Parties might consider for particular attention (see Box). Work is also under way within the Convention to elaborate Annex I in order to assist Parties further.

Indicative categories to guide Parties in the identification and monitoring of biodiversity

Ecosystems and habitats

- *with high diversity, large numbers of endemic or threatened species, or wilderness*
- *required by migratory species*
- *of social, economic, cultural or scientific importance*
- *representative, unique or associated with key evolutionary or other biological processes*

Species and communities

- *threatened*
- *wild relatives of domesticated or cultivated species*
- *of medicinal, agricultural or other economic value*
- *of social, scientific or cultural importance*
- *of importance for research into the conservation and sustainable use of biological diversity, such as indicator species*

Described genomes or genes of social, scientific or economic importance

Parties are also required to monitor important components of biodiversity, and to identify processes or activities likely to have adverse effects on biodiversity. The development of indicators may assist Parties in monitoring the status of biological diversity and the effects of measures taken for its conservation and sustainable use.

Spain

"Agriculture has claimed 39% of Spanish territory, most of which was forest in origin. Atmospheric contamination is responsible for the degradation of approximately 7% of forest cover, which shows 25% defoliation."

Article 8: Conservation of biodiversity *in situ*

The Convention addresses both *in situ* and *ex situ* conservation, but the emphasis is on *in situ* measures, i.e. within ecosystems and natural habitats or, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties. Article 8 sets out a comprehensive framework for *in situ* conservation and a Party's national biodiversity planning process should include consideration of the extent to which it currently addresses the following issues.

Protected areas Parties should establish a system of protected areas or areas where special measures are required to conserve biological diversity, covering both marine and terrestrial areas. They are expected to develop guidelines for the selection, establishment and management of these areas, and to enhance the protection of such areas by the environmentally sound and sustainable development of adjacent areas.

Regulation and management of biological resources Parties should regulate or manage important components of biological diversity whether found within protected areas or outside them. Legislation or other regulatory measures should therefore be introduced or maintained to promote the protection of ecosystems, natural and semi-natural habitats and the maintenance of viable populations of species in natural surroundings.

Regulation and management of activities Under Article 7 Parties should attempt to identify activities that may be detrimental to biological diversity. Where such activities have been identified, Parties should take steps to manage them so as to reduce their impacts.

Rehabilitation and restoration Parties should develop plans and management strategies for the rehabilitation and restoration of degraded ecosystems and the recovery of threatened species.

Alien species Parties should prevent the introduction of, and control or eradicate alien species which threaten ecosystems, habitats, or native species.

Living modified organisms Parties should establish or maintain means to manage the risks associated with the use and release of living modified organisms (LMOs) resulting from biotechnology. Parties are thus required to take action at the national level to ensure that LMOs do not cause adverse effects to biodiversity.

Traditional knowledge and practices The Convention recognizes that indigenous and local communities embodying traditional lifestyles have a crucial role to play in the conservation and sustainable use of biodiversity. It calls on Parties to respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities and to encourage their customary uses of biological resources compatible with the conservation and sustainable use of these resources. By this, the Convention acknowledges the significance of traditional knowledge and practices, which should be taken into account in the implementation of all aspects of the Convention.

Article 9: Conservation of biodiversity *ex situ*

While prioritising *in situ* conservation, the Convention recognizes the contribution that *ex situ* measures and facilities, such as gene banks, botanic gardens and zoos, can make to the conservation and sustainable use of biological diversity. It specifies that, where possible, facilities for *ex situ* conservation should be established and maintained in the country of origin of the genetic resources concerned.

The Convention does not, however, apply its provisions on access and benefit-sharing to *ex situ* resources collected prior to the entry into force of the Convention. This is of particular concern to developing countries, from which natural resources have already been removed and stored in *ex situ* collections, without a mechanism to ensure the sharing of benefits. The issue of the status of *ex situ* resources is currently being reviewed within the context of the work of the Food and Agriculture Organization of the United Nations.

Switzerland

"75% of all standard orchards have disappeared within the last 40 years. Only 7% of the forests on the Plateau have not been exploited."

Article 10: Sustainable use

Although the term conservation has sometimes been taken to incorporate sustainable use of resources, in the Convention the two terms appear side by side, and a specific Article of the Convention is devoted to sustainable use. This reflects the view of many countries during the negotiation of the Convention that the importance of sustainable use of resources be accorded explicit recognition. Sustainable use is defined in the Convention as:

"the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations."

The practical implications of this definition in terms of management are difficult to assess. Article 10 does not suggest quantitative methods for establishing the sustainability of use, but sets out five general areas of activity: the need to integrate conservation and sustainable use into national decision-making; to avoid or minimize adverse impacts on biological diversity; to protect and encourage customary uses of biodiversity in accordance with traditional cultural practices; to support local populations to develop and implement remedial action in degraded areas; and to encourage cooperation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.

Articles 11-14: Measures to promote conservation and sustainable use

The Convention makes explicit reference to a number of additional policy and procedural measures to promote conservation and sustainable use. For example, it requires Parties to adopt economically and socially sound incentives for this purpose (Article 11). It also recognizes the importance of public education and awareness to the effective implementation of the Convention (Article 13). Parties are therefore required to promote understanding of the importance of biodiversity conservation, and of the measures needed.

Research and training are critical to the implementation of almost every substantive obligation. Some deficit in human capacity exists in all countries, particularly so in developing countries. The Convention requires Parties to establish relevant scientific and technical training programmes, to promote research contributing to conservation and sustainable use, and to cooperate in using research results to develop and apply methods to achieve these goals (Article 12). Special

attention must be given to supporting the research and training needs of developing countries, and this is explicitly linked to the provisions on access to and transfer of technology, technical and scientific cooperation and financial resources.

Parties are required to introduce appropriate environment impact assessment (EIA) procedures for projects likely to have significant adverse effects on biodiversity (Article 14). Legislation on EIA will generally incorporate a number of elements, including a threshold for determining when an EIA will be required, procedural requirements for carrying it out, and the requirement that the assessment be taken into account when determining whether the project should proceed. In addition, Parties are required to consult with other States on activities under their jurisdiction and control that may adversely affect the biodiversity of other States, or areas beyond national jurisdiction.

Articles 15-21: Benefits

The Convention provides for scientific and technical cooperation to support the conservation and sustainable use of biological diversity, and a clearing-house mechanism is being developed to promote and facilitate this cooperation. The provisions on scientific and technical cooperation provide a basis for capacity-building activities. For example, the COP has requested the financial mechanism to support a *Global Taxonomy Initiative* designed, among other things, to develop national, regional and sub-regional training programmes, and to strengthen reference collections in countries of origin. In addition to general provisions on cooperation, research and training, the Convention includes articles promoting access to the potential benefits resulting from the use of genetic resources, access to and transfer of relevant technology, and access to increased financial resources.

The potential benefits for developing country Parties under the Convention arise from the new position on conservation negotiated between developed and developing countries. The extent to which these benefits materialise is likely to be crucial to determining the long-term success of the Convention. Global biodiversity increases toward the tropics, and the Convention gives developing countries, in this zone and elsewhere, an opportunity to derive financial and technical benefits from their biological resources, while the world overall benefits from the goods and services that the biodiversity thus conserved will continue to provide.

Access to genetic resources and benefit-sharing Before the negotiation of the Convention, genetic resources were considered to be freely available, despite their potential monetary value. However, the approach taken in the Convention is radically different. Article 15 reaffirms the sovereignty of Parties over their genetic resources, and recognizes the authority of States to determine access to those resources. While the Convention addresses sovereignty over resources, it does not address their *ownership*, which remains to be determined at national level in accordance with national legislation or practice.

Although the sovereign rights of States over their genetic resources is emphasised, access to genetic resources for environmentally sound uses by scientific and commercial institutions under the jurisdiction of other Parties is to be facilitated. Since genetic resources are no longer regarded as freely available, the Convention paves the way for new types of regimes governing the relationship between providers and users of genetic resources.

Syria

"By 1997, 200 thousand hectares of the country have been afforested or 1.06% of the total area of the country. Only 233 thousand hectares is covered with natural forest."

Key elements in genetic resource use agreements

- the need to obtain the *prior informed consent* of the country of origin before obtaining access to resources
- the need for *mutually agreed terms* of access with the country of origin (and potentially with direct providers of genetic resources such as individual holders or local communities)
- the importance of *benefit-sharing*; the obligation to share, in a fair and equitable way, benefits arising from the use of genetic resources with the Party that provides those resources

It is generally agreed that benefit-sharing should extend not only to the government of the country of origin but also to indigenous and local communities directly responsible for the conservation and sustainable use of the genetic resources in question. National legislation might require bio-prospectors to agree terms with such communities for the use of resources, and this may be all the more crucial where bio-prospectors are seeking to draw upon not only the resources themselves, but also upon the knowledge of these communities about those resources and their potential use.

Access to and transfer of technologies Under Article 16 of the Convention, Parties agree to share technologies relevant to the conservation of biological diversity and the sustainable use of its components, and also technologies that make use of genetic resources. Technology transfer under the Convention therefore incorporates both "traditional" technologies and biotechnology.

Biotechnology is defined in the Convention as: any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Technologies which make use of genetic resources are subject to special provisions aimed at allowing the country of origin of the resources to share in the benefits arising out of the development of these technologies. The Convention makes it a specific requirement that all Parties create a legislative, administrative or policy framework with the aim that such technologies are transferred, on mutually agreed terms, to those providing the genetic resources. This obligation extends to technology protected by patents and other intellectual property rights.

More generally, developing country Parties are to have access to technology under terms which are fair and most favourable, including on concessional and preferential terms, where mutually agreed. Article 16 provides that where relevant technology is subject to an intellectual property right such as a patent, the transfer must be on terms which recognize and are consistent with the adequate and effective protection of the property right. However, it also goes on to provide that Parties are to cooperate in ensuring that intellectual property rights are supportive of, and do not run counter to, the objectives of the Convention.

Financial resources All Parties undertake to provide financial support and incentives for implementation of the Convention at the national level, in accordance with their capabilities. In addition, developed country Parties agree to make available to developing country Parties, new and additional financial resources to meet "the agreed full incremental costs" of implementing measures to fulfil their obligations.

In addition to the financial mechanism mentioned earlier, developed country Parties may provide resources to improve implementation of the Convention through overseas development agencies and other bilateral channels.

The Convention explicitly recognizes that the extent to which developing country Parties will be able to implement their obligations under the Convention will depend on the developed country Parties fulfilling their obligations to provide resources. The Convention also acknowledges that economic and social development remains the overriding priority of developing countries, and in this regard recognizes the special circumstances and needs of the small island developing States. As a result of both these considerations, developed country Parties are expected to give due consideration to the dependence on, distribution and location of biological diversity within developing countries, in particular small island States and those that are most environmentally vulnerable, such as those with arid and semi-arid zones, coastal and mountainous areas.

ASSESSING IMPLEMENTATION OF THE CONVENTION

The Convention provides for Parties to present reports to the COP on measures taken to implement the provisions of the Convention and their effectiveness in meeting the objectives of the Convention (Article 26). At its second meeting, the COP decided that the first national reports should focus on implementation of Article 6 of the Convention. This article concerns the need to develop a national biodiversity strategy and action plan, and to ensure that the conservation and sustainable use of biological diversity is integrated with the policies and programmes of other sectors. The information in these reports was considered by the fourth meeting of the COP, which asked SBSTTA to give advice on the nature of the information required from Parties in order to assess the state of implementation of the Convention. A review of national implementation based on the information in the first national reports is contained in chapter 4.

At its fifth meeting, the COP adopted a methodology for national reporting that will enable Parties to provide information on the implementation of all their obligations, as derived from the articles of the Convention and from decisions of the COP that call for action by Parties. The reporting guidelines will permit Parties to consider the effectiveness of the measures taken and to identify national priorities, national capacity for implementation and constraints encountered. The COP will be able to identify issues that require further scientific or technical investigation, and to identify successes and constraints faced by Parties. In the latter case it will be better placed to decide what steps are necessary to support Parties, and to give appropriate guidance to the financial mechanism, institutions able to assist with capacity development, the Secretariat and to the Parties themselves.

COOPERATION

Given the enormous breadth of the issues that the Convention seeks to address, there is need not only for cooperation between Parties, but also to develop institutional links and cooperative relationships with other international bodies. Mechanisms for coordinating these relationships are fundamental to the implementation of the Convention. Each meeting of the COP has reaffirmed the importance it attaches to cooperation and coordination between the Convention and other relevant conventions, institutions and processes, and has invited these to take an active role in the implementation of aspects of the Convention.

Thailand

"54% of Thailand was covered by forest in 1960, however this figure had declined to 26% by 1992."

Equally importantly, the COP has reaffirmed the importance of the role to be played by groups other than States and international bodies. Non-state actors – national and international non-governmental organizations, scientific bodies, industrial and agricultural associations, and indigenous peoples' organizations, amongst others – have all been called upon to cooperate in scientific assessments, policy development, and implementation of the Convention's work programmes. In particular, as traditional knowledge about conserving and sustainably using biodiversity is central to the development and implementation of the work programmes, cooperation with the holders of traditional knowledge has been particularly emphasized.

The institutional structure of the Convention thus extends beyond those institutions established by the process itself. Cooperation is discussed in chapter 5.

THE OPERATIONS OF THE CONVENTION

MEETINGS OF THE CONFERENCE OF THE PARTIES AND SBSTTA TO DATE

The Conference of the Parties is the governing body of the Convention, and advances implementation of the Convention through the decisions it takes at its periodic meetings. This chapter explains briefly how meeting are conducted and decisions made, and discusses the main thematic areas covered by decisions to date.[1]

It is worth noting at the outset that a key issue confronting the Conference of the Parties is to assess the extent to which the decisions it takes are acted upon. In the case of action to be taken by the bodies established by the Convention (subsidiary bodies, the Secretariat, the financial mechanism) or by other international bodies, procedures for reporting back to the COP, and its review of action taken, are straightforward. In the case of action to be taken by Parties, the COP depends upon the submission of the national reports on implementation called for by the Convention or of voluntary submission of case studies or other information by Parties.

To assist in clarifying expectations and responsibilities, the Conference of the Parties has decided to adopt targeted decisions – identifying who is expected to carry out the action in question – and has begun the process of developing a strategic plan for the Convention until 2010. It has also further elaborated the *modus operandi* of SBSTTA in order to improve the ability of SBSTTA to provide the COP with scientific, technical and technological advice.

To date the Conference of the Parties has held five ordinary meetings, and one extraordinary meeting (the latter, to adopt the Biosafety Protocol, was held in two parts). From 1994 to 1996, the Conference of the Parties held its ordinary meetings annually. Since then these meetings have been held somewhat less frequently and, following a change in the rules of procedure in 2000, will now be held every two years. To date the Conference of the Parties has taken a total of 114 procedural and substantive decisions.

Tunisia

"Forests and forest vegetation occupied 3,300,000 hectares at the beginning of the century, but now only cover 970,000 hectares. It has been estimated that between 1890 and 1975, 2,500,000 hectares of forest and 2,700,000 hectares of steppe were turned into agricultural land."

[1] Further information on the conduct of meetings is contained in the Annex to this chapter. Full information on the decisions adopted by the Conference of the Parties can be found in the *Handbook of the Convention on Biological Diversity.*

Table 3.1 **Meetings of the Conference of the Parties**

Meeting of the Conference of the Parties	Location	Date	No. of decisions
First ordinary meeting (COP-1)	Nassau, Bahamas	28 November – 9 December 1994	13
Second ordinary meeting (COP-2)	Jakarta, Indonesia	4-17 November 1995	23
Third ordinary meeting (COP-3)	Buenos Aires, Argentina	3-14 November 1996	27
Fourth ordinary meeting (COP-4)	Bratislava, Slovak Republic	4-15 May 1998	19
First extraordinary meeting (ExCOP)	Cartagena, Colombia and Montreal, Canada	22-24 February 1999 and 24-29 January 2000	3
Fifth ordinary meeting (COP-5)	Nairobi, Kenya	15-26 May 2000	29

The sixth ordinary meeting (COP-6) will be held in The Hague, The Netherlands from 8 to 19 April 2002.

The agenda of the meetings of the Conference of the Parties is very wide-ranging, reflecting the programme of work the Conference of the Parties has established for itself. At its first meeting, the Conference of the Parties decided on a medium-term programme of work for the period 1995-1997. Implementation of this programme has laid the groundwork for the long-term implementation of the Convention itself. In particular it has seen the development of a number of thematic work programmes, and identified a series of key cross-cutting issues relevant to all work programmes. These are discussed in more detail below.

The fourth meeting of the Conference of the Parties established a programme of work to cover the period from then until the seventh meeting and, more importantly, established a process to review the operations of the Convention and set out a longer-term programme of work. As part of this process, an intersessional meeting on the operations of the Convention was held in 1999, the results of which were reported to the fifth meeting of the Conference of the Parties and formed the basis for a decision on future operations of the Convention.

Table 3.2 **Major themes at meetings of the Conference of the Parties**

Meeting of the Conference of the Parties	Items for in-depth consideration
First (1994)	Guidance to the financial mechanism Medium-term programme of work
Second (1995)	Marine and coastal biological diversity Access to genetic resources Conservation and sustainable use of biological diversity Biosafety
Third (1996)	Agricultural biodiversity Financial resources and mechanism Identification, monitoring and assessment Intellectual property rights
Fourth (1998)	Inland water ecosystems Review of the operations of the Convention Article 8(j) and related issues (traditional knowledge) Benefit-sharing
Fifth (2000)	Dryland, mediterranean, arid, semi-arid, grassland and savannah ecosystems Sustainable use, including tourism Access to genetic resources
Sixth (2002)	Forest ecosystems Alien species Benefit-sharing Strategic plan 2002-2010
Seventh (2004)	Mountain ecosystems Protected areas Transfer of technology and technology cooperation

Uganda

"Rates of deforestation have recently decreased due to improved political and economic stability. However the biodiversity they contain are still under considerable pressure."

In this decision the COP set out a series of standing items for the provisional agenda of its meetings, namely:

- Organizational matters;
- Reports from subsidiary bodies, the financial mechanism and the Executive Secretary;
- Review of the implementation of the programme of work;
- Priority issues for review and guidance; and
- Other matters.

The COP has also undertaken to prepare and develop a Strategic Plan for the Convention, with a view to adopting it at its sixth meeting. The plan will initially cover the period 2002-2010. It will be based on the longer-term programmes of work of the COP and SBSTTA and is intended to provide strategic and operational guidance for the implementation of these programmes. It will contain a set of operational goals that the Conference of the Parties wishes to be achieved in the period covered by the plan, relating to the three main

areas of work, these being the thematic programmes, cross-cutting issues and initiatives, and the implementation of the provisions of the Convention.

The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)

SBSTTA has also met five times to date and produced a total of 49 recommendations to the Conference of the Parties, ten of which have been endorsed in full by the latter. Such endorsement makes these recommendations *de facto* decisions of the Conference of the Parties. Parts of other recommendations have also been endorsed, and many others have been taken up in modified form.

The seventh meeting will take place in Montreal from 12 to 16 November 2002.

The Conference of the Parties has recognized the need for an improvement in the quality of scientific, technical and technological advice provided to it and decided at its fifth meeting in 2000 to give further guidance at its next meeting to SBSTTA on ways for the latter to improve its inputs. It decided that SBSTTA should meet every year and gave it more flexibility in the way it carried out its work, for example by allowing it to make requests directly to the Executive Secretary (rather than channelling these through the Conference of the Parties as in the past) and using the clearing-house mechanism to help prepare its meetings.

Ukraine

"Forest covers 14.3% of Ukraine compared with 28% in 1850."

Table 3.3 **Meetings of the Subsidiary Body on Scientific, Technical and Technological Advice**

Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)	Location	Date	No. of recommendations
First meeting (SBSTTA 1)	Paris, France	4-8 September 1995	9
Second meeting (SBSTTA 2)	Montreal	2-6 September 1996	12
Third meeting (SBSTTA 3)	Montreal	1-5 September 1997	7
Fourth meeting (SBSTTA 4)	Montreal	21-25 June 1999	7
Fifth meeting (SBSTTA 5)	Montreal	31 January – 4 February 2000	14
Sixth meeting (SBSTTA 6)	Montreal	12-16 March 2001	9

United Kingdom

"5,200 hectares of trees have been replanted in the country up to 1996/97."

The form and content of decisions

Decisions of the Conference of the Parties cover matters ranging from the date and venue of the next meeting to substantive issues such as the budget of the Convention, adoption of protocols and the establishment of major work programmes. Under Article 29, the Parties may even decide to amend the text of the Convention itself, although this has not yet happened.

Decisions vary greatly in their form and content. However, those concerning substantive issues generally contain some or all of the following:

- Advice to Parties, including:
  - General advice concerning national policies and activities,
  - Advice concerning the Convention processes, such as submission of case studies to the Secretariat, sharing of experiences through the clearing-house mechanism, the form, content and submission date of national reports,
- Instructions to the Secretariat concerning implementation of the decision, including mechanisms for reporting back to the Conference of the Parties,
- Instructions to, and requests for advice from, the Subsidiary Body on Scientific, Technical and Technological Advice,
- Responses to recommendations received from SBSTTA, including noting and full or partial endorsement,
- Establishment of and terms of reference for various other intersessional bodies and activities, including liaison groups, expert groups and working groups,
- Advice to the institution operating the financial mechanism,
- Decisions on the relationship between the Convention and other relevant processes, including transmission of statements from the Conference of the Parties to other processes.

Detailed work programmes, sets of guiding principles and statements for transmission to other processes are generally placed in annexes to the decision.

At its fifth meeting, the Conference of the Parties decided to try to standardise its decisions, by ensuring that as far as possible they identify expected outcomes, activities to achieve those outcomes, those to whom the decisions are directed and timetables for action and follow-up. Previous decisions are to be reviewed periodically to assess their implementation.

The ecosystem approach

The Conference of the Parties decided early on the ecosystem approach should be the primary framework of action to be taken under the Convention. The Convention defines an ecosystem as "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit."

In deliberations on the ecosystem approach, it has become apparent that there are different interpretations of what the term might actually mean in practice. In order to help try to resolve this, a workshop was held in Malawi in 1998. At its fourth meeting, the Conference of the Parties noted the results of the workshop, which included a set of guidelines, and asked SBSTTA to develop the guidelines further. The resulting document contained a description of the ecosystem approach and a set of twelve guiding principles in its application, together with five points of operational guidance. At its fifth meeting, the Conference of the Parties endorsed the description of the ecosystem approach and the points of operational guidance, and recommended application of the principles as reflecting the present level of common understanding. It also encouraged further conceptual elaboration and practical verification.

Table 3.4 **The ecosystem approach** (decision V/6)

Guiding principles	The following 12 principles are complementary and interlinked:
Principle 1	The objectives of management of land, water and living resources are a matter of societal choice.
Principle 2	Management should be decentralized to the lowest appropriate level.
Principle 3	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
Principle 4	Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: (a) Reduce those market distortions that adversely affect biological diversity; (b) Align incentives to promote biodiversity conservation and sustainable use; (c) Internalize costs and benefits in the given ecosystem to the extent feasible.
Principle 5	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
Principle 6	Ecosystems must be managed within the limits of their functioning.
Principle 7	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
Principle 8	Recognizing the varying temporal scales and lag effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
Principle 9	Management must recognize that change is inevitable.
Principle 10	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
Principle 11	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
Principle 12	The ecosystem approach should involve all relevant sectors of society and scientific disciplines.
Operational guidance	In applying the 12 principles of the ecosystem approach, the following five points are proposed as operational guidance:
	Focus on the functional relationships and processes within ecosystems.
	Enhance benefit-sharing.
	Use adaptive management practices.
	Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate.
	Ensure intersectoral cooperation.

Uzbekistan

"Total area occupied by trees and shrubs in the Kashkadarya river basin has dropped by 12%. Area of Tugai forests has declined by 2 times due to the shrinking of the Aral Sea."

The description of the ecosystem approach stresses that, as defined under the Convention, an ecosystem can be a functional unit at any spatial scale. It also observes that humans are an integral part of many ecosystems, and notes that, because of the often unpredictable nature of ecosystem responses and our incomplete understanding of ecosystem functioning, application of the ecosystem approach will require adaptive management techniques. It further states that the ecosystem approach does not preclude other management and conservation approaches, such as protected areas and single-species conservation programmes, but could rather integrate all these approaches to deal with complex situations.

The Conference of the Parties has asked Parties to strengthen regional, national and local capacities on the ecosystem approach by identifying case studies, by implementing pilot projects and by organizing workshops and consultations to enhance awareness and share experiences. It has asked the Secretariat to collect, analyse and compare case studies and to prepare a synthesis of experiences and lessons learned.

THE MAJOR THEMATIC AREAS COVERED BY COP DECISIONS

The approach adopted by the Conference of the Parties in implementing the Convention has been the development of a series of thematic work programmes on major ecosystem types. To date these cover:

- marine and coastal biological diversity (the Jakarta Mandate),
- forest biological diversity,
- inland water biological diversity,
- agricultural biological diversity,
- biological diversity of dry and sub-humid lands.

The programmes have certain elements in common. They establish basic principles for future work, set out key issues for consideration, identify potential outputs and suggest a timetable and ways and means of producing these outputs. It is envisaged that each programme will have contributions from Parties, the Secretariat and a range of relevant organizations. Through an early emphasis on stocktaking of existing activities, assessments of status and trends, and capacity-building, the outputs from these programmes will include guidelines and manuals of best practice, criteria and indicators, codes of conduct and guidance for the institutions of the Convention. These will facilitate implementation of the specific operative articles of the Convention, as implementation moves into the next phase.

Marine and coastal biological diversity – the Jakarta Mandate

The conservation and sustainable use of marine and coastal biological diversity was one of the first major issues to be addressed by the Conference of the Parties. Following advice from SBSTTA, the second meeting of the Conference of the Parties produced a lengthy decision on the subject. In this it set out guidance on the process to be used to develop a work programme on marine and coastal biological diversity and on key elements to be included in the work programme, as well as providing guidance to Parties. The Ministerial Statement on the Implementation of the Convention at this meeting referred to the global consensus reflected in the decision as the *Jakarta Mandate on Marine and Coastal Biological Diversity*.

Following consultation with a group of experts, and further elaboration by SBSTTA 3, the fourth meeting of the Conference of the Parties adopted a work programme, based on the Jakarta Mandate. This identified five major programme elements:

- integrated marine and coastal area management,
- sustainable use of marine and coastal living resources,

Viet Nam

"During the period 1976 to 1990 the areas of evergreen broad leaved and semi deciduous forests declined rapidly from 8,337,700 hectares to 5,759,500 hectares."

- marine and coastal protected areas,
- mariculture,
- alien species.

These have been translated into five elements of the work programme, with a sixth added to cover general matters. Each programme element has one, two or three operational objectives. Activities to meet these objectives are set out, along with a time schedule and ways and means of carrying out these activities. The latter involves extensive collaborative linkages, coordinated by the Secretariat, and the use of experts.

Coral reefs and coral bleaching At its fifth meeting, the Conference of the Parties responded to the severe outbreaks of coral bleaching reported from many parts of the world in 1998 and 1999. It decided to integrate coral reefs into the programme element on marine and coastal living resources of the work programme and identified a series of priority areas for action on coral bleaching, based on the results of an expert meeting on the subject held in Manila in 1999. It noted that there was significant evidence that climate change was a primary cause of the recent and extensive coral bleaching and urged the United Nations Framework on Climate Change to take all possible actions to reduce the effects of climate change on water temperature and to address the socio-economic impacts on the countries and communities most affected by coral bleaching.

Forest biological diversity

Early consideration of forest biological diversity by the Conference of the Parties mostly concerned input to and the relationship with the Intergovernmental Panel on Forests established under the UN Commission on Sustainable Development (the precursor of the Intergovernmental Forum on Forests and the future United Nations Forum on Forests – see chapter 6). At its third meeting, the Conference of the Parties asked the Secretariat to develop a focused work programme on forest biological diversity, working closely with the Intergovernmental Panel on Forests and other relevant institutions. Following input from a liaison group on forest biological diversity, which met in 1997, SBSTTA proposed a draft work programme. This forms the basis of the work programme as endorsed by the Conference of the Parties at its fourth meeting.

The work programme reflects a three-year planning horizon in three phases, so that the whole programme is envisaged to last nine years. The main elements of the work programme are:

- holistic and intersectoral ecosystem approaches,
- comprehensive analysis of the ways in which human activities, in particular forest-management practices, influence biological diversity and assessment of ways to minimize or mitigate negative influences,
- methodologies necessary to advance the elaboration and implementation of criteria and indicators for forest biological diversity,
- promoting the development of scientific and technical local approaches to:
  - ways of minimizing or mitigating the underlying causes of loss of forest biological diversity,
  - assessing ecological landscape models, the integration of protected areas in the ecosystem approach to sustainable forest management and the representativeness and adequacy of protected areas networks,
- advancing scientific and technical approaches, including management of biological diversity in production forests, rehabilitation of degraded ecosystems and enrichment of indigenous biological diversity in plantations.

In preparation for its in-depth consideration of forest ecosystems at its sixth meeting in 2002, the Conference of the Parties decided to establish an *ad hoc* technical expert group on forest biological diversity to assist SBSTTA. This expert group met in November 2000 and in April 2001. The Conference of the Parties asked Parties to submit a thematic report on forest ecosystems by 15 May 2001, as part of their national reporting. By 1 August 2001, 28 Parties had submitted this report.

Agricultural biological diversity

The Conference of the Parties established the framework for a work programme on agricultural biological diversity at its third meeting. At that time it asked the Secretariat and FAO, in close collaboration with other relevant organizations, to identify and assess national and international activities and instruments in the field, with the results of this assessment to be reported through SBSTTA. To help define the programme, the COP called for a range of information from Parties, including details of national activities, existing instruments and case studies of experiences relating to:

- conservation and sustainable use of agricultural biological diversity;
- pollinators and soil biota;
- socio-economic and ecological analyses of different land-use management options.

On the basis of this assessment, and SBSTTA's recommendations, a programme of work was adopted at the fifth meeting of the Conference of the Parties.

The programme's objectives are:

- to promote the positive effects and mitigate the negative effects of agricultural systems and practices on biological diversity in agro-ecosystems and their interface with other ecosystems;
- to promote the conservation and sustainable use of genetic resources of actual and potential value for food and agriculture; and
- to promote the fair and equitable sharing of benefits arising out of the use of genetic resources.

It has four elements: assessments; adaptive management; capacity-building; and mainstreaming. For each of these a series of activities is set out, along with ways and means of carrying out these activities and timing of expected outputs.

At its fifth meeting, the Conference of the Parties recognized two cross-cutting issues of particular importance for emphasis in the work programme: pollinators and genetic use restriction technologies.

The Conference of the Parties has recognized the contribution of farmers, indigenous and local communities to the conservation and sustainable use of agricultural biodiversity and the importance of this to their livelihoods. It has emphasized the importance of their participation in the implementation of the programme of work and recognized the need for incentives, capacity-building and information exchange to benefit farmers, indigenous and local communities.

It has also decided to consider, at its sixth meeting, the establishment of a global strategy for plant conservation.

The Conference of the Parties has emphasised the linkages between its work on agriculture and that relating to access to genetic resources, and particularly the ongoing revision of the FAO International Undertaking on Plant Genetic Resources, in harmony with the Convention. In this context, the Conference of the Parties has recognized the special nature of agricultural biodiversity, its distinctive features and problems needing distinctive solutions. It has also recommended collaboration and consultation with the World Trade Organization to develop a better appreciation and understanding of the relationship between trade and agricultural biological diversity in the context of trade liberalization.

Pollinators The Conference of the Parties noted the worldwide decline in pollinator diversity and established an International Initiative for the Conservation and Sustainable Use of Pollinators as a cross-cutting initiative within the work programme on agricultural biological diversity. The aims of this initiative are to: monitor pollinator decline; address the lack of taxonomic information on pollinators; assess the economic value of pollination; and promote conservation, restoration and sustainable use of pollinator diversity in agriculture and related ecosystems.

Genetic use restriction technologies The Conference of the Parties also decided to continue its consideration of the impacts of genetic use restriction technologies[2] under the umbrella of, and integrated into, the four elements of the work programme. It emphasised the current absence of reliable data on such technologies, and the consequent difficulty in assessing the risks involved in their use. It recommended that Parties did not approve products incorporating such technologies for field-testing until appropriate scientific data could justify such testing. The Conference of the Parties also recognized the need to understand better the implications with respect to intellectual property rights of use of such technologies, and how they might relate to Farmers' Rights and the implementation of Article 8(j) on the knowledge, innovations and practices of indigenous and local communities. Whilst possible socio-economic impacts of such technologies can be considered under the work programme on agricultural biological diversity, the possible biosafety implications will fall under the scope of the Cartagena Protocol on Biosafety.

Biological diversity of inland waters

The third meeting of SBSTTA considered inland water ecosystems in some depth. Its subsequent recommendation formed the basis of a work programme adopted by the Conference of the Parties at its fourth meeting. The programme addresses the following areas:

- assessment of the status and trends of the biological diversity of inland water ecosystems and identification of options for conservation and sustainable use,
- provision of scientific advice and further guidance to assist in the national elaboration of Annex I of the Convention, as pertaining to inland water ecosystems,
- review of methodologies for assessment of biological diversity, as pertaining to inland water ecosystems,
- the urgency of needed action in taxonomy.

The Conference of the Parties noted that while the implementation of the programme of work was subject to availability of financial resources, particular attention should be given to early progress in the development of rapid assessment methodologies especially in relation to small island States.

[2] Technological means that rely on genetic transformation of plants to introduce a genetic switch mechanism which prevents unauthorised use of either particular plant germplasm, or trait(s) associated with that germplasm and which are designed to provide a genetic, in-built protection against unauthorised reproduction of the seed or the added-value trait.

Zambia

"About 80% of the country is potential forest and woodland but 20% has been converted to agriculture."

As well as adopting its own work programme on inland water biological diversity, the Conference of the Parties has endorsed a joint work plan on wetlands with the Convention on Wetlands (the "Ramsar Convention"), put forward by its secretariat (the Ramsar Bureau).

Biological diversity of dry and sub-humid lands

A programme of work on the biological diversity of dryland, Mediterranean, arid, semi-arid, grassland and savannah ecosystems (known as the work programme on dry and sub-humid lands) was established at the fifth meeting of the Conference of the Parties. The programme is divided into two parts, "assessments" and "targeted actions in response to identified needs," to be implemented in parallel.

Under assessments, six activities are identified, all concerning assessments in dry and sub-humid lands:

- assessment of the status and trends of biological diversity,
- identification of specific areas of value for biological diversity, with reference to the criteria in Annex I to the Convention,
- further development of indicators,
- building knowledge on ecological, physical and social processes,
- identification of local and global benefits derived from biological diversity,
- identification and dissemination of best management practices, including knowledge, innovation and practices of indigenous and local communities.

These activities are to be carried out through: consolidation of information from existing sources; targeted research; multidisciplinary and interdisciplinary case-studies on management practices, carried out primarily by national and regional institutions; dissemination of information and capacity-building.

Under targeted actions, three clusters of activities are identified:

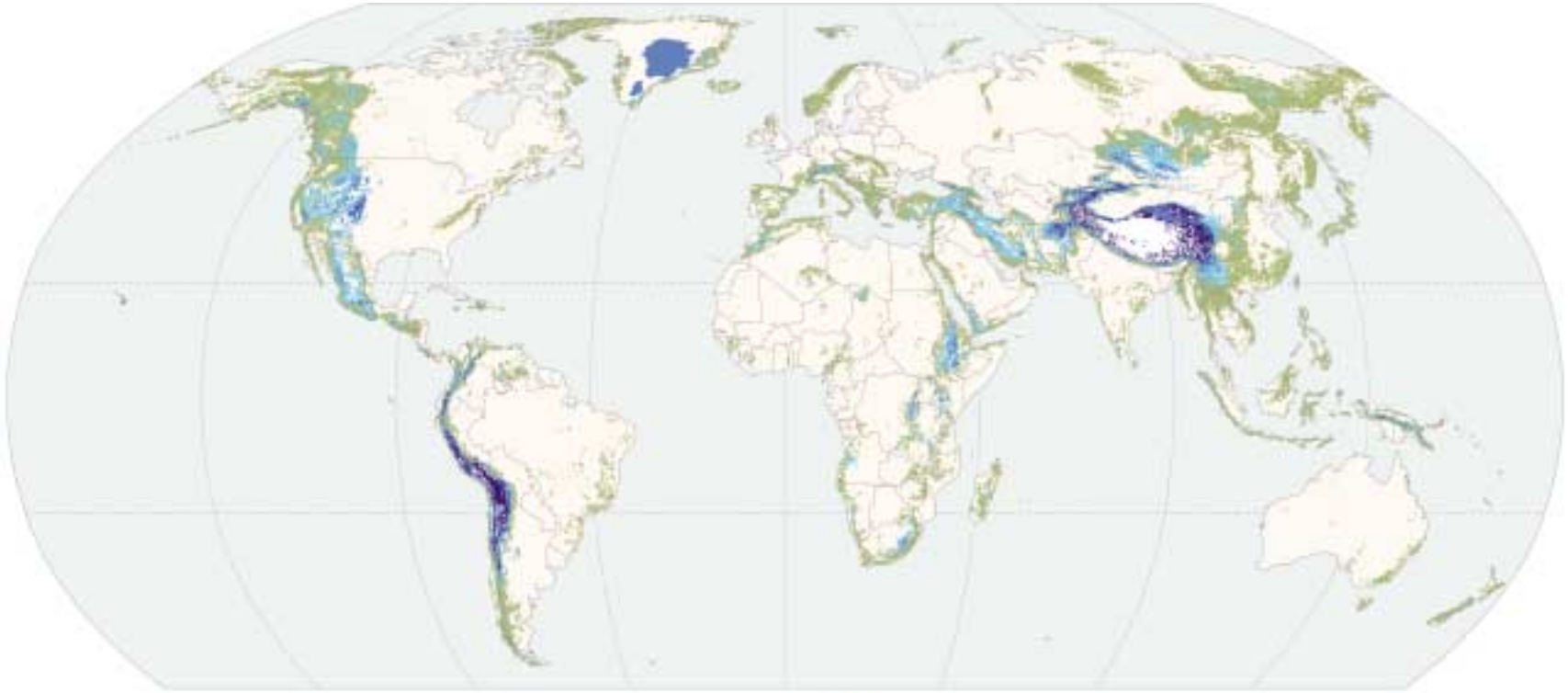
- promotion of specific measures for the conservation and sustainable use of biological diversity through, for example, use and establishment of additional protected areas, appropriate management and sustainable use of water resources and management of invasive alien species,
- promotion of responsible resource management, at appropriate levels, applying the ecosystem approach, through and enabling policy environment,
- support for sustainable livelihoods, through diversifying sources of income, promotion of sustainable harvesting including of wildlife; exploring innovative sustainable use of biological diversity.

These activities are to be carried out through capacity-building, particularly at national and local levels, establishment of an international network of designated demonstration sites, case studies on successful management, partnerships between relevant stakeholders and the development of a joint work programme with the Convention to Combat Desertification. The Conference of the Parties requested the Secretariat to collaborate with the Secretariat of the Convention to Combat Desertification to develop possible elements of such a joint work programme on the basis of a proposal prepared by the two secretariats for the fifth meeting.

Mountain biological diversity

As noted in Table 3.2, the Conference of the Parties will consider the biological diversity of mountain ecosystems in-depth at its seventh meeting (2004). To prepare for this, mountain biological diversity will be the main issue for the eighth meeting of SBSTTA (late 2002). 2002 is the International Year of Mountains. Map19 shows the mountains of the world.

MAP 19



Mountains of the world

A global elevation model was used to generate slope and local elevation range on a fine-scale world grid, and these values were combined with elevation data to define mountain areas for assessment and planning purposes. Areas between 300 metres and 2,500 m are classed as mountainous where slope and/or local elevation range is marked; all areas above 2,500 m are classed as mountainous.

Source: simplified from analysis and original map by UNEP-WCMC, published in M.F. Price and N. Butt (eds). 2000 *Forests in mountain* development. CAB International, Wallingford; topographic data from GTOPO30 global digital elevation model, USGS EROS Data Centre.

Latvia

"Populations of many species inhabiting natural meadows and seminatural grasslands decreased due to changes in landuse."

CROSS-CUTTING ISSUES COVERED BY COP DECISIONS

Identification, monitoring and assessment, and indicators including the Global Taxonomy Initiative

At the request of the Conference of the Parties, SBSTTA considered these subjects at its second meeting, and produced a lengthy recommendation subsequently endorsed by the Conference of the Parties. The recommendation provided general advice and identified a number of priority tasks and proposed specific recommendations. It advocated a two-track approach to assessment and indicator development: in the short term assessment of reasonably well-known sectors and components of biological diversity should be carried out, making use of indicators known to be operational; at the same time longer-term programmes should be developed involving research and capacity-building in areas needing advances in knowledge. The recommendation also proposed that indicators, assessment and monitoring be considered together as a standing item on the agenda of SBSTTA.

The importance of indicator development has subsequently been stressed in each of the thematic work programmes. In addition, following the SBSTTA recommendation, the Executive Secretary, in consultation with a liaison group, produced a guideline report to assist Parties, particularly in the preparation of national reports, containing, *inter alia*, information on indicators and monitoring techniques; a listing of current approaches to indicator development and recommendations for a core set of indicators of biological diversity, particularly those related to threats; and a list of options for capacity-building in developing countries in the application of these. From this preliminary report, SBSTTA developed a proposed work programme, using the two-track approach, that was adopted by the Conference of the Parties, who also emphasised that further work on indicators should take into account the ecosystem approach. The SBSTTA recommendation that was endorsed by the Conference of the Parties stressed that the primary role of indicators in this context should be as a tool for management of biological diversity at local and national level and for assessing implementation of the Convention. However, it also recognized that they may have a wider role and noted that in future the development of regional and global indicators would be necessary to address specific aspects of the world's biological diversity.

Taxonomy and the Global Taxonomy Initiative The Conference of the Parties recognized early on that lack of taxonomic knowledge was a key obstacle in the implementation of the Convention. SBSTTA considered the matter at its second meeting and produced a recommendation on practical approaches for capacity-building in taxonomy, which was endorsed by the Conference of the Parties. This recommendation stressed the need to strengthen national institutions, to build links between institutions in developing and developed countries and to explore ways to make taxonomic information more readily available, in particular to countries of origin. It established a Global Taxonomy Initiative (GTI) to help meet these goals, and requested the GEF to provide financial resources to developing countries for capacity-building, including taxonomy, to help in the implementation of Article 7.

The GTI is specifically designed to address the lack of taxonomic information and expertise available in many parts of the world, and thereby to improve decision-making in conservation, sustainable use and equitable sharing of the benefits derived from genetic resources. It is specifically intended to support implementation of the work programmes of the Convention on thematic and cross-cutting issues.

Given the many competing demands for capacity building in taxonomy, activities under the GTI must be clearly linked to the implementation of Convention.

Knowledge, innovations and practices of indigenous and local communities

Article 8(j) of the Convention concerns the knowledge, innovations and practices of indigenous and local communities as they relate to biological diversity. Under the Convention, this has been discussed both as a separate issue and also as it relates to intellectual property rights, access to genetic resources, benefit-sharing and the various thematic work programmes.

At its third meeting, the Conference of the Parties decided to hold a workshop on traditional knowledge and biological diversity that would include representation of indigenous and local communities. The workshop was held in Madrid in November 1997. Its report set out possible elements of a work programme on traditional knowledge and biological diversity that could be undertaken under the Convention. At its fourth meeting, the Conference of the Parties decided on the basis of this to establish an Ad Hoc Open-ended Intersessional Working Group that would address the implementation of Article 8(j) and related provisions. The group reports directly to the Conference of the Parties but can also offer advice to SBSTTA on relevant issues. The first meeting of the Working Group was held in Spain in March 2000. The meeting was attended by representatives of 92 Parties and Governments, and of 74 indigenous people and local community organizations. The Working Group adopted a recommendation that formed the basis for a decision taken at the fifth meeting of the Conference of the Parties, which included a work programme on the implementation of Article 8(j) and related provisions of the Convention.

The work programme recognizes a set of five general principles concerning: full and effective participation of indigenous and local communities, including women, in the work programme; an holistic approach consistent with cultural and spiritual values; valuing of traditional knowledge; the ecosystem approach; prior informed consent or prior informed approval for access to traditional knowledge, innovations and practices. It also identifies a series of tasks to be undertaken in two phases. In the first phase, twelve tasks are divided among six elements, namely:

- participatory mechanisms for indigenous and local communities,
- status and trends in relation to Article 8(j) and related provisions,
- equitable sharing of benefits,
- exchange and dissemination of information,
- monitoring elements,
- legal elements.

The first element is directed at Parties and involves enhancing the capacity at national level of indigenous and local communities to participate in implementation of the provisions of the Convention and particularly in carrying out the programme of work.

The Conference of the Parties extended the mandate of the Working Group and requested it to review progress in the implementation of the priority tasks of its programme of work, to recommend further action, and to further explore ways for increased participation by indigenous and local communities in the thematic work programmes of the Convention. It recognised the role played by the International Indigenous Forum on Biodiversity and called upon Parties to support this and other relevant organizations in providing advice on implementation of the programme of work.

The work programme is to take into account the work of the Ad Hoc Open-ended Working Group on Access and Benefit-sharing and to be carried out as far as possible in collaboration with other relevant organizations, including the World Intellectual Property Organization (WIPO). The Working Group will meet in February 2002.

Alien species

The potential threat caused by alien species to ecosystems, habitats and species, as recognized in Article 8(h) of the Convention, has been the subject of considerable attention under the Convention. It has been specifically mentioned as a problem to be addressed in the work programmes on marine and coastal biological diversity, forest biological diversity and inland water biological diversity. One of the five programme elements in the work programme on marine and coastal biological diversity is entirely devoted to alien species.

The Conference of the Parties discussed alien species at its fourth meeting and asked SBSTTA to report back to it on the matter. SBSTTA considered the subject at both its fourth and fifth meetings. It recommended a format for case studies and proposed that the Conference of the Parties adopt a set of guiding principles on introduction of alien species.

At its fifth meeting, the Conference of the Parties urged Parties, Governments and relevant organizations to apply a modified version of these guiding principles for the interim, noting that the definition of many of the terms was not yet settled. It also called for case studies to be submitted. The Conference of the Parties stressed the importance of the Global Invasive Species Programme (see chapter 6), calling on the latter to develop a second phase of its activities and urging that the programme be supported financially. It also decided that it would consider at its next meeting further options for implementing Article 8(h), including the possibility of developing an international instrument. To assist in these deliberations, the Conference of the Parties asked Parties to submit a thematic report on alien species by 30 September 2000, following a standardised format. By August 2001, 53 Parties had done so.

Tourism

The Conference of the Parties has discussed the relationship between biological diversity and tourism in its deliberations on sustainable use. The latter is the subject of Article 10 of the Convention, but is also one of the three objectives of the Convention, and is referred to in many of the operative articles.

The fourth meeting of SBSTTA considered the interlinkages between tourism and biological diversity at length. It prepared an assessment that discussed both the potential benefits of tourism for conservation of biological diversity and sustainable use of its components and its possible adverse impacts. This assessment, with minor modifications, was adopted by the Conference of the Parties at its fifth meeting.

In the context of the United Nation's proclamation of 2002 as the International Year of Ecotourism, the Conference of the Parties accepted the invitation to participate in the international work programme on sustainable tourism development under the Commission on Sustainable Development, in particular with a view to contributing to international guidelines on sustainable tourism development in areas important for biological diversity. It transmitted the assessment to the Commission and simultaneously recommended to Governments, the tourism industry and relevant international organizations, in particular the World Tourism

Mozambique

"Protected areas have shown massive declines in large mammal populations, except for Niassa Reserve in northern Mozambique. This decimation is directly linked to the long period of internal conflict in the country."

Organization, that they use the assessment as the basis for their policies, programmes and activities in the field of sustainable tourism.

The Conference of the Parties also:

- encouraged submission of case studies to enable sharing of knowledge, experience and best practice through the clearing-house mechanism;
- requested the Executive Secretary to convene an international workshop to develop international guidelines on biological diversity and tourism;
- encouraged Governments, the tourism industry and relevant international organizations to support the International Year of Ecotourism, the International Year of Mountains (also 2002) and the International Coral Reef Initiative by local capacity-building, a commitment to work within principles and guidelines for sustainable tourism and by establishing enabling policies and legal frameworks.

Norway

"About 2,500 fish stocks in southern Norway have been lost."

The Workshop on Biological Diversity and Tourism was held in June 2001. It approved draft international guidelines for sustainable tourism development in vulnerable terrestrial, marine and coastal ecosystems and habitats of major importance for biological diversity and protected areas. The guidelines will be considered by SBSTTA in November 2001, and by the Conference of the Parties in April 2002.

Biodiversity and climate change

At its fifth meeting the Conference of the Parties noted the interactions between climate change and the conservation and sustainable use of biological diversity in a number of thematic and cross-cutting areas including coral bleaching, forest biodiversity, and incentive measures. Specifically it:

- noted that there is significant evidence that climate change is a primary cause of the recent and severe extensive coral bleaching, and that this evidence is sufficient to warrant remedial measures being taken in line with the precautionary approach;
- urged the United Nations Framework Convention on Climate Change (UNFCCC) to take all possible actions to reduce the effect of climate change on water temperatures and to address the socio-economic impacts on the countries and communities most affected by coral bleaching;
- urged the UNFCCC, including its Kyoto Protocol, to ensure that future activities of the UNFCCC, including forest and carbon sequestration, are consistent with and supportive of the conservation and sustainable use of biological diversity;
- urged Parties and other Governments to explore possible ways and means by which incentive measures promoted through the Kyoto Protocol under the United Nations Framework Convention on Climate Change can support the objectives of the Convention on Biological Diversity; and
- urged strengthened cooperation with the UNFCCC, on these matters and on biological diversity in dry and sub-humid lands.

SBSTTA was requested to consider the impact of climatic change on forest biological diversity and to prepare scientific advice in order to integrate biodiversity considerations, including biodiversity conservation, into the implementation of the UNFCCC and its Kyoto Protocol. In both cases, the Conference of Parties has called for this

work to be carried out in collaboration with the appropriate bodies of the UNFCCC and the Intergovernmental Panel on Climate Change (IPCC), where appropriate and feasible.

The decisions of the Conference of the Parties were considered by the Subsidiary Body on Scientific and Technological Advice of the United Nations Framework Convention on Climate Change (UNFCCC) at the second part of its thirteenth session (November 2000). At its sixth meeting (March 2001), SBSTTA decided to undertake an assessment of the interlinkages between biological diversity and climate change, in order to develop comprehensive scientific advice on integrating biodiversity considerations into the implementation of the UNFCCC and its Kyoto Protocol. A technical expert group was established to undertake a pilot assessment to:

- analyse possible adverse effects on biological diversity of measures that might be taken or are being considered under the UNFCCC and the Kyoto Protocol;
- identify factors that influence biodiversity's capacity to mitigate climate change and contribute to adaptation and the likely effects of climate change on that capacity; and
- identify options for future work on climate change that also contribute to the conservation and sustainable use of biological diversity.

At its fourteenth session (July 2001), the UNFCCC's SBSTA welcomed the assessment, endorsed the proposal for a joint liaison group between the secretariats of the UNFCCC and the CBD, and invited the Secretariat of the United Nations Convention to Combat Desertification (UNCCD) to participate.

In April 2001, the Intergovernmental Panel on Climate Change (IPCC) agreed to contribute to the assessment by preparing a technical paper on the interlinkages between biological diversity and climate change and in September 2001 it approved.

Migratory species

At its third meeting, the Conference of the Parties requested the Executive Secretary, in consultation with the Secretariat of the Convention on Migratory Species of Wild Animals (CMS), to evaluate how implementation of the CMS could complement the implementation of the CBD. A study prepared for the fifth meeting concluded that the CMS Instruments (CMS, its Range States' agreements and integrated conservation, management and action plans) provide the basis for Parties to deepen their treatment of migratory species through specific conservation and management plans for individual migratory species and groups of migratory species, and for them to do this within global and regional legal frameworks that encourage and support cooperative action. It suggested that this approach would provide a link between individual and groups of migratory species, their habitat needs, the other components of biodiversity they depend upon and interact with, as well as the various threats facing these species.

The fifth meeting of the Conference of the Parties has asked the Secretariat, in collaboration with the CMS Secretariat, to develop a proposal on how migratory species could be integrated into the work programme of the CBD and the role that the CMS could play, particularly with regard to the ecosystem approach, the Global Taxonomy Initiative, indicators, assessment and monitoring, protected areas, public education and awareness, sustainable use, and tourism.

Armenia

"20,000 hectares of marsh and wetland have been drained and converted to agricultural use over the last 50 years."

Incentive measures and economic valuation of biological diversity

Article 11 of the Convention determines that each Party shall, as far as is possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.

The issue of incentive measures has been closely linked to the deliberations of the Conference of the Parties on the economic and other valuation of biological diversity, first considered in depth at the second meeting of SBSTTA and the third meeting of the Conference of the Parties. At this and its two subsequent meetings, the Conference of the Parties has discussed both the development of positive incentives to promote the conservation and sustainable use of the components of biological diversity and the need to eliminate perverse incentives, that is incentives that encourage the destruction of biological diversity.

The Conference of the Parties has decided that incentive measures should be incorporated as appropriate into the various thematic and sectoral work programmes under the Convention. It asked SBSTTA to provide further advice on this, and encouraged the submission of case studies by Parties. Only twelve countries had submitted case studies by the fifth meeting of the Conference of the Parties. A number of others had been received from the United Nations Environment Programme, IUCN – the World Conservation Union and the Organization for Economic Co-operation and Development.

The fifth meeting of the Conference of the Parties established a work programme on incentive measures in order to support Parties, Governments and organizations in developing practical policies and projects and to develop practical guidelines to the financial mechanism for effective support and prioritization of these policies and projects. It requested the Executive Secretary to elaborate proposals for the design and implementation of incentive measures, for consideration by SBSTTA and the sixth meeting of the Conference of the Parties.

Public education and awareness

Article 13 of the Convention urges Parties to promote and encourage understanding of issues surrounding biological diversity through the media and in their educational programmes, and also to cooperate with other States and international organizations in the development of educational and public awareness programmes.

The Conference of the Parties considered public education and awareness in some depth at its fourth meeting, and decided that these should become an integral component of all sectoral and thematic items under the Convention's work programme. It urged Parties to implement a number of actions, including promotion of education on biological diversity through relevant institutions including non-governmental organizations and integration of biodiversity concerns into education strategies. It also suggested illustrating and translating the provisions of the Convention into local languages.

As a result of a request at that meeting, the Secretariat and the United Nations Educational, Cultural and Scientific Organization (UNESCO) considered the feasibility of launching a global initiative on biological diversity education and public awareness. At its fifth meeting, the Conference of the Parties asked the Executive Secretary to convene a working group of experts from a range of organizations, including UNESCO, UNEP, the World Bank, IUCN and WWF, to advance this idea further and set priorities for such an initiative. This group was established and is developing a set of strategic recommendations for

Finland

"Finland's mireland has been reduced from 10.4 million hectares to 6 million hectares, due to drainage for timber production. An additional 1 million hectares is being used for agricultural purposes."

the implementation of the Initiative, including operational elements and options for action, for consideration by the Conference of the Parties in 2002.

In 1994 the General Assembly of the United Nations declared 29 December, the date of the entry into force of the Convention in 1993, as the International Day for Biological Diversity. In 2000, in light of the difficulties experienced in attracting public attention on a date that coincides with a holiday period in most countries, the General Assembly changed the date of the International Day for Biological Diversity to 22 May, the date of the adoption of the Convention in 1992. It is hoped that this change will enable countries to undertake more effective public education and awareness activities on this day, around a theme to be designated each year by the Executive Secretary. The theme for 2001 was "Biodiversity and Management of Alien Invasive Species."

Impact assessment, liability and redress

The Conference of the Parties considered Article 14 of the Convention at its fourth and fifth meetings and recommended that appropriate issues related to environmental impact assessments become an integral part of the relevant sectoral and thematic areas under the Convention's programme of work. It also asked SBSTTA to further develop, in cooperation with a range of organizations, guidelines for incorporating biodiversity-related issues into legislation and processes concerning strategic environmental impact assessment. With regard to liability and redress, the Conference of the Parties has asked the Executive Secretary to prepare, and subsequently to update a synthesis report on liability that reviews developments in other international fora. The Conference of the Parties also decided to consider mechanisms for further reviewing this issue at its sixth meeting, including the establishment of an *ad hoc* technical expert group.

Access to genetic resources

The Conference of the Parties has considered Article 15 at each of its meetings to date. The initial focus of considerations has been on promoting the development of measures on access to genetic resources and benefit-sharing, on gathering information on national and regional approaches to regulating access and on the dissemination of information. The Conference of the Parties has noted that all countries are providers and recipients of genetic resources. It has urged countries to put in place the necessary legal and other measures to support the efforts of provider countries to ensure that access to their genetic resources and traditional knowledge is subject to the provisions of the Convention regarding access to genetic resources, transfer of technology, and the handling and distribution of the benefits of biotechnology.

Two specific issues that have arisen are a) the relationship between the Convention and the FAO International Undertaking on Plant Genetic Resources for Food and Agriculture and b) *ex situ* collections of genetic resources. With regard to the former, governments, in the forum of the FAO Commission on Genetic Resources for Food and Agriculture, are currently negotiating the revision of the International Undertaking, in harmony with the Convention, following Resolution 3 of the Nairobi Final Act, and in this process addressing the question of access to *ex situ* collections of plant genetic resources for food and agriculture. The Conference of the Parties has made a number of statements regarding *ex situ* collections of plant genetic resources not addressed by the FAO Commission on Genetic Resources for Food and Agriculture.

The Conference of the Parties has considered at some length the relationship between intellectual property rights and benefit-sharing. It has requested the Executive Secretary to cooperate with the World Trade Organisation through the latter's Committee on Trade and

Germany

"Between 1950 and 1985, 57% of all wetlands disappeared in West Germany."

Environment to explore the extent to which there may be linkages between Article 15 and relevant articles of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). It has also emphasised that further work is needed to help develop a common appreciation of the relationship between the TRIPS Agreement and the Convention with regard to, *inter alia*, the fair and equitable sharing of benefits arising out of the use of genetic resources. The Conference of the Parties has requested the Executive Secretary to apply for observer status on the Committee on Trade and Environment and on the Council of TRIPS. The WTO has granted this status in the first case, but not in the second.

To assist it in its consideration of issues relating to Article 15, in 1998 the Conference of the Parties established a regionally balanced panel of experts to try to develop a common understanding of basic concepts and explore all options for access and benefit-sharing on mutually agreed terms including guiding principles, guidelines and codes of best practice. At its fifth meeting, the Conference of the Parties decided to reconvene the panel of experts with a concrete mandate and agenda, to work on outstanding issues, namely:

- assessment of user and provider experience in access to genetic resources and benefit-sharing and study of complementary options;
- identification of approaches to involvement of stakeholders in access to genetic resources and benefit-sharing processes.

It also established an Ad Hoc Open-ended Working Group with the mandate to develop guidelines and other approaches for submission to the Conference of the Parties and to assist Parties and stakeholders in addressing a range of relevant issues. This Working Group will meet in October 2001.

Clearing-house mechanism

Under Article 18, on technical and scientific cooperation, the Conference of the Parties was to determine at its first meeting how to establish a clearing-house mechanism to promote and facilitate technical and scientific cooperation. The second meeting of the Conference of the Parties decided that the clearing-house mechanism would develop starting with a pilot phase for 1996-1997, later extended until December 1998. Since then it has moved into its full implementation phase. The clearing-house mechanism is assisted in its functioning by an informal advisory committee, constituted and coordinated by the Executive Secretary.

A number of regional workshops and expert meetings were held in 1997 and 1998. Their purpose was to attain a clear definition of national and regional scientific and technical information needs and priorities as well as the means to deliver information and evaluate national capacities for the implementation of the clearing-house mechanism. As a result of recommendations arising from these meetings, a strategic plan for the implementation of the clearing-house mechanism has been drawn up. The strategic plan, which drew on an independent review of the clearing-house mechanism carried out in 1999, was adopted at the fifth meeting of the Conference of the Parties, along with a longer-term programme of work for the mechanism, for the period 1999-2004.

The guiding principles of the clearing-house mechanism are to be "neutral, cost-effective, efficient, accessible, independent and transparent." It is intended to be bottom-up, decentralized and nationally driven with a number of different types of focal points (national, regional, sub-regional and thematic). Each focal point has responsibility for developing its own supporting network, so that the clearing-house mechanism should effectively function as a

meta-system. There are currently around 140 national focal points for the mechanism. Its functioning is supported by the Secretariat in Montreal. Eligible countries receive financial support for national development of the clearing-house mechanism as part of their biodiversity enabling activities from the Global Environment Facility.

The Conference of the Parties has attached considerable importance to the development of the clearing-house mechanism and has consistently called on it to support the thematic and cross-cutting work programmes. The pilot phase saw its development as a mechanism for information exchange mechanism; the coming phase will see increased emphasis on its development as an active tool for technical and scientific cooperation, as called for under Article 18 of the Convention.

National reporting

National reports submitted by Parties play a pivotal role in assessing implementation of the Convention and should also serve as a stimulus for Parties to focus their efforts in implementation. The Conference of the Parties decided early on that the first national reports should concentrate on the implementation of Article 6, and should be submitted by the end of June 1997, subsequently amended to the beginning of January 1998. Parties were also encouraged to identify priority issues specifically related to those components of biodiversity under threat. By the fourth meeting of the Conference of the Parties (May 1998), some 107 national reports had been received in final or draft form. Parties that had not yet submitted were encouraged to do so by the end of that year. By the end of 2000, a further eight Parties had done so.

The form and content of the first national reports varied enormously, making it difficult to assess the overall state of implementation of the Convention. In consequence the Conference of the Parties asked the SBSTTA for further advice on the form and intervals of national reports.

At its fifth meeting, SBSTTA considered guidelines for future national reporting that had been developed by the Secretariat through a pilot project, carried out with the collaboration of a number of Parties, to identify a methodology for assessing the state of implementation of the Convention. This involved (i) identifying the obligations on Parties deriving from the provisions of the Convention and the decisions of the Conference of the Parties and (ii) formulating these as questions designed to elicit responses that would reveal the level of implementation, relative priorities, constraints encountered and issues not yet addressed.

The fifth meeting of the Conference of the Parties endorsed this format as a guide for future national reporting and as a means by which the status of national implementation can be measured. Parties were requested to submit their second national reports by 15 May 2001. By August 2001, 48 countries had done so.[3] National reports will be called for on a four-yearly basis and will be considered at alternate meetings of the Conference of the Parties.

Parties were also invited to submit thematic reports on the issues to be considered in depth at meetings of the Conference of the Parties. In the case of the sixth meeting, these will be alien species, forest ecosystems and benefit-sharing. The deadlines were, respectively, 30 September 2000, 15 May 2001 and 30 December 2000.

[3] All national reports and thematic reports are available on the website of the Convention (www.biodiv.org).

As previously noted, by August 2001, 53 Parties had submitted thematic reports on alien species. By the same date 14 Parties had submitted reports on benefit-sharing and 28 had submitted reports on forest ecosystems.

ADOPTION OF PROTOCOLS

The Convention provides a legal framework for achieving its objectives and goals. It allows for these to be further developed into binding obligations by additional legal instruments called "protocols."
At the time of negotiation, the only area that was identified as the possible subject of a protocol was the question of biosafety. Since then however, the Conference of the Parties has affirmed its willingness to consider the possibility that a revised International Undertaking on Plant Genetic Resources take the form of a protocol to the Convention, should the FAO so decide. It has also stated that it would consider the option of developing a protocol for the full and effective implementation of the Convention's provisions concerning alien invasive species.

Suggestions for meeting other goals through the form of protocols have also been made by individual Parties and organizations, but have not yet been considered by the Conference of the Parties.

Biosafety

Paragraph 3 of Article 19 of the Convention states that the Parties shall consider the need for a protocol in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have an adverse effect on the conservation and sustainable use of biological diversity.

The Conference of the Parties turned its attention to biosafety at its first meeting, and decided to seek advice from experts on the need for, and possible formulation of, a protocol. A panel of fifteen experts met in May 1995 and a larger group of experts convened in July of that year. Following advice from these, the second meeting of the Conference of the Parties established an Open-ended Ad Hoc Working Group on Biosafety (known as the Biosafety Working Group) to develop a protocol. The Working Group, which was directly answerable to the Conference of the Parties, met six times from July 1996 to February 1999. The main areas of disagreement in the negotiations were: the extent to which the protocol should cover products of living modified organisms, specifically those intended for food or animal feed, or for processing; issues of liability and redress; and the extent to which socio-economic implications of the use of living modified organisms should be addressed.

The final meeting of the Working Group was held in Cartagena, Colombia, in February 1999. An extraordinary meeting of the Conference of the Parties was held immediately after this, on 22 and 23 February 1999 in Cartagena, with the aim of concluding the protocol. However, a number of issues remained outstanding and the Conference of the Parties therefore decided to suspend its extraordinary meeting. Informal consultations on the protocol were held in Vienna in September 1999 and in Montreal in January 2000. The extraordinary meeting was resumed in Montreal immediately after the latter and the protocol was adopted on 29 January 2000.

The Cartagena Protocol on Biosafety specifically focuses on transboundary movements of living modified organisms that may have adverse effects on the conservation and sustainable use of biological diversity. Those that are to be intentionally introduced into the environment are to be subject to an advanced informed agreement

procedure in which the exporter must provide detailed information to each importing country in advance of the first shipment, and the importer may then authorize or refuse the shipment. Shipments of such organisms are to be accompanied by documentation containing information specified in the protocol. Under Article 15 of the Protocol, Parties of import may require the exporter to carry out a risk assessment and may also require that the notifier bear the cost of the risk assessment.

Living modified organisms intended for direct use as food or feed, or for processing, are subject to a simplified procedure in which a Party informs others of its decision regarding domestic use of such organisms via a Biosafety Clearing-House. Documentation accompanying shipments of such organisms must identify that they "may contain" living modified organisms. Other requirements of documentation accompanying these shipments are to be determined in the future by the Conference of the Parties serving as the meeting of the Parties to the Protocol. Living modified organisms that are destined for contained use are exempt from the advanced informed agreement procedure but are also to be labelled with information specified in the protocol. Living modified organisms that are pharmaceuticals for humans are exempt from the protocol.

The issue of liability and redress remains unresolved. Under Article 27 of the protocol, the Conference of the Parties, acting as the Meeting of the Parties to the Protocol (MOP), is to elaborate appropriate rules and procedures, if possible within four years of the protocol entering into force. With regard to socio-economic considerations, the Parties have decided that an individual Party may take into account, consistent with its international obligations, socio-economic considerations arising from the impact of the use of living modified organisms on biological diversity, when deciding whether to permit an import or not.

The protocol is open only to Parties to the Convention, 103 of which had signed it by August 2001. It will enter into force on the ninetieth day after the deposit of the fiftieth instrument of ratification, acceptance, approval or accession.

Biosafety Clearing-House

The Protocol established a Biosafety Clearing-House (BCH) under the clearing-house mechanism of the Convention, in order to facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms; and to assist Parties to implement the Protocol. At its first meeting (December 2000), the Intergovernmental Committee for the Cartagena Protocol (ICCP) recommended that the BCH should be established in a phased manner beginning with a pilot phase, guided by the principles of inclusiveness, transparency and equity, and that the pilot phase be open to all governments and address the mechanisms for both electronic and non-electronic information sharing.

The ICCP identified the objectives of the pilot phase as:

- Building experience and providing feedback for the development of a functional and accessible internet based BCH; and identifying alternatives to the electronic system; and
- Identifying and addressing the capacity needs of countries with respect to the BCH.

Finland

"Only 1 to 3% of Finland's waterbodies remain in their natural state. 90% of Finland's original ponds and brooks have disappeared."

Ireland

"Shellfish harvesting and aquaculture in shallow bays has damaged sub-littoral communities. Untreated sewage has led to excessive algal growth and eutrophication in bays and inlets adjacent to larger population centers. Sea cliffs and rocky islands are not considered threatened. Many Irish estuarine sites are probably less degraded than those in Britain and mainland Europe. Few pristine examples of sand dunes and machair currently exist, because so many have been degraded."

It also recognized that the clearing-house mechanism and the Biosafety Clearing-House have distinctly different roles, and recommended that at the technical and operational levels, the Biosafety Clearing-House shall be run as a distinct element.

It requested the Executive Secretary to seek the appropriate administrative arrangements with relevant international organizations, such as the OECD and UNIDO, and Governments and that during the pilot phase use is made of existing information systems, such as the use of the ICGEB database and the OECD/UNIDO databases, including the product database, as models.

The relationship between the Protocol and the WTO

The commercial development of biotechnology has spawned multi-billion-dollar industries for foodstuffs and pharmaceuticals that continue to grow at a dramatic pace. Under World Trade Organization (WTO) regulations, the regulation of trade must be based on "sound scientific knowledge." Under environmental regimes, the precautionary approach is seen as an indispensable component of sustainable development.

The WTO also does not accept socio-economic concerns, such as the risk that exports of genetically engineered crops may replace traditional ones and undermine local cultures and traditions in importing countries; however, this forms part of the risk assessment under the Biosafety Protocol. The subsidiary agreements of the WTO, including the Sanitary and Phytosanitary Agreement (SPS), Technical Barriers to Trade Agreement (TBT), and the Agreement on Trade-Related Intellectual Property (TRIPs), also contain specific provisions that apply to the biosafety issue.

Among other things, the Preamble to the Protocol:

- Recognizes that trade and environment agreements should be mutually supportive;
- Emphasizes that the Protocol does not change rights and obligations under existing agreements; and
- Understands that the Protocol is not subordinate to other international agreements.

FINANCIAL ARRANGEMENTS AND THE FINANCIAL MECHANISM

Financial arrangements under the Convention cover two very different areas. The first concerns budgetary arrangements for the administration of the Convention itself and the financing of the processes directly associated with it. The second concerns the mechanism by which funds are made available to developing country Parties to enable them to meet their wider obligations under the Convention.

The financing of the Convention

The Conference of the Parties at each of its ordinary meetings approves a budget for the administration of the Convention for the following two-year period or biennium. Funding for activities is provided in three separate trust funds, to which Parties contribute.

The core programme of the Convention is funded by a core budget, known as the BY Trust Fund. Parties are expected to contribute to this according to the UN scale of assessments, a UN-wide system for assessing the relative wealth of each country. Under the Convention, no one Party pays more than 25% of the total contributions of all Parties, and no least developed country (LDC) pays more than 0.01%

of the total contributions. The core budget essentially covers staffing requirements at the Secretariat and the servicing of the major meetings under the Convention (ie. those of the Conference of the Parties and SBSTTA). It also covers a 13% programme support charge levied on all activities by the United Nations Environment Programme under direction from the latter's Governing Council and the United Nations General Assembly. The total core budget allocated for 2001 was just over eight and a half million dollars and that for 2002 just over ten million dollars.

A variety of additional activities in the overall programme of work approved by the Conference of the Parties are funded through a special voluntary trust fund (BE), to which Parties and others are urged to contribute. This fund covers a range of items and activities including: additional meetings envisaged in decisions of the Conference of the Parties, such as those of Panels of Experts, regional meetings and workshops on various issues; additional staff posts at the Secretariat; travel of the president of the Conference of the Parties and the chairperson of SBSTTA; and various subcontracts and consultancies. Items included here will only be funded if the money is made available by voluntary contributions to the BE trust fund. The budget under this fund was just over two and half million dollars for 2001 and just over two million dollars for 2002.

A second voluntary trust fund (BZ) exists to help developing country Parties (particularly least developed countries and small island developing States) and those with economies in transition attend various meetings under the Convention, most importantly those of the Conference of the Parties and SBSTTA. The budget for this fund was just over two million dollars in 2001 and nearly three million dollars in 2002. The Bureau of the fourth meeting of the Conference of the Parties has also allowed the Executive Secretary to use unspent money from the core (BY) fund to help such countries attend meetings.

Financial resources

The Convention recognizes that fulfilling its obligations will impose a financial burden on Parties. This burden is most acutely felt by developing countries, which hold most of the world's biological diversity but have limited financial resources. Under Article 20 of the Convention, developed country Parties are obliged to provide new and additional financial resources to enable developing country Parties to meet the agreed full incremental costs to them of implementing measures that fulfil the obligations of the Convention. Article 21 establishes a system – the so-called financial mechanism – for the provision of these resources.

Article 39 of the Convention determined that the Global Environment Facility, if suitably restructured, would be the institutional structure operating the financial mechanism on an interim basis, for the period between the entry into force of the Convention and the first meeting of the Conference of the Parties, or until such time as the Conference of the Parties had decided which institutional structure would operate the financial mechanism.

At its first meeting, the Conference of the Parties decided on a list of developed country Parties that would provide new and additional financial resources to developing country Parties to allow them to meet their obligations under the Convention. The Convention also makes provision for other Parties, including those with economies in transition, to assume voluntarily the obligations of a developed country Party. To date no Parties have done this.

Table 3.5 **Developed country Parties** [4]

Australia	Iceland	Norway
Austria	Ireland	Portugal
Belgium	Italy	San Marino
Canada	Japan	Spain
Denmark	Liechtenstein	Sweden
Finland	Luxembourg	Switzerland
France	Monaco	United Kingdom
Germany	Netherlands	
Greece	New Zealand	

Latvia

"Mires occupy 5.6% of the territory of Latvia. 70% of them are relatively undisturbed by human activities. Water quality in 80% of Latvian rivers is estimated as good or satisfactory. About 40% of lakes suffer from heavy anthropogenic influences."

A Memorandum of Understanding between the Conference of the Parties and the GEF Council (see below) was adopted by the Conference of the Parties at its third meeting and by the GEF Council shortly thereafter. Under the memorandum, the GEF continues to serve as the institutional structure operating the financial mechanism on an interim basis. The memorandum sets out terms for cooperation between the Conference of the Parties and the GEF, in particular specifying the kinds of guidance that the Conference of the Parties may communicate to the GEF. Under the memorandum, the GEF provides a report of its activities to each ordinary meeting of the Conference of the Parties.

Under Article 21 of the Convention, the Conference of the Parties is to review the effectiveness of the financial mechanism not less than two years after the Convention's entry into force and on a regular basis thereafter. The Conference of the Parties carried out its first review at its fourth meeting and decided to carry out such a review every three years thereafter. Terms of reference for the second review were drawn up at the fifth meeting of the Conference of the Parties.

The Global Environment Facility

The Global Environment Facility (GEF) was established in 1991 as a joint programme of the United Nations Development Programme, the United Nations Environment Programme and the World Bank. To begin with, it was a three-year pilot programme whose aim was to provide grants and low-interest loans to developing countries to allow them to implement projects and programmes to relieve pressure on ecosystems. The GEF was restructured in 1994, following the United Nations Conference on Environment and Development (the Earth Summit). It operates in four main focal areas: biological diversity; climate change; international waters; and ozone layer depletion. Projects on land degradation as it is related to the focal areas are also eligible for funding.

[4] The list adopted by the first meeting of the Conference of the Parties contained twenty-one countries. Belgium, Ireland and Liechtenstein had not yet become Parties. San Marino, although a Party at the time of the first meeting, was not included in the list. Article 20 provides that the Conference of the Parties shall periodically review and, if necessary, amend the list. To date, the Conference of the Parties has not done so. Table 3.5 contains the accepted working list of developed country Parties. For practical purposes, the European Community should also be included.

There are 166 States participating in the GEF, including some that are not Parties to the Convention. Representatives of all the Member Countries constitute the GEF Assembly, which meets every three years to review general policies and evaluate the operation of the facility. The GEF Council functions as an independent board of directors, with primary responsibility for developing, adopting, and evaluating GEF programmes. Council members representing 32 constituencies (16 from developing countries, 14 from developed countries, and two from countries with transitional economies) meet twice each year. All decisions are by consensus although a voting mechanism is in place if consensus cannot be reached. The Scientific and Technical Advisory Panel (STAP) provides advice to the council. It consists of twelve experts appointed by the Executive Director of the United Nations Environment Programme and can also call upon a roster of experts.

GEF-funded projects and programmes are country driven and respond to national priorities. As determined by Article 20, the GEF funds the incremental costs of these activities needed to meet global benefits. There are currently four operational programmes in the biological diversity focal area: arid and semi-arid zone ecosystems; marine, coastal and freshwater ecosystems; forest ecosystems; and mountain ecosystems. An operational programme on agricultural ecosystems is currently under development. There is also an operational programme on integrated ecosystem management, which embraces three of the focal areas (biological diversity, climate change and international waters). In funding activities related to biological diversity, the GEF follows advice from the Conference of the Parties, both that contained in specific decisions addressed to the GEF and in the more general guidance issued by the Conference of the Parties.

Broadly speaking, GEF-funded projects and programmes can be divided into three categories: full projects, medium-sized projects, and enabling activities. Funding for any given activity ranges from a few tens of thousands of dollars to many tens of millions.

Enabling activities are primarily concerned with capacity-building and are chiefly to allow individual countries to develop comprehensive national biodiversity strategies and action plans. Expedited procedures allow fast track approval for enabling activities requests of up to US$ 450,000. Medium-sized projects (those with up to one million dollars of GEF funding) and full projects may cover one or more countries. The two are chiefly distinguished by the funding approval process, which is much simpler for the former than the latter. As well as normal projects, medium-sized and full projects may also be short-term response measures or targeted research. A short-term response measure is a project that is designed to respond quickly to urgent needs or to seize a promising country-driven opportunity. A targeted research project is a research activity aimed at providing information, knowledge and tools to improve the quality and effectiveness of GEF projects and programmes. It has to be within the context of the operational programmes.

The GEF attaches great importance to leveraging cofinancing for projects and programmes wherever possible. Such additional funding may be in cash or in kind. By January 2001, the GEF had allocated over 1.3 billion dollars to 416 biodiversity projects and enabling activities in 136 countries (Annex 3). This was around 40% of the GEF's overall funding allocation during this period. Cofinancing for these projects was over 2.3 billion dollars. The main contributors to the GEF's overall budget are the United States of America (a non-Party to the Convention), Japan, Germany, France and the United Kingdom, who together provided two thirds of funding for the second replenishment period (1998-2002).

Additional financial resources

The Convention also encourages developed country Parties to provide financial resources through channels other than the financial mechanism, to help developing countries implement the Convention. This subject has been a focus of the Conference of the Parties since its first meeting, when it asked the Secretariat to provide a study on the availability of such financial resources. This call was repeated at the second and third meetings, with a request that the Executive Secretary report to the fifth meeting. The subsequent decision of the Conference of the Parties reflected the observations made in the Executive Secretary's report that, although it appeared that a number of funding institutions had increased funding support to biodiversity projects and activities, the absence of standardised reporting systems and the lack of comprehensive information made it extremely difficult to assess just how much funding for biodiversity was available.

In the decision of its fifth meeting, the Conference of the Parties asked the Executive Secretary to further develop a database on biodiversity-related funding mechanisms and urged developed country Parties to establish a process to monitor financial support to biodiversity and to provide further information on this in their second national reports. It also invited the GEF to assist the Secretariat to convene a workshop on financing for biodiversity with relevant international organizations and funding institutions.

Progress on this issue, which has been slow to date, is clearly crucial in order to determine the extent to which the global community shows commitment to meeting the objectives of the Convention. Although funding through the GEF can be clearly monitored, until overall funding for biodiversity-related activities can be identified with precision, it will not be clear to what extent funding through the Convention's financial mechanism actually represents the new and additional financial resources called for under Article 20.

Annex to Chapter 3

The conduct of meetings

Meetings of the Conference of the Parties are conducted following rules of procedure that have been decided on by the Conference of the Parties. Officers are elected from amongst the Parties to form the Bureau of the meeting, comprising a President, eight Vice-Presidents and a Rapporteur. The Bureau is geographically balanced with two representatives from each of the five UN regions (see below) and remains in office between meetings, its function at this time being to guide the Secretariat in preparations for and conduct of forthcoming meetings, and to officiate at extraordinary meetings.

When, as is normally the case, a meeting is hosted by a Party, rather than being held at the seat of the Secretariat in Montreal, a representative of that Party is traditionally elected President of the meeting. According to the rules of procedure, the offices of President and Rapporteur should normally rotate among the five regions. Between the second and sixth meetings of the Conference of the Parties, each region will have hosted one meeting.

The Bureau of SBSTTA is constituted in essentially the same way, although the officers are referred to as Chairman and Vice-Chairman. The roles of Chairman and Rapporteur of SBSTTA are also intended to rotate regionally.

Voting

Provision is made in the rules of procedure for Parties to vote on both procedural issues, such as the election of officers, and on substantive issues. However Rule 40, which sets out the procedure for voting on matters of substance, has not to date been agreed on by

Norway

"Since 1988, the sulphur content of precipitation, rivers and lakes in southern Norway has dropped by about 35%, and certain species of aquatic invertebrates are now recovering. However inputs of nitrogen have not been reduced. In Western and Central Norway, 86% of the total area of land formerly covered by 15 river deltas has been used for infrastructure development of agriculture."

the Parties. The disagreement concerns the procedure for voting on matters concerning the financial mechanism (Article 21). Because Rule 40 has not yet been agreed, all decisions on matters of substance must currently be reached by consensus.

Regional coordination and representation

Much of the Convention's business is conducted on a regional basis. Most important are the five major divisions recognized by the General Assembly of the United Nations in 1972 in the resolution that established the United Nations Environment Programme (UNEP). These divisions constituted the regional groups that would make up the Governing Council of UNEP. They are currently referred to within the UN system as:

- The African Group
- The Asian Group
- The Group of Countries with Economies in Transition (formerly Eastern European States)
- The Group of Latin America and the Caribbean (GRULAC)
- The Western Europe and Others Group (WEOG)

For some purposes, the Western Europe and Others Group divides itself into the European Union (its fifteen member States) and the group known as JUSSCANNZ (Japan, the United States of America (a non-Party), Switzerland, Canada, Australia, Norway and New Zealand).

Two other groupings are also of importance. These are the Group of 77 and Small Island Developing States.

The Group of 77

The Group of 77 comprises the largest coalition of developing countries within the United Nations system. It was established in 1964 by seventy-seven developing countries at the first session of the United Nations Conference on Trade and Development. Its membership now comprises some 133 countries, but it has retained its original name. It serves as the principal means by which the developing world articulates and promotes its collective economic interests within the United Nations system. Under the Convention the group normally presents a single viewpoint on matters concerning financial resources and particularly advice to the financial mechanism. China, whilst not formally a member of the Group of 77, participates in the grouping which is then referred to as the "Group of 77 and China."

Small Island Developing States

In 1994, as part of the implementation of Agenda 21, a Global Conference on the Sustainable Development of Small Island Developing States (SIDS) was held in Barbados. The conference highlighted the economic and ecological vulnerabilities of such States and set out a programme of action to address sustainable development in them (the Barbados Programme of Action).

The special conditions of small island States are noted in the preamble to the Convention, and small island developing States are singled out in Article 20 on financial resources. The Conference of the Parties has also drawn attention to these in a number of its decisions, for example those concerning alien species and the programmes or work on inland water, forest and marine and coastal biological diversity.

The following list (Table 3.6) of countries and territories is that used by the United Nations Department of Economic and Social Affairs to monitor the progress of the Barbados Programme of Action for the sustainable development of small island developing States.

Table 3.6 **Small Island Developing States** (Parties to the CBD in **bold**)

Antigua and Barbuda	**Haiti**	**Saint Lucia**
Aruba[1]	**Jamaica**	**Saint Vincent and the Grenadines**
Bahamas	**Kiribati**	**Samoa**
Bahrain	**Maldives**	**Sao Tome and Principe**
Barbados	**Malta**	**Seychelles**
Cape Verde	**Marshall Islands**	**Singapore**
Comoros	**Mauritius**	**Solomon Islands**
Cook Islands	**Micronesia (Federated States of)**	Tokelau[2]
Cuba	**Nauru**	**Tonga**
Cyprus	Netherlands Antilles[1]	**Trinidad and Tobago**
Dominica	**Niue**	Tuvalu[3]
Dominican Republic	**Palau**	US Virgin Islands[4]
Fiji	**Papua New Guinea**	**Vanuatu**
Grenada	**Saint Kitts and Nevis**	

[1] non-self-governing dependency of the Netherlands, a Party; [2] non-self-governing dependency of the New Zealand, a Party; [3] non-Party; [4] non-self-governing dependency of the United States of America, a non-Party.

REVIEW OF IMPLEMENTATION OF THE CONVENTION AT THE NATIONAL LEVEL

INTRODUCTION

Conservation and management of biodiversity take effect in the field, and result from actions taken within national policy and legislative frameworks. Advice given to the Conference of the Parties, and the decisions it adopts, will largely focus on recommendations for action to be taken by the Parties, as the principal avenue for advancing implementation of the Convention. However, such guidance has to be translated into action at national level in order for it to be effective. This is ultimately where the best intentions of Parties to the Convention will succeed or fail. This chapter will review and assess national implementation.

Philippines

"Only 5% of the country's coral reefs remain in a pristine condition. 30-50% of seagrass beds have been lost in the last 50 years. 80% of mangrove coverage has been lost in the last 75 years."

Information on implementation

The main sources for such a review are the *national reports* submitted to the Conference of Parties and the *case studies* that Parties and other groups have submitted following the various calls for action and information made by the Secretariat in response to decisions of the Conference of Parties. The chapter therefore draws on the first national reports, submitted in 1998, and national reports on alien invasive species, submitted in late 2000, together with case studies submitted on Article 8(j) and related provisions, benefit-sharing, incentive measures for conservation and sustainable use (Article 11), environmental impact assessment (Article 14). It will consider in more detail the specific case of agricultural biological diversity.

Implementation of the Convention is overwhelmingly the responsibility of Parties and most action for implementation needs to be taken at the national level. What needs to be done is laid out in a general way in the operative articles of the text of the Convention, and these are clarified and expanded upon in the cumulative decisions of successive meetings of the Conference of the Parties. Each Party has autonomy to decide how to go about implementing the general provisions of the Convention and the specific guidance provided by the Conference of the Parties. Given the nature of the Convention and the specific conditions in each country with regard to the characteristics and status of its biodiversity, available financial and institutional resources, and national development priorities, it would be difficult for it to be otherwise.

However, the task of assessing the state of overall implementation of the Convention is therefore dependent upon the submission of information by all Parties on the measures each has taken to implement the provisions of the Convention and the effectiveness of these measures. Article 26 of the Convention contains the obligation for each Party to provide this information. Without comprehensive compliance with this requirement, the Conference of the Parties will operate in the dark. It will not have the necessary information to assess implementation, identify progress made and obstacles encountered, and identify priorities for future action. It will not be able to provide timely and targeted guidance to Parties, the Secretariat, the financial mechanism or any of the other bodies with a role to play in implementation.

Saint Lucia

"43% of the 32,625 km of beach is currently being mined for sand. St Lucia has already lost 40% of its wetlands."

Almost eight years after the entry into force of the Convention it is still not possible to construct more than a partial picture of overall implementation. Many Parties have not provided information, either through national reports, case studies or other types of submissions. This chapter draws on the information submitted, without pretending to offer an overall assessment.

There are a number of reasons why this is the case: some Parties felt that the guidelines for the first reports were not clear; the focus on implementation of Article 6 meant that information on other key areas of implementation was not submitted; many Parties felt unable to report on their implementation of Article 6 before completion of their national biodiversity strategy and action plan. The preparation of reports absorbs often scarce resources and time. The accumulation of reporting requirements under different biodiversity-related and environmental conventions can impose serious burdens on the national agencies responsible, when these lack resources. Finally, despite the fundamental importance of reporting on implementation, many countries harbour misgivings about reporting on difficulties encountered or lack of effective action, and wish to avoid what are perceived as unfavourable comparisons between themselves and other Parties.

First national reports

A total of 114 first national reports have been submitted, most of these by mid-1998. Although this means that almost two thirds of the Parties submitted a report of some kind, it would be unwise to assume that the information they contain can be taken as representative of implementation overall. The reports vary widely in size, format and content. Some are intended as final reports, while others are interim reports or drafts, and this argues for care when making comparisons.

The Conference of the Parties decided that the first national reports should focus on the implementation of Article 6 of the Convention "General Measures for Conservation and Sustainable Use." It was anticipated, therefore, that Parties would provide details of the development of national biodiversity strategies and action plans and on the integration of the conservation and sustainable use of biological diversity into the plans, programmes and policies of other relevant economic sectors.

That a large number of Parties did not complete national reports, even within the extended deadlines, whilst others provided only interim or partial information, in itself amounts to a delay in implementation of the Convention. Many countries were unable to report, or may have not wished to report until the process of developing national strategies and action plans was complete. This appears to have been the case particularly with countries applying for support from the financial mechanism for assistance with the development of their national biodiversity strategies and action plans (see next section).

The variability of information and treatment in the first national reports and the difficulties of drawing comparisons between the experiences of implementation, the patchy response to calls for the submission of case studies and the absence of standard outlines for their preparation, and the difficulties of obtaining accurate and timely information about the status of national biodiversity strategies and action plans have meant that it has so far been difficult to develop a global picture of the experiences of Parties in carrying out measures for the implementation of the Convention, and the effectiveness of the measures taken.

The new format for national reports, which calls for submission of information on action taken in pursuit of all the obligations on Parties under the Convention and on the experiences of Parties in

undertaking such actions, including the reasons for the selection of relative priorities and constraints to implementation, will go a long way to overcoming the existing information deficit and the problems of comparability.

The near-universal membership of the Convention means that, if all Parties submit complete reports, there is the possibility of obtaining a reliable global overview of implementation. Preliminary analysis of the reports received shows that most Parties have used the format and that the information in the reports can be analysed in a way that enables a picture of the status of implementation to be developed. In particular, it will be possible to identify where Parties have identified constraints to implementation.

Slovakia

"Almost one tenth of its wetlands have been drained."

Although a reliable picture of this sort is not yet available, preliminary conclusions can be drawn from the information contained in the first national reports, from reports prepared by the GEF and its Implementing Agencies on implementation of biodiversity enabling activities, and from other information provided by Parties which indicate that the implementation of the Convention is proceeding in most countries. This is illustrated by:

- The ongoing preparation of national biodiversity strategies and action plans in most countries,
- Increasing efforts to reform institutional and legislative arrangements, with a view to integrating biodiversity issues into sectoral activities,
- Increased recognition of the importance of the identification and monitoring of biological diversity,
- Renewed emphasis on *in situ* conservation of biological diversity,
- Continuing requests for financial and technical assistance to complete the strategies and action plans and to focus on national and local implementation,
- Emerging interest among Parties in promoting regional cooperation for implementation of the Convention.

Reporting on the status of biological diversity and its conservation

The form and content of the biodiversity information provided in the first reports varies widely, in part perhaps because Parties were not clear how much information was actually required and for what purpose. It appears that most Parties have a reasonable knowledge of the status and distribution of the larger species and main ecosystems within their territories, and some have very detailed information; although nearly all note the need for more information. In general, rather less information is available on genetic resources than on species and ecosystems, except in the case of major crop species.

Reporting on threats to biodiversity also varies greatly. This might imply that significant differences exist in the way threats are addressed at the national level; it might also reflect a tendency to avoid reporting on negative issues. Where threats are referred to, specific threats are usually identified (such as pollution or habitat fragmentation), and the steps being taken to deal with them are briefly discussed. However, it is clear that a systematic approach to the identification of threats to biodiversity is lacking in many countries. Some countries have carried out systematic reviews to identify the potential impacts on biodiversity of other sectors, such as agriculture or transport. This is a potentially valuable approach as it moves from looking at the pressures themselves toward an initial assessment of the driving forces behind them. A number of Parties have assessed the socio-economic conditions and trends associated with adverse impacts on biodiversity.

All countries have some form of environmental legislation in force, although the form and function of that legislation can vary widely, as can the extent to which it is implemented. Of particular interest are the arrangements (both legal and institutional) in those countries with a federal system of government, in part because of the extra steps required to ensure coordination between the different levels of government. Another issue of particular interest in certain parts of the world, particularly in the Pacific, is the relative importance of customary law and traditional management structures, and the efforts to build effective conservation programmes into such practices.

A number of Parties have provided the Secretariat with information on their efforts to conserve plant and animal genetic resources for food and agriculture. This includes information on regulatory frameworks in place, on *in situ* conservation of landraces and indigenous cultivars, on measures taken for *ex situ* conservation of genetic resources within the country, and details of national institutions with important germplasm collections. Difficulties in obtaining adequate funding for the maintenance and further development of national *ex situ* facilities have been noted, and there is also a lack of coordination in certain areas.

There appears to be a lack of coordination in the application of national legislation in a number of countries, and in some, difficulties in its implementation. Closer integration of national policies and legislation with international agreements is commonly needed. On the other hand, many countries work with international organizations and participate in international programmes that directly or indirectly provide means for the implementation of the Convention. Examples include UNESCO's Man and Biosphere (MAB) programme, and the activities of member institutions of the Consultative Group on International Agricultural Research (CGIAR). Further development of such collaborations has the potential to support and improve national implementation of the Convention.

Because many Parties are in the early stages of preparation of their biodiversity plans and strategies, much discussion in the first national reports concerns existing environmental measures. Some reports stress research and monitoring, while others place more emphasis on conservation action, but almost everywhere initiatives exist that can be developed as a means of implementing the Convention. In general, these activities place more emphasis on the species and ecosystem levels of biological diversity than on the genetic level, both in conservation activities and in research and monitoring programmes.

The form of institutional responsibility clearly varies quite considerably, as does the extent to which institutions at the national level interact and coordinate with each other. Indeed, a number of the national reports explicitly note the lack of coordination in activities concerned with biodiversity conservation, and identify this as an impediment to the efficient implementation of the Convention.

One report by a developed country Party stresses the steps taken to assess the impact of all its activities, past and present, on the world's biodiversity. This type of assessment of a nation's "ecological footprint" serves not only to demonstrate the extent of a country's impact on the world, but also the dependence of that country's citizens on biodiversity and the products and services that biodiversity provides. Further studies of this sort would be valuable.

STATUS OF NATIONAL BIODIVERSITY STRATEGY AND ACTION PLANNING

Development and adoption of a national biodiversity strategy is the foundation for implementation of the Convention by Parties. A national strategy will reflect how the country intends to fulfil the objectives of the Convention in light of its specific national circumstances, and the related action plans will constitute the sequence of steps to be taken to meet these goals.

Spain

"Of the 7,300 km of rivers in Spain 11% are substantially contaminated and another 15% show medium contamination. In the last 50 years 60% of Iberian wetlands have been desiccated. Close to 40% of the coasts littoral zone has been urbanised and occupied."

The Convention requires that biodiversity considerations be mainstreamed into all aspects of national planning and that each Party shall integrate consideration of the conservation and sustainable use of biological resources into national decision-making. The requirement to mainstream the conservation and sustainable use of biological resources across all sectors of the national economy and of the policy-making framework is the complex challenge at the heart of the Convention.

Some countries have prior or underlying national frameworks for biodiversity based on elements of biodiversity management such as nature conservation strategies, wildlife policies, national park and protected areas plans and legislation, and have used or adapted these to meet the obligations of Article 6. However, the broad scope of the Convention has meant that many countries, developed and developing, are having to deal with a range of unfamiliar issues and concepts. This is the case both for Parties that are adapting existing frameworks to meet the obligations of the Convention and those that are developing national biodiversity strategies and action plans (NBSAPs) for the first time. New issues include access to genetic resources and benefit-sharing, bioprospecting, biosafety, and protection and application of traditional knowledge. For many Parties such issues are among their highest priorities.

Parties need assistance to develop national biodiversity strategies and action plans, to identify priority actions, to develop the necessary human and institutional capacity, and to obtain appropriate financial support. The Convention recognises that cooperation – between Parties and sources of external support, and between Parties themselves – is essential.

By January 2001, 125 eligible developing countries and countries with economies in transition had had biodiversity enabling activities approved. A number of developing country Parties are preparing their strategies with other resources. Overall, on the basis of the available information, it appears that around one third of the 153 developing countries Parties or Parties with economies in transition have completed the preparation of their national biodiversity strategies and action plans. Of the 26 developed country Parties, it appears that most have developed a national biodiversity strategy or have adapted existing strategies to reflect the measures set out in the Convention.

The absence of a requirement for Parties to inform the Secretariat when national biodiversity strategies have been completed and approved, or to provide a copy of the completed strategy document, has meant that it is not possible to maintain an up-to-date picture of the overall status of strategies. As a way of remedying this, the format for the second national reports includes a requirement that the Party inform the Secretariat of the status of development of its national biodiversity strategy and action plan and, if this has been completed, to provide a copy to the Secretariat. In this way it is hoped that a complete picture can be obtained and that completed strategy documents can be made available through the clearing-house mechanism for consultation by countries that have not yet completed the strategy development process.

Despite the fact that, for many countries, development of a national biodiversity strategy and action plan has been or will be a new experience, requiring new methods and arrangements, it is likely that implementing the strategy will make even greater demands. A key factor that may well determine the extent to which implementation succeeds, rather than the strategy remaining yet another document on the shelf, will have been the real degree to which the development

Ireland

"In a recent survey of Irish lakes 60% were categorized as unpolluted, 32% as strongly eutrophic and the remainder as highly eutrophic and hypertrophic. The majority of rivers are salmonid quality, but the length of pristine, unpolluted rivers has steadily declined, from 84% in 1971 to 57% currently."

of the strategy has been a country-driven process and not, in the case of developing country Parties, simply a response to the availability of financial support from the GEF.

When Parties reported in 1998, most of the developing countries that had begun work on development of a NBSAP were at a fairly early stage in the process, and as a result many of the reports were of an interim or summary nature. Many developing country Parties and Parties with economies in transition did not fully start developing their NBSAPs until late 1997 or early 1998, and some later still.

The NBSAPs of developed country Parties draw heavily on existing plans and strategies. In those developed countries that had not completed their NBSAP in 1998 relevant activities were generally under way. A key task has been to integrate existing efforts (which include policies, law, programmes and guidelines) into the NBSAP process in a meaningful and effective way, avoiding duplication.

Consultation with or participation by stakeholders is taking place in many countries, although the level of actual involvement varies widely. Many Parties are drawing upon advice and experience from elsewhere.

A number of reports refer to cross-border protected areas, where international collaboration can lead to an increase in protection for certain species and habitats, increased opportunities for managers to cooperate and to share experiences, and an increased profile for conservation action. Such cross-border initiatives provide an important means of improving implementation of the Convention, although it is not clear to what extent they are a response to the Convention.

One Party provided information in its national report on the conclusions of a national audit on the management of the natural environment, which identified the need for reform in the distribution of financial resources and in administrative activities. This kind of analysis can be very useful, both as a check on the cost-effectiveness of action being taken, and as a stimulus for cross-sectoral integration.

A number of intergovernmental workshops in 1997 and 1998 reviewed regional implementation of the Convention, providing an opportunity for national focal points and others to share experiences. A general conclusion was that biodiversity planning, in the context of the comprehensive scope of the Convention, was a new concept for which there were no prior models or examples of best practice, and for which few methodological tools were available. All countries, notwithstanding differences arising from the specific conditions of each, were engaged in similar learning processes.

Specific problems identified at the start of the biodiversity planning process included:

- Inadequate political support for crucial aspects of the planning process and for approval of action;
- Weak legislative base;
- Inadequate information;
- Lack of appropriate scientific and technical expertise and experience in biodiversity planning;
- Lack of institutional coordination within Governments, and between Governments and stakeholders;
- Difficulties in access to and availability of funding;
- Direct economic pressure on ecosystems and a lack of national budget allocations;
- Need for increased public education and awareness;
- Need for recognition of the long-term nature of the NBSAP process;

- Complexity of translating a biodiversity strategy into a costed and prioritized action plan;
- Scarcity of examples of the effective integration of biodiversity considerations into sectoral or cross-sectoral planning.

Action to integrate conservation and sustainable use into other sectors

Most countries recognize the importance of integrating biodiversity into other sectors, in particular agriculture and forestry. Mechanisms, such as land-use planning systems, are widely being put in place to achieve this. It is often difficult to determine to what extent this is a result of the Convention itself. In some regions, for example, Parties have clearly made significant efforts to include all stakeholders in the development of NBSAPs, and it appears that a wide range of sectors and interests are involved in the implementation of action plans. In most cases, a steering or coordination group has been set up, usually under the auspices of the Ministry of Environment or its equivalent. These groups mainly comprise representatives of the relevant ministries, research institutes and non-government organizations. Some countries mention the involvement of different levels of government, and others stress the involvement of trade, industry and the private sector. At regional level in Western Europe, European Community policy and legislation provides a further potential opportunity to develop intersectoral integration, building on strong national planning processes. Wide dialogue can lead to increased understanding of the Convention among a range of stakeholders, and this can in turn lead to improved integration.

The situation in countries with economies in transition varies widely. In some countries government-appointed commissions are responsible for ensuring integration, including through policy reviews in different sectors to address the links with environmental policy. In other countries activities in different sectors appear insufficiently coordinated. These differences are possibly due to different economic conditions. The development of cross-sectoral responsibility clearly emerges as a key issue, to be addressed through collaborative development of NBSAPs.

A study of key trends in integrating biodiversity into other sectors taken from the reports of Parties in the Pan-European region (Western Europe and countries with economies in transition) indicates that:

- no single economic sector stood out alone as impacting on biodiversity across the whole of Europe;
- the key sectors of concern indicated by European countries are agriculture, forestry, fishery, transport, tourism, and water management. Protected areas were highlighted as one of the main approaches to address integration;
- national reports generally made reference to a limited number of sectors concerning integration. Few national reports indicated a wide spectrum of sectors;
- important sectors for biodiversity, such as mining, coal, oil, chemicals are mentioned only in a few reports;
- regional trends appear to exist, with the European Community being most concerned with agriculture although taking an intersectoral rather than single sector approach, whilst in the CEE region there is relatively more concern than in Western Europe for forestry.[1]

[1] Drucker, Graham and Damarad, Tatsiana. (2000). *Integrating Biodiversity in Europe: A Review of Convention on Biological Diversity General Measures and Sectoral Policies.* Tilburg (Netherlands). European Centre for Nature Conservation. page 20

In the Latin America and the Caribbean region a process of wide consultation for developing NBSAPs appears to be taking place, with the intention of leading to inclusive and integrated future programmes. Several Parties identify a body responsible for ensuring (or advising on) cross-sectoral integration, nevertheless more can be done in this area.

Several Parties in the Asia region clearly recognize the importance of the NBSAP process in promoting dialogue between diverse stakeholders, and in facilitating the development of a better awareness and understanding of cross-sectoral responsibility. This is an important process, as in many countries there are overlaps of mandate and areas in which there is no clear coordination, while in others there are deficiencies in integration resulting from restrictions inherent in the legislative framework.

Mechanisms for achieving integration vary. Some Parties have established national biodiversity commissions or committees derived from key areas of government, NGOs and the private sector, in order to coordinate or advise on the development and implementation of biodiversity policy. Other Parties have less broad-based mechanisms, with one ministry or group of ministries taking the lead in the development and implementation of biodiversity policy, although other bodies may be able to contribute.[2]

Switzerland

"Since 1800, 90% of Swiss wetlands have disappeared. The area of flood plains has also been reduced by 90%, and of the remaining plains only 20% can be considered active."

[2] Types of bodies established in the Pan-European region include: interministerial or departmental committees, biodiversity steering groups, national commissions for biodiversity, experts committees, national biodiversity forums, sustainable development roundtables, interdisciplinary working groups, sustainable development commissions, national environment and sustainable development commissions. (Drucker and Tamarad (2000), table 5)

Many countries recognize the importance of public education and awareness for integrating the objectives of the Convention into other sectors. A general lack of understanding of the importance of biological diversity and the dangers arising from its loss are highlighted in several reports, and a number of Parties state that they are planning activities to address this. Some countries are aware of the opportunities offered by ecotourism for generating revenue for investment in conservation and sustainable use of biological diversity, and as a method for raising awareness and interest in biological diversity.

Several national reports give the impression that integration is led from one ministry and, in effect, imposed on other sectors in the name of national policy, with the risk that integration is more apparent than real in such cases. On the other hand, it does appear from many reports that there are real and creative efforts to ensure effective integration of biological diversity into other sectors, which is a very positive outcome.

Action to identify and monitor biological diversity and impacts upon it

Effective implementation of the Convention requires identification of the components of biodiversity and the activities that impact on conservation and sustainable use of biological diversity, and the effective management of this information.

In Latin America, much is known about important components of biodiversity, and the key threats to biodiversity have generally been identified, but there are also significant gaps in knowledge concerning particular regions and components of biological diversity. The status of information systems varies widely, from Parties with very few mechanisms for managing and ensuring access to information, to those that are in the process of developing more integrated

information systems that will facilitate the flow of information necessary for effective implementation of the Convention. However, national reports suggest that greater integration and information-sharing is needed, and that most monitoring and information management currently relates to the status of biodiversity rather than threats to it.

Within the small island developing States, information on key components of biodiversity is available, and there is an understanding of some of the major threats, but the information base is known to be incomplete, and the availability of integrated information is a problem. There are also problems because of the relative remoteness of some island areas, which can mean that access to them for assessment and monitoring purposes is restricted.

In Asia, major elements of biodiversity at the species and ecosystem level are generally known, and the main threats to biodiversity are also well documented. However, particularly in the larger countries, this information is often patchy, leaving significant gaps. Action is already under way in a number of these countries to fill information gaps, to address the causes of biodiversity loss, and to continue to monitor the situation.

Within Africa, lack of baseline information is widely identified as an impediment to the effective implementation of the Convention and one that needs to be addressed urgently. Several countries note that national biodiversity units have been or are being set up in order to improve access to information.

In Western Europe, there is significant activity under way to assess and monitor the various elements of biological diversity, including a number of international programmes (e.g. bird-ringing and recording). Such work is gradually being complemented and strengthened, and there are moves toward increased integration at national and international levels. However, mechanisms for assessment and monitoring of genetic diversity still lag behind, as they do elsewhere in the world, and should be given more attention.

Those countries with economies in transition often have an excellent information base, based on research and monitoring programmes. It is not clear to what extent these programmes have been augmented or adjusted as a result of ratification of the Convention. There are a number of initiatives under way to increase access to existing information, such as through the UNEP Environment and Natural Resources Information Network programme (assisting countries to develop their information management capacity and reporting ability).

All the developed country Parties have significant amounts of information for biodiversity assessment purposes. A number of countries are developing programmes, targets and indicators for use in monitoring, planning and reporting. These are predominantly at an early stage of development. Some of these programmes are based on further development of work developed for other initiatives, including the review of the implementation of environmental action plans and the statistical information prepared for the Organization for Economic Cooperation and Development (OECD) and the Commission on Sustainable Development (CSD).

There are great differences in the state of development of information systems supporting development and implementation of biodiversity conservation policy. Although most countries possess a significant information base, in some areas lack of baseline data is still identified as an impediment to the effective implementation of the Convention, particularly in Africa, and improved coordination of information

management is often required. National information networks are under development in a number of countries. There is commonly need to reduce duplication of effort and increase compatibility between such systems.

Article 8(j) and related provisions

Decision IV/9 of the Conference of the Parties invited Governments and others to provide the Executive Secretary with case studies and other relevant information to support the discussions of the Open-ended Intersessional Working Group on Article 8(j) and related provisions of the Convention.

Article 8(j) and related provisions

Article 8(j) (*in situ* conservation):
"Each Contracting Party shall, as far as possible and as appropriate:
(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

Article 10(c) (Sustainable use of components of biological diversity):
"Each Contracting Party shall, as far as possible and as appropriate:
(c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements."

Article 17(2) (Exchange of information):
"Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information."

Article 18(4) (Technical and scientific cooperation):
"The Contracting Parties shall, in accordance with national legislation and policies, encourage and develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies, in pursuance of the objectives of this Convention. For this purpose, the Contracting Parties shall also promote cooperation in the training of personnel and exchange of experts."

Interaction between traditional and other forms of knowledge relating to the conservation of and sustainable use of biological diversity is an important issue for the successful implementation of the Convention. The validity and potential impact is recognized in Article 8(j) of the Convention. Reference to traditional knowledge is found in an increasing number of decisions from the first to the fifth meetings of the Conference of the Parties, reflecting the growing recognition

Uzbekistan

"Since the 1970s the Aral Sea has shrunk to approximately half its size. Reed bed area has declined by 6 times due to the shrinking of the Aral Sea. However by letting water into other lake systems 99,000 ha have been gradually restored."

of its status as an essential component of implementation of the Convention. This incremental growth in reference to traditional knowledge reflects the growing understanding of Parties of its intrinsic importance and the need to address issues such as mechanisms for cooperation, consent, benefit-sharing and conservation. These are important components of the conservation and sustainable use of biological diversity and the effective participation of indigenous and local communities in the implementation of the Convention.

At the national level, recognition of and respect for indigenous rights and cultures may have the potential to promote the sharing of the benefits of traditional knowledge. In advance of any such sharing it is essential that mechanisms, such as national legislation and international instruments, be developed and implemented in cooperation with indigenous and local communities to protect the inherent rights and "ownership" of the holders of such knowledge. The lack of confidence within indigenous and local communities toward many such instruments has led to a general recognition that *sui generis* regimes may be worth exploring where current laws and agreements cannot be effectively used. At present intellectual property laws such as geographical indicators and trademarks, as well as certain aspects of common law, are being explored with respect to the collective traditions and values of indigenous and local communities. A number of countries have acknowledged their constitutional obligations to recognize and affirm existing aboriginal and treaty rights that may constrain compliance with international instruments in areas such as fishing and forestry.

Incorporation of the traditional knowledge of indigenous and local communities in development and resource management decision-making processes emerges as an issue of considerable importance. Access to information is a very sensitive issue, and ethical guidance for the conduct of research in indigenous communities is needed. The relationship between representatives of indigenous communities and holders of traditional biodiversity-related knowledge may require further examination, specifically with respect to matters of prior informed consent and the collective nature of indigenous knowledge. More countries should provide case studies and related information on this so as to share experience on how to reach the respect and value of traditional biodiversity-related knowledge in order to meet the principles contained in Article 8(j) and related provisions.

Protected areas

Virtually all reports from every region stress the importance of protected area systems in national programmes for implementing conservation, and the action to be taken as part of the national biodiversity strategy and action plan is identified. It is in general essential to ensure that:

- protected area systems cover the full range of biodiversity adequately,
- legislation, enforcement and management are effective (including sufficient human and financial resources),
- protected areas are integrated with the wider region, and
- all stakeholders are involved in the establishment and management of protected areas.

International protected area initiatives and transfrontier protected areas are effective means of encouraging and extending national action. For example, within the countries of the European Union and those countries seeking to apply for membership, particular emphasis is placed on development of the networks of protected areas established under European Community legislation. This international

network of nationally designated sites (Natura 2000) aims to protect core areas for all species and habitats of European significance. Elsewhere in Europe and beyond, the Bern Convention is encouraging the development of a parallel network of core areas called the *Emerald Network*.

In the wider Pan-European region, including the Russian Federation and the Central Asian republics, there is a programme for development of a *Pan-European Ecological Network* as part of the Pan-European Biological and Landscape Diversity Strategy. The aim of this programme is to build on the series of core areas with a series of buffer zones, corridors and other protected areas that between them ensure the efficient conservation of all biodiversity and landscape elements of Pan-European significance. Networks of this sort are already under development in many of the countries with economies in transition, as well as some of the countries of Western Europe and parts of North America.

Among Pacific small island States the GEF has been supporting development of an approach to the establishment and management of conservation areas that involves local stakeholders effectively and takes full account of the complex land tenure systems in these countries. With one or two GEF-supported conservation areas in each country, it is hoped that the lessons learnt will be repeated elsewhere, strengthening conservation in the Pacific islands, and making it more relevant to local people.

Consistent with the ecosystem approach, there is an increased emphasis on the relationship between protected areas and the surrounding lands in many other countries too, coupled with uptake of a bioregional approach to protected areas establishment, and an increase in the involvement of local peoples. The GEF is supporting a range of protected areas projects that are making significant moves in this direction.

Protected areas are a critical component of the measures that will ultimately determine how effectively countries are implementing the Convention. However, the issue of protected areas has not been fully addressed by the COP to date, except as one tool in a range of tools for implementing conservation and sustainable use in particular ecosystems. Various organizations, led by the IUCN World Commission on Protected Areas, are starting to draw together lessons learnt in protected areas establishment and management for the World Parks Congress in 2002; this will in turn provide major input to the SBSTTA and COP discussions on protected areas in 2004.

Sustainable use

Sustainable management agreements between purchasing companies and local inhabitants can provide the basis for avoiding illegal take and overharvesting, and generate greater benefits for local communities from commercial use. The CAMPFIRE programme in Zimbabwe is an example of community-based natural resource management. It seeks to demonstrate that with appropriate incentives, wildlife is a viable land-use option in ecologically marginal areas.

For successful establishment and implementation of an agreement it is essential that the participation is broad-based and takes into account the traditional structure of the communities where relevant. All stakeholders need to be involved in the process to ensure acceptance and ownership. However, there is a need to differentiate between producing and non-producing communities and carefully allocate the revenues according to the contributions made to the project as well as the costs incurred. Such an effort will be successful in establishing a clear link between producer (defined by cost) and benefit.

Viet Nam

"Between 1990 and 1995 the area of mangroves was reduced from 73,500 hectares to 34,700 hectares, a loss of 60% of the 1990 area."

All available case studies demonstrate that sustainable use has positive impacts on the conservation of the species harvested as well as on support species. The greatest benefit from sustainable use approaches will not be in the form of tangible and measurable outputs such as equipment and money, but rather the catalysing role that this type of activity plays in coupling conservation needs with the needs of communities

Incentive measures

Decision III/18 of the Conference of Parties calls for Parties to provide the Executive Secretary with case studies on incentive measures, and the experience demonstrated by these case studies was used to inform discussions at the third meeting of the COP.

Effective incentive measures for the sustainable management of biological diversity are recognised as an important priority. A series of recent meetings have specifically focused on the use of economics and incentive measures for biodiversity management, and case studies originating from some of these efforts have provided valuable input to discussion. Several conclusions can be drawn:

- Successful design and implementation of incentive measures require consideration of socio-cultural factors; while economic factors are highly significant, they are not the only determinants of biodiversity management outcomes;
- Opportunities to implement incentive measures are country-specific; each having a unique institutional environment defining opportunities for, and constraints on, policy measures;
- Involvement of the private sector is facilitated by a participatory approach; this sector becomes increasingly committed to conservation and sustainable use when its concerns are taken seriously and incorporated into policy.

Successful incentives for conservation and sustainable use arise from a combination of measures incorporating economic, social, cultural and legal factors. Improving biodiversity management involves successfully changing patterns of human behaviour, and in designing new incentive measures the implementing agency must take concerted action on the legal, social, and enforcement fronts simultaneously. Two approaches can be taken to creation of incentives. Formal constraints are written instruments that provide a legally enforceable framework for the economic and social activities of a society; these include laws, government policies (including economic measures) and property rights. Social constraints are unwritten rules that govern everyday human behaviour in economic and social exchange. Cultural norms, social conventions, traditions and taboos are all social constraints which stem from belief systems, and compliance with them is by convention.

Environmental impact assessment

Decision IV/10 of the Conference of Parties called for Parties to provide the Executive Secretary with case studies relating to environmental impact assessment (EIA), and the experience demonstrated by these case studies was used to inform discussions at the fourth meeting of SBSTTA. Six countries responded to this call, Argentina, Australia, Canada, Dominican Republic, Namibia and Oman, as well as UNEP and the World Bank.

An environmental impact assessment process is in place in many countries, and is often a legal requirement. However such processes often fail to incorporate biological diversity considerations in full, and even if they are included these considerations may subsequently be regarded as low priority in comparison with economic and development considerations.

On the other hand, work on biological diversity and impact assessment is being undertaken by Parties and relevant organisations. Examples include the workshop on biological diversity and impact assessment in Central Africa, held in Cameroon in March 1999, and the European Directive on the assessment of the effects of certain public and private projects on the environment, substantially modified in 1997. Impact assessment was analysed at the seventh meeting of the COP of the Convention on Wetlands (San Jose, May 1999); at the sixth meeting of COP of the Convention on Migratory Species (Cape Town, November 1999); and at the twelfth meeting of the COP of the Convention on International Trade of Endangered Species (Nairobi, April 2000).

The case studies and other information submitted to the Executive Secretary in 1999 were not sufficient, either in number or in their degree of detail, to reach definitive conclusions about the present status of incorporation of biodiversity considerations into environmental impact assessments. The report was therefore considered as an initial step in covering the issue, with the expectation that further information and analysis would lead to the development of guidelines on the incorporation of biological diversity considerations into EIA.

On the basis of the case studies reviewed by the Executive Secretary, the following preliminary conclusions can be drawn:

- Impact assessments on biological diversity should address actual and potential effects of development activities and projects on ecosystems, species and genetic resources, as well as effects on functional performance and resilience of natural habitats and ecosystems.
- The value of *Strategic Environmental Assessments* is highlighted. These consider the overall environmental policy context instead of focusing on individual projects and/or resources and should address conservation and sustainable use of biological diversity and ecosystems.
- The lack of adequate scientific data on the status and trends of biological diversity, including information regarding threatened and endangered species and their habitats, constitutes a serious limitation in carrying out such assessments.
- Continuous monitoring is required through baseline/benchmark data and indicators, to provide early warning of potential threats, and to measure impacts on biological diversity, ecosystem processes and interactions. This should address both specific and cumulative environmental effects resulting from human activities.
- Some adverse impacts may be wide-ranging and have effects beyond the limits of particular ecosystems or national boundaries. Environmental management plans and strategies should therefore consider regional and transboundary impacts, and provide the basis for consistent and integrated approaches. These plans and strategies may be backed up by legislation and incentive measures, including measures to restore or rehabilitate ecosystems and to recreate habitats and biological resources.
- Proposed programmes and projects that may have a potential negative impact on biological diversity should be systematically

Armenia

"The area of natural pasture land has declined from 1.4 million hectares in 1940 to 808,000 hectares today."

screened from the earliest stage of the proposal and through all subsequent stages of the development process. Such assessments should provide early warning of incipient problems rather than assessing damage at a stage where it may already be irreversible.

- In all stages of the assessment process, the involvement of interested and affected stakeholders should be ensured, including governmental bodies, the private sector, research institutions, indigenous and local communities and non-governmental organisations, through the use of participatory approaches.
- There is an urgent need for capacity-building, including the development of local expertise in rapid assessment methodologies, techniques and procedures, to permit, at the very least, the identification of impacts of major importance on biological diversity.

A number of countries in Africa and Central Europe have also referred to the need to develop procedures for addressing agricultural biological diversity in environmental impact assessments.

Access and benefit-sharing

The Conference of the Parties, through a series of decisions, has requested Parties to provide information to the Executive Secretary on a number of issues related to access and benefit-sharing, including developments of national, regional and sectoral administrative and policy measures and case studies on access and benefit-sharing arrangements. On the basis of this information, the Executive Secretary is to facilitate an exchange of information among Parties and to help inform subsequent discussions of the COP.

In order to implement the Convention efficiently, measures are required for regulating not only the provision of genetic resources, but also the commitments of the user. As the provider and user may be from different countries, they may well be subject to different legal, administrative and policy systems. This has important implications for agreements and their development.

As more and more access legislation is being enacted at the national level, there is a need for mechanisms to help harmonize efforts to implement the Convention framework at the national and regional levels, and to ensure fair and equitable sharing of benefits. Guidelines need to be developed and adopted based on the best practices developed by those countries that have set up legislation, including administrative regulations and other administrative and policy measures. Countries choose a variety of mechanisms to introduce access measures into their national law, including new stand-alone laws or additions to existing law relating to biodiversity or specific sectors such as fisheries, forestry or protected areas.

One message common to all case studies is the need to establish a clear institutional setting and a legal and policy framework which is favourable for multidisciplinary arrangements. In most cases where specific access legislation has been developed, countries have decided to establish a committee at the national level, including stakeholders from all levels of society. Biodiversity prospecting is a multidisciplinary and complex field, and the cooperation of a range of sectors in society is required in order to develop effective regulations.

Because the chances of a drug being developed from any one collection of genetic material is relatively low, benefit-sharing mechanisms with immediate incentives are important, rather than

ones based only on potential future royalties. Basic needs of the local inhabitants are crucial in creating incentives for protecting natural resources, and the extended period required for the development of products (particularly so when dealing with potential pharmaceutical products) means that long-term relationships are important. In some cases, measures are in place to set up joint research programmes involving institutions in the provider and user countries. In order to allow countries to negotiate effectively with international companies, a register of experts upon which communities can draw has been proposed. In general, scientists, development workers, and local community representatives will lack commercial and legal experience to negotiate agreements without competent legal counsel. Communication in the host country language is needed to satisfy the requirement for informed consent.

Belarus

"In the past 30 years 150 thousand ha of bush and shrubland have been transformed into agricultural land."

Financial and human resources

Many Parties clearly recognize that they are in the early stages of a process that will bring changes and add new tasks to the programmes of their agencies. Training in new skills is identified as a future need in many counties, particularly in areas such as biotechnology and biosafety. In other more traditional areas, such as taxonomy, there are always shortages of skills in particular areas.

The national reports from many Parties in Latin America, Asia, and Africa identify a common need for additional financial and human resources in order to help implement the Convention, lack of these being a major constraint to implementation, particularly in Africa. Most countries in these three regions already receive support from the GEF for the development of strategies and action plans, and other international support is also being provided through bilateral and multinational development assistance. Only two Parties refer in their reports to funding biodiversity through debt-for-nature swaps.

Within Western Europe, the human and financial resources available for implementation of NBSAPs are generally good. Further financial resources are identified as being required in several countries, but innovative approaches to raising revenue and sponsorship are being explored, particularly with the private sector. In some parts of Europe, significant funds are available through the EC, where structural funds and the Cohesion Fund can be used to finance activities that support biodiversity conservation.

The availability of resources varies widely in those countries with economies in transition, and most of the countries are seeking outside assistance, both financial and technical, in at least some areas of activity. Such support varies from specific projects, such as managing protected area systems or developing biodiversity information management, to a much more wide-ranging requirement for capacity building. In most cases the GEF is supporting the development of NBSAPs.

A review of GEF biodiversity enabling activities was completed in late 1999[3], based on interviews and review of key documents as well as visits to twelve countries: Argentina, Belize, Cameroon, Cuba, Egypt, Eritrea, Gabon, Kenya, Mexico, Poland, Ukraine, and Zimbabwe. Additional case studies were commissioned in India, Nepal and the Philippines. Broader reviews were commissioned for enabling activities in two regions, the Arab States, and the South Pacific Islands.

[3] GEF (1999)

France

"Grasslands have decreased by 12%. Over the last 50 years wetlands have receded by tens of thousands of hectares. 20% of flora taxa are considered threatened."

An overall finding of the review was that most countries appear to have undertaken a worthwhile and cost-effective national biodiversity planning process, or are in the process of doing so. Most of the NBSAPs reviewed during the assessment were well-informed and impressive documents, containing what appeared to be reasonable assessments of current biodiversity strategies and trends. Given that the stated objectives of enabling activities are extremely ambitious and set a very high standard for any country to achieve, it may be more realistic to think of these as helping set the stage for national biodiversity planning.

Significant progress in biodiversity planning has indeed been made by many countries, but the development and implementation of national biodiversity plans which can make a real difference to current rates of biodiversity loss, and the commitment and capacity to implement such plans, are still some way in the future.

Seven national reports submitted to the Secretariat by developed country Parties contained figures on their biodiversity funding. Some of these contained information on specific environmental funding programmes of which biodiversity is an integral part. Examples include the Austrian Global Environment Cooperation Trust Fund administered by the World Bank, the Belgian Special Programme for Africa operated through the International Fund for Agricultural Development (IFAD), the Darwin Initiative established by the United Kingdom, the Phare and Tacis programmes developed by the European Commission, and the French Global Environment Facility (FGEF).

However, most national reports did not provide quantitative information regarding financial support to biodiversity, and the lack of a standard mechanism for compiling information on international support for biodiversity conservation and sustainable use makes assessment of its extent difficult.

Mechanisms for sharing national experience

The compilation and analysis of case studies is central to several areas of work of the Convention. Although it was requested that national reports should include case studies, and several calls for case studies have been made in COP decisions, it is evident that this information has not been provided in a consistently structured manner, and many Parties have not reported on the issues at all. Experience to date suggests that additional means to encourage and assist Parties to respond to requests for case studies are needed. Workshops can be a particularly useful mechanism to elicit reports, and the support of international organizations can be valuable. Particular efforts may be needed to support the preparation of case studies for the least developed countries and other small island developing countries.

Improving the availability and comparability of case studies, and encouraging their preparation and submission, will promote sharing of experience and analysis of lessons learned. The fifth meeting of the Conference of the Parties took a step in this direction by endorsing an outline for case studies on alien species.

At its second meeting, the Conference of the Parties requested Parties to organize a national clearing-house mechanism steering committee, gave advice on the content of information to be placed in the national CHM, and requested Parties to link national CHMs to the Convention's website through the Internet, where possible. By early

2001 the clearing-house mechanism network had 137 national focal points or "participating nodes" responsible for coordinating CHM activities at the national level. Fifty national clearing-house mechanisms had been linked to the Convention's website, twenty from developed country Parties and thirty from developing countries or countries with economies in transition. However the information suggested by the COP in 1995 (country profiles, national biodiversity strategies and action plans, appropriate legislation, scientific and technological information, and financial sources) has broadly speaking not yet been made available through these mechanisms.

Many developing country Parties have received funding through the GEF's biodiversity enabling activities for the establishment of their national clearing-house mechanism. The fifth meeting of the Conference of the Parties considered the independent evaluation of the pilot phase of the clearing-house mechanism, which had included seeking the views of Parties, and supported the implementation of the proposed strategic plan for the clearing-house mechanism. It identified a series of measure to be undertaken by Parties in the period 2001-2002. Chief amongst these were measures to establish or strengthen:

- National directories of scientific institutions and experts working on specific thematic areas of the Convention and to make these available through the clearing-house mechanism;
- A national baseline of existing scientific and technical cooperation initiatives relevant to the implementation of the Convention;
- National clearing-house mechanisms.

Implementation of policies and actions across international borders

Many international initiatives exist bringing national Governments together for planning and implementing activities of potential relevance to the conservation and sustainable use of biodiversity. This is dealt with in more detail in the following chapter, but it is important to recognize here the strong influence that international agreements and programmes have on national action.

International legislation Within the European Union, and even beyond its boundaries amongst those countries aspiring to membership, national action is strongly influenced by EC policies and legislation (directives and regulations). For example, the EC Birds Directive and the EC Habitats Directive mentioned earlier require member States to identify and adequately manage protected sites for certain listed species – countries can be taken to court and fined for inadequate implementation of these directives.

Information collection and management The European Environment Agency (EEA) and the Organization for Economic Cooperation and Development (OECD) are amongst organizations requesting information from national organizations in standard formats, and in doing so providing leadership in promoting and harmonizing approaches to information collection and management. Within the Western Hemisphere, the 1996 Summit of the Americas called for the establishment of an Inter-American Biodiversity Information Network (IABIN) to promote compatible means of collection, communication and exchange of information relevant to decision-making. Similar efforts to develop better application of information within regions and themes can be found in other parts of the world.

Kenya

"Woodlands, bushlands and wooded grasslands are decreasing at a rate of 50,000 hectares per year."

Coordinated programmes The countries of the Arctic region (Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States) are collaborating at an intergovernmental level on sustainable development and environmental protection in the Arctic. Within the context of the Conservation of Arctic Flora and Fauna (CAFF) and the Circumpolar Protected Areas Network (CPAN) national actions are being undertaken as part of a coordinated international programme.

Mutual interest The countries around some of the major rivers have a clear interest in jointly defining controls relating to water use and pollution, which also have implications for the conservation and sustainable use of biological diversity. This provides a strong influence on national action. Examples would be the agreements covering the Danube or Rhine rivers crossing Europe.

AN IN-DEPTH CASE: AGRICULTURAL BIOLOGICAL DIVERSITY

Decisions III/11 and IV/6 of the Conference of Parties called for Parties and others to provide the Executive Secretary with case studies on activities and instruments relating to agricultural biological diversity at international and national levels to help inform discussions at the fifth meeting of SBSTTA. There have also been a number of international workshops that have brought Parties together to discuss these issues.

A comparatively large amount of information is available about the status and trends of agricultural biodiversity at the national level, and about measures taken by Parties to promote its conservation and sustainable use. It is thus possible to present a synthesis of available information in greater depth than is possible in the case of other areas of implementation.

Agricultural biodiversity is a broad term that is taken to include all components of biological diversity of relevance to food and agriculture. For the purposes of the assessment carried out by the Executive Secretary, the following dimensions of agricultural biodiversity were identified:

- genetic resources for food and agriculture (species, breeds and varieties, their wild relatives, harvested wild foods), including:
- components of agricultural biodiversity that provide ecological services. These mainly fall under the heading "associated agricultural biodiversity" and include:
- abiotic factors, which have a determining effect on these aspects of agricultural biodiversity and, in line with decision III/11, were also addressed in the assessment;
- socio-economic and cultural dimensions, which were also considered, as cross-cutting issues, since agricultural biodiversity is largely shaped by human activities and management practices.

Identification, monitoring and assessment

Comprehensive data and information systems exist for the main genetic resources components (farm animals, crop plants, aquaculture, tree species, and some microbial species) and for the different abiotic resources that provide the basis for agriculture (water, land and use, climatic). Much of this information is compiled and managed by international rather than national organizations, although some countries have well developed information systems. Information on underutilized crops and some locally or regionally important staples (such as yams, bambara groundnut and cassava), as well as wild species of interest for food and agriculture, is scarce compared with major crops. (Though of course it is not scarce to the cultivators, highlighting again the importance of traditional knowledge

Latvia

"Between 1910 and 1995 coverage of grassland has decreased from 60% to 40%."

to the conservation and sustainable use of biodiversity, as well as to local and regional food security.) There is also much less information available generally on *in situ* resources in comparison with *ex situ* collections. It is clear therefore that there are major gaps or shortcomings in information systems.

Many countries have identified gaps in baseline data on animal genetic resources, in particular on wild/endemic and indigenous animal genetic resources. A global, country-driven assessment of the state of the world's farm animal genetic resources is planned under the guidance of the Commission on Genetic Resources for Food and Agriculture. Many countries in different regions have identified large gaps in baseline data on microbial genetic resources such as viruses, fungi and soil bacteria. Assessment of micro-organisms is generally limited to very few species of direct relevance to food additives, fixation of nitrogen and other nutrients, and plant and animal health.

Despite increasing scientific knowledge and understanding of the ecological functions of biodiversity and of the importance of sustainable functioning ecosystems, comprehensive monitoring and assessment systems are not yet available. Some relevant databases and information systems exist, but these are insufficient for assessing ecosystem function.

Species that provide essential services to agriculture such as pollinators, predators and soil biota, and a vast array of microbial species that contribute indirectly to food and agriculture, are inadequately assessed. Ecological functions of agricultural systems that contribute environmental benefits, such as wildlife habitats, watershed protection, landscape value, water quality need also to be incorporated in monitoring and assessment processes. Once identified and valued, these can provide the basis for agri-environmental policies that encourage productivity and sustainability.

Very little is being done systematically to bring together the data, information and associated tools required to address agricultural policy and management issues at the national, regional and global levels. There is an urgent need to promote the further development and application of indicators and assessment methodologies for the assessment of the status and trends of agricultural biodiversity and for the identification of biodiversity-friendly agricultural practice.

Research, best practices and technologies

Many initiatives have been launched in recent years concerning on-farm management and improvement of plant genetic resources for food and agriculture. Initiatives reported by Parties include surveying farmers with a view to integrating on-farm conservation into the national conservation strategy and developing on-farm conservation programmes, with the support of FAO, IPGRI, and the International Fund for Agricultural Development. The CGIAR now supports many participatory plant breeding activities.

It has been widely recognized that the most efficient and feasible strategy for the conservation of forest genetic resources is conservation *in situ*, conserving targeted species, populations and genetic resources as parts of the ecosystems in which they occur. Most countries, in all regions, mention conservation of genetic resources through protected areas in their reports. A number of countries have supplemented this with very successful community forestry programmes.

A wide range of best practices and technologies in the area of agricultural ecosystem function are already available. These activities include identifying establishing demonstration sites, carrying out on-farm experiments, and promoting awareness and training. There are also examples of national efforts to conserve soil resources in the *cerrados* of Brazil, farmer-organized minimum tillage programmes

have resulted in the rehabilitation of previously damaged soils, leading to increased productivity. Many traditional integrated production systems, such as home gardens, agro-forestry systems, rice-aquaculture systems, and the use of features such as hedgerows as ecological corridors along watercourses and roads, etc., can provide for high levels of diversity at the landscape level with mosaics of land-use types.

National initiatives include the development of the sustainable agricultural village concept in China for maintaining and restoring environmental conservation functions and natural ecosystems and landscapes, development of environmental farm plans in Canada, integrated farming systems in Thailand, and comparative analysis of different farming methods in Western and Central Europe.

Many countries have identified the lack of public awareness of agricultural biodiversity as a key constraint to improvement in this area. Public awareness campaigns could help to demonstrate the inter-relationships between the conservation of biological diversity and the management of agricultural systems, as well as the ecosystem service value of agricultural biodiversity. The organic agricultural movement has helped substantially to promote ecologically sound approaches. Guidelines for organic agriculture have been developed to promote its adoption, and incentives are provided through consumer demand.

In many cases, a wide range of case studies are already available on best practices and lessons learned from past experiences and experiments. These valuable experiences, both positive and negative, should be learned from and taken into account for future research initiatives. However, more understanding is needed of the multiple functions of biodiversity in production systems. A greater focus on the ecosystem approach is needed, including coordinated research in different agro-ecosystems, and under different management practices, to quantify the direct and indirect contributions of agricultural biodiversity.

Strategies, programmes and action plans

While most Parties have developed NBSAPs, only a few countries have reported the development of comprehensive strategies and action plans for the conservation and sustainable use of agricultural biodiversity. These include, for example, Bhutan, Canada, Hungary, India, and some countries in Western Europe. Overall more attention is given in the plans to the main animal and plant genetic resources components of agricultural biodiversity, and less attention is paid to the biological support system and the different production systems and agro-ecosystems.

There are examples in each region of ongoing GEF-funded programmes and projects on agricultural biodiversity, however the number of approved projects and funding volume for agricultural biodiversity has remained low in comparison to other thematic areas. The GEF has been taking steps to ensure that there are more opportunities to formulate and present relevant projects.

Countries have reported much progress in the area of strengthening of national programmes on crop genetic resources in particular, despite reductions in funding to national agricultural research systems. Several countries have held national workshops, which have helped further define national priorities, and stimulate the formation of national committees. At the same time, countries also report a wider involvement of stakeholder groups.

Mongolia

"Only 2% of pastures have not been degraded. Of the remaining pastures 50% are considered to be mediumly degraded and 1.5% very highly degraded. Between 1971 and 1997 forest and steppe fires destroyed over 14 million hectares of land."

A number of countries have developed programmes to promote sustainable agriculture that could provide the basis for promoting the conservation and sustainable use of agricultural biodiversity. In some cases, biological diversity issues are also being integrated into land-use planning and sectoral agriculture, forestry and fisheries programmes (e.g. Bhutan, Mozambique and several countries in Western Europe).

A concerted and coordinated effort that addresses the various components of agricultural biodiversity depends upon a coherent framework to guide national strategies and actions for the conservation and sustainable use on agricultural biodiversity. Integration of agricultural biodiversity considerations in national agricultural strategies and action plans, including forestry and fisheries, is necessary, as well as into environmental programmes, such as national environmental action plans (NEAPs) and environmental strategies and policies addressing specific resources such as forest and wildlife resource.

The agricultural sector is very complex and there are many different stakeholders that need to be involved in the planning and development process. These include producers (farmers, foresters, fishers), community leaders, the technicians and policy-makers in diverse sectors including agribusiness and development agencies, as well as the consumers that influence market demand. Coordinating mechanisms and transparent consultative processes are required to allow exchanges, negotiation and conflict resolution between different stakeholders, and to provide effective feedback mechanisms between producers and the technical and policy levels. This is crucial in the identification of issues and priorities, the design of appropriate strategies and actions, and the monitoring and evaluation of the performance and impacts (cost-effectiveness and impact) of programmes and actions.

Policies and legislation

The extent to which specific national policies and legislation on agricultural biodiversity have been developed varies greatly between countries. For example, most countries have legislation concerning seed certification and variety release, but few have legislation specific to microbial genetic resources. However this is an area of rapid change as understanding of the importance of genetic resources increases, and many countries are reporting changes in the last five years in legislation on matters such as plant breeders' rights and other relevant intellectual property rights, and access legislation.

Many countries have national legislation on factors affecting ecosystem functions and services, such as the reduction of chemical inputs, conservation farming practices and introduction of alien species. Legal arrangements that address the landscape and ecosystem level have been addressed most substantially within the European region, in part led by the European Commission.

Several countries have identified the need for policies and legislation that encourage sustainability through incentive measures and benefit-sharing arrangements. Land tenure issues and appropriate land-use policies are cited as important issues for conservation and sustainable use to reduce excess exploitation and unregulated access to biological resources.

There is a clear need to develop further coherence at national, regional and international levels between policies and legislation developed to address the conservation and sustainable use of agricultural biodiversity, including access and benefit-sharing, and between these and other policies and legislation that have an impact in these areas.

Norway

"Hay meadows have largely been abandoned. In 1959, semi-natural hay meadows accounted for more than 10% of the total agricultural area. By 1989, this had dropped to less than 5% in large parts of the country and to less than 0.5% in certain areas."

CONCLUSION

The Convention establishes an interconnected web of obligations on countries to conserve biological diversity, to use the components of biodiversity in a sustainable way, and to share the benefits arising out of the use of genetic resources:

- Articles 8 and 9 contain a comprehensive list of categories of measures to be taken in order to promote conservation of biodiversity;
- Article 10 provides that, to ensure sustainable use of biodiversity, Parties will need to integrate biodiversity into national decision-making, avoid or minimize adverse impacts on biodiversity, encourage compatible customary uses, support remedial action in degraded areas, and involve the private sector in developing methods for sustainable use;
- Articles 15 to 19 contain categories of measures that countries that provide genetic resources and countries that acquire genetic resources both need to take to ensure that the benefits that arise are shared fairly and equitably.

Parties will find it difficult to move forward on a secure basis in identifying and implementing the appropriate measures, without having completed the first cycle of the identification and monitoring measures specified in Article 7 through:

- Identifying components of biological diversity important for its conservation and sustainable use;
- Monitoring these, particularly those requiring urgent conservation measures and those offering the greatest potential for sustainable use;
- Identifying activities likely to have significant adverse effects on biological diversity;
- Maintaining data on all the above.

Article 6 is fundamental in this regard. It requires Parties to develop national biodiversity strategies and action plans (or adapt existing strategies) and mainstream biodiversity into all sectors. Procedures recommended by the Conference of the Parties for developing national biodiversity strategies start with the need to identify the biodiversity within the country and assess its status, if this hasn't been done. With this assessment, and having identified an institutional framework and operational responsibilities, the strategy can then be developed to address the three objectives of the Convention in the light of national circumstances.

It is the central importance of having a national strategy and action plan as the cornerstone of national action to implement the Convention that led to the decision by the Conference of the Parties that, in the first round of national reporting, countries should focus on their implementation of Article 6.

However, as we have seen, in many cases the development of the national biodiversity strategy has been slower and more complex than anticipated. Few developing countries were in a position to report on a completed process by the time the first reports were due. A number of developed countries were similarly unable to report on the completed process.

This means that, following the first round of reporting in 1997-98, there is no comprehensive basis on which to answer the question "What do we know about progress, constraints, and emerging issues?" in implementing each of the objectives of the Convention – conservation, sustainable use, and benefit sharing.

For this reason the Conference of the Parties has adopted a new reporting format for future rounds of national reporting, designed to bring out information about all the measures Parties have been requested to take, deriving from the provisions of the Convention and from decisions of the Conference of the Parties. It is hoped that this will provide the comprehensive overview of progress, constraints and emerging issues on each aspect of implementation needed to allow a global analysis of the state of national implementation of the Convention. This analysis will form the central focus of the next edition of the *Global Biodiversity Outlook*.

GLOBAL IMPLEMENTATION OF THE CONVENTION AND COOPERATION WITH OTHER CONVENTIONS AND PROCESSES

INTRODUCTION

The scope of the Convention means that its effective implementation will require cooperation and coordination with a wide range of other conventions, institutions and processes. These include other biodiversity-related conventions and the other "Rio Conventions" (Table 5.1[1]); many international organizations whose mandates cover issues relevant to the implementation of the Convention (Table 5.2); regional environmental agreements; and non-governmental programmes and networks, including scientific, cooperation and capacity-development processes.

Oman

"The overall annual increase in land under cultivation was 2.3% between 1993 and 1996."

Cooperation has two aspects. The first covers the need to ensure that the development and delivery of policies and programmes by the different instruments, through their secretariats and agencies, is mutually consistent and reinforcing. The second covers the role that these instruments can play in helping ensure that the positions taken and activities undertaken by national governments under the different agreements are coordinated at national level.

Although self-evidently desirable, putting into practice the calls for cooperation made by the Conference of the Parties can be a difficult task. Each convention or agency has its own governing body that will normally need to approve new activities undertaken in response to calls from the Convention to cooperate. These activities are likely to have budgetary or staffing implications and may require changes in ongoing programmes and policies that themselves are often the outcome of protracted and perhaps difficult negotiations within those fora.

Theoretically, the fact that the governing bodies of these other conventions and agencies are composed of Governments, in the same way as the Conference of the Parties, should mean that consistency in decision-making under different instruments and institutions is relatively easy to arrive at. To some extent this is increasingly the case, as more Governments put in place procedures at national level to ensure that their delegations to meetings of different but related bodies present consistent and mutually reinforcing positions at each. In many ways, as this chapter will indicate, significant progress has indeed been made in promoting cooperation among related conventions and processes for the more effective implementation of their objectives.

However, at least some Governments still sometimes take inconsistent, even contradictory, positions at meetings of different bodies. In part this reflects differing political positions and priorities at the national level, which can only be resolved by the relevant national actors. Often, however, such divergent positions reflect a lack of coordination and sharing of information between the national lead agencies for the different instruments. For example, national delegations to trade negotiations may be unaware of the general obligations the country has assumed by its membership of a multilateral environment agreement or, as may be more often the case, of the precise implications for the country of the decisions and programmes of work

[1] All the tables referred to in the text of this chapter are located in the annex to the chapter (page 222).

adopted by the multilateral environment agreement. In this case the establishment of the necessary domestic consultation machinery – for example, a sustainable development body or a national biodiversity council – will help to identify possible conflicting positions and ways to overcome them.

The Conference of the Parties has requested Parties to promote consistency and coordination in negotiation and implementation. It has called upon national focal points to cooperate with the competent authorities of the Convention on Wetlands, CITES and the Convention on Migratory Species on the implementation of these conventions at the national level to avoid duplication of effort. It has also called upon Parties to coordinate their positions in both the FAO and the CBD.

The more that the relevant convention secretariats and international organizations are able to cooperate at the policy and operational levels, the better they will be able to assist member Governments in promoting such national level coordination for implementation. The results should be greater synergies between measures taken to implement more than one Convention and better integration of biodiversity considerations into other sectors, as required under Article 6(b) of the Convention.

National level coordination has been referred to in chapters 3 and 4. This chapter will provide a picture of cooperative links with other related conventions and processes. It will start with an introduction to these, before providing an overview of cooperation being undertaken for the implementation of the different provisions and work programmes of the Convention. The annex to the chapter gives more details of the relevant conventions and processes.

RELEVANT INTERNATIONAL AND REGIONAL AGREEMENTS

A large number of other international and regional agreements address issues of relevance to the Convention on Biological Diversity. Some of the most directly relevant of these are highlighted here in Table 5.1. Most international and regional agreements aimed at environmental protection require the Parties to undertake a range of similar measures, which offer possibilities for inter-linkages and synergies in implementation. These include, for example, requirements: to gather relevant information, to provide periodic reports, to formulate policies and to design strategies, plans and programmes, to raise public awareness and provide public education.

International and regional agreements whose implementation might benefit from coordination with that of the Convention on Biological Diversity fall into a number of categories, of which the most relevant are:

- agreements related to conservation and sustainable use of biodiversity,
- agreements related to agriculture, forestry, water resources, the marine environment and fisheries,
- other agreements arising from the UN Conference on Environment and Development (the "Rio Conventions": UNFCCC and UNCCD, see Table 5.1, in addition to the CBD),
- agreements and programmes related to trade and intellectual property rights (see Table 5.4).

The Rio Conventions (including the Convention on Biological Diversity) address a number of common substantive and procedural issues: for example, forests are relevant to the implementation of all three agreements. Each of the Rio Conventions calls for capacity-building, scientific and technical cooperation, the development of specific national plans and strategies, and periodic reporting.

Peru

"Natural Andean grasslands cover 259,658 km² of Peru, however half of these are threatened by desertification."

Ratification of these different biodiversity-related agreements by States can have costs and benefits. Benefits can include more specific guidance on relevant aspects of the Convention on Biological Diversity, and access to additional (although generally very limited) sources of funding. Costs can include additional reporting requirements and additional specific obligations. In many cases, these agreements require similar steps such as the establishment of protected areas; the regulation of the taking of wild species (or particular species); and the implementation of management measures for specific species or habitats.

Institutional mechanisms for cooperation

The Handbook of the Convention, produced in parallel with this volume, provides a detailed guide to calls made by the Conference of the Parties for cooperation in the implementation of various decisions and of the thematic work programmes. The following section provides only a summary of these and readers are referred to the Handbook for more details.

Almost invariably, when the Conference of the Parties considers an issue in depth, and particularly when it establishes a work programme, it calls on the Executive Secretary to cooperate with relevant international organizations and processes in any work to be carried out. Usually the Conference of the Parties names a number of such organizations and processes, but notes that cooperation should not be confined to these. Basic information on some of the relevant United Nations bodies is presented in Table 5.2. The Executive Secretary has signed a number of memoranda of cooperation with other relevant organizations (Table 5.3).

In some cases a particular organization or initiative is implicitly recognized as a major player in a particular area (e.g. the Global Invasive Species Programme in the implementation of Article 8 (h), and the Food and Agriculture Organization of the United Nations in the implementation of the work programme on agricultural biological diversity). In other cases the Conference of the Parties has specifically invited a particular organization to cooperate as a lead partner in an activity or programme (e.g. the Ramsar Convention in the implementation of the work programme on biological diversity of inland waters). However, the Conference of the Parties has in no case deferred to any other organization, and has stressed that work programmes addressing these and other issues should be collaborative in nature.

Where joint work programmes with other conventions have been developed, some concern has been expressed because not all Parties to the CBD are parties to the other conventions (see Table 5.1 for the numbers of parties in each of the conventions). The Conference of the Parties has taken pains to stress, however, that no Party to the CBD should be disadvantaged in any such work programme because it is not a party to any other relevant agreement. To date the most advanced joint work programme developed under the auspices of the Convention is probably that with the Ramsar Convention concerning biological diversity of inland waters.

The potential for harmonisation among biodiversity-related conventions

The different biodiversity-related conventions each impose reporting requirements on their parties and also generate significant need for information by their parties. Meeting these can place a substantial burden on governments, particularly those with limited resources.

In 1998 the five global biodiversity-related treaty secretariats and UNEP commissioned the World Conservation Monitoring Centre to undertake a *Feasibility Study* to identify opportunities for harmonising information management between the treaties. In addition to the Convention on Biological Diversity, the other four treaties are the Convention on Migratory Species, CITES, the Convention on Wetlands and the World Heritage Convention.

The *Feasibility Study* considered approaches toward development of a harmonised information management infrastructure for the treaties within their existing defined mandates. Its purpose was to consider how the secretariats could improve effectiveness and efficiency in gathering, handling, disseminating and sharing information. Subsequently, contracting parties to four of these conventions, including the Conference of the Parties to the CBD, endorsed the move toward increased harmonisation of information management and reporting.

At the same time there have been moves to increase synergy amongst the various agreements made at the Earth Summit in 1992, the European Environment Agency is working on a project which aims to streamline reporting systems for the 64 environmental agreements to which the European Community is party, and UNEP GRID Arendal has been working with the Government of Norway on means to make reporting to international environment conventions more efficient.

Also concurrently there has been increased focus on regional seas agreements, and the secretariats of these agreements have met to discuss common concerns, which include promoting "horizontal collaboration and facilitating stronger linkages with global conventions."

At a workshop in October 2000, comprising representatives of convention secretariats, UNEP, Parties and international organizations, project concepts for testing at both national and international levels with a range of conventions and in different types of countries were developed. Pilot projects will take place and their results will be reviewed in late 2001 or early 2002.

RELEVANT REGIONAL AND GLOBAL PROCESSES UNDER THE MAJOR ARTICLES OF THE CONVENTION

The text of the Convention clearly indicates that the implementation of its provisions is primarily the duty of the contracting Parties. However, an enormous range of other organizations, both national and international, representing many different sectors of society are playing an active role in assisting Parties in implementation. The following sections provide an overview of illustrative global and regional initiatives organised under the operative Articles of the Convention and within the framework of the thematic work programmes. It is important to stress that this is not a comprehensive list of such initiatives.

Cooperation

The bodies and meetings of the Convention itself are the major mechanism for cooperation of Parties at the global level. These are discussed in detail in chapters 2 and 3. In order to improve coordination at regional level, four of the five major regional groups (Africa, Asia, Countries with Economies in Transition and Latin America and the Caribbean) have held regional preparatory meetings prior to meetings of the Conference of the Parties.

In March 2000 the first interregional meeting - the Intergovernmental Conference "Biodiversity in Europe," held in Riga, Latvia – brought together countries from Western, Central and Eastern Europe and Central Asia to examine opportunities for closer cooperation and integration of European biodiversity processes and to prepare a Pan-European input to the fifth meeting of the Conference of the Parties.

A number of regional conventions and programmes cover the conservation and sustainable use of biological diversity. For example:

- Seventeen regional seas conventions throughout the world involve cooperation between more than 140 States and territories for shared goals. Most have developed Action Plans, under which the conservation of biological diversity and the establishment of marine protected areas are coordinated.
- The conservation of biodiversity is one of the programme areas of the Commission for Environmental Cooperation (CEC), an organization created by Canada, Mexico and the United States of America under the North American Agreement on Environmental Cooperation. The Agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA). The biodiversity programme area consists of three parts: a diagnosis to identify the current state of the conservation of biodiversity in the region, the development of strategies, and the implementation of mechanisms, projects and information management systems. The work plan includes activities such as the Ecosystem Monitoring Initiative, the North American Marine Protected Areas Network and the North American Biodiversity Information Network.
- The Central American Commission for Environment and Development (CCAD) is implementing the Mesoamerican Biological Corridor. This was established in 1997 by the seven countries of Central America, all of whom are members of CCAD: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. The Mesoamerican Biological Corridor is a crucial environmental initiative for the region, with a central development concept – integrating conservation and sustainable use of biodiversity within the framework of sustainable economic development.
- The South Asia Cooperative Environment Programme embraces regional cooperation in the management of mountain ecosystems, watersheds and coastal resources, and wildlife and wildlife habitat conservation.
- In the Arctic region, Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States of America work together through the Arctic Council, a high level intergovernmental forum to address the common concerns and challenges faced by the Arctic governments and the people of the Arctic. The Arctic Council runs four programmes, one of which is the Program for the Conservation of Arctic Flora and Fauna (CAFF). In 1997 CAFF developed the Co-operative Strategy for the Conservation of Biological Diversity in the Arctic Region, which focuses on conservation of biodiversity, the sustainable use of biological resources, participation of local and indigenous people in relevant policies and programmes, and public education and awareness. The strategy will be implemented through the Strategic Plan for the Conservation of Arctic Biological Diversity endorsed by the Arctic Ministers in 1998.

General measures for conservation and sustainable use

Many activities are under way to support the development of strategies, plans and programmes on biological diversity and the integration of the Convention's objectives into relevant sectoral and cross-sectoral plans, programmes and policies. As early as 1992, the

World Resources Institute (WRI), the World Conservation Union (IUCN) and the United Nations Environment Programme (UNEP) published the *Global Biodiversity Strategy* with a detailed list of 85 proposed actions.

In 1993 UNEP published "Guidelines for Country Studies on Biological Diversity" and in 1995 the World Resources Institute published, together with UNEP and IUCN, "National Biodiversity Planning: Guidelines Based on Early Experiences Around the World." These guidelines were commended by the Conference of the Parties as relevant for implementation of Article 6.

The Global Environment Facility (GEF) has introduced two programmes specifically to support biodiversity planning projects. The first is Enabling Activities for Biodiversity, which, as noted in chapter 3, are activities that prepare the foundation to design and implement effective response measures to achieve Convention objectives. They assist recipient countries to develop national strategies, plans or programs (Article 6) and to identify components of biodiversity together with processes and activities likely to have significant adverse impacts on conservation and sustainable use of biodiversity (Article 7).

The second is the Biodiversity Planning Support Programme (BPSP), implemented by UNDP, UNEP and a network of regional partner organizations, which was established to respond to needs recognized by Parties for strengthening national capacity to prepare and implement national biodiversity strategies and action plans (NBSAPs) in compliance with Article 6. The programme focuses on the gathering and dissemination of relevant technical information for biodiversity planning; exchange of knowledge, expertise and best practice at regional and global levels; and provision of guidance on how to address contemporary thematic issues related to implementation of the Convention in the context of national planning.

The programme has three components that are being implemented at global and regional levels:

- Information and data gathering to identify key stakeholders and to establish an efficient communications network;
- Development and distribution of guidelines and best practice documentation based on global experience with the development and implementation of national biodiversity strategies and action plans;
- Organisation of global and regional workshops for the exchange of experience and expertise, as well as the development and dissemination of guidance on thematic issues related to implementation of the Convention in the context of national biodiversity strategies and action plans.

In 1999 and 2000 regional workshops were held in the Latin America and Caribbean, Southeast Asia, South Asia, South Pacific, East Africa, North Africa, and Northeast and Central Asia regions at which critical elements for the design and implementation of successful national biodiversity strategies and action plans were identified.

In the European region, the "Biodiversity Service" established by a consortium of agencies (UNEP, IUCN, the European Centre for Nature Conservation and the Regional Environmental Centre for Central and Eastern Europe) seeks to promote and facilitate implementation of the Convention in Central and Eastern European countries and the Newly Independent States by providing assistance in implementing national biodiversity strategies and action plans.

Identification and monitoring

Many recent and continuing activities relate to the collection and analysis of information on biological diversity, most of which contribute significantly to implementation of the Convention even if that was not their specific purpose.

Activities at the UNEP World Conservation Monitoring Centre (UNEP-WCMC) include assessment and early warning studies in forest, dryland, freshwater and marine ecosystems, as well as on endangered species and biodiversity indicators. The UNEP/GEF Biodiversity Data Management Project is designed to strengthen the capacity of developing countries in data and biodiversity information management.

The Global Biodiversity Information Facility (GBIF), which has developed from the work of the OECD Megascience Forum Working Group on Biological Informatics established in 1996, will be an interoperable network of biodiversity databases and information technology tools that will enable users to navigate and put to use the world's vast quantities of biodiversity information to produce national economic, environmental and social benefits. The purpose of establishing GBIF is to design, implement, coordinate, and promote the compilation, linking, standardisation, digitisation and global dissemination of the world's biodiversity data, within an appropriate framework for property rights and due attribution. The GBIF began operations in March 2001.

The Food and Agriculture Organization of the United Nations (FAO) holds a range of data sets, such as the World Agricultural Information Centre (WAICENT), the World Information and Early Warning System on Plant Genetic Resources (WIEWS), the Domestic Animal Diversity Information System (DADIS) and the Global Information System on Forest Genetic Resources (REFORGEN). The Consultative Group on International Agricultural Research (CGIAR) runs the System-Wide Information Network on Genetic Resources (SINGER). The Convention on Migratory Species, in cooperation with Bonn University, is developing a Global Registry of Migratory Species.

A number of overviews of global biodiversity have been published (see Annex), as well as studies, notably by IUCN and FAO, on threatened species and breeds. For plants and birds, centres of endemism have been identified on a global scale. Various initiatives have attempted to define key areas for biodiversity, e.g. Conservation International have reported on global hotspots, while the World Wide Fund for Nature (WWF) Global 2000 project has delimited a set of significant eco-regions, holding characteristic species, communities, and environmental conditions.

The Species 2000 programme was established in 1994 by the International Union of Biological Sciences (IUBS) in cooperation with the Committee on Data for Science and Technology (CODATA) and the International Union of Microbiological Societies (IUMS). Its chief aim is to provide a uniform and validated quality index of names of all known species.

The Millennium Ecosystem Assessment (MA) is a process designed to improve the management of ecosystems and their contribution to human development by helping to bring the best available information and knowledge on ecosystem goods and services to bear on policy and management decisions. The MA consists of a global scientific assessment as well as catalytic regional, national, and local assessments and aims to build capacity at all levels to undertake integrated ecosystem assessments and to act on their findings.

Switzerland

"The area of dry and semi-dry grasslands has decreased by 90% since 1945. "

The primary users of the MA will be the international ecosystem-related conventions, national governments, civil society, and the private sector. The MA will provide information and strengthen capacity but it will not set goals or advocate specific policies or practices. It will be policy relevant but not policy prescriptive. It is overseen by a Board bringing together a wide array of stakeholders and an Executive Committee that includes the secretariats of the Convention on Biological Diversity, the Convention to Combat Desertification and the Ramsar Convention on Wetlands, and is closely linked to the CBD process.

Another important initiative related to Article 7 is the International Biodiversity Observation Year (IBOY) Programme launched by DIVERSITAS in 1998 with the intention of making 2001 and 2002 breakthrough years in which to dramatically increase communication of findings about the status of biodiversity and its links to human welfare. The IBOY is inspired by the International Geophysical Year of 1957-1958, in which scientists worked together across disciplinary and national boundaries to advance knowledge about the Earth, oceans and atmosphere.

The development of indicators for biological diversity has been undertaken by several organizations, among them the World Resources Institute (WRI), World Wide Fund for Nature (WWF) and UNEP-WCMC. These efforts are closely linked to the discussion of environmental and sustainable development indicators taking place in the OECD and the Commission on Sustainable Development (CSD).

Other initiatives are restricted to the regional and sub-regional level. The Dobris Assessment is a comprehensive assessment of the state of Europe's environment with many aspects of biological diversity considered. The European Biodiversity Monitoring Initiative, implemented by the European Centre for Nature Conservation (ECNC) and the European Environment Agency (EEA), will include a harmonised system for monitoring progress on the implementation of biodiversity-related agreements in Europe. The World Bank, in cooperation with WWF, published an assessment of the terrestrial eco-regions of Latin America and the Caribbean. The Inter-American Biodiversity Information Network (IABIN) is an initiative of the Summit of the Americas to provide greater and more useful access to biodiversity information throughout the Western Hemisphere. In eight southern African countries, the GEF is supporting a regional capacity-building project on inventory and monitoring of botanical diversity.

in situ conservation

Site-based approach

The Conference of the Parties has not yet addressed the issue of protected areas in depth, but will do so at its seventh meeting in 2004. In the interim, the Conference of the Parties has encouraged the Executive Secretary to develop relationships with other processes with a view to fostering good practices in a range of aspects of protected area management. The major thematic work programmes dealing with forests, drylands, coastal and marine biological diversity and inland water biological diversity all include consideration of protected areas. Implementation of each of these work programmes calls for cooperation with other processes, as discussed below. A significant proportion – perhaps 75% – of GEF projects related to biodiversity is associated with protected areas.

In consideration of protected areas in general, the major relevant international processes are the UNESCO Man and the Biosphere Programme (MAB), the World Heritage Convention (WHC) and the IUCN World Commission on Protected Areas (WCPA). The fifth World Congress on Protected Areas will take place in Durban, South Africa in September 2003.

Protected areas are major tools for implementing the site-based provisions of Article 8 of the Convention (Maps 20 and 21). IUCN has defined Protected Area Management Categories. Some global mechanisms have developed systems of priority areas, such as the list of wetlands of international importance of the Ramsar Convention on Wetlands, the World Heritage Sites of the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), the Biosphere Reserves of the Man and Biosphere (MAB) Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and BirdLife International's Important Bird Areas (IBA) programme.

CAFF's Circumpolar Protected Areas Network (CPAN) Strategy and Action Plan contains lists of existing and proposed protected areas in the Arctic (Map 22). The European Community through the Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora requires the member States to designate special conservation areas to provide a coherent European ecological network, called NATURA 2000. On the wider Pan-European level, the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) is establishing the Pan-European Ecological Network. In Kazakhstan, Kyrgyz Republic and Uzbekistan, GEF is supporting the Central Asia Transboundary Biodiversity Project that aims to protect the vulnerable and unique biological communities in the West Tien Shan Range through the strengthening and coordination of national policies, regulations and institutional arrangements.

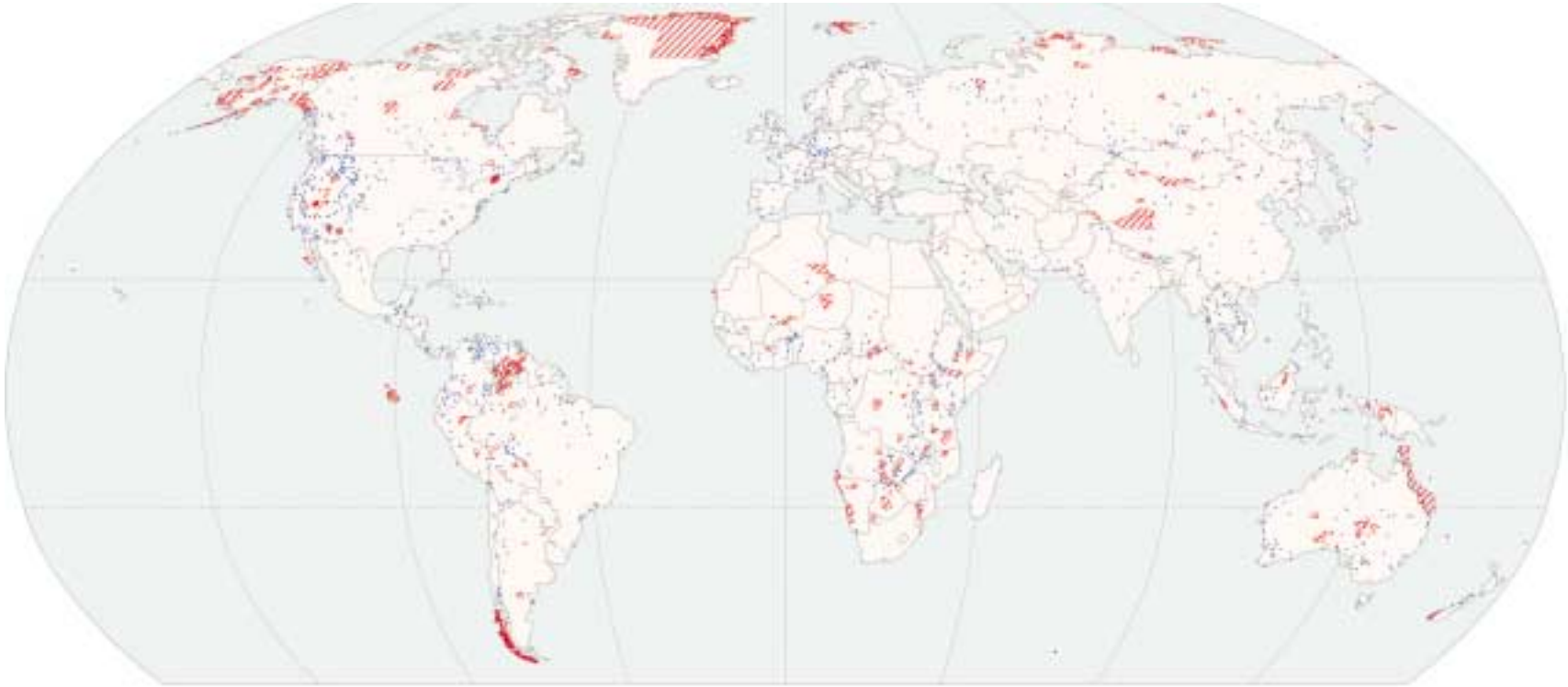
The Programme for the Consolidation of the Meso-American Biological Corridor involving Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama is a joint initiative within a region of rich biodiversity, crossing a diverse landscape of approximately 768,990 square kilometres, and containing 8% of the world's known biodiversity. The project, which will receive an allocation of US$11 million from the GEF, builds upon all regional and in-country initiatives to collaboratively form conservation and sustainable use programmes and harmonization of regional policies.

Species approach

The IUCN Species Survival Commission (SSC) has produced Species Action Plans for many threatened plants and animals. The Action Plans assess the conservation status of the species and their habitats and specify conservation priorities. In 1999, the FAO Committee on Fisheries adopted two action plans: the International Plan of Action for the Conservation and Management of Sharks and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries.

The Council of Europe, BirdLife International and Wetlands International have published action plans for globally threatened species in Europe. The Convention on Migratory Species (CMS) has adopted a number of regional agreements. These include the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS), the Agreement on the Conservation of Seals in the Wadden Sea, the Agreement on the Conservation of Bats in Europe (EUROBATS), the African-Eurasian Migratory Waterbird Agreement (AEWA), as well as Memoranda of Understanding concerning conservation measures for marine turtles of the Atlantic Coast of Africa, for the Siberian Crane and the Slender-billed Curlew.

MAP 20

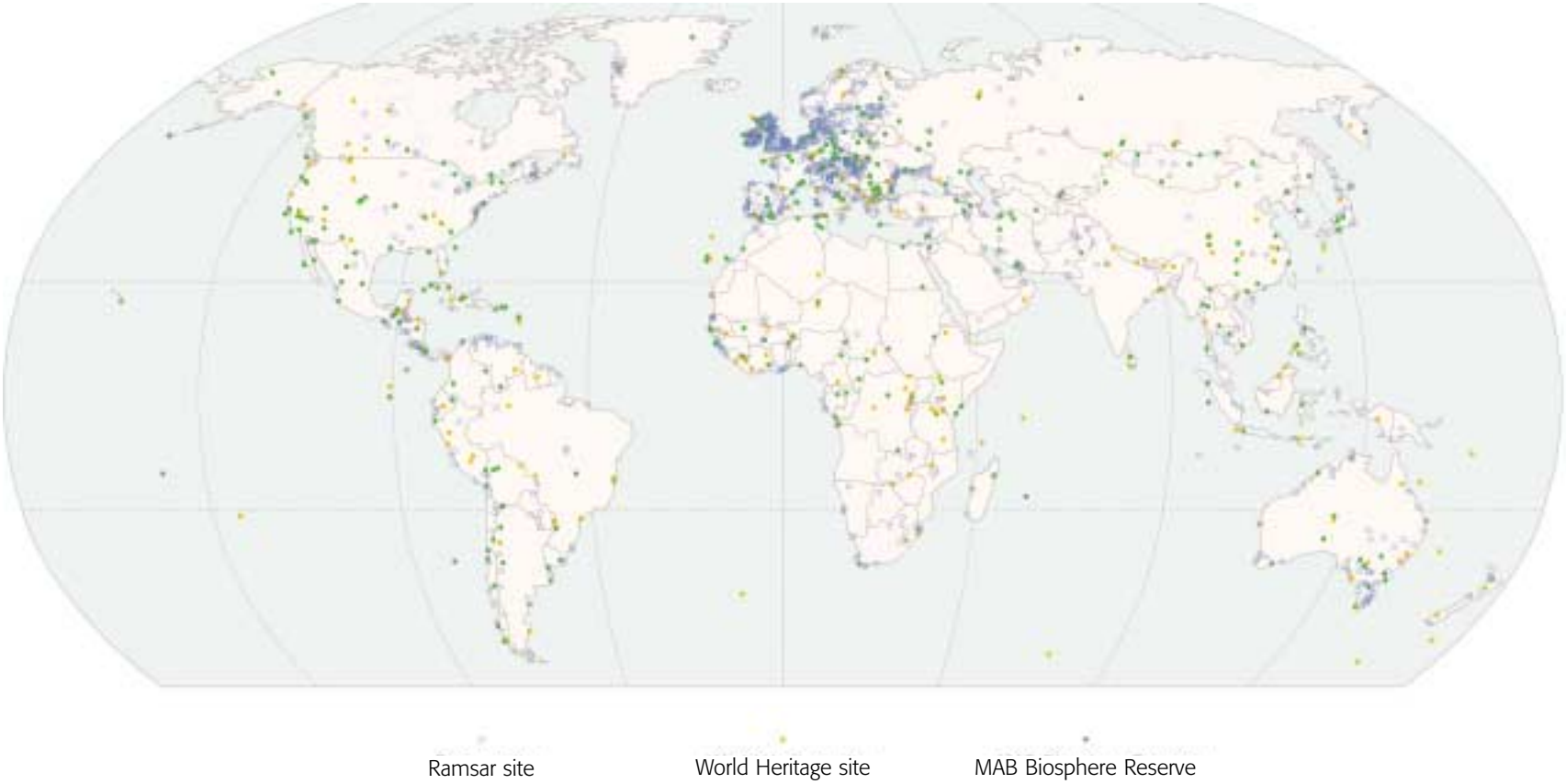


World protected areas

This map provides an overview of the world's surface nominally subject to protection and appropriate management. The location of protected areas in IUCN/WCPA categories I-VI greater than 100,000 hectares in area is shown. Where the protected area exceeds one million ha in extent the area boundary is plotted (unless boundary data unavailable).

Source: UNEP-WCMC database, maintained in collaboration with IUCN World Commission on Protected Areas.

MAP 21

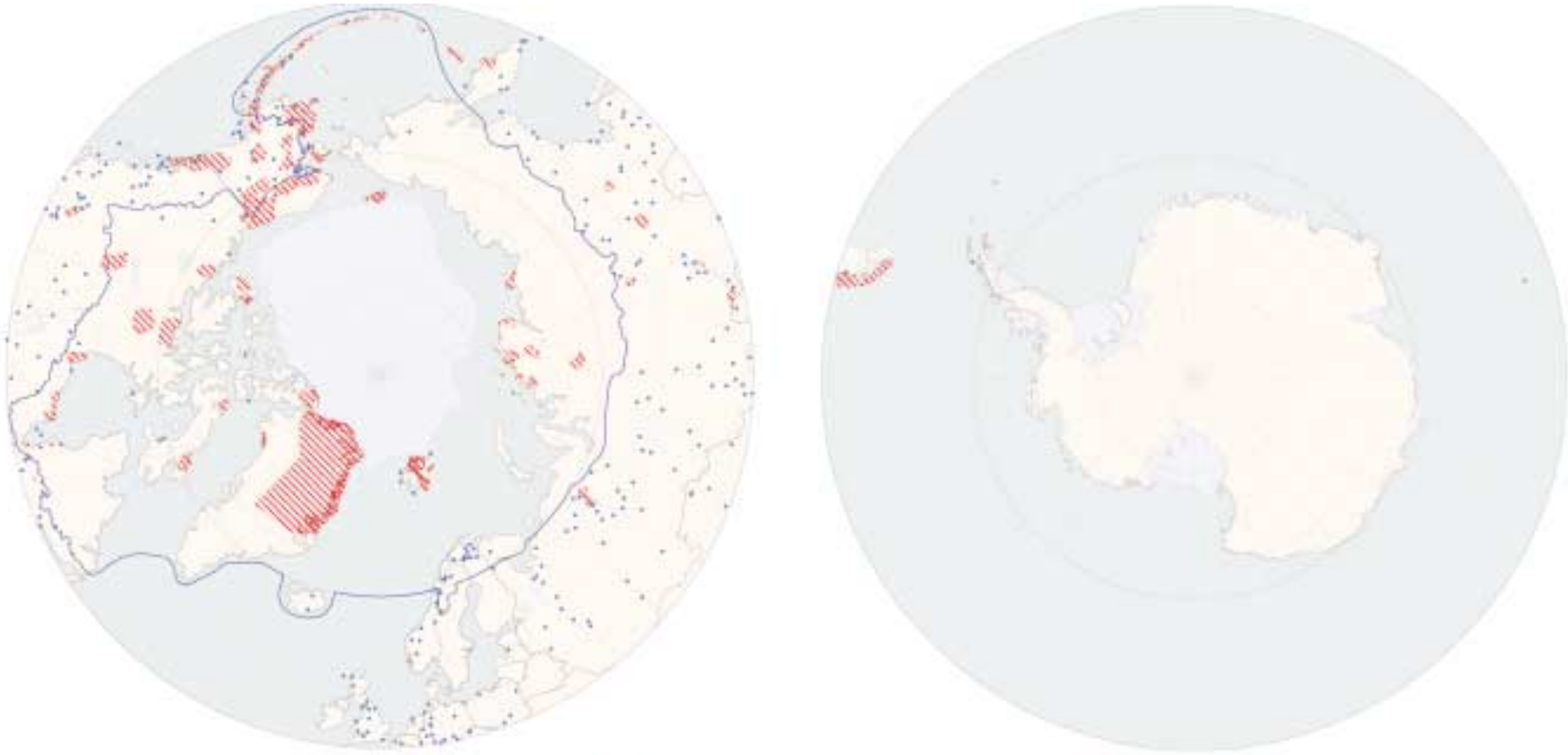


Sites managed under international protected area agreements

Protected areas managed under the Ramsar Convention on wetlands, under the World Heritage Convention (natural sites), or as a Biosphere Reserve within the UNESCO Man and Biosphere programme.

Source: UNEP-WCMC database, maintained in collaboration with IUCN World Commission on Protected Areas.

MAP 22



Protected areas in polar regions

The distribution of protected areas is shown, with approximate location of permanent ice and, in the arctic region, the boundary of the Conservation of Arctic Fauna and Flora programme area. The location of protected areas in IUCN/WCPA categories I-VI greater than 100,000 hectares in area is shown. Where the protected area exceeds one million ha in extent the area boundary is plotted (unless boundary data unavailable).

Source: UNEP-WCMC database, maintained in collaboration with IUCN World Commission on Protected Areas.

Turkey

"90% of grazinglands in Turkey are considered degraded and unproductive due to uncontrolled grazing."

The European Community Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora as well as the Directive 79/409/EEC on the Conservation of Wild Birds establish direct protection regimes for rare and threatened species of plants and animals. Their habitats are supposed to be included in the above-mentioned European ecological network NATURA 2000. Several other international species conservation initiatives exist.

Restoration of degraded ecosystems

In 1991, the International Commission for the Protection of the Rhine (ICPR), consisting of Switzerland, Germany, France, Luxembourg, the Netherlands and the European Community, adopted an Ecological Master Plan for the Rhine. The Plan aims at the restoration of the main stream as a backbone of the complex Rhine ecosystem and the protection, preservation and improvement of ecologically important reaches of the Rhine and the Rhine valley. As part of the Plan, the ICPR in 1998 developed an Overall Concept of the Rhine and defined development objectives for the flood plain and the riverbed, with a strategy for implementation. In Botswana, Kenya and Mali, the GEF is funding a project on Management of Indigenous Vegetation for the Rehabilitation of Degraded Rangelands.

Alien species

In 1996 the Scientific Committee on Problems of the Environment (SCOPE), in conjunction with IUCN, CABI and UNEP, launched the Global Invasive Species Programme (GISP). GISP has two components: the knowledge base, which comprises ecology, human dimensions, pathways, global change, and present status worldwide; and the new tools component. The latter, co-funded by GEF, includes economic and legal aspects, risk assessment, early warning systems, controls and management, and educational aspects.

The International Plant Protection Convention (IPPC) is a multilateral treaty deposited with the FAO, which provides the IPPC Secretariat. One hundred and eleven governments are currently contracting parties to the IPPC, whose purpose is to secure common and effective action to prevent the spread and introduction of pests of plants and plant products and to promote measures for their control. The Convention provides a framework and forum for international cooperation, harmonization and technical exchange in collaboration with regional and national plant protection organizations. It is the organization recognized by the World Trade Organization in the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) as the source for international standards for the phytosanitary measures (ISPMs) affecting trade.

The FAO has compiled codes of practices to deal with alien species and has developed products, such as the FAO Database on Introductions of Aquatic Species. IUCN has an Invasive Species Specialist Group and is establishing a cross-sectoral programme on invasive species. In addition, IUCN has launched a programme on People and Invasive Species: Dealing with the Human Dimensions of the Problem.

The International Council on the Exploration of the Sea (ICES), the Intergovernmental Oceanographic Commission of UNESCO (IOC) and the International Maritime Organization (IMO) have established a joint Study Group on Ballast Water and Sediments. The Group's terms of reference include the collection of information on and proposing options for the control of the dissemination of organisms by ballasts of ships.

At a sub-regional level, an assessment of the distribution of alien species is contained in the Third Periodic Assessment of the Status of Environment of the Baltic Sea (1997), produced by the Helsinki Commission on the basis of the Baltic Monitoring Programme.

The Inter-American Biodiversity Information Network (IABIN) is implementing a project on invasive species of fish and vascular plants for effective networking among the IABIN countries.

Traditional knowledge

Article 8(j) of the Convention, concerning the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity, has created considerable discussion. Indigenous peoples' organizations are involved with the implementation of the provisions of the Convention, and an International Indigenous Forum on Biodiversity has met several times. The Indigenous Peoples Biodiversity Information Network (IBIN) is a mechanism to exchange information about experiences and projects and to increase collaboration among indigenous groups.

UNESCO, through its World Commission on Culture and Development, and the World Intellectual Property Organization (WIPO) held the World Forum on the Protection of Folklore in 1997 in Thailand. UNESCO has also appointed a Special Rapporteur on the Protection of the Heritage of Indigenous Peoples and established an Intersectoral Task Force to deal with matters concerning indigenous and local communities. The World Bank has produced Operational Directive 4.20, which is the Bank's principal policy statement on the relationship between its operations and indigenous peoples.

In July 2000 ECOSOC accepted the recommendation of the Commission on Human Rights that a Permanent Forum for Indigenous People in the United Nations system be established. The Permanent Forum will serve as an advisory body to ECOSOC with a mandate to consider issues within ECOSOC's mandate relating to economic and social development, culture, the environment, education, health and human rights. The Commission has established a process for elaborating a "Draft United Nations declaration on the rights of indigenous peoples." The UN Sub-Commission on the Promotion and Protection of Human Rights in August 2000 expressed strong concerns about the impacts of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement on human rights and environment, and on biodiversity-related indigenous knowledge.

The Conference of the Parties has emphasized that further work is required to develop a common understanding of the relationship between intellectual property rights and the relevant provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights and the Convention, particularly as it relates to the knowledge, innovations and practices of indigenous and local communities. It has sought to initiate cooperation with the World Intellectual Property Organization (WIPO) on this issue and a memorandum of cooperation between the secretariat and WIPO is being discussed.

As the specialized UN agency responsible for the promotion of intellectual property worldwide, WIPO was mandated in 1998 to undertake exploratory groundwork in order to provide an informed and realistic analysis of the intellectual property aspects of traditional knowledge and folklore protection.

The primary mandate of this exploratory program is to research the implications of developments in the field of traditional knowledge for the intellectual property system, so as to enable WIPO to maintain its capacity to serve the interests of all its member States. The work in the 1998-99 biennium was therefore focused on issue identification and the assessment of the intellectual property needs of various stakeholders in the field of traditional knowledge.

United Kingdom

"One sixth of the heathland present in 1800 remains today."

In the 2000-2001 biennium the exploratory work is focused on the development of practical activities designed to test current approaches to, and future possibilities for, managing the interfaces between intellectual property protection and TK. The work also seeks to facilitate dialogue between relevant stakeholders, provide training and information, and examine other specific issues identified during 1998 and 1999. In particular, WIPO will organize intellectual property training workshops for TK stakeholders and conduct case studies and pilot projects regarding the interfaces between IP and TK.

Since 2000, WIPO's activities on intellectual property and TK extend beyond the exploratory program into WIPO's cooperation for development, training and technical assistance programs. In October 2000 the WIPO General Assembly established an Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, whose main purpose is to facilitate discussions among member states on access to genetic resources and benefit-sharing, protection of traditional knowledge (whether or not associated with those resources), and the protection of the expressions of folklore. The first session of the Intergovernmental Committee took place in May 2001.

Issues related to traditional knowledge and access to genetic resources are also being addressed by the United Nations Conference on Trade and Development (UNCTAD) The Commission on Trade in Goods and Services, and Commodities of UNCTAD's Trade and Development Board convened an Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices in October 2000. The UNCTAD Secretariat worked closely with the secretariats of other intergovernmental organizations, in particular the secretariats of the CBD and WIPO, in preparing the meeting, which considered systems for the protection of traditional knowledge and benefit-sharing, harnessing traditional knowledge for trade and development, and capacity-building needs.

Ex situ conservation

Until recently most conservation efforts of plant genetic resources for food and agriculture, apart from work on forest genetic resources, have concentrated on *ex situ* conservation, particularly seed gene banks. Plant collecting and *ex situ* conservation, especially in botanical gardens, have a long history dating back several hundred years. Beginning in the 1960s, the FAO strongly promoted *ex situ* conservation of crop genetic resources. Great emphasis was placed on germplasm collecting during the 1970s and 1980s and it is now estimated that existing global *ex situ* collections contain approximately six million accessions.

This total includes many working collections of plant breeders as well as collections established specifically for long-term conservation. About one tenth of these accessions are maintained within the Consultative Group on International Agricultural Research (CGIAR) system, while the remainder are stored in regional or national gene banks.

Ex situ collections consist of seed gene banks, field gene banks and *in vitro* collections. Species with orthodox seeds are stored in seed gene banks, whilst the other two methods are used mainly for vegetatively propagated crops, species with seeds that cannot be dried and stored for long periods, perennial species that produce small amounts of seed (e.g. some forage species), and species that have long life cycles (e.g. trees). It is estimated that seed storage accounts for about 90% of total accessions held *ex situ*.

Almost 700 of the 1,500 botanical gardens worldwide have germplasm collections for the conservation of ornamental species, indigenous crop relatives and medicinal and forest species. Of these, 119 conserve germplasm of cultivated species – including landraces and wild food plants – and other non-cultivated species for local use. Such species are frequently lacking in other *ex situ* germplasm collections and botanical gardens therefore play an important complementary role in *ex situ* collection systems.[2]

In 1989, the FAO Commission on Genetic Resources for Food and Agriculture called for the development of The International Network of *Ex situ* Collections under the Auspices of FAO, in line with Article 7.1(a) of the International Undertaking on Plant Genetic Resources, because of lack of clarity regarding the legal situation of the *ex situ* collections.

Twelve centres of the Consultative Group on International Agricultural Research (CGIAR) signed agreements with the FAO in 1994, placing most of their collections (some 600,000 accessions) in the International Network. Through these agreements, the Centres recognised the "intergovernmental authority of FAO and its Commission in setting policies for the International Network." They have agreed to hold the designated germplasm "in trust for the benefit of the international community," and "not to claim ownership, or seek intellectual property rights, over the designated germplasm and related information." The Regional Collections of the International Coconut Genetic Resources Network (COGENT) were brought into the Network in 1998.

The CGRFA has stated that the Agreement provides and interim solution, until the revision of the International Undertaking has been completed. The Commission has noted that "the final form of the Agreements would depend on the outcome of the negotiations for the revision of the International Undertaking, and that the Agreements might need to be revised in the light of that outcome."

Botanic Gardens Conservation International (BGCI) and its members, more than 450 institutions in 100 countries, are implementing the Botanic Gardens Conservation Strategy for plant conservation. One of BGCI's achievements is a database of rare plants held in over 300 collections. Similarly, the World Zoo Organization comprises 132 leading zoological institutions and 14 regional or national zoo associations and, in collaboration with the IUCN Species Survival Commission's Captive Breeding Specialist Group, has developed the World Zoo Conservation Strategy.

The World Federation for Culture Collections (WFCC) represents the majority of *ex situ* microbial resource centres. Five hundred of these, with more than 250,000 cultures of all kinds, are listed in its World Data Centre for Microorganisms (WDCM). The objectives of the WFCC are the overall support of the activities of microbial resource centres, the promotion of a world network for information and communication, and the exchange of microbial genetic resources. The International Mycological Institute (IMI), funded by CABI, draws its collection of 19,000 fungi and 2,000 bacteria from 130 countries. The collection is available to depositor countries, academics and industry.

There are many regional *ex situ* collections such as gene banks. For example, the Plant Genetic Resources Centre of the Southern African Development Community (SADC) in Zambia, established with the assistance from Nordic countries, is a network providing long-term storage of the southern African countries' plant accessions.

Annex 1 provides a list by country of types of institutions holding *ex situ* collections.

[2] This introduction is drawn from section 3.1 of the FAO report "The state of the world's plant genetic resources for food and agriculture" (1998).

Sustainable use of components of biological diversity

Consideration of the sustainable use of biological resources, as one of the three objectives of the Convention, should be an integral part of most of the activities undertaken under the Convention. It is more or less explicitly addressed in each of the thematic work programmes (e.g. as one of the five thematic issues identified under the Jakarta Mandate on marine and coastal biological diversity) and features in most of the operative Articles of the Convention.

To date, however, consideration by the Conference of the Parties of sustainable use as a separate issue has been largely confined to an assessment, made at COP5, of the relationship between biological diversity and tourism. The Conference of the Parties decided to participate in the international work programme on sustainable tourism development under the Commission on Sustainable Development, in particular with a view to contributing to international guidelines for activities related to sustainable tourism development.

Other processes and organizations that are directly concerned with issues of sustainable use include CITES, TRAFFIC, the IUCN SSC Wildlife Trade Programme, the IUCN Sustainable Use Initiative and FAO (notably with regard to fisheries and timber).

The World Business Council for Sustainable Development and IUCN in 1997 published a guide for the private sector on business and biodiversity. The guide's aim is to explain why business should be involved in the biodiversity debate and to suggest how it can participate. A similar guide to the biodiversity negotiations has been prepared by the International Petroleum Industry Environmental Conservation Association (IPIECA).

The United Nations Conference on Trade and Development (UNCTAD) launched the BIOTRADE Initiative at the third meeting of the Conference of the Parties in 1996. The mission of BIOTRADE is to stimulate trade and investment in biological resources to further sustainable development, in line with the three objectives of the CBD. The BIOTRADE Initiative seeks to enhance the capability of developing countries to produce value-added products and services from biodiversity for both domestic and international markets. It is an integrated programme consisting of three complementary components: the BIOTRADE country programmes, market research and policy analysis, and Internet services. One of the recent BIOTRADE projects is Programme Bolsa Amazonia, which was launched during the UNCTAD Partners for Development Summit in Lyon in 1998, through a partnership between the non-governmental organization POEMAR and UNCTAD. The overall objective of Programme Bolsa Amazonia is to "promote the sustainable use of Amazonia's natural resources through the establishment of an efficient network of economic relationships between organised, agro-extractive small holders of Amazonia and local, national and international companies with social and environmental responsibility, and interested in the sustainable use of biodiversity to benefit present and future generations and to guarantee a dignified livelihood in the region."

The Forest Stewardship Council (FSC) is an international non-profit organisation founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests. It is an association of representatives from environmental and social groups, the timber trade and the forestry profession, indigenous people's organisations, community forestry groups and forest product certification organisations from around the world. The FSC is introducing an international labelling scheme for forest products, which provides a credible guarantee that the product comes from a well managed forest. All forest products carrying the FSC

Armenia

"Soil has been completely lost from a number of slopes making thousands of hectares of land unusable. Overgrazing by livestock has caused reduction in vegetation density and in some cases 20-40% loss in vegetation cover. Mining and chemical industries have caused significant pollution of natural landscapes with at least 8,000 hectares of land have been directly affected by industrial operations. Between 1985 and 1995 crop productivity has decreased by an average of 40%."

logo have been independently certified as coming from forests that meet the internationally recognised FSC Principles and Criteria of Forest Stewardship. In this way FSC provides an incentive in the market place for good forest stewardship.

In a similar fashion, the Marine Stewardship Council (MSC) is working for sustainable marine fisheries by introducing a certification scheme. The MSC, founded by the multinational company Unilever and the World Wide Fund for Nature (WWF) in 1996, now operates independently and has succeeded in bringing together a broad coalition of supporters from several organisations around the world with a stake in the future of the fishing industry. It spent its first two years developing an environmental standard, through a major international consultation programme with key fishery stakeholders around the world. The year 2000 saw the launch of its first certified products and supermarkets, especially in the USA and UK, are preparing for the arrival of labelled products. There is increasing interest from the fishing industry around the world in winning the use of the MSC logo.

The Marine Aquarium Council is a global network of marine ornamental collectors, industry, hobbyists, conservation and government organizations and public aquariums. Its mission is to conserve coral reefs and other marine ecosystems by creating standards and education and certifying those engaged in the collection and care of ornamental marine life from reef to aquarium.

The Southern African Development Community (SADC) has developed policies on the sustainable use of several sectors. The Wildlife Sector strategy, for example, aims to develop long-term approaches to community-oriented wildlife management that are socially and politically acceptable, ecologically viable, profitable and sustainable.

Tourism

Many organizations have been involved with guidelines on sustainable tourism. In 1992, the World Tourism Organization, UNEP and IUCN jointly published guidelines on the development of national parks and protected areas for tourism. The World Conference on Sustainable Tourism in Lanzarote in 1995 adopted the Charter for Sustainable Tourism. In 1997, the International Conference of Environment Ministers on Biodiversity and Tourism in Berlin, Germany adopted the Berlin Declaration on Biological Diversity and Sustainable Tourism. UNEP drafted a set of guiding principles on sustainable tourism and has started a multi-stakeholder consultation process on them. With the World Tourism Organization and UNESCO, UNEP is involved in the Tour Operator Initiative for Sustainable Tourism Development. This initiative is designed to address community and industry concerns about the impact of tourism on the environment. In conjunction with the Ecotourism Society, UNEP is working on the Marine Ecotourism Guidelines Project.

Regionally, the Council of Europe in 1994 adopted recommendations for sustainable tourism, while a number of workshops further explored the relationships between tourism and biodiversity: a Workshop on Sustainable Coastal Tourism in 1995 by the UNEP Regional Office for Asia and the Pacific and the United Nations Economic and Social Commission for Asia and the Pacific, a Workshop on Marine Biodiversity in the Caribbean in 1998, an International Conference on Sustainable Tourism in Small Island Developing States and other Islands in 1998 (UNEP and the World Tourism Organization), and regional workshops to evaluate the feasibility of introducing the Blue Flag scheme in the Asia Pacific region (1999) and in the Caribbean region (1999) by UNEP, the Foundation for Environmental Education in Europe, the World Tourism Organization and the Caribbean Alliance for Sustainable Tourism.

Incentive measures

The OECD has produced a number of tools supporting the implementation of incentive measures for the conservation and sustainable use of biological diversity. These include publications such as *Saving Biological Diversity: Economic Incentives* (1996) and the *Handbook of Incentive Measures for Biodiversity: Design and Implementation* (1999). The OECD Expert Group on the Economic Aspects of Biological Diversity has analysed the experience of OECD member countries with incentive measures and has made the resulting case studies available to the Convention's Conference of the Parties.

IUCN has developed a Biodiversity Economics website that provides policy-makers and the wider public with up-to-date information on business, finance, incentives, trade, assessment and valuation.

Research and training

Established in 1991, DIVERSITAS is a partnership of intergovernmental and non-governmental organizations, formed to promote scientific research on biodiversity. The goal of DIVERSITAS is to provide accurate scientific information and predictive models of the status of biodiversity and sustainability of the use of the Earth's biotic resources, and to increase worldwide capacity for biodiversity science. DIVERSITAS is sponsored by the International Union of Biological Sciences (IUBS), the Scientific Committee on Problems of the Environment (SCOPE), UNESCO, the International Council for Science (ICSU), the International Geosphere-Biosphere Programme (IGBP) and the International Union of Microbiological Societies (IUMS).

The mission of the Consultative Group on International Agricultural Research (CGIAR) system is to contribute to food security and poverty eradication in developing countries through research, partnership, capacity-building, and policy support. It promotes sustainable agricultural development based on the environmentally sound management of natural resources and has five major research thrusts: Increasing Productivity, Protecting the Environment, Saving Biodiversity, Improving Policies, and Strengthening National Research.

The Southern African Botanical Diversity Network (SABONET) is a capacity-building network of southern African herbaria and botanic gardens with the objective of developing local botanical expertise. The ten countries participating in SABONET are Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe; these countries cover an area of some 6 million square kilometres. SABONET's objectives are to develop a strong core of professional botanists, taxonomists, horticulturists and plant diversity specialists within the ten countries of southern Africa, competent to inventory, monitor, evaluate and conserve the botanical diversity of the region in the face of specific development challenges, and to respond to the technical and scientific needs of the Convention on Biological Diversity. SABONET is a GEF project, implemented by UNDP. South Africa's National Botanical Institute (NBI) is the Executing Agency, responsible for the overall management and administration of the project.

The European Community in 1996 established an *ad hoc* European Working Group on Research and Biodiversity. The Working Group has identified research topics of common concern, such as threats to biological diversity, values of biological diversity, and indicators and monitoring.

Public education and awareness

The main partner of the Convention for implementing Article 13 on the global level is UNESCO. In 1994, UNESCO launched the project *Educating for a Sustainable Future*. The organization has produced a range of educational material on biological diversity, e.g. a series of wall charts in English and French, aimed at teachers and students attending institutes of secondary and tertiary education. UNESCO is closely cooperating with other organizations such as FAO, the International Council of Scientific Unions, DIVERSITAS, the Man and Biosphere Programme, the Intergovernmental Oceanographic Commission and IUCN. The IUCN Commission on Education and Communication (CEC) is a global network of 250 education and communication experts in environmental and sustainable development education and communication.

The Secretariat of the CMS Agreement on the Conservation of Bats in Europe (EUROBATS) sponsors the annual European Bat Festival and the annual European Bat Night, which is celebrated in August in many European countries. The Biodiversity Conservation Centre and the "B12" Coalition of Experts on Biodiversity Conservation for Eastern Europe and Northern Asia have produced a brochure, *Pan-European Biodiversity Conservation for children and ministers – Vision from the East.*

Impact assessment and minimising adverse impacts

The International Association for Impact Assessment (IAIA) was established in 1980. Its members are researchers, practitioners and users of various types of impact assessment from all parts of the world. Training programmes are held regularly in conjunction with IAIA international conferences. In cooperation with IUCN, IAIA has established a biological diversity task force.

UNEP provides advisory services to governments on the development of EIA legislation, and has published on EIA legislation in the Compendium of Environmental Laws of African Countries, and reported on the harmonization of EIA legislation in East Africa (Kenya, Tanzania and Uganda).

The Environmental Assessment (EA) Sourcebook Update of the World Bank (1997) provides an introduction to the policy framework for protection and enhancement of biological diversity. It also outlines the relevant project contexts where biological diversity may be adversely impacted or, conversely, projects which offer opportunities for conserving or enhancing biological diversity and guidelines for integrating biological diversity concerns into EA.

The document *Guidelines for Environmental Assessments and Traditional Knowledge* is a report from the Centre for Traditional Knowledge to the World Council of Indigenous People, funded by the Canadian International Development Agency (CIDA) and Environment Canada. It is aimed at presenting how indigenous people, governments and the private sector can work together to ensure that development projects and environmental assessments properly respect and acknowledge indigenous knowledge and the people who hold it.

Several examples of regional requirements for environmental impact assessment exist: e.g. under the 1991 UNECE Convention on Environmental Impact Assessment in a Transboundary Context (the Espoo Convention), the 1991 Protocol on Environmental Protection to the Antarctic Treaty, and the European Community Directive 85/337 on Environmental Impact Assessment (1995) in connection with the Directive 97/11/EC. Some regional banks have taken account of biodiversity conservation and use in their operational policies and/or practice. At the European Bank for Reconstruction and

Belgium

"Reduction in the overall size of natural areas and their fragmentation has rapidly increased as a result of urban expansion and road construction."

Development (EBRD), for example, all operations are subjected to environmental screening and, on the basis of this exercise, may be subject to environmental impact assessment and/or environmental audit.

Access to genetic resources

Many activities have taken place in support of implementation of Article 15. International discussions have been carried out to address the issue of access to genetic resources and benefit-sharing, for example in the 1998 workshop "Towards Best Practices for Access to Genetic Resources" in Cordoba, Spain and under the auspices of the CBD during the first meeting of the Expert Panel on Access and Benefit-Sharing in October 1999, in San José, Costa Rica. The World Federation for Culture Collections (WFCC) is developing operational guidelines for access and benefit-sharing procedures through the Microorganisms Sustainable Use and Access Regulation International Code of Conduct (MOSAICC) project. Providers of material to the International Mycological Institute (IMI) have to prove that the necessary Prior Informed Consent procedures have been applied. The Consultative Group on International Agricultural Research (CGIAR) Centres provide a framework for a global system for multilateral exchange of genetic resources important for food and agriculture. Around 150,000 germplasm accessions from CGIAR collections, and 500,000 samples of improved materials, are distributed by the Centres each year, the large majority going to developing countries.

Botanic Gardens Conservation International (BGCI) and the International Association of Botanic Gardens started a project in 1997 designed to meet the access and benefit-sharing requirements of the Convention. It involves 17 botanic gardens from 15 countries around the world, and is coordinated by the Royal Botanic Gardens (RBG), Kew, UK and funded by the UK Department for International Development. Project priorities are to develop a harmonised approach and to produce model material transfer agreements for the acquisition and supply of genetic resources. The RBG has produced a manual on the repatriation of information from *ex situ* institutions to countries of origin.

A number of companies, such as GlaxoSmithKline, Novo-Nordisk, Xenova, Bristol Myers Squibb and Shaman Pharmaceuticals have developed policies or guidelines on the acquisition of genetic resources in line with the Convention.

The International Cooperative Biodiversity Groups (ICBG) are a programme jointly sponsored by the United States National Institutes of Health, the National Science Foundation and the United States Agency for International Development. The programme currently funds five groups working in eight countries in Latin America and Africa. Its main focus is the establishment of an integrated programme for the discovery of biologically active plants for drug development, especially for tropical diseases, biodiversity conservation, and at the same time ensuring that local communities and source countries derive maximum benefits for their biological resources and their intellectual contribution. This is sought by active involvement of universities, traditional healers and NGOs.

Several regions and subregions are developing a regional approach to the implementation of Article 15. It is most advanced in the Andean Region – Bolivia, Colombia, Ecuador, Peru and Venezuela – where in 1996 the Commission of the Cartagena Accord, known as the Andean Pact, introduced The Common System on Access to Genetic Resources whose objective is to regulate access to the genetic resources of the member States. The Scientific, Technical and Research Commission of the Organization of African Unity (OAU)

is developing a Declaration and Draft on Community Rights and Access to Biological Resources with the objective to ensure that local communities continue to control their natural resources and knowledge and to develop a Draft African Convention on Genetic Resources. The Association of South East Asian Nations (ASEAN) has started a process to draft the ASEAN Framework Agreement on Access to Genetic Resources.

The GEF is supporting projects aimed to implement Article 15, such as Participatory Management of Date Palm Plant Genetic Resources in Oases of the Maghreb and Regional Studies for the Conservation and Sustainable Management of Natural Resources in the Amazon. In 1999, the Inter-American Biodiversity Information Network (IABIN) ran a survey of biodiversity-related new world holdings in museums and private collections in Europe.

In its definition of the scope of agricultural biodiversity, adopted at its fifth meeting, the Conference of the Parties notes that genetic resources for food and agriculture are a dimension of agricultural biodiversity and include:

- Plant genetic resources, including pasture and rangeland species, genetic resources of trees that are an integral part of farming systems;
- Animal genetic resources, including fishery genetic resources, in cases where fish production is part of the farming system, and insect genetic resources;
- Microbial and fungal genetic resources.

The Conference of the Parties has noted that the International Undertaking on Plant Genetic Resources has a crucial role to play in implementation of the Convention and has expressed its wish that the revision of the International Undertaking in harmony with the Convention be concluded as soon as possible. In recognition of the special nature of agricultural biodiversity, and the need for specific solutions, Governments negotiating the revision of the International Undertaking are developing a Multilateral System of Access and benefit-sharing for plant genetic resources for food and agriculture, for the crops essential for food security, in regard of which countries are interdependent. Both the FAO Conference and the Conference of the Parties have requested countries preparing general access legislation to leave room for the Multilateral System.

Access to and transfer of technology

The private sector is a key player in the use of genetic resources and is likely to become even more so in the future. The main form this has taken in recent years is the involvement of international drug firms in prospecting for new biochemical compounds. In most developing countries, private firms' participation in biodiversity-related activities is still limited because of the lack of appropriate incentives. However, a number of developing country institutions are beginning to engage in various forms of technology partnerships with public research and development institutions and private-sector firms from industrialised countries.

Exchange of information and technical and scientific cooperation

The Conference of the Parties determined that the clearing-house mechanism to promote and facilitate technical and scientific cooperation should be developed as a decentralized mechanism in close cooperation with relevant international organizations as active partners. A number of regional biodiversity information networks have come into being through other processes and can contribute to the objectives of the Convention's clearing-house mechanism.

The Inter-American Biodiversity Information Network (IABIN) is an intergovernmental initiative intended to promote greater coordination among Western Hemisphere countries in collection, sharing, and use of environmental information. The proposal to develop IABIN was an element of the final "Hemispheric Plan of Action" adopted by the leaders of South, Central, and North American nations in Santa Cruz de la Sierra, Bolivia in December 1996 at the Summit on Sustainable Development. The Action Plan included a commitment that the parties would "seek to establish an Inter-American Biodiversity Information Network, primarily through the Internet, that will promote compatible means of collection, communication and exchange of information relevant to decision-making and education on biodiversity conservation as appropriate, and that builds upon such initiatives such as the Clearing House Mechanism provided for in the Convention on Biological Diversity, and the Man and the Biosphere Network (MABNET Americas) and the Biodiversity Conservation Information System (BCIS), an initiative of nine IUCN programs and partner organizations".

The North American Biodiversity Information Network (NABIN) is an initiative of the Commission for Environmental Cooperation (CEC), an international organization created by Canada, Mexico and the United States under the North American Agreement on Environmental Cooperation (NAAEC). NABIN will assist institutions and agencies that collect, manage or use biodiversity data collaborate to provide more effective information access throughout North America. It will also be linked to other national and international initiatives, such as the Canadian Biodiversity Information Network (CBIN), the US National Biological Information Infrastructure (NBII), Mexico's Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (Conabio), the Inter-American Biodiversity Information Network (IABIN), as well as the Convention's clearing-house mechanism, thereby participating in a worldwide biodiversity information system.

The European Community Biodiversity Clearing-House Mechanism is being developed by the European Environment Agency (EEA), under the guidance of a steering committee consisting of representatives of the eighteen EEA member countries, the European Commission and intergovernmental bodies, including the Convention Secretariat. The mechanism was launched in early 2000.

Biosafety Clearing-House

The establishment of the Biosafety Clearing-House, required under the Cartagena Protocol on Biosafety, will involve substantial global efforts in scientific and technical cooperation and information exchange and a number of intergovernmental organizations active in biosafety and/or information-exchange issues are contributing to the development of its pilot phase. These include the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), World Bank, Global Environment Facility (GEF), International Centre for Genetic Engineering and Biotechnology (ICGEB), and Organisation for Economic Co-operation and Development (OECD).

Handling of biotechnology and distribution of its benefits

Prior to the adoption of the Cartagena Protocol on Biosafety in January 2000, a number of different institutions developed guidelines on biosafety:

- In 1991, the United Nations Industrial Development Organization (UNIDO) issued a Voluntary Code of Conduct for the Release of Organisms into the Environment.
- The OECD Safety Considerations for Biotechnology, published in 1992, set out general principles and criteria for safe

large-scale production and small-scale experimental field research in biotechnology.

- The UNEP International Technical Guidelines on Biosafety in Biotechnology adopted in 1995 were designed to act as guidance during the development of the Cartagena Protocol on Biosafety and to complement it after its conclusion.
- The FAO draft Code of Conduct on Biotechnology aims to promote the use of biotechnologies for the conservation and sustainable utilisation of plant genetic resources.

Regional guidelines include two directives of the European Union, one (Directive 90/219/EEC, as amended by Council Directive 98/81/EC) which regulates the contained use of GMOs for research and industrial purposes, and the other (Directive 90/220/EEC) which puts in place a step-by-step approval process on a case-by-case assessment of the risks to human health, animal health and the environment before any GMO or product consisting of or containing GMOs can be released into the environment or placed on the market. A new Directive (2001/18/EC) on the deliberate release of GMOs was adopted by the European Parliament in February 2001 and will enter into force on 17 October 2002.[3]

In 1991, the Inter-American Institute for Cooperation on Agriculture issued Guidelines for the Use and Safety of Genetic Engineering Techniques or Recombinant DNA Technology and Guidelines for the Release into the Environment of Genetically Modified Organisms.

Financial resources

The Global Environment Facility (GEF) serves as the institutional structure operating the financial mechanism of the Convention. Through January 2001, the GEF had allocated US$1.3 billion to 416 biodiversity projects and enabling activities, matched by US$2.3 billion in cofinancing. A list of biodiversity projects funded through the GEF is contained in Annex 3.

There is some indication from reports published by bilateral agencies that they have taken biodiversity into account in their regular development-cooperation operations, and that some have initiated specific programmes to support biodiversity activities or provided funding to nature conservation projects. It also appears that the regional development banks have, in different ways, taken account of the conservation and sustainable use of biodiversity in their operational policies and/or practice. What continues to be lacking however is reliable and comparable information about the flow of financial resources to eligible from multi- and bilateral donors and lenders for the purposes of the Convention.

Some United Nations agencies have been involved in funding biodiversity activities and projects. For example, UNESCO has provided support for activities to some of the 125 countries that participate in the Man and Biosphere (MAB) programme. The FAO has spent at least US$190 million on biodiversity field programme projects since 1992, of which US$147 million relate to genetic resources. The United Nations University supports a number of ongoing biodiversity projects, and UNIDO has undertaken biotechnology-related projects.

Eritrea

"Eritrea's rich biological diversity has been denuded, so that now it has some of the most difficult agricultural conditions in the region."

[3] European Union "Questions and answers on the regulation of GMOs in the EU." Memo/00/27. Brussels, 24 July 2001.

Many intergovernmental organizations and NGOs have successfully mobilised financial resources from the donor community for biodiversity activities. A number of organizations, such as the Council of Europe, the South Pacific Regional Environment Programme (SPREP) and the International Tropical Timber Organization (ITTO), have provided funding to support a range of biodiversity activities. The European Union has established a number of funding instruments, which are entirely or partly devoted to conservation and sustainable use of biological diversity, such as LIFE-Nature and the budget lines *Environment in Developing Countries* and *Tropical Forests*; PHARE, set up to support Central and Eastern European countries, including grants to adapt their environmental legislation to EU standards; and TACIS, which fosters the development of links between the EU and the newly independent states, including environmental and nature conservation projects.

National reporting

As noted above, steps are under way to test ways to harmonise the reporting requirements (in terms of content and timing) of biodiversity-related agreements. This is a cooperative effort involving the secretariats, countries that have volunteered to take part, UNEP and other international organizations.

THEMATIC WORK PROGRAMMES

Marine and coastal biological diversity

A wide range of organizations and initiatives are undertaking activities that support implementation of the Jakarta Mandate. UNEP operates several relevant programmes, including the Global International Waters Assessment (GIWA), the Regional Seas Programme, and the Global Plan of Action for the Protection of the Marine Environment from Land-Based Activities. The Straddling Fish Stocks Agreement (see Table 5.1) is not yet in force but could play a major role in the future management of marine fish stocks. The FAO Code of Conduct for Responsible Fisheries is especially relevant. IUCN has mobilised expertise in the identification and selection of criteria for marine and coastal protected areas establishment and management. UNESCO and its Intergovernmental Oceanographic Commission (IOC) work on integrated marine and coastal area management and marine and coastal protected areas. In 1996, UNESCO launched the Coastal Regions and Small Island Initiative.

The Conference of the Parties has asked the Secretariat, in consultation with the United Nations Division of Ocean Affairs and the Law of the Sea, to carry out a study of the relationship between the Convention and Convention on the Law of the Sea with regard to the conservation and sustainable use of genetic resources on the deep seabed in preparation for future consideration by SBSTTA of issues relating to bio-prospecting of genetic resources on the deep seabed. Initial analysis of the relationship between the two conventions suggests that:

- CBD and UNCLOS complement each other with regard to the conservation and sustainable use of genetic resources of the deep seabed within national jurisdiction;

- CBD and UNCLOS complement each other with regard to marine scientific research involving genetic resources in the International Seabed Area, since the CBD has competence in terms of the content and scope of the research, while UNCLOS, because of the location of the research, has competence in the regulation of the conduct of the research;
- There is a lacuna, and thus a possible need to develop a regime for prospecting, exploration and exploitation for commercial purposes of genetic resources in the International Seabed Area.

The International Coral Reef Initiative (ICRI) is an informal mechanism that allows representatives of over eighty developing countries with coral reefs to sit in equal partnership with major donor countries and development banks, international environmental and development agencies, scientific associations, the private sector and non-governmental organizations to identify strategies to conserve the world's coral reef resources. ICRI has three operational networks: the Global Coral Reef Monitoring Network (GCRMN), the International Coral Reef Action Network (ICRAN), and the International Coral Reef Information Network (ICRIN).

A wide range of regional mechanisms support the global efforts of the Jakarta Mandate. This includes the Regional Seas Conventions, many of which have taken measures to integrate conservation and sustainable use of biological diversity into their operations, such as the Convention on the Protection of the Marine Environment of the Baltic Sea (Helsinki Convention), the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), and the UNEP Regional Seas Programme with further nine regional conventions. Of these, the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and its Protocol Concerning Specially Protected Areas and Wildlife have issued Regional Guidelines for Integrated Planning and Management of Coastal and Marine Areas in the Wider Caribbean Region and a database of wider Caribbean Marine Protected Areas. In the North Sea region, the International Conference on the Protection of the North Sea establishes regional consensus and cooperative action while in the Wadden Sea, Denmark, Germany and the Netherlands cooperate through the Joint Declaration on the Protection of the Wadden Sea. SPREP has adopted a Strategic Action Programme for International Waters of the Pacific Islands Region. The Commission for the Conservation of Antarctic Marine Living Resources is specifically applying the precautionary approach in its operations.

Inland water biological diversity

At its fourth meeting, the Conference of the Parties welcomed the recommendations on strategic approaches to freshwater management of the Commission on Sustainable Development and urged Parties and Governments to (a) include information on the biological diversity of inland waters when providing voluntary national communications and reports on actions further to the recommendations of the Commission on Sustainable Development; and (b) consider inland water biological diversity in the agenda of subsequent meetings held to further the recommendations of the Commission on Sustainable Development.

At the same meeting it also encouraged the implementation of the Joint Work Plan with the Convention on Wetlands as a framework for enhanced cooperation between the Conventions and, at its fifth meeting, welcomed and endorsed the second joint work plan (2000-2001) between the two Conventions which, amongst other activities, includes a River Basin Initiative.

Other relevant initiatives include:

- Wetlands International assesses freshwater biodiversity in several regions, sets up regional and national wetland programmes and action plans, and offers a variety of guidelines, manuals and information material.
- The UNEP Global International Waters Assessment (GIWA) will develop an integrated view of inland and marine waters.
- UNEP-WCMC, in collaboration with the IUCN Species Survival Commission, has provided a preliminary global overview of freshwater biodiversity, with an analysis of priorities for basin protection.
- The World Resources Institute (WRI) and the Worldwatch Institute have published an overview of the major watersheds of the world.
- The IUCN Commission on Ecosystem Management has launched the initiative *The Biodiversity of Inland Water Systems: Trends and Options for Improved Conservation and Management.*
- The World Water Council (WWC), established in 1994, has included freshwater biodiversity as a key component of its Long Term Vision for Water Life and the Environment.
- Activities carried out by the International Centre for Living Aquatic Resources Management (ICLARM), including FishBase and the establishment of the International Network on Genetics in Aquaculture.
- DIVERSITAS has proposed a number of research components on inland water biological diversity.
- The report of the World Commission on Dams concluded that large dams have led to the loss of forests and wildlife habitat and to the loss of aquatic biodiversity of upstream and downstream fisheries. It found that efforts to counter the ecosystem impact of large dams had met with limited success. (See Table 5.5 in the annex to this chapter.)

Many projects supported by the GEF focus on conservation and sustainable use of inland water biological diversity. For example, in Ethiopia, Kenya and Tanzania, UNDP and UNEP implement the GEF project *Conservation and Sustainable Use of Biological Diversity in the Eastern Rift Valley Lakes*, which aims to develop and implement a Strategic Action Programme on systems of conservation areas and the sustainable use of resources.

Forest biological diversity

The second meeting of the Conference of the Parties adopted a statement from the Convention to the Intergovernmental Panel on Forests (IPF) (see Table 5.6 in the annex to this chapter) which affirmed the desire of the Conference of the Parties to contribute to the IPF and to establish a dialogue with it on issues related to forests and biological diversity. In order to ensure coordinated input from the United Nations system to the IPF process, an informal Inter-Agency Task Force on Forests (ITFF) was formed, with the Secretariat of the Convention as a member and responsible for the IPF programme element on traditional forest-related knowledge.

Following the IPF Proposals for Action, a range of activities focus on the development of criteria and indicators, namely the International Tropical Timber Organization's (ITTO) work on criteria and indicators associated with trade and the productivity of tropical forests, and the Centre for International Forestry Research's (CIFOR) project on the application of criteria and indicators across different ecoregions, with

respect to forest dwellers and community forestry. Several of the CGIAR centres, for example the International Centre for Research in Agroforestry (ICRAF) and the International Institute of Tropical Agriculture (IITA), are involved in forestry-related research.

The FAO's Global Forest Resources Assessment 2000 (FRA 2000) reviewed the state of the world's forests at the end of the millennium and was divided into three main areas: assessment based on existing information, remote sensing survey, and special studies. The FRA 2000 was the most comprehensive, reliable and authoritative baseline survey of forest resources at the global level, providing a broad range of up-to-date information on the world's forest resources. The results of FRA 2000 are available both as printed reports and on the World Wide Web in the form of country profiles, synthesis reports and global maps.

Lessons learned from FRA 2000 and past assessments will provide the basis for the development of new and better ways of generating reliable information on the world's forests. The FRA programme will continue to seek more accurate and objective information for future global surveys, for example through increased use of sampling at the global level and capacity building in countries where there is a need to improve their forest inventories.

FRA 2000 results showed that many developing countries still require financial and technical support to conduct forest inventories. The scarcity of comparable multiple-date inventories illustrated the need for many of these countries to develop better mechanisms to monitor change in their forest cover. There was also a need for industrialized countries to improve their national assessments through the implementation of continuous forest inventories. Both improved and expanded surveys (i.e. beyond traditional timber inventories) will provide much of the information needed to help countries manage their forests sustainably.

The World Bank and WWF have formed the Alliance for Forest Conservation and Sustainable Use which is aiming to achieve three targets by 2005: 50 million hectares of new forest protected areas; 50 million hectares of existing, but highly threatened, forest protected areas secured under effective management; and 200 million hectares of the world's production forests under certified sustainable management.

Many regional initiatives focus on the development of criteria and indicators for sustainable forest management: the Helsinki process for boreal, temperate and Mediterranean-type forests in Europe; the Montreal process for temperate and boreal forests outside of Europe; the Tarapoto proposal for the Amazon region; the UNEP/FAO-initiated processes for dry-zone Africa and the Near East; and the FAO/Central American Commission on Environment and Development-initiated *Lepaterique* process for Central America.

The GEF is supporting many projects with a focus on forest biological diversity, such as *Conservation Priority-Setting for the Upper Guinea Forest Ecosystems in West Africa* and *Development of a Regional Strategic Action Programme for the Environmental and Biodiversity Resources of the Ecosystems of the Congo Basin*. In the western African Rift Valley, the Albertine Rift Conservation Society (ARCOS) is implementing a project on Networking and Awareness Raising for the Conservation and Sustainable Use of Albertine Rift Montane Forests.

"Addressing the Underlying Causes of Deforestation and Forest Degradation" was a joint initiative of Governments, NGOs, indigenous peoples' organizations, Afro-American organizations, grass-root organizations, intergovernmental agencies, farmers' cooperatives, trade unions and representatives of business and industry who met to analyse the underlying causes of deforestation and forest degradation. Seven regional and one indigenous peoples' organizations workshops were held in 1998 and 1999, as well as a global workshop in 1999 in

Germany

"Of the main types of terrestrial and marine biotopes, more than two thirds have become endangered in the last 100 years. Of these 60% are considered completely or virtually beyond regeneration. Only 6% of all types of biotope are considered under no threat whatsoever."

San José. Building on 40 case studies, the major underlying causes of deforestation and forest degradation were identified as: land tenure, resource management and stakeholder participation; trade and consumption; international economic relations and financial flows; and valuation of forest goods and services. The final document contains the case studies and recommendations for action.

Agricultural biological diversity

The Convention's work programme on agricultural biological diversity is being implemented in close cooperation with the FAO. The FAO Conference has adopted the International Plant Protection Convention, the Code of Conduct for Responsible Fisheries and the International Undertaking on Plant Genetic Resources. The FAO assists with the implementation of the 1996 Global Plan of Action on Plant Genetic Resources (see Table 5.7 in the annex to this chapter) and the Global Strategy on the Management of Farm Animal Genetic Resources, and also hosts the Global IPM (Integrated Pest Management) Facility.

The International Undertaking on Plant Genetic Resources for Food and Agriculture seeks to "ensure that plant genetic resources of economic and/or social interest, particularly for agriculture, will be explored, preserved, evaluated and made available for plant breeding and scientific purposes". In 1993, the FAO Conference requested the Commission on Genetic Resources for Food and Agriculture (CGRFA) to negotiate a revised International Undertaking in harmony with the CBD; to considerate access on mutually agreed terms to plant genetic resources, including *ex situ* collections not addressed by the CBD; and the realisation of Farmers' Rights. In June 2001 the CGRFA adopted the text of a revised International Undertaking. This will be considered at the Thirty-first Session of the FAO Conference in November 2001. When adopted the revised International Undertaking (IU) will establish a new and binding framework for cooperation in the area of plant genetic resources for food and agriculture. The objectives of the IU are "the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security" (Article 1.1). These objectives will be attained by closely linking the IU to the FAO and to the Convention (Article 1.2). The IU establishes a Multilateral System of Access and Benefit-sharing and a list of crops covered under the Multilateral System.

A number of relevant conferences have been held, including:

- The CBD, FAO, Government of the Netherlands Technical Workshop on Farming Systems Approaches for the Conservation and Sustainable Use of Agricultural Biological Diversity and Agro-Ecosystems (Rome, 1997);
- The FAO, University of São Paulo and Brazilian National Council for Research and Technology Development Workshop on the Conservation and Sustainable Use of Pollinators in Agriculture – with an Emphasis on Bees (São Paulo, 1998);
- The FAO, CBD, Government of the Netherlands Workshop on Sustaining Agricultural Biodiversity and Agro-Ecosystem Functions (Rome, 1998); and
- The FAO-Netherlands Conference on the Multifunctional Character of Agriculture and Land (Maastricht, 1999).

Many intergovernmental organizations, such as CABI and the International Fund for Agricultural Development, and NGOs, such as the International Association of Plant Breeders and Rural Advancement Foundation International (RAFI), are involved with the conservation and sustainable use of biological diversity in agricultural activities.

Much of the work on agricultural biological diversity under the Convention to date, in particular with regard to the development of the work programme, has been undertaken in cooperation with FAO.

The Secretariat is collaborating with the World Trade Organization in examining the impacts of trade liberalization on the conservation and sustainable use of biological diversity.

Biological diversity of dry and sub-humid lands

The main partner agency for implementation of the Convention's programme of work on dryland, Mediterranean, arid, semi-arid, grassland and savannah ecosystems is the United Nations Convention to Combat Desertification. The CCD is developing a wide range of activities, including regional, sub-regional and national action programmes.

FAO has many dryland-related programmes on the conservation, sustainable use and assessment of crop, grassland, forest and livestock genetic resources. UNEP has promoted many programmes to combat desertification and to support the conservation of dryland biodiversity. UNESCO operates the Man and the Biosphere (MAB) programme, which promotes the integrated conservation and sustainable use of resources, with many MAB sites being located in drylands.

The International Fund for Agricultural Development (IFAD) funds a large number of agricultural development investment projects aimed at reducing poverty in marginal areas, including drylands. It also promotes research through its technical grants programme, and hosts the Global Mechanism for the CCD.

The CGIAR international agricultural research centres house large *ex situ* collections of germplasm of dryland crops, and have well-developed breeding programmes for them. Two centres have a mandate that focuses specifically on drylands: the International Centre for Agricultural Research in the Dry Areas (ICARDA) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Research areas include improvement of on-farm water use efficiency, management and rehabilitation of rangelands, and management and nutrition of small ruminants, such as sheep and goats. The centres cooperate with a range of other organizations. Examples include the recently started GEF-funded project on conservation and sustainable use of dryland agrobiodiversity in Jordan, Lebanon, the Syrian Arab Republic and the Palestinian Authority, and the Desert Margins Programme, which aims at developing integrated national, sub-regional and international activities to develop sustainable natural resource management options to combat land degradation and loss of biodiversity.

To date, there are three sub-regional action programmes under the CCD: the "Maghreb Subregional Action Programme to Combat Desertification," the "Subregional Action Programme to Combat Desertification for West Africa and Chad," and "the Subregional Action Programme to Combat Desertification in Southern Africa." They aim to coordinate and integrate the efforts of the countries of the region, as well as intergovernmental and NGOs, and to establish coherent mechanisms for the sustainable use of the joint natural resources. A specific objective is to support the National Action Programmes under the CCD of the states of the region.

The programme of work on the biological diversity of dry and semi-humid lands is the most recent of the thematic work programmes to be established by the Conference of the Parties, having been adopted at COP5. The decision envisages the development of a joint work programme involving the CBD, the CCD and other relevant organizations.

CONCLUSION

Substantial work supporting the implementation of the objectives, articles and work programmes of the Convention is going on worldwide. Many of these projects and programmes were initiated by the Convention, but many more arose from existing initiatives or were started independently from the Convention process. The Convention has already played a role in coordinating biodiversity-related activities, for example through the Global Environment Facility as the main global funding mechanism for biodiversity. This role could be enhanced through more information being provided directly by the existing initiatives dealing with biodiversity issues to the Conference of the Parties. At the same time, the Convention, through Parties and its bodies, offers the potential to influence existing activities related to conservation and the use of natural resources, to better integrate aspects of biodiversity conservation, sustainable use and benefit-sharing into their operations.

Many initiatives in support of the Convention have gained in efficiency through regional cooperation. Regional strategies and action plans for the conservation and sustainable use of biological diversity, and for equitable benefit-sharing are important mechanisms for achieving the Convention's objectives. The Conference of the Parties has emphasized the functions of sub-regional and regional processes in promoting implementation of the Convention at the regional, sub-regional and national levels. A key element is capacity development at regional and national levels. Initiatives such as the Biodiversity Planning Support Programme, the Global Biodiversity Forum and the GEF-UNDP Capacity Development Initiative[4] are significant in this respect.

[4] The Capacity Development Initiative (CDI) is a strategic partnership between the United Nations Development Programme and the GEF Secretariat to produce a comprehensive approach for developing country-level capacities needed for addressing challenges of global environmental action in areas of biodiversity, climate change, and land degradation.

Annex to Chapter 5

Table 5.1 **Global biodiversity-related conventions**

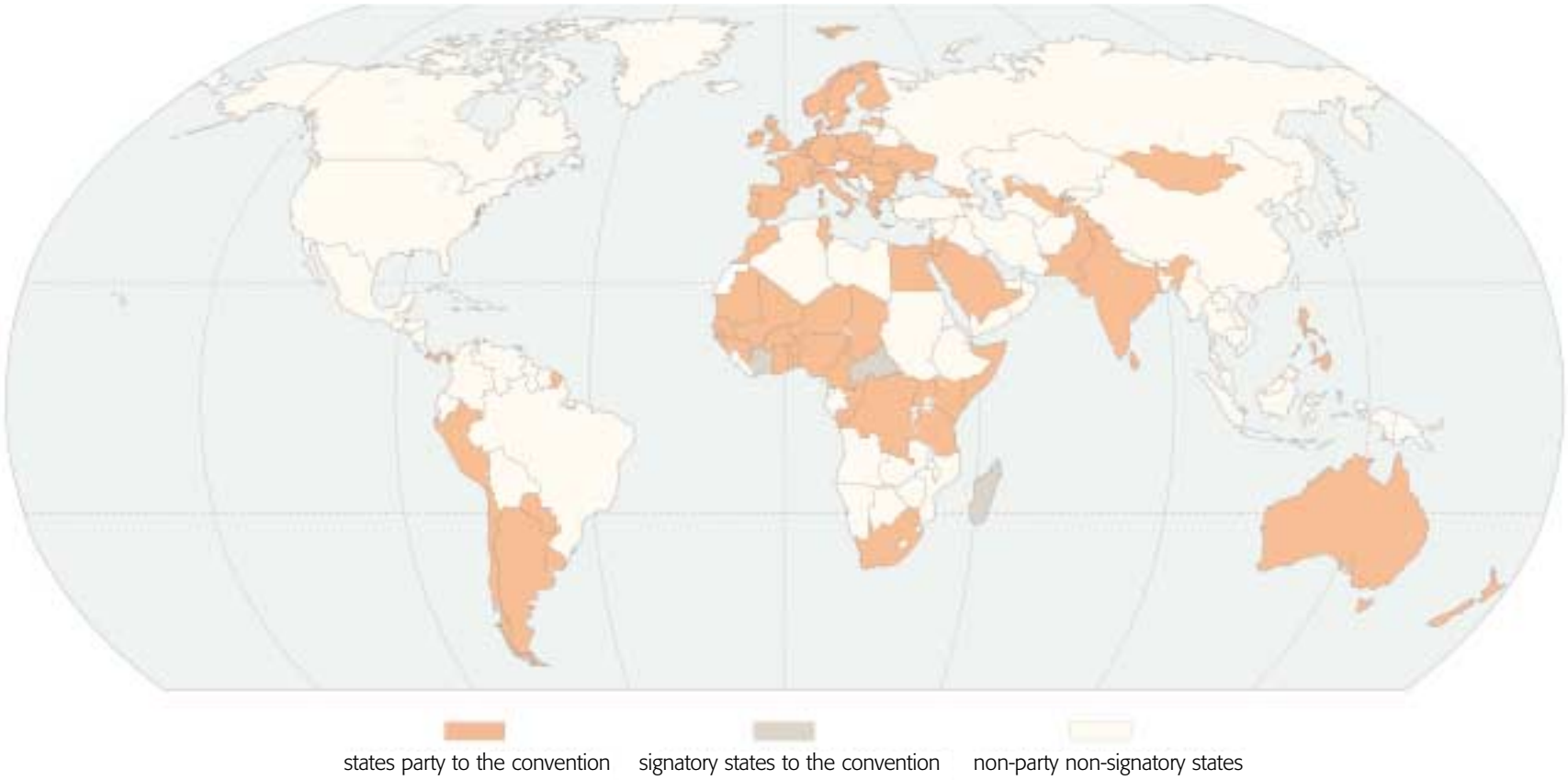
Name			Scope
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Convention on Wetlands or Ramsar Convention)			All aspects of wetland conservation and wise use. Parties are required to list at least one wetland of international importance for special management and protection
Year 1971	Entry 1975	Parties 125	
Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)			To define and conserve the world's heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer cooperation among nations. Parties pledge to conserve the sites situated on their territory, some of which may be recognized as World Heritage. Sites may be of importance as cultural heritage or natural heritage or both.
Year 1972	Entry 1975	Parties 164	
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)			Protects wildlife against overexploitation and prevents international trade from threatening species with extinction. Parties act by banning commercial international trade in an agreed list of endangered species (Appendix-I listed species) and by regulating and monitoring trade in others that might become endangered or whose trade needs to be regulated to ensure control over trade in Appendix-I species (Appendix-II listed species).
Date 1973	Entry 1975	Parties 154	
Convention on Migratory Species (Bonn Convention)			Aims to protect migratory species and their habitats. Parties cooperate in research relating to migratory species and provide immediate protection for species listed in Appendix I of the Convention. For those species listed in Appendix II, Parties are required to endeavour to conclude "range State" agreements on their conservation and management; a number of such agreements have been concluded.
Date 1979	Entry 1983	Parties 75	

Name			Scope
United Nations Convention on the Law of the Sea (UNCLOS)			Contains a comprehensive codification of the principles and rules relating to the seas. UNCLOS establishes rights and obligations relating to navigation, the conservation and use of marine resources, and the protection of the marine environment. Relevant aspects include obligations relating to marine living resources, and exploitation of the living resources of the Exclusive Economic Zone.
Year 1982	Entry 1994	Parties 136	
Agreement for the Implementation of the Provisions of the UN Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Straddling Fish Stocks Agreement)			Objective is to ensure the long-term conservation and sustainable use of straddling and highly migratory fish stocks. Emphasises the precautionary approach, the protection of the marine biodiversity and the sustainable use of fisheries resources. The Agreement is not yet in force. As of August 2001 there were 59 signatories and 29 ratifications or accesssions; 30 ratifications or accessions are required before the Agreement enters into force.
United Nations Framework Convention on Climate Change (UNFCCC)			The Climate Change Convention and its Kyoto Protocol aim to stabilise greenhouse gas concentrations in the atmosphere at safe levels. Parties are required to inventory their sources and sinks of greenhouse gases and to formulate policies and measures to mitigate and/or adapt to the effect of climate change. Developed country Parties are required to reduce their emissions of greenhouse gases to their 1990 level by the year 2000. The Kyoto Protocol establishes further reduction commitments for developed country Parties.
Date 1992	Entry 1994	Parties 186	

Name			Scope
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD – Desertification Convention)			Through action programmes the Convention aims to ensure improved management of dryland ecosystems and of development aid flow. National Action Programmes (NAPs) will address the underlying causes of desertification and drought and seek to identify preventative or remedial measures. These will be complemented by sub-regional and regional programmes (SRAPs, RAPs), particularly when transboundary resources such as lakes and rivers are involved. The Convention places strong emphasis on local participation in decision-making.
Year 1994	Entry 1996	Parties 175	

Note: "Date" is date of agreement, "Entry" is year in which agreement entered into force, "Parties" is number of Party States in August 2001.

MAP 23

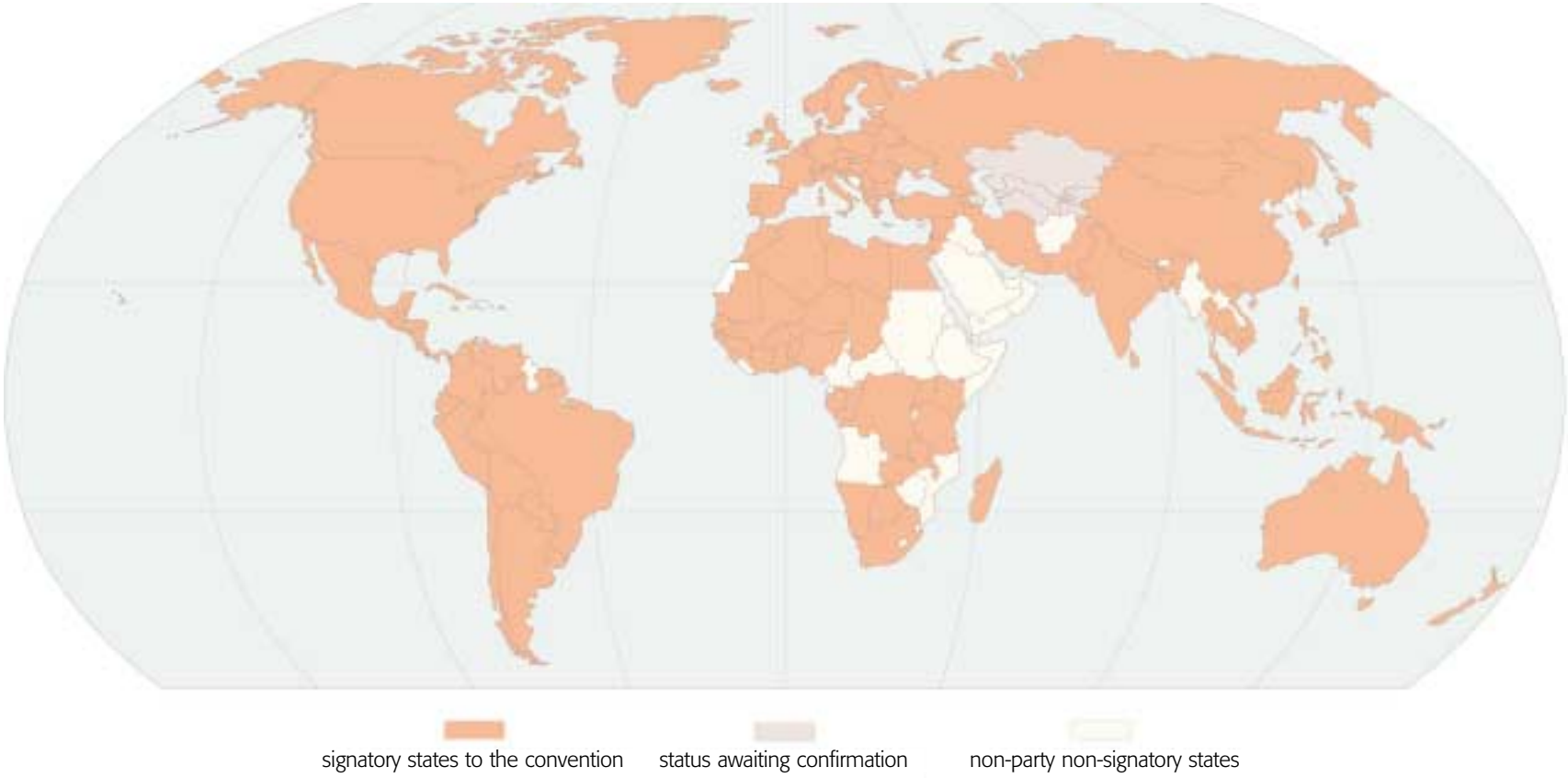


Parties and signatories to the Convention on Migratory Species

This map shows which nations are full parties to the CMS, which are signatory only, and which are neither.

Source: data from CMS website, 6 August 2001.

MAP 24



Parties to the Convention on Wetlands

This map shows nations party to the Ramsar Convention, and a small number of newly independent States whose status requires confirmation.

Source: data from the Ramsar Convention website, 6 August 2001.

MAP 25

Parties to the Desertification Convention

This map shows nations party to the UNCCD.

Source: data from UNCCD website, 6 August 2001.

MAP 26

Parties to the Climate Change Convention

This map shows nations party to the UNFCCC.

Source: data from UNFCCC website, 6 August 2001.

Table 5.2 **United Nations bodies and agencies relevant to implementation of the CBD**

The General Assembly of the United Nations

The General Assembly has invited the Executive Secretary to report on progress in implementation of the Convention to each annual session. It has adopted a series of resolutions on the Convention. At its forty-ninth session (1994) it declared 29 December, the date of the Convention's entry into force in 1993, as the International Day for Biological Diversity. At its fifty-fifth session (2000), at the request of the Conference of the Parties, it changed the date to 22 May, the date of the adoption of the Convention in 1993.

A Special Session of the General Assembly held in June 1997 adopted a Programme for the Further Implementation of Agenda 21 prepared by the Commission on Sustainable Development. The General Assembly invited the Conference of the Parties to provide input to the Special Session. The General Assembly has also invited the Secretariat to assist with preparations for the World Summit on Sustainable Development (the ten-year review of progress in implementing the outcomes of the 1992 Earth Summit), to be held in Johannesburg, South Africa in September 2002 and to report on progress made in implementation of the Convention.

CSD – The Commission on Sustainable Development

The Commission on Sustainable Development (CSD) was created in December 1992 to ensure effective follow-up of UNCED and to monitor and report on implementation of the Earth Summit agreements at the local, national, regional and international levels. The CSD is a functional commission of the UN Economic and Social Council (ECOSOC), with 53 members. A number of the themes of this programme of work of the Commission for 1998-2002 are of direct relevance to implementation of the Convention (e.g. freshwater resources, oceans and seas, agriculture, forests, tourism) and both the Conference of the Parties and the Secretariat have provided input to the CSD discussions on these themes.

EMG – The Environmental Management Group

The Environmental Management Group (EMG) was established by the UN General Assembly at its fifty-third session (1998) and is chaired by the Executive Director of UNEP, who reports directly to the UN Secretary-General. The EMG focuses on environment and human settlement issues, in the context of the linkages between environment and development. The most important goal of the EMG is to achieve effective coordination and joint action in key areas of environmental and human settlements concern. The Executive Secretary participates in the EMG.

FAO – The Food and Agriculture Organization of the United Nations

The Food and Agriculture Organization was founded in October 1945 with a mandate to raise levels of nutrition and standards of living, to improve agricultural productivity, and to better the condition of rural populations. It offers direct development assistance, collects, analyses and disseminates information, provides policy and planning advice to governments and acts as an international forum for debate on food and agriculture issues. FAO is active in land and water development, plant and animal production, forestry, fisheries, economic and social policy, investment, nutrition, food standards and commodities and trade. A specific priority of FAO is encouraging sustainable agriculture and rural development. It has 180 Member Nations plus the EC (a Member Organization). Of particular relevance to the Convention are the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA) and the International Undertaking on Plant Genetic Resources for Food and Agriculture (IU).

The CGRFA is a permanent intergovernmental forum whose objectives are to ensure the conservation and sustainable utilization of genetic resources for food and agriculture, as well as the fair and equitable sharing of benefits derived from their use, for present and future generations. Its mandate covers all components of agro-biodiversity of relevance to food and agriculture.

The International Undertaking is the first comprehensive international agreement dealing with plant genetic resources for food and agriculture and was adopted by the FAO Conference in 1983. It is monitored by the CGRFA. In 1992 Agenda 21 called for the strengthening of the FAO Global System on Plant Genetic Resources, and its adjustment in line with the outcome of negotiations on the Convention on Biological Diversity. In adopting the agreed text of the Convention in May 1992, countries requested that outstanding matters concerning plant genetic resources, in particular a) access to *ex situ* collections not addressed by the Convention, and b) the question of farmers' rights be addressed within FAO's forum. The negotiations for the revision of the International Undertaking in harmony with CBD started in November 1994 and are expected to be completed in 2001. The Conference of the Parties has affirmed its willingness to consider a decision that the revised International Undertaking become a legally binding instrument with strong links to both FAO and the Convention.

UNCTAD – The United Nations Conference on Trade and Development

Established in 1964 as a permanent intergovernmental body, UNCTAD is the principal organ of the United Nations General Assembly in the field of trade and development. It is the focal point within the United Nations for the integrated treatment of development and interrelated issues in the areas of trade, finance, technology, investment and sustainable development. UNCTAD's main goals are to maximize the trade, investment and development opportunities of developing countries, and to help them face challenges arising from globalisation and integrate equitably into the world economy. It tries to meet these goals through research and policy analysis, intergovernmental deliberations, technical cooperation, and interaction with civil society and the business sector. As of August 2001 there were 191 Member States. UNCTAD has developed the BIOTRADE Initiative aimed at stimulating trade and investment in biological resources to further sustainable development in line with the objectives of the Convention (see page 207 above).

UNDP – The United Nations Development Programme

UNDP is the United Nations' principal provider of development advice, advocacy and grant support. Its core programmes focus on the countries that are home to 90% of the world's extremely poor people. Its mission is to provide its clients -- the developing countries – with knowledge-based policy advice on the entire range of issues that pertain to reducing poverty, building institutional capacity, and managing the challenges of globalisation. A key UNDP area is energy and environment policy, where its mission is to promote environmentally sound development policies to improve the livelihoods of the poor, sustain economic growth and protect the global environment. This includes strengthening policies and institutions for the development of clean, affordable energy and the sustainable management of natural resources including water, land and biodiversity. UNDP is one of the Implementing Agencies of the Global Environment Facility and is assisting over seventy-five Parties with the development of their national biodiversity strategies and action plans, as well as with other biodiversity projects.

UNESCO – The United Nations Educational, Scientific and Cultural Organization

UNESCO was founded in 1945. Its main objective is to contribute to peace and security in the world by promoting collaboration among nations through education, science, culture and communication in order to further universal respect for justice, for the rule of law and for the human rights and fundamental freedoms that are affirmed by the Charter of the United Nations. UNESCO performs five principal

functions: prospective studies; the advancement, transfer and sharing of knowledge; standard-setting action; provision of expertise to Member States through technical cooperation; exchange of specialized information. As of August 2001 it had 188 Member States. The World Heritage Convention, the Man and the Biosphere Programme (MAB) and the Intergovernmental Oceanographic Commission (IOC) operate under the aegis of UNESCO. UNESCO and the Secretariat are cooperating in the development of a global initiative on biological diversity education and public awareness.

UNEP – The United Nations Environment Programme

The mission of UNEP is to be the principal United Nations body in the field of the environment. The core elements of its mandate are environmental monitoring, assessment, information and research, including early warning; enhanced coordination of environmental conventions; development of environmental policy instruments; freshwater; technology transfer and industry; and support to Africa. UNEP provides the secretariats of a number of international agreements, including the CBD. It is an Implementing Agency of the Global Environment Facility.

Table 5.3 **Partners with memoranda of cooperation with the CBD**

Memorandum of Understanding with the Conference of the Parties

- Council of the Global Environment Facility

Memoranda of Understanding with the Secretariat

- The Bureau of the Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar Convention)
- The Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- The Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- The Secretariat of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and its Protocol Concerning Specially Protected Areas and Wildlife (SPAW)
- The World Bank
- The Secretariat of the Intergovernmental Oceanographic Commission of UNESCO
- The Food and Agriculture Organization of the United Nations (FAO)
- The UNEP World Conservation Monitoring Centre
- The United Nations Conference on Trade and Development (UNCTAD)
- The Secretariat of DIVERSITAS
- The Foundation for International Environmental Law and Development (FIELD)
- The United Nations Educational, Scientific and Cultural Organization (UNESCO)
- The Secretariat of the Permanent Commission of the South Pacific
- The Secretariat of the United Nations Convention to Combat Desertification (UNCCD)
- The Council of Europe and UNEP as Joint Secretariat of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS)
- The Council of Europe as Secretariat of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
- The Coordinating Unit of the Mediterranean Action Plan
- IUCN – World Conservation Union

5.4 Agreements and programmes related to trade and intellectual property rights

World Trade Organization (WTO)

The WTO is the international body dealing with the rules of trade between nations. The WTO had 142 members as of August 2001. At its heart are the WTO agreements, the legal ground rules for international commerce and for trade policy. The agreements have three main objectives: to help trade flow as freely as possible, to achieve further liberalization gradually through negotiation, and to set up an impartial means of settling disputes. The General Agreement on Tariffs and Trade (GATT) is the principal rule book for trade in goods. The Uruguay Round also created new rules for dealing with trade in services, relevant aspects of intellectual property, dispute settlement, and trade policy reviews. Through these agreements, WTO members operate a non-discriminatory trading system that spells out their rights and their obligations. Two themes appear regularly in discussions on the subject in the WTO: the broader relationship between trade liberalization and the environment; and more specifically how the trade rules – which WTO members negotiated and agreed – relate to environmental protection policies and to international environmental agreements. The principal forum for discussing these issues in the WTO is the Committee on Trade and Environment (CTE), which consists of all WTO members. Agreements relevant to implementation of the Convention on Biological Diversity include:

- the *General Agreement on Tariffs and Trade* (GATT)
- the *Agreement on Agriculture* (Agriculture Agreement)
- the *Agreement on Sanitary and Phytosanitary Measures* (SPS Agreement)
- the *Agreement on Technical Barriers to Trade* (TBT Agreement)
- the *Agreement on Trade Related Intellectual Property Rights* (TRIPs Agreement).

The TRIPs Agreement sets minimum standards for intellectual property protection and requires members of the WTO to provide intellectual property rights regimes. Although patent protection can be excluded for animals and plants, and for "essentially biological processes," an effective system of plant variety protection must be provided (Art. 27(3)(b)). The Council of TRIPs, the main body responsible for monitoring the operation of TRIPs, began a review of the implementation of the whole Agreement in 2000. The Conference of the Parties has asked the Executive Secretary to seek observer status with the Council of TRIPs; however this status has not yet been granted.

World Intellectual Property Organization (WIPO)

WIPO is the United Nations agency established to promote the protection of intellectual property worldwide through cooperation among States, and to administer various treaties dealing with legal and administrative aspects of intellectual property. In addition, WIPO provides assistance to developing countries in relation to the development of intellectual property protection. As of August 2001, there were 177 Member States. In 1998 WIPO established its *Programme on Global Intellectual Property Issues* (Main Programme 11). Of particular relevance to the Convention are the following subprogrammes:

Intellectual Property Rights for New Beneficiaries: the main objectives of this sub-programme are to identify the intellectual property needs and expectations of indigenous and local communities, and to initiate pilot projects for new approaches to the creation, protection, use and management of intellectual property rights. A number of activities are envisaged under this subprogramme, including studies on current approaches and Roundtables on Indigenous Intellectual Property to facilitate an exchange of views among policy-makers and indigenous peoples.

Biological Diversity and Biotechnology: the main objective of this subprogramme is to examine the links between the intellectual property aspects of biotechnology and the conservation, use and benefit-sharing of biological resources. Expected results of the subprogramme are enhanced awareness of the role of intellectual property in implementing the Convention, and promotion of projects for documenting traditional knowledge, laying the foundation for sharing benefits arising from the use of such knowledge.

International Convention for the Protection of New Varieties of Plants (UPOV)

UPOV was adopted in 1961 to encourage innovation in plant breeding by providing exclusive rights for plant breeders in plant varieties which they have developed. UPOV has since been revised three times, most recently in 1991. The 1991 amendments, which entered into force in April 1998, broaden the scope of protection marking a shift toward more patent-like protection. In particular, the 1991 UPOV removed the automatic "farmers' privilege," which allowed farmers to use saved seed from a protected variety for replanting on the farm (but not for commercial purposes) without the breeders' authorisation. Parties to UPOV may still, within their national legislation, allow farmers to use such material within "reasonable limits," subject to safeguarding the legitimate interests of the plant breeder. Such provisions may be challenged by the plant breeder if legitimate interests are at stake.

The 1991 UPOV also restrict the use of protected varieties by other 3 to develop new varieties.

As of August 2001 there were 47 Contracting Parties to UPOV.

Table 5.5 **The World Commission on Dams**

The World Commission on Dams (WCD) was established in 1998 following the growing concerns about the ecological and social impacts of large dams. The mandate of the WCD was to: review the development effectiveness of large dams and assess alternatives; develop a framework for assessing options and decision-making processes for water resources, energy services and development; and develop internationally acceptable criteria and guidelines for planning, designing, construction, operation, monitoring, and decommissioning of dams.

The WCD conducted detailed reviews of eight large dams in Turkey, Norway, the United States, Zambia and Zimbabwe, Thailand, Pakistan, Brazil and South Africa. It also prepared country reviews for India and China, as well as a briefing paper on Russia and the Newly Independent States. A survey of 125 large dams was also undertaken, along with 17 thematic reviews on social, environmental and economic issues; on alternatives to dams; and on governance and institutional processes. It received 947 submissions and hosted four regional consultations in Colombo, São Paulo, Cairo and Hanoi where the Commissioners listened to people's individual experiences. All these inputs formed the core of the WCD Knowledge Base that served to inform the Commission on the main issues surrounding dams and their alternatives.

The Commission's report "Dams and Development" was issued in November 2000. One of the conclusions is that large dams have led to the loss of forests and wildlife habitat and the loss of aquatic biodiversity of upstream and downstream fisheries. The Commission found that efforts to counter the ecosystem impact of large dams had met with limited success.

The Report argues that by negotiating outcomes through multi-criteria analysis -- technical, environmental, economic, social and financial -- the development effectiveness of water and energy projects will be improved, unfavourable projects will be eliminated at an early stage, and the options chosen will be what key stakeholders agree best meets the needs in question. In order to achieve this new framework for decision-making, the Commission provides specific recommendations and responsibilities for key stakeholders in the debate. These reflect lessons learnt and offer guidance as to how a consensus on optimal use of water and energy resources can be achieved. One such guiding parameter is environmental flow requirements to sustain aquatic ecosystems.

Table 5.6 **Forests under the Commission on Sustainable Development**

Intergovernmental Panel on Forests

At the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992, forests were among the most controversial issues being considered. The prevailing North-South polarization concerning forests did not permit agreements beyond the text of the "Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests," the so-called "Forest Principles," and Chapter 11 of Agenda 21 "Combating Deforestation." By contrast, the "Post-Rio" period 1992-1995 was one of confidence building and emerging North-South partnerships, enabling the United Nations Commission on Sustainable Development (CSD), at its third session in April 1995, to establish the Intergovernmental Panel on Forests (IPF), to continue the intergovernmental forest policy dialogue.

The mandate of the IPF was for a two-year period (1995-1997) and with a programme of work involving several complex and politically sensitive issues grouped into the following five categories:

1. Implementation of forest-related decisions of the United Nations Conference on Environment and Development at the national and international levels, including an examination of sectoral and cross-sectoral linkages;
2. International cooperation in financial assistance and technology transfer;
3. Scientific research, forest assessment and the development of criteria and indicators for sustainable forest management;
4. Trade and environment in relation to forest products and services;
5. International organizations and multilateral institutions and instruments, including appropriate legal mechanisms.

The informal, high level Interagency Task Force on Forests (ITFF)

Following the establishment of the IPF in April 1995, an informal, high level Interagency Task Force on Forests (ITFF) was set up in Geneva in July 1995 to coordinate the inputs of international organizations to the forest policy process. The ITFF members include the following organizations: Centre for International Forestry Research (CIFOR); Food and Agriculture Organization of the United Nations (FAO); International Tropical Timber Organization (ITTO); Secretariat of the Convention on Biological Diversity (CBD); United Nations Department for Social and Economic Affairs (UN/DESA); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); and the World Bank.

The legacy of the IPF: Over a hundred proposals for action

The two years of intensive work of the IPF resulted in over one hundred negotiated proposals for action on a number of issues related to sustainable forest management (SFM) including national forest programmes, forest assessment, criteria and indicators, traditional forest-related knowledge, underlying causes of deforestation, etc. Matters requiring further consideration – either because consensus could not be reached or because further analysis was required – included issues related to finance and transfer of technology, trade and environment, and institutions and legal instruments.

Endorsement of the Proposals for Action of the IPF

The intergovernmental policy dialogue on forests and the proposals for action of the IPF have stimulated a number of initiatives and activities around the world. These initiatives have been further encouraged by a number of references to the outcome of the IPF and endorsement of the Panel's proposals for action by major international and intergovernmental fora.

The establishment of the IFF as the successor to the IPF

The outcome of the Panel was endorsed by the fifth session of the CSD in April 1997 and by the 19th Special Session of the UN General Assembly (UNGASS) in June 1997. However, in view of the remaining outstanding issues, UNGASS recommended a continuation of the intergovernmental policy dialogue on forests. In July 1997 ECOSOC decided to establish the *ad hoc* open ended Intergovernmental Forum on Forests under the CSD with a mandate to:

1. Promote and facilitate the implementation of the proposals for action of the Intergovernmental Panel on Forests (IPF) and review, monitor and report on progress in the management, conservation and sustainable development of all types of forest;
2. Consider matters left pending and other issues arising from the programme elements of the IPF process;
3. Consider international arrangements and mechanisms to promote the management, conservation and sustainable development of all types of forests.

The Intergovernmental Forum on Forests met four times between October 1997 and February 2000 and recommended that ECOSOC establish an international arrangement on forests. In October 2000 ECOSOC established the United Nations Forum on Forests (UNFF) to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end. The UNFF would promote the implementation of internationally agreed action on forests, at the national, regional and global levels, to provide a coherent, transparent and participatory global framework for policy implementation, coordination and development, and to carry out functions, based on the Rio Declaration, the Forest Principles, Agenda 21 and the outcomes of the IPF and the IFF, in a manner consistent with and complementary to existing international legally binding instruments relevant to forests. ECOSOC also invited UN and other relevant international and regional organizations to form a collaborative partnership on forests (CPF) to support the UNFF and recommended that this build on a high-level, informal group such as the Interagency Task Force on Forests.

The United Nations Forum on Forests

At its first session (June 2001), the UNFF approved its multi-year programme of work:

- Second session (March 2002) it will consider: Combating deforestation and forest degradation; forest conservation and protection of unique types of forests and fragile ecosystems; rehabilitation and conservation strategies for countries with low forest cover; rehabilitation and restoration of degraded lands; promotion of natural and planted forests; concepts, terminology and definitions;
- Third session: Economic aspects of forests; forest health and productivity; maintaining forest cover to meet present and future needs;
- Fourth session: Traditional forest-related knowledge; forest-related scientific knowledge; social and cultural aspects of forests; monitoring, assessment and reporting, concepts and terminology and definitions; criteria and indicators of sustainable forest management;
- Fifth meeting: Review of progress and consideration of future actions; the parameters of a mandate for developing a legal framework on all types of forests; the effectiveness of international arrangements on forests.

The Collaborative Partnership on Forests

The Collaborative Partnership on Forests (CPF) was established in April 2001, following the recommendation of the Economic and Social Council of the United Nations (ECOSOC). It is based on the six-year

experience of the Interagency Task Force on Forests (ITFF) and initial membership of the CPF comprises the eight members of the ITFF (see above). The mission of the CPF is to support the work of the UNFF in the promotion of the management, conservation and sustainable development of all types of forests and in the strengthening of political commitment to this end. The secretariats of the GEF and the UNCCD have also joined the CPF.

Table 5.7 **The Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture**

The Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture was adopted at the International Technical Conference on Plant Genetic Resources in Leipzig, Germany in 1996. The Plan is meant as a contribution to the implementation of the Convention on Biological Diversity and a significant step toward global food security. The aims of the Global Plan are:

- To ensure the conservation of plant genetic resources for food and agriculture (PGRFA) as a basis for food security
- To promote sustainable utilisation of PGRFA
- To promote a fair and equitable sharing of benefits arising from the use of PGRFA, recognising the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of PGRFA and their sustainable use
- To assist countries and institutions responsible for conserving and using PGRFA to identify priorities for action
- To strengthen, in particular, national programmes, as well as regional and international programmes, including education and training, for the conservation and utilisation of PGRFA and to enhance institutional capacity.

OUTLOOK

Ireland

"The country is largely free from air pollution and the watercourses are generally of a satisfactory high quality."

The preceding chapters have provided an overview of the status and trends of global biodiversity. They have outlined how the Convention on Biological Diversity was designed by the international community to provide the framework for reversing biodiversity loss and for ensuring that biodiversity is used sustainably and that benefits are equitably shared. The experience of implementation so far, through both national action and global cooperation, has been described.

If there is a simple message to be heard from the experience of the first eight years it has two components – two sides of the same coin. First, the nature and scope of the measures needed for implementing the Convention, which are themselves a reflection of the nature and scope of the underlying causes of biodiversity loss, require making complex and integrated policy choices that call for coordination, political will and active leadership at the national level. Second, the Convention will only succeed if its importance is recognised in the wider context of economic development and global change, in particular by the international regimes on key issues such as trade, agriculture, and climate change. Unless these processes acknowledge the concerns of this Convention and its programmes for implementation, and actively take account of these in their own decision-making and measures for implementation, the Convention is unlikely to succeed. In this case biodiversity, with all the social benefits and ecological services that derive from it, will continue to be lost.

This chapter will note the urgent priority issues that need to be addressed at the national level, by those agencies and services that can support national action, and by the Convention itself. It will consider how the experience of implementing this Convention can contribute to an examination of the issues concerning international environmental governance that will occur in the broader context of multilateral efforts for sustainable development to be considered at the World Summit on Sustainable Development in 2002.

NATIONAL ACTION

As has been stressed throughout this report, the primary focus for implementation of the Convention is national action. The types of actions that Parties are currently undertaking have been outlined in chapter 4. The following are some of the most important priority areas for further action by countries. Above all, however, countries will need to combine implementation of the different measures called for under this Convention into truly integrated national biodiversity strategies and make these the centrepiece of national sustainable development strategies.

Investing in public education and awareness

Meeting the objectives of the Convention will require changes in behaviour at all levels of society, from the individual to the State. These will only be brought about by changes in attitude, which will require greatly increased investments in public education and awareness. An increased awareness of the importance of biological diversity will be necessary in order to generate the levels of public opinion favourable to the necessary policy and behavioural changes, which

in turn will reinforce pressure on decision-makers to demonstrate the political will to push through change at governmental and intergovernmental levels.

In developing the educational and public awareness programmes called for under the Convention, Parties will need to identify different target audiences, the specific educational and informational needs of these, and develop appropriately focused materials. All avenues need to be explored: formal education systems, mass media, informal education, and specialist training. The clearing-house mechanism should become an important tool for education and public awareness, particularly through the development of national biodiversity clearing-house mechanisms providing access to national biodiversity information in the national language(s).

Increasing stakeholder involvement in decision-making

The world's poor, particularly the rural poor, are those most immediately and severely affected by environmental degradation. They are also often expected to bear much of the cost of maintaining biodiversity, for example in the form of foregone benefits of land conversion when areas are set aside for the protection of unique or threatened ecosystems or species. Unless they are fully involved in decision-making, it is unlikely that long-term solutions to the problem of biodiversity loss can be found. In developing mechanisms to ensure such involvement, it is vital that issues of gender and social structure are properly addressed.

Although the Convention recognizes the vital role that women play in the conservation and sustainable use of biological diversity and affirms the need for the full participation of women at all levels of policy-making and implementation, the decisions of the Conference of the Parties contain no specific guidance on the question of the role of women in implementation, nor have Parties referred to this in their national reports.

The Conference of the Parties has emphasized the central role that full stakeholder participation will play in the successful implementation of the different work programmes of the Convention. Organizations representing the private sector, in particular those sectors that use biological resources or have an impact on biodiversity, need to be fully engaged in national efforts to implement the Convention. The development of national biodiversity strategies and action plans should take place with the full involvement of relevant stakeholders, and national reports on implementation should be prepared through consultative processes.

Completing and implementing national biodiversity strategies and action plans

Most developed country Parties have developed a national biodiversity strategy or adapted existing strategies. Of developing country Parties and Parties with economies in transition, it appears that about one third have completed their national biodiversity strategies and action plans, a similar number are in the process of doing so, and around forty have yet to start.

Completing and adopting national strategies is clearly a priority for all those countries that have not yet done so. For others, implementation of completed strategies and action plans is a high priority. Biodiversity strategies and action plans should be integral parts of national sustainable development strategies and, for those countries eligible for external assistance, they should be central to funding strategies and programming.

Strategies need to be regularly reviewed and updated on the basis of the experience gained in implementation. Regularly reviewing strategies will provide an opportunity to incorporate guidance given by the Conference of the Parties in the intervening period and, for those countries whose initial strategies were prepared within government agencies or in a top-down fashion, to ensure full participation by stakeholders in the revision.

Improving sectoral and cross-sectoral integration

As the Convention makes explicit, it will be impossible to meet its objectives until consideration of biodiversity is fully integrated into other sectors. While many countries have made some start in this, notably in those sectors most immediately associated with biodiversity such as forestry, fisheries and agriculture, much more needs to be done, particularly in areas that traditionally are economically and politically dominant such as industry, trade and transport.

Leadership will be called for in the resolution of conflicts over uses, while the adoption of economically and socially sound incentive measures, and the removal of perverse incentives, will help reduce such conflicts. Even in those sectors where a start has been made in incorporating consideration of biodiversity into decision-making, more cross-sectoral integration is needed, for example consideration of the impacts of forestry, agriculture or aquaculture on sustainable use of inland water biodiversity, of fishing on marine and coastal biodiversity, or of land-use change on forest or dryland biodiversity.

Strengthening protected area networks

As noted in chapter 3, the great majority of national reports submitted by Parties have emphasised the importance of protected areas in maintaining biodiversity. Most countries now have, on paper at least, protected area networks that hold a significant proportion of the country's biodiversity. However, each country will need to evaluate whether its protected area network is representative of the full range of its biological diversity. There are still major gaps in the protected area network in many parts of the world and filling these gaps is important.

In many countries, the effectiveness of protected area networks in maintaining biodiversity is often seriously compromised by a chronic shortage of human and financial resources. Remedying this is undoubtedly one of the most immediate priorities in many countries, and requires technical and financial cooperation. Where relevant, countries should collaborate for the establishment of transboundary protected areas, which can counter the trend toward fragmentation of areas rich in biodiversity and constitute efficient and effective means for its maintenance.

However protected areas should not be seen as biodiversity sanctuaries removed from the wider economic and social context. Within national biodiversity strategies, protected areas should form an integral part of coordinated measures for conservation and sustainable use of biodiversity, with attention given to socially and environmentally appropriate activities within protected areas and in buffer zones, to the establishment of biological corridors, and to eco-regional planning. Protected areas should be part of broader land-use planning systems that are based on the ecosystem approach, and that maintain and enhance landscape diversity.

Israel

"Israel is world renowned for its strategies for combating desertification in the arid Negev and for its reafforestation efforts."

Improving EIA legislation and procedures

Although many countries have enacted environmental impact assessment legislation, this frequently places relatively low emphasis on impacts on biodiversity and is often weakly enforced. Even where such laws are enforced, penalties for transgression are often very low and do not reflect the true environmental costs incurred. In such cases, a first step will be to strengthen such legislation, with increased emphasis on biodiversity and more stringent penalties.

Countries should address loss of biological diversity and the interrelated socio-economic, cultural and human health aspects relevant to biological diversity when carrying out environmental impact assessments. They should look beyond the impacts of individual projects and use strategic environmental assessments to assess their cumulative and global effects, including on biological diversity.

Strengthening the role of the national focal point

Given the extremely wide-ranging remit of the Convention, and the need for cross-sectoral integration outlined above, it is important that the national focal point for the Convention in each country is empowered to play an effective coordinating role. This includes not merely enhancing its ability to monitor those national activities that contribute to, or adversely affect, implementation, but also increasing its ability to promote more favourable outcomes. Many national focal points are located within the system of national government, but in some countries they are located outside government. Irrespective of location, a major responsibility of the national focal point is the exchange of information and the development of public awareness of biodiversity issues. The national focal point should act as an effective advocate for the implementation of a full and effective national biodiversity strategy.

Achieving policy coherence in national positions under different international instruments and processes

As stressed in chapter 5, there is a wide range of international processes, including binding treaties and agreements, which impact on the ability of the Convention to achieve its objectives. It is not uncommon for Governments to adopt divergent, or even contradictory, positions under these different processes. Clearly, this is a serious impediment to implementation of all the agreements concerned, including this Convention. Achieving coherence amongst those that directly address environmental issues, particularly aspects of biodiversity (e.g. this Convention, the Convention on Migratory Species, CITES, the Ramsar Convention and the World Heritage Convention), should be relatively straightforward and should principally entail an improvement in the efficacy of the coordinating role of the national focal point. Ensuring that trade and economic agreements are consistent with and do not conflict with the Convention is considerably more challenging. Decisions involving these agreements are usually made in different government sectors from those directly involved with implementation of the CBD, and often ones that carry more influence. Remedying this will involve improving cross-sectoral integration, as discussed above.

Increasing information, training and capacity development

In many countries there is a serious lack of resources with which to undertake implementation of the Convention. However, the recommended procedures for developing a national biodiversity strategy and action plan involve a process of stocktaking to identify what is known about the status and trends of biodiversity in the country, and what human and institutional resources already exist. In many cases countries may discover that more information and resources are available than was initially supposed. The problem may

be that information is dispersed, and institutions and individuals are not working in a coordinated way. The framework of the strategy process should be designed to use existing resources to maximum effect.

Development of the national clearing-house mechanism is a key element in ensuring that information is brought together and made accessible to those involved in implementation of the national strategy, in the national language(s). It will also act as the portal for accessing relevant information from other countries, and for making national information and lessons learned accessible to others. The number of countries who have established national biodiversity clearing-houses amounts to less than a third of Parties, and the number who have built up the information content in the way recommended by the Conference of the Parties is even smaller. This suggests that much remains to be done at the national level to create the functional global network for technical and scientific cooperation envisaged by the Convention.

As part of the development of their biodiversity strategy, the problems and constraints encountered by countries need to be identified, and appropriate training and capacity development needs specified and included in the action plans. If countries eligible for external assistance make the biodiversity strategy and action plan the centrepiece of their discussions with donors, it will then be easier to ensure that measures to address such identified needs are clearly seen as priority activities in a country-driven process.

Effective national reporting

Revised formats for national reporting have been developed, aimed at eliciting comprehensive information about the experiences of implementation by Parties of all aspects of the Convention. Without reliable and comparable information, it is not possible to assess the state of implementation or to identify constraints, lessons learned or emerging issues. The responsibility rests with Parties to provide the Conference of the Parties with the information needed in the agreed format and by the agreed deadline.

It is recognised that reporting can represent a burden, especially when information on similar matters is required under more than one international agreement. The reporting process under the Convention has been revised with a view to ameliorating this problem. Work is also under way on pilot projects, involving convention secretariats and volunteer countries, to test methodologies for harmonised reporting to different environmental agreements.

The preparation of reports should not been seen by Parties simply as an external obligation. Many countries have reported that the process of reporting provides an important management tool, allowing those responsible for implementation to take stock of progress and set future targets.

National level indicators of biodiversity

Effective implementation of the Convention is currently seriously hampered both by a lack of coherent information on the effectiveness of measures already undertaken and by the difficulty in presenting information on the state of biodiversity in a form understandable and relevant to policy-makers. The Parties have recognised this in their calls for the development of a core set of indicators of biodiversity and in the efforts they have made to develop credible and feasible biodiversity indicators. Complex scientific and political questions come into play, but momentum needs to be maintained in this key area.

Universal membership

The Convention has 180 Contracting Parties, making it one of the most inclusive multilateral agreements in any field. However membership is not universal. There is a small number of countries that have not yet ratified the Convention. Achieving the objectives of the Convention requires action on a global scale, and it is important that all countries make the commitment to work together for its implementation. Where ratification is being blocked by domestic pressures, those responsible for biodiversity management in the country can continue to press the case for ratification by explaining the nature of the goods and services biodiversity provides, why it is important to halt the loss of biodiversity, and why only coordinated global action can do this.

The Conference of the Parties has urged Parties to take all necessary measures to ratify the Cartagena Protocol on Biosafety so that it comes into force at the earliest possible opportunity and that universal membership is achieved as soon as possible thereafter.

SUPPORT FOR NATIONAL ACTION

The provisions of the Convention probably comprise the broadest range of issues of any international agreement. These are addressed in a holistic way. Many of the issues are complex and unfamiliar to the institutions who will need to be involved in the implementation of the Convention. All Parties, to a greater or lesser degree, are grappling with the challenges the Convention poses. However, the challenges faced by many developing countries are exacerbated by inadequate technical and financial resources. National action needs to be supported through policy guidance, financial assistance and cooperation for the development of national capacity.

Improving scientific assessment procedures

A considerable amount of information on the status of biodiversity exists within the global scientific community. However, it is often scattered, relatively inaccessible and in a form that is not necessarily easy to understand or synthesise. Drawing this information together to produce coherent assessments of biodiversity has proved problematic and the clearing-house mechanism has a key role to play. The Conference of the Parties, when reviewing the role of the Subsidiary Body for Scientific, Technical and Technological Advice, noted that the quality of assessment presented to it needed, in general, to be improved.

Recent efforts to ensure greater involvement of the international scientific community in the work of SBSTTA have led to improved recommendations going forward to the Conference of the Parties. Such efforts should be continued in order to ensure that policy development under the Convention counts on the full range of global scientific expertise. Given that biodiversity loss is overwhelmingly the result of human activity, and that changes in social, economic and political sectors will be required to meet the objectives of the Convention, such scientific expertise should not be thought of as residing solely in the fields of biological or environmental sciences. The identification and implementation of workable strategies and programmes for addressing the underlying causes of biodiversity loss and generating changes in social behaviour is, above all, a multi-disciplinary endeavour requiring the participation of all fields, including the social sciences.

The absence of reliable assessments hampers both individual Parties and the Conference of the Parties itself in setting priorities for action. Remedying this requires the development of standardised, widely applicable methodologies and, more importantly, adequate

Norway

"The proportion of wilderness-like areas has decreased from 48% of Norway's total area in 1900 to 12% in 1994. In Southern Norway such areas account for only 5% of the total, and they have been disappearing considerably faster during the last 15 years."

investment in the process: the production of reliable assessments at anything other than local level is time-consuming and costly. It is equally important that the assessments themselves are tailored to produce policy-relevant results, regarding for example, early warning of major problems, and are not merely abstract scientific exercises. To achieve this, a wide range of stakeholders should be involved in determining what questions such assessments should aim to answer.

It should also be stressed, however, that in many cases existing information is perfectly adequate to form the basis for the action required to help meet the Convention's objectives in, for example, implementing Articles 6 and 8 (the Conference of the Parties explicitly recognized this in early decisions). Rather, what is often missing is the political will, the resources, or both, to undertake such action.

Reform of multilateral and bilateral aid mechanisms

Donor institutions have made great strides in recognising the importance of incorporating environmental considerations into their plans, programmes and strategies. Nevertheless much more remains to be done, in particular with regard to mainstreaming biodiversity and treating it as an integrating factor, and not a subject to be treated separately from other development concerns and (usually) accorded low priority. Donor countries could ensure, for example through the Development Assistance Committee of the Organization for Economic Cooperation and Development, that their development assistance priorities are supportive of the Convention's objectives. Regional development banks could take a much more proactive role in the mainstreaming of biodiversity. The World Bank's Comprehensive Development Framework and Poverty Reduction Strategies offer the possibility for ensuring that the National Biodiversity Strategies and Action Plans and National Strategies for Sustainable Development of its borrowers become central to its overall lending. IMF stabilization and structural adjustment programmes should avoid treating national investments in environmental management as a first, soft option for budget cuts.

Donors of all types should commit to increasing funding for projects that directly address biodiversity. However, there is also a pressing need for donors to review the way in which such projects are funded. Most problems relating to the maintenance and sustainable use of biodiversity are not amenable to the "quick fix," and it is often clearly unrealistic to expect local sustainability of activities at the end of a three- or five-year project. Although there is increasing awareness of this in the international community, many donors still appear to be wedded to short-term project cycles. The long-term impact of this approach may be actively counterproductive and it is probable that longer-term commitments involving smaller annual disbursement may be more effective than spending larger amounts of money over a shorter period. Donors should also ensure that biodiversity planning processes are country-driven and not donor-driven, in order to increase their effectiveness and the prospects for sustainability at the end of the funding period.

The proposed strengthening of the role of UN resident coordinators, contained in the Secretary-General's reform plan, will create the opportunity to provide harmonised and synergistic support by UN agencies to national implementation of the Convention through the country-level UN Development Assistance Framework. The current process of decentralisation from headquarters to regional centres offers UNDP the opportunity to ensure that regional and field office staff are familiar with the objectives and programmes of the Convention, and actively seek to identify with Governments opportunities for integrating these into its full range of development activities (from policy to operations) for simultaneous poverty reduction and environmental protection.

Peru

"Approximately 1% of good farmland has been lost to urban development projects. Barely 20% of agricultural terraces (andenes) are being used properly, the rest are deteriorated due to inappropriate farming practices. Up to 30% of the national territory has serious and moderate eroded areas."

OPERATIONS OF THE CONVENTION

Improving institutional mechanisms

It is vital that, in their efforts to implement the Convention, Parties are supported by a strong and flexible institutional structure. The institutions of the Convention must be able to respond to changing political circumstances and to the evolving scientific understanding of the subjects that the Convention deals with. Moreover, they must be able to bring together the scientific and the policy or political spheres in ways that allow science to inform policy in a persuasive and comprehensible way.

As noted, it is very important that the scientific and technical inputs to the Convention are of the highest possible standard and that the mechanisms for input should be as streamlined and efficient as possible. The changes in the operations of the Conference of the Parties and of the functioning of the Subsidiary Body on Scientific, Technical and Technological Advice recently introduced should be continuously monitored and assessed in this regard.

Of special importance is the decision by the Conference of the Parties to focus its decisions, to identify who is being called on to undertake each activity identified, and to follow-up on implementation.

The effectiveness of the financial mechanism is crucial to implementation of the Convention. The relationship between the Conference of the Parties and the Global Environment Facility has evolved since the entry into force of the Convention. The expectations that Parties have of the financial mechanism are high and the Conference of the Parties must provide clear guidance to the GEF, which in turn must ensure that this is translated into support for country-driven projects in a timely and strategic fashion. The Convention provides for the Conference of the Parties to review the effectiveness of the financial mechanism on a regular basis and to take appropriate action to improve effectiveness, if necessary.

The pilot phase of the clearing-house mechanism was evaluated and a strategic plan for implementation has been approved by the Conference of the Parties. Parties, international and scientific bodies, the Secretariat and the financial mechanism will need to work together in a strategic and coordinated way on implementing complex priority tasks identified in the strategic plan in order to accelerate the building of a truly decentralised, global and effective mechanism for technical and scientific cooperation.

Strategic planning

One of the greatest strengths of the Convention, but also one of the greatest challenges in its implementation, is the breadth of its provisions. Chapter 3 testifies to the range of subjects already addressed by the Conference of the Parties, and those to be addressed in the near future. There is a danger that, with such a wide – and ever-growing – agenda, focus is lost and energy becomes dissipated. There is a need to set priorities amongst competing, but often equally relevant, priorities. The process of priority setting needs to be participative and transparent.

The Conference of the Parties is developing a strategic plan for adoption at its sixth meeting in 2002. The strategic plan will cover the period 2002 to 2010.

Strategic planning is about making choices amongst limitless possibilities: what objectives to pursue, what outputs to attain? The choices need to be based on stated rationales that explain why specific priorities and activities have been chosen and others have not.

A crucial element of the strategic plan will therefore be the overall objectives and how to reach them. What is the Convention's vision for 2010 and what route(s) should be taken to implement and achieve this vision? What is to be achieved in ten years time, especially in relation to biodiversity and how will this be assessed?

The fundamental rationale for the plan should be to achieve the objectives of the Convention: namely, the conservation and sustainable use of biodiversity and the equitable sharing of its benefits. In other words, all elements of the plan should relate to achieving these objectives. Identifying priorities and activities to achieve these objectives requires reviewing the status of biodiversity, the institutional and political context in which the Convention operates and the effectiveness of the Convention to date.

The consensus is that the basic structure of the plan should comprise:

A mission statement. This should state an eternal truth, a goal that all stakeholders will be working toward at all times. It should be based on the objectives of the Convention as provided in Article 1;

A vision. This should be composed of three elements (one for each objective of the Convention) that represent a visionary but realistic level of achievement by 2010;

Operational goals. A series of operational goals should be developed for each element of the vision;

Action plans to achieve the operational goals. Each operational goal should contain a number of action plans, which are activities undertaken to achieve the relevant operational goal. These plans will contain the expected products. The action plans should not simply be "programmes of work" analogous to existing CBD thematic and cross-cutting programmes of work. In order to add value to the existing initiatives it is important that they contain outcome-orientated targets (these differ from the "output" targets or "process" targets used so far under the Convention); and

Monitoring, reporting, assessment and review, and communication. The plan needs to provide a process for ensuring implementation and this will be structured around the above basic elements.

On the basis of the advice received from the Meeting on the Strategic Plan (November 2001), the Conference of the Parties is expected to adopt a strategic plan for the Convention at its sixth meeting in April 2002.

Measuring and improving compliance

One of the most controversial and sensitive issues in the Convention is that of compliance. Critics have argued that, given its country-driven nature, the highly qualified nature of many of its substantive provisions, and the absence of any standardised measures, targets or lists, it is difficult to see how implementation can ever be measured, still less enforced. Even if measurable standards are set, it is not clear what action might be politically feasible to be taken under the Convention if these are not reached. The Conference of the Parties has emphasised, for example in its guidelines for national reports, that information provided by Parties will not be used to rank performance or to otherwise compare implementation between individual contracting Parties. However, without such measurable standards, the long-term credibility of the Convention as an instrument of genuine change may well be at stake. This problem is all the more complex as implementation of this Convention implies making politically difficult changes in many important sectors.

A way forward may lie in the development of further protocols, regulatory instruments or guidelines under the Convention. The adoption of the Biosafety Protocol marks an extremely important step forward. As outlined in chapter 3, the Protocol has a clear, and monitorable, *modus operandi*, although its efficacy has yet to be tested in action.

COOPERATION AND GOVERNANCE

As described in chapter 2, the Convention on Biological Diversity grew out of the coalescing preoccupations emerging in the 1970s and 1980s concerning persistent poverty, increasing inequality and growing environmental degradation at the global scale. In the case of preoccupations about what would later come to be called "biodiversity," the global community adopted a number of species-based or thematic agreements. A growing number of regional instruments were also devised. The sum of these preoccupations and instruments on biodiversity formed a component of what would later come to be called the "sustainable development" agenda. By the early 1990s these strands had come together in the preparations for the Earth Summit.

The products of the Earth Summit included a programme of action for sustainable development (Agenda 21), a declaration on environment and development, two major new international legal instruments (the Convention on Biological Diversity and the Framework Convention on Climate Change), a statement of forest principles, and the commitment to develop a third legal instrument (the Convention to Combat Desertification). Following the Earth Summit, a series of other summit meetings took place, addressing global issues that intersect in crucial ways with the global sustainable development agenda agreed in Rio de Janeiro. These included small island developing states, migratory fish stocks, human rights, population and development, human settlements, women, and social development. The programmes of action and commitments emerging from these are highly relevant for sustainable development, and to the objectives of the Convention on Biological Diversity. More recently new global regimes on chemical management and on biotechnology and biosafety have emerged, the latter notably through the adoption of the first protocol under the Convention on Biological Diversity.

However over the same decade the world has changed in ways and at a rate that were not anticipated when the Convention was being negotiated. Political change, economic liberalisation, and extremely high levels of technological innovation have brought about many changes, including a process of globalisation that has taken many countries by surprise, has not brought comparable benefits to all, and has highlighted emerging areas of concern. Central to this process, that was developing in parallel to the raft of global sustainable development instruments and institutions just described, was, of course, a new global trade regime that came into force in 1994. This is composed of agreements that intersect with the sustainable development agreements negotiated contemporaneously, and establishes a single powerful institution to oversee rule making, negotiation and the settlement of disputes.

As the Convention reflects on the experience and achievements of its first eight years of operations, and prepares to contribute to the World Summit on Sustainable Development that in 2002 will examine progress achieved since Rio, it needs to consider whether current legal and institutional arrangements facilitate or impede achievement of its objectives, how its Parties can reconcile their development needs and aspirations with obligations under these regimes that may in crucial areas appear to conflict, and how they can identify the necessary resources and arrangements to ensure that policies to promote economic growth, to ensure that development is sustainable and to take advantage of opportunities offered by globalisation are coordinated and coherent.

United Kingdom

"Loss of 5% of hedgerows each year is threatening the biodiversity of lowland agricultural ecosystems."

Over the recent period countries have tried to identify the best arrangements for environmental protection and natural resource management at the national level. Many started with agencies responsible for interministerial coordination for environmental issues, but found that these did not resolve existing environmental problems or prevent the emergence of new problems. This experience led in many cases to the establishment of environment ministries. These may have executive authority and budgets for some areas of the sustainable development agenda, but dispersion of responsibility for important "environmental" issues is still the norm. Other agencies, typically those dealing with national planning, agriculture, forests and trade, are usually more powerful than the environment ministry.

Some have identified the same paradigm in global environmental governance arrangements. Interagency coordination has not been sufficient, it is argued, to reverse the rate of environmental degradation.

Whatever the arguments for or against a global environment organization, it is clear from the point of view of the Convention and its Parties that there are improvements that can be made and synergies that can be captured.

The process for investigating possibilities for harmonised reporting under biodiversity-related conventions has been described. There may be further ways in which coordination can be achieved. Joint work programmes are under way in some areas, joint strategic planning and harmonisation of work programmes by conferences of parties can be envisaged. Resources saved through increased coordination of meetings and secretariat services could in turn be devoted to more coordinated implementation of these conventions.

What is needed, above all, is for other international regimes to take on board the concerns of this Convention. As was described above, the experience has been mixed. On some issues there have been encouraging advances, albeit slower than desired. In others no headway has been made.

For example, despite slow progress there are encouraging signs that the revision of the International Undertaking on Plant Genetic Resources in harmony with the Convention will be completed and the revised Undertaking will have strong links with both the Convention and FAO. Similarly, examination by Parties of the linkages between this Convention and the Framework Convention on Climate Change, and how implementation of one affects the other, is now getting under way. The Conference of the Parties has requested SBSTTA to prepare scientific advice on the integration of biodiversity considerations into the implementation of the Framework Convention on Climate Change and its Kyoto Protocol.

Collaboration between the Convention and the International Plant Protection Convention on alien invasive species has also started. At its next meeting the Conference of the Parties will consider options for further developing the guiding principles referred to in chapter 3, developing an international instrument, or other options.

However, although the Executive Secretary has repeatedly conveyed the wish of the Conference of the Parties to explore with the World Trade Organization the interrelationship between relevant provisions of the Convention and those of the Agreements on Trade-Related Aspects of Intellectual Property Rights and on Agriculture, neither of the Councils of these Agreements have yet been able to consider this, nor been able to grant the Executive Secretary the observer status requested by the Conference of the Parties.

The Convention has also faced difficulties in conveying the message of the economic importance of biodiversity. Although a dialogue with relevant private sector organizations is emerging in the areas of biosafety and access to genetic resources, it is fair to say that the Convention has yet to identify mechanisms for engaging the private sector at the national and global levels in the implementation of the Convention.

The World Summit on Sustainable Development

The General Assembly of the United Nations has noted with concern that, despite the many successful and continuing efforts since the Stockholm Conference in 1972 and the fact that some progress has been achieved, the environment and natural resource base that support life on Earth continue to deteriorate at an alarming rate.

The World Summit on Sustainable Development, to be held in Johannesburg in 2002, will bring the issues of sustainable development back onto the political agenda at the highest levels and, it is hoped, reinvigorate the global commitment to sustainable development.

Chapter 1 above has shown that the condition of biodiversity in the world's major ecosystems continues to deteriorate, almost without exception and often at an accelerating rate. Biological diversity provides the goods and services that make life on Earth possible and satisfy the needs of human societies. The variability it represents constitutes a global life insurance policy.

This report represents an account of what has been achieved since the Convention was opened for signature in Rio during the United Nations Conference on Environment and Development. It points to some of the critical issues that have to be addressed if the Convention is to succeed in meeting its objectives.

Key amongst these is the need to integrate the economic, social and environmental objectives of sustainable development, to promote greater policy coherence and coordination between the various processes, and to renew the commitment to make available the financial resources and the technical and scientific cooperation that are needed if progress is to be made. These are concerns that will be addressed in Johannesburg in 2002.

The conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources are keys to achieving sustainable human development in the 21st century. Implementing the objectives of the Convention over the coming decade will require policy coherence between all relevant instruments and processes, renewed political will on the part of Governments, and a renewed commitment to cooperation and to providing the resources and technology required.

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FOREWORD

The Convention on Biological Diversity was adopted in 1992, as a result of a growing recognition that isolated actions targeting individual species or ecosystems were insufficient to stem the increasing loss of the natural resource base that underpins all human societies and whose maintenance is essential for sustainable development. The Convention was – and still is – an ambitious undertaking. Its scope is broad, and its commitments so general that much work has been needed by the Conference of the Parties to translate them into practical actions. The Convention is, however, clear on one thing: that, if the impending catastrophe of biodiversity loss is to be averted, action is needed at the national and international levels and that this action must be facilitated through cooperation among all countries and, in particular, the transfer of the necessary financial and technological resources from North to South to enable developing countries – the countries that are home to the majority of the world's natural wealth – to meet their commitments.

Since the adoption of the Convention, assessments of biological diversity produced by a number of international agencies and an improved understanding of biological processes have confirmed that biodiversity loss is occurring at unprecedented rates. To address this crisis, the Conference of the Parties to the Convention has over the years adopted more than one hundred decisions and launched several programmes of work; some one billion dollars have been channelled to biodiversity-related projects through the financial mechanism under the Convention; and cooperative programmes have been established with a number of other environmental conventions and processes.

Now, nine years on, the Convention has some 180 Parties and its coverage is virtually universal. With the institutional structures under the Convention now mature and the programmes of work in place, it is time to take stock of progress achieved and to identify barriers and priorities for implementation. *The Global Biodiversity Outlook*, which I am proud to introduce here, responds to this need. It is the first comprehensive attempt to date to assess the status of biodiversity and the state of implementation of the Convention at the national, regional and international levels. It is the first in a series intended to assist policy makers and other stakeholders to measure progress and help chart the way forward toward meeting the lofty aspirations placed by the international community in the Convention on Biological Diversity.

The *Global Biodiversity Outlook* is the result of an ambitious collective effort that points at some of the critical issues that must be addressed if the Convention is to succeed in meeting its three objectives, namely, the conservation of biological diversity, the sustainable use of its components, and the equitable sharing of benefits arising out of the use of genetic resources. I hope that it will serve as an important tool in evaluating options for the future action needed to stave off one of the most serious – if poorly understood and underestimated – environmental threats of our era.

It is therefore with a deep debt of gratitude to all those individuals and organizations involved in its preparation that I commend this first *Global Biodiversity Outlook* to everyone with an interest in the future of the Convention on Biological Diversity as a key instrument in the quest for sustainable development.

Hamdallah Zedan
Executive Secretary
Convention on Biological Diversity

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“The need to map and conserve the remainder of the world’s biodiversity is one of the most urgent issues of this century. This great resource is disappearing fast. It cannot be recovered, and its loss will affect humanity for all time. On the other hand, if saved and wisely used, biodiversity offers us environmental stability and a cornucopia of material and spiritual benefits. On these key points scientists are agreed, as expressed in the Global Biodiversity Outlook, and I hope our political leaders will at long last pay attention.”

E.O. Wilson
Harvard University

Global Biodiversity Outlook

- Status and Trends of Global Biodiversity
- The Convention on Biological Diversity
- The Operations of the Convention
- Review of Implementation of the Convention at the National Level
- Global Implementation of the Convention and Cooperation with other Conventions and Processes
- Outlook

Secretariat of the
Convention on Biological Diversity

CBD

UNEP

Message from the Executive Director of the United Nations Environment Programme

I am delighted to introduce the *Global Biodiversity Outlook*, the first in a series of periodic reports on biodiversity to be produced under the Convention on Biological Diversity.

Biological diversity underpins life on our blue planet; without it humanity could not survive. The triple objectives of the Convention on Biological Diversity – to conserve biodiversity, to use the components of biodiversity in a sustainable way, and to share the benefits arising from the use of genetic resources in a fair and equitable way – represent key challenges for our times. It is the most complex and wide-ranging environmental treaty in existence.

Governments of all countries need to take urgent action to implement the provisions of the Convention, for the only way global environmental problems can be addressed is through collective action on the part of the global community. This means not just Governments, but all the sectors of society that are stakeholders in biodiversity – and this therefore means everyone, since we are all, collectively and individually, stakeholders.

The encouraging news is that 180 countries and one regional economic integration organization have committed themselves to working together to implement the provisions of the agreement. The framework is in place and important steps have been taken. This report gives an overview of the status of biodiversity and what the Convention on Biological Diversity has achieved in the eight years it has been in force.

Despite these collective efforts, however, the status of biodiversity globally continues to decline. Efforts to conserve and use it sustainably must be redoubled. Greater levels of scientific assessment are needed. The resources needed by countries in order to implement the Convention must be made available – both at the national level, by Governments recognising the urgency of addressing biodiversity issues, and internationally, through technical and scientific cooperation, and the provision of financial resources and capacity development to those countries that need them.

The World Summit on Sustainable Development, to be held in South Africa in 2002, is the opportunity for world leaders to renew their commitment to sustainable development. Implementing the objectives of the Convention over the coming decade will require policy coherence between all relevant instruments and processes, renewed political will on the part of Governments, and a renewed commitment to cooperation and to providing the resources and technology required.

I hope that the publication of the *Global Biodiversity Outlook* will help to focus the attention of the Summit on the key role the objectives of the Convention play in achieving sustainable development. I hope it will stimulate renewed political will and a renewed commitment to providing the necessary resources to address the global environmental problems of our times. It is a moment for vision and courage.

Klaus Töpfer
Executive Director
United Nation Environment Programme