

The Regional Organization for the
Conservation of the Environment of
the Red Sea and Gulf of Aden
(PERSGA)

*Status of the Living Marine
Resources in the Red Sea and Gulf
of Aden and Their Management*

Strategic Action Programme
for the
Red Sea and Gulf of Aden

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PERSGA - 'The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden' is an intergovernmental authority dedicated to the conservation of the coastal and marine environments in the region.

The Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (Jeddah Convention) 1982, provides the legal foundation for PERSGA. The Secretariat of the Organization was formally established in Jeddah following the Cairo Declaration of September 1995. The PERSGA member states are Djibouti, Egypt, Jordan, Saudi Arabia, Somalia, Sudan, and Yemen.

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ANNEX A: MAIN TARGET SPECIES IN THE RED SEA AND GULF OF ADEN

A. Invertebrate species

English name	Species or family name
Cuttlefish	<i>Sepia pharaonis</i>
Deep-sea lobster	<i>Puerulus sewelli</i>
Deep-sea shrimp	<i>Parapenaeopsis</i> spp.
Pearl oyster	<i>Pinctada margaritifera</i>
Rock lobster	<i>Panulirus homarus</i> , <i>P. versicolor</i>
Trochus	<i>Tectus dentatus</i> , <i>Trochus virgatus</i>
Shrimps	<i>Penaeus latisulcatus</i> , <i>P. japonicus</i> , <i>P. semisulcatus</i> , <i>P. monodon</i> , <i>Metapenaeus</i> spp.
Sea cucumber	<i>Holothuria scabra</i> and <i>Actinopyga</i> sp.

B. Fin-fish species

English name	Species or family name
Anchovy	<i>Stolephorus</i> sp.
Barracuda	<i>Sphyraena jello</i> , <i>S. barracuda</i>
Black marlin	<i>Makaira indica</i>
Blue marlin	<i>Makaira mazara</i>
Striped marlin	<i>Tetrapturus audax</i>
Black spot shark	<i>Carcharhinus sealei</i>
Blacktip reef shark	<i>Carcharhinus melanopterus</i>
Blacktip shark	<i>Carcharhinus limbatus</i>
Bluefin tuna or kawakawa	<i>Euthynnus affinis</i>
Breams	All species of family Sparidae
Catfish	<i>Arius thalassinus</i>
Cobia	<i>Rachycentron canadum</i>
Croaker	Scianidae
Dolphin fish	<i>Coryphaena hippurus</i>
Emperor	All species of family Lethrinidae; especially <i>Lethrinus nebulosus</i> , <i>L. mahsena</i> , <i>L. lentjan</i>
Frigate mackerel	<i>Auxis thazard</i>
Goat fishes	Family Mullidae
Gold-spot herring	<i>Herklotsichthys punctatus</i>
Grouper	All species of family Serranidae; especially <i>Epinephelus chlorostigma</i> , <i>E. summana</i> , <i>E. areolatus</i> , <i>E. tauvina</i> , <i>Plectropomus maculatus</i> , <i>P. areolatus</i> , <i>P. pessulifera</i> , <i>Variola louti</i>
Grunt	<i>Pomadasyss</i> spp.
Guitarfish	Rhinobatidae
Halfbeak	<i>Hemirhamphus</i> spp.

Hammerhead Shark	<i>Sphyrna zygaena</i>
Horse mackerel	<i>Trachurus indicus, Decapterus marudsi</i>
Indian mackerel	<i>Rastrelliger kanagurta</i>
Jacks, trevallies	All species of family Carangidae
Kingfish (Spanish mackerel)	<i>Scomberomorus commersoni</i>
Little tuna	<i>Euthynnus affinis</i>
Lizardfish	<i>Saurida undosquamis</i>
Longspine bream	<i>Argyrops spinifer, Evynnis cardinalis, Sparus majir</i>
Longtail tuna	<i>Thunnus tonggol</i>
Mojarras	Family Gerridae
Mullet	<i>Mugil robustus; M. cephalus, M. capito, Valamugil seheli</i>
Needlefish or “longtoms”	All species of the family Belonidae
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>
Pacific mackerel	<i>Scomber japonicus</i>
Parrotfish	All fishes of family Scaridae; <i>Scarus ghobban, S. hareed</i>
Pomfret	<i>Pampus argenteus</i>
Pristis Pectinata	Sawshark
Queenfish	<i>Corinemus</i> spp.
Rabbit fish	All species of the family Siganidae; e.g. <i>Siganus oramin, S. rivulatus</i>
Red mullet	<i>Upeneus asymmetricus, U. tiagula, U. vittatus</i>
Ribbonfish	<i>Trichiurus</i> sp.
Round herring	<i>Etrumeus teres</i>
Sailfish	<i>Istiophorus gladius</i>
Sand bar shark	<i>Carcharhinus plumbeus</i>
Sailfish	<i>Istiophorus platypterus</i>
Sardines	<i>Sardinella longiceps, Sardinella sirm, Sardinella gibbosa</i>
Scalloped hammerhead shark	<i>Sphyrna lewini</i>
Scavenger / emperor	<i>Lethrinus</i> spp.
Shortfin mako shark	<i>Isurus oxyrinchus</i>
Silvertip shark	<i>Carcharhinus albimarginatus</i>
Skipjack tuna	<i>Katsuwonus pelamis</i>
Snapper	All species of family Lutjanidae; e.g. <i>Lutjanus bohar, Aprion virescens, Pristipomoides</i> spp.
Threadfin bream	<i>Nemipterus japonicus</i>
Tiger shark	<i>Galeocerdo cuvier</i>
Unicorn fish	<i>Naso unicornis</i>
Whitetip	<i>Triaenodon obesus</i>
Wolf herring	<i>Chirocentrus</i> sp.
Yellowfin tuna	<i>Thunnus albacares</i>

ANNEX B: ARTISANAL FISHERIES PROFILE, RED SEA AND GULF OF ADEN

Artisanal Fisheries: Red Sea

	No. fishermen	Houris	Sambuqs	Total vessels	Principal gear	Reference year (Source)
Jordan	230			100	HL, LL, TP, GN, SP	1999 (Khalaf, 2000)
Egypt	9,024	n.a.	n.a.	820	HL, LL	1997 (PERSGA, 1997)
Saudi Arabia	4,100			5,428	HL, GN	1997 (MAW, 1998)
Sudan	209	125	226	460	HL, ST,	1997 (PERSGA, 1997)
Eritrea	n.a.	n.a.	n.a.	n.a.		
Yemen	16,000	1,610	620	2,230	SN, GN, TR, HL	1997 (PERSGA, 1997)
<i>sub-total Red Sea</i>	29,563	1,735	846	9,038		
<u>Artisanal Fisheries: Gulf of Aden</u>						
Djibouti	270	90	-	90	HL, GN, CN	1996 (PERSGA, 1997c)
Yemen	19,700	n.a.	n.a.	5,800	SN, GN, TR, HL	1997 (MEP, 1999)
Somalia	8,000	1,050	420-	522	Sh.N, HL, GN, LL, TP, BS	2000 (Ministry of Fisheries, Ports and Marine Transport 2000; Ministry of Fisheries and Coastal Development, 2000)
<i>sub-total Gulf of Aden</i>	27,970	1,140	420	6,412		
<i>PERSGA Region and Eritrea total</i>	57,533	2,875	1,266	15,450		

Notes: 'n.a.' – data not available. Gear codes: LL - longline; GN - gill nets; HL - hand line; BG - beach gleaners; TR - trawl; TN - trammel net; SN - small surround net; CN - Cast nets; Sh.N - shark tangle; nets; TP- traps; BS - Beach seine; ST - set nets; SP - spears.

ANNEX C: INDUSTRIAL FISHERIES PROFILE, RED SEA AND GULF OF ADEN

Industrial fishing: Red Sea

	Estimated no. fishermen	No. vessels:						Reference year (source)
		Purse seine	Trawl	Longline	Handliners	not specified	total vessels	
Jordan	0	0	0	0	0	0	0	1999 (Khalaf, 2000)
Egypt	7,535	83	173	-	245	932	1,433	1995 (Barrania, 1997)
Saudi Arabia	35	n.a.	n.a.	n.a.	n.a.	n.a.	130	1997 (MAW, 1998)
Sudan	<100	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1997 (PERSGA, 1997)
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Yemen	n.a.	n.a.	78	n.a.	n.a.	n.a.	78	1997 (PERSGA, 1997)
<i>sub-total Red Sea</i>	7,570	83	251	-	245	932	1,641	
<u>Industrial fishing: Gulf of Aden</u>								
Djibouti	0	0	0	0	0	0	0	1996 (PERSGA, 1996)
Yemen	350	n.a.	n.a.	n.a.	n.a.	n.a.	65	1997 (PERSGA, 1997)
Somalia	<100	0	0	0	0	0	0	
<i>sub-total Gulf of Aden</i>	450	4	20	-	-	-	65	
<i>PERSGA Region and Eritrea total</i>	7,908	87	271	-	245	932	1,706	

Notes: 'n.a.' – data not available.

A. Invertebrate species (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Yemen	Cuttlefish, bobtail squids	2,169	2,170	3,352	2,122	695	906	306	1,313	1,884	8,657	8,440
	Natantian decapods	86	90	94	104	101	108	.	.	.	.	.
	Penaeus shrimps	273	219	152	183	89	358	722	981	665	601	590
	Sea cucumbers	29	30	63	140	48	65	63	60	60	60	60
	Tropical spiny lobsters	969	970	1,704	1,500	839	1,021	475	390	345	482	470
Somalia	Cephalopods	727	346	352	650	500	550	600	570	550	500	550
	Tropical spiny lobsters	500	550	543	550	500	450	400	380	400	400	400
TOTAL		10,609	10,636	10,543	8,391	6,735	7,329	9,449	22,402	14,085	20,767	22,609

B. Fin-fishes, by major groupings (Source: FAO Statistics, 2000)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Jordan (Red Sea)	Emperors (=Scavengers)	.	.	.	.	.	.	.	.	.	.	2
	Fusiliers	.	.	.	.	.	.	.	.	.	.	15
	Marine fishes	2	2	2	20	30	45	60	75	90	100	3
	Scads	.	.	.	.	.	.	.	.	.	.	20
	Spinefeet (=Rabbitfishes)	.	.	.	.	.	.	.	.	.	.	10
	Tunas	.	.	.	.	.	.	.	.	.	.	70
Egypt (Red Sea)	Barracudas	.	.	.	.	.	.	.	12	3	1	.
	Chub mackerel	164	278	412	810	185	453	3,041	1,926	2,042	2,392	810
	Demersal percomorphs	99	12,194	7,131	16,101	5,562	5,600	12,092	.	.	.	.
	Emperors (=Scavengers)	.	.	.	.	.	.	.	429	425	574	577
	Groupers	18	99	78	-	58	334	247	387	647	689	722
	Indian mackerel	.	.	.	.	.	.	.	1,363	1,151	1,914	652
	Jacks, trevallies	2,927	2,545	5,849	6,919	4,841	14,361	11,823	.	.	.	.
	Lizardfishes	854	1,932	2,884	4,776	5,820	6,073	4,845	4,696	4,151	5,117	7,994
	Marine fishes	18,003	19,247	17,230	8,896	19,170	13,597	.	7,331	10,542	16,520	12,797
	Meagre	88	48	31	.	.	.	158	45	<0.5	<0.5	19
	Mulletts	28	.	10	.	.	.	.	31	67	59	352
	Narrow-barred Spanish mackerel	16	49	86	.	191	.	1,242	1,297	8,880	8,503	9,933
	Needlefishes	.	.	.	.	.	.	.	123	48	32	17
	Porgies, seabreams	12	50	86	.	.	.	.	4,012	2,428	2,175	1,282
	Sardinellas	5,415	6,198	4,307	2,860	1,613	3,763	2,973	2,822	6,833	5,639	4,973
	Sharks, rays, skates, etc.	18	69	9	61	29	30	69	137	122	180	135
	Snappers, jobfishes	.	.	.	.	.	.	4,875	5,053	4,044	5,165	8,784
	Spinefeet (=Rabbitfishes)	.	.	.	.	.	.	.	185	128	129	175
	Spotted seabass	.	.	.	.	.	.	.	101	2	35	36
	Striped bonito	.	.	.	.	.	.	.	131	318	755	841
Surmullets (=Red mullets)	276	146	996	583	668	689	777	1,077	716	744	439	

Table B. (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Saudi Arabia	Angelfishes	.	.	.	.	.	.	.	.	.	.	16
	Barracudas	1,917	1,960	1,843	1,801	1,913	1,990	2,249	1,065	1,251	1,246	1,352
	Blue sea chub	.	.	.	.	.	.	.	.	.	8	<0.5
	Carangids	4,954	5,379	4,182	4,251	4,444	4,920	5,730	4,547	5,524	5,125	5,173
	Clupeoids	.	186	416	333	346	369	391	259	201	560	2,329
	Cobia	23	58	35	33	52	48	71	124	155	155	100
	Demersal percomorphs	.	.	.	.	.	.	.	7	40	50	34
	Emperors (=Scavengers)	7,511	7,775	6,453	6,513	7,715	8,281	7,524	6,598	7,314	6,904	4,773
	Flatfishes	31	30	26	26	30	30	42	51	58	75	89
	Flatheads	.	.	.	.	.	.	.	.	.	.	121
	Goatfishes	10	10	9	9	10	10	52	65	83	73	228
	Groupers, seabasses	5,889	5,827	5,072	4,625	5,731	5,752	5,707	3,514	4,207	4,403	4,978
	Grunts, sweetlips	284	367	226	303	254	351	489	814	1,063	1,014	2,554
	Indian mackerel	899	1,727	1,579	1,579	1,658	1,741	3,240	3,069	1,549	1,990	2,078
	Indo-Pacific sailfish	.	.	.	.	.	.	.	.	.	.	3
	Lizardfishes	82	4	69	69	72	76	195	195	172	188	215
	Marine fishes	3,997	3,116	3,733	4,348	4,578	4,325	3,074	1,480	1,205	820	817
	Milkfish	.	.	.	.	.	.	10	137	130	70	83
	Mojarras (=Silver-biddies)	5	86	4	4	4	5	164	337	360	438	539
	Mulletts	.	202	22	143	145	112	29	400	320	369	527
	Needlefishes	.	.	.	.	.	.	461	324	96	111	393
	Pelagic percomorphs	.	.	.	.	.	.	.	.	.	.	.
	Percoids	190	210	153	166	183	242	176	837	777	906	469
	Porgies, seabreams	818	653	692	735	845	1,064	1,910	1,469	1,722	2,481	2,796
	Queenfishes	.	.	.	.	.	.	154	312	349	385	297
	Rainbow runner	.	.	.	.	.	.	.	.	.	415	98
	Rays, stingrays, mantas	.	.	.	.	.	.	.	.	.	.	4
	Sea catfishes	23	151	192	192	201	212	226	303	302	366	319
	Seerfishes	9,362	9,243	8,662	8,768	9,872	10,374	10,851	6,279	5,277	5,634	5,491

Table B. (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
S. Arabia	Sharks, rays, skates, etc.	642	696	38	38	40	42	125	467	398	543	1,527	
	Silver pomfret	.	.	.	.	.	.	5	41	31	16	60
	Snappers, jobfishes	3,048	2,757	2,423	2,771	2,712	3,019	3,054	1,662	1,704	2,148	2,391	
	Snubnose pompano	.	.	.	.	.	.	.	.	.	.	4
	Spadefishes	.	.	.	.	.	.	.	.	.	.	1
	Spinefeet(=Rabbitfishes)	444	865	1,063	868	1,385	1,388	1,887	2,341	2,779	2,173	1,823	
	Surgeonfishes	.	.	.	.	.	.	68	113	238	173	252
	Swordfish	2
	Therapon perch	205
	Threadfin breams	.	.	.	.	.	.	21	221	131	87	305
	Triggerfishes, durgons	.	.	.	.	.	.	.	.	.	26	8
	Tuna-like fishes	288	319	272	517	343	713	923	1,190	1,091	1,339	628	
	Wrasses, hogfishes, etc.	.	.	.	.	.	.	.	165	108	105	66
Sudan (Red Sea)	Marine fishes	1,200	1,200	1,500	1,500	2,000	2,500	4,000	4,000	4,500	5,000	5,500	
Eritrea	Barracudas	.	.	.	.	.	.	37	109	185	21	57
	Batfishes	.	.	.	.	.	.	.	.	.	<0.5	1
	Bigeyes	.	.	.	.	.	.	<0.5	5	<0.5	-	-
	Carangids	.	.	.	.	.	.	48	697	815	13	184
	Cobia	.	.	.	.	.	.	2	10	38	2	6
	Emperors (=Scavengers)	.	.	.	.	.	.	217	1,010	767	90	104
	Flatheads	.	.	.	.	.	.	18	14	<0.5	<0.5	<0.5
	Goatfishes	.	.	.	.	.	.	61	7	2	1	1
	Groupers	.	.	.	.	.	.	14	83	141	95	117
	Grunts, sweetlips	.	.	.	.	.	.	61	469	367	13	47
	Guitarfishes, etc.	.	.	.	.	.	.	3	1	<0.5	<0.5	-
	Indian halibut	.	.	.	.	.	.	9	4	8	1	<0.5
	Indian mackerel	.	.	.	.	.	.	40	75	58	2	<0.5

Table B. (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Eritrea												
	Indo-Pacific sailfish	.	.	.	.	.	.	.	.	.	<0.5	1
	Kawakawa	.	.	.	.	.	.	.	.	.	.	6
	Lefteye flounders	.	.	.	.	.	.	.	.	.	<0.5	1
	Lizardfishes	.	.	.	.	.	.	651	166	3	5	<0.5
	Longtail tuna	.	.	.	.	.	.	.	.	.	.	22
	Mackerel-like fishes	.	.	.	.	.	.	7	34	.	.	5
	Marine fishes	.	.	.	.	.	475	451	456	211	215	212
	Milkfish	.	.	.	.	.	.	<0.5	2	<0.5	2	3
	Mullets	.	.	.	.	.	.	.	.	3	4	2
	Spanish mackerel	.	.	.	.	.	.	.	.	181	174	182
	Porgies, seabreams	.	.	.	.	.	.	12	22	12	<0.5	<0.5
	Queenfishes	.	.	.	.	.	.	.	.	8	4	.
	Rainbow runner	.	.	.	.	.	.	.	.	3	-	<0.5
	Requiem sharks	.	.	.	.	.	.	13	6	15	13	17
	Sea catfishes	.	.	.	.	.	.	52	60	9	<0.5	149
	Snappers	.	.	.	.	.	.	43	205	281	219	294
	Snappers, jobfishes	.	.	.	.	.	.	2	<0.5	43	59	69
	Spinefeet (=Rabbitfishes)	.	.	.	.	.	.	.	.	<0.5	<0.5	1
	Threadfin breams	.	.	.	.	.	.	928	206	4	15	<0.5
	Triggerfishes, durgons	.	.	.	.	.	.	9	1	<0.5	<0.5	<0.5
	Tuna-like fishes	.	.	.	.	.	.	.	.	4	29	81

Table B. (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Djibouti	Barracudas	15	9	10	12	13	14	15	16	20	19	20
	Carangids	53	19	17	13	14	15	16	18	20	19	20
	Groupers	101	95	83	77	84	92	98	107	110	104	105
	Jacks, trevallies	.	5	3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Marine fishes	110	27	18	8	9	10	11	12	10	9	10
	Mulletts	7	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Porgies, seabreams	43	37	29	28	31	34	36	39	40	38	40
	Seerfishes	26	37	57	48	52	57	61	67	65	61	60
	Snappers, jobfishes	59	143	121	55	60	65	69	76	80	76	80
	Tuna-like fishes	32	11	20	11	12	13	14	15	15	14	15
	Yemen	Barracudas	1,102	634	1,766	1,873	2,670	3,279	2,716	2,356	1,813	1,900	1,850
Demersal percomorphs		3,329	3,000	3,836	4,258	4,131	4,000	4,000	5,383	5,022	5,250	5,120
Emperors (=Scavengers)		2,909	3,670	2,256	3,399	3,275	5,478	4,390	3,214	2,437	2,550	2,490
Frigate and bullet tunas		58	21	22	24	23	25	25	20	20	20	20
Groupers, seabasses		1,023	1,761	1,584	1,376	2,038	2,487	2,400	2,260	1,743	1,820	1,770
Grunts, sweetlips		72	116	74	313	569	754	1,147	1,813	1,318	1,380	1,350
Indian halibut		170	121	134	327	368	89	422	974	724	760	740
Indian mackerel		5,363	5,820	6,542	7,301	6,567	6,000	6,500	6,958	752	790	770
Indian oil sardine		.	.	.	.	.	.	.	.	4,120	4,310	4,200
Jack and horse mackerels		823	820	855	949	921	990	990	4,412	1,380	1,440	1,400
Jacks, trevallies		345	815	556	125	509	174	480	431	413	430	420
Kawakawa		1,315	1,252	1,569	1,601	1,615	504	1,164	1,226	1,183	1,240	1,210
Longtail tuna		552	563	1,276	651	1,324	1,707	2,291	2,204	1,887	1,970	1,920
Mulletts		364	280	311	834	<0.5	<0.5	<0.5	391	380	400	390
Narrow-barred Spanish mackerel		2,273	2,273	3,118	3,207	2,551	3,092	3,255	3,047	3,521	3,680	3,580
Pelagic percomorphs		44,374	40,000	43,117	43,564	36,134	38,104	35,664	52,407	59,344	62,304	60,740
Rays, stingrays, mantas		.	.	.	.	.	.	.	156	<0.5	<0.5	<0.5

Table B. (continued)

Country	Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
	Sea catfishes	413	154	206	532	1,364	1,411	1,043	1,697	1,700	1,780	1,740
	Seerfishes	295	446	465	516	500	538	538	500	500	520	510
	Sharks, rays, skates, etc.	704	1,329	639	2,749	6,067	6,537	6,455	4,480	4,878	5,100	4,970
	Skipjack tuna	<0.5	12	13	14	13	14	14	15	88	90	90
	Snappers, jobfishes	1,006	1,268	669	1,428	1,815	3,575	2,660	2,006	1,460	1,530	1,490
	Swordfish	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Threadfin, dwarf breams	1,840	3,118	2,092	2,377	4,279	3,592	3,718	3,170	2,504	2,620	2,550
	Tuna-like fishes	48	262	273	303	294	316	316	300	300	310	300
	Yellowfin tuna	1,252	667	695	771	748	804	804	800	800	840	820
Somalia	Marine fishes	16,500	18,450	20,000	22,000	20,000	18,000	16,000	15,000	14,800	14,500	14,800
TOTAL		156,113	172,914	170,201	181,362	180,750	194,754	195,020	192,831	202,377	214,970	216,458

Landing site:	Facility												
	Workshops /repairs	Cold storage	Ice plant	Electricity	Forklift	Fresh water	Fuel oil	Derrick/ Crane	Boat-building/ repairs	Auction facilities	Quay/ pier	Fish process- ing	Slipway
SOMALIA													
Bereda	x			x		x			x		x		x
Xabo	x	x	x	x		x			x		x		x
Qandala	x	x	x	x		x			x		x		x
Bosaso	x	x	x	x		x			x		x		x
Laas Qoray	x	x	x	x		x			x		x		x
Berbera	x	x	x	x		x			x		x		x

Note: In **Somalia** most of these facilities have been destroyed during the civil strife and are no longer operational.

ANNEX F: SOCIO-ECONOMIC INDICATORS

JORDAN			
Land area	88,884 km ²	Continental shelf (to 200 m)	<100 km ²
Length of coastline	27 km	Population	5.7 million (1993)
Employment in primary catching sector	230 fishermen (2000)	Employment in secondary sector	n.a.
Public sector employment: management and research	n.a.	Public sector employment: training, extension and services	n.a.
Annual fish production	450 mt (1999)	Value of fisheries exports	Negligible
Gross domestic product	US\$ 6.105 billion (1993)	GNP per capita	n.a.
Fisheries contribution to GDP	Negligible	Per capita fish consumption	2.7 kg/annum (1998)

EGYPT			
Land area	1.01 million km ²	Continental shelf (to 200 m)	8,400 km ²
Length of coastline	1,800 km (Red Sea coast)	Population	61.4 million (1998)
Employment in primary catching sector	18,000 fishermen (1995)	Employment in secondary sector	At least 10,000 (processing, marketing and ancillary services. (1995)
Public sector employment: management and research	400 (1995)	Public sector employment: training, extension and services	53 (1995)
Annual fish production	58,000 mt (1998 – Red Sea)	Value of fisheries exports	\$ 12.2 million (1998)
Gross domestic product	US\$ 84.3 billions (1998)	GNP per capita	US\$ 1,290 (1998)
Fisheries contribution to GDP	n.a.	Per capita fish consumption	4-6 kg/annum (1999)

SAUDI ARABIA			
Land area	2.25 million km ²	Continental shelf (to 200 m)	77,859 km ²
Length of coastline	1,840 km	Population	20.7 million (1998)
Employment in primary catching sector	4,145 fishermen (1997)	Employment in secondary sector	At least 6,700 (processing, marketing and ancillary services (1997) including Saudi and non-Saudi workers)
Public sector employment: management and research	-	Public sector employment: training, extension and services	n.a.
Annual fish production – Red Sea only	26,000 mt (1998)	Value of fisheries exports	US\$ 4.8 million (1998)
Gross domestic product	US\$ 125.8 billion (1998)	GNP per capita	n.a.
Fisheries contribution to GDP	0.13% (1999)	Per capita fish consumption	8.0 kg/annum (1993)

Sources: PERSGA 1997.

SUDAN			
Land area	2.51 million km ²	Continental shelf (to 200 m)	9,800 km ² (800 km ² deep water trawling grounds; 9,000 km ² artisanal grounds)
Length of coastline	853 km	Population	28.3 million (1998); 685,000 (Red Sea State, 1993 census)
Employment in primary catching sector	943 fishermen (1994)	Employment in secondary sector	At least 104 (processing, marketing and ancillary services.(1994)
Public sector employment: management and research	70 (1994)	Public sector employment: training, extension and services	n.a.
Annual fish production	1,500 mt (1998)	Value of fisheries exports	n.a.
Gross domestic product	US\$ n.a. (1998)	GNP per capita:	US\$ 290 (1998)
Fisheries contribution to GDP	Negligible (<1%, 1997)	Per capita fish consumption	1.2 – 2.0 kg/annum (1997)

Sources: PERSGA (1997)

DJIBOUTI			
Land area	23,200 km ²	Continental shelf (to 200 m)	2,280 km ²
Length of coastline	370 km	Population	650,000 (1998)
Employment in primary catching sector	n.a.	Employment in secondary sector	n.a.
Public sector employment: management and research	n.a.	Public sector employment: training, extension and services	n.a.
Annual fish production	450 mt. (1998)	Value of fisheries exports	negligible (1998)
Gross domestic product	US\$ 0.51 billion (1998)	GNP per capita	n.a. (1998)
Fisheries contribution to GDP	Negligible (1996)	Per capita fish consumption	1.8 kg/annum (1992)

Sources: PERSGA Country report: Djibouti. (1996)

YEMEN			
Land area	527,970 km ²	Continental shelf (to 200 m)	Gulf of Aden shelf – 20,255 km ² ; Red Sea shelf – 11,200 km ² .
Length of coastline	2,200 km (Red Sea and Gulf of Aden)	Population	16.5 million (1998)
Employment in primary catching sector	36,050 fishermen (1997)	Employment in secondary sector	At least 10,000 (processing, marketing and ancillary services.(1997)
Public sector employment: management and research	617 (1997)	Public sector employment: training, extension and services	2,030 (1997)
Annual fish production	128,600 mt (1998)	Value of fisheries exports	US\$11.1 million (1996)
Gross domestic product	US\$ 5.4 billion (1998)	GNP per capita	US\$ 300 per capita (1998)
Fisheries contribution to GDP	1.4% (1996)	Per capita fish consumption	40 kg/annum (1997)

Sources: MEP (1997). Fourth Fisheries Project: Fish Sector Review. MFW 2000.

SOMALIA			
Land area	627,340 km ²	Continental shelf (to 200 m)	8,400 km ² (north coast only)
Length of coastline	1,300 km (north coast)	Population	9.1 million (1998)
Employment in primary catching sector	2000 fishermen (1997)	Employment in secondary sector	n.a.
Public sector employment: management and research	n.a.	Public sector employment: training, extension and services	n.a.
Annual fish production	4,000 mt (1998)	Value of fisheries exports	US\$ 1.5 million (1998)
Gross domestic product	n.a. (1998)	GDP per capita:	n.a. (1998)
Fisheries contribution to GDP	2% (1997)	Per capita fish consumption	0.25 kg (1996)

ANNEX G: NATIONAL INSTITUTIONS INVOLVED IN FISHERIES AND ENVIRONMENTAL MANAGEMENT

JORDAN

Name of Authority	Main function
Marine Science Station, Aqaba	Fisheries and marine research.
Ministry of Agriculture	Policy and management.

EGYPT

Name of Authority	Main function
Egyptian Environmental Affairs Agency (EEAA)	Monitoring and protection of the marine environment.
Egyptian Organisation for Standardisation (EOS)	Maintenance of standards for domestic products, provides training in compliance with national standards.
General Authority for Fish Resource Development (GAFRD)	Fisheries management, development and conservation; enforcement, MCS, data collection, training and extension; aquaculture development.
National Institute of Oceanography and Fisheries (NIOF)	Primary research institute for marine fisheries.
Ministry of Defence	With Frontier Guard Corp, issue fishing permits and monitor vessel activities, crewing levels etc.
Ministry of Health	Examination of agricultural and fisheries foodstuffs in regard to chemical and biological safety levels.
Ministry of Scientific Research	Supervises the IOF and its two research stations in Suez and Hurghada.
Ministry of Supply and Trade	Supervision of fish quality and monitoring landings quotas in Suez, Red Sea and South Sinai Governorate.
Ministry of Supply and Trade, Dept. of Food Inspection and Quality control.	Quality assurance for all agricultural, food (including seafood) and industrial products.
Ministry of Supply and Trade, General Organisation for Control of Export and Import (GOCEI)	Concerned with Quality control of all agricultural and industrial exports.

SAUDI ARABIA

Name of Authority	Main function
Faculty of Marine Sciences of King Abdulaziz University	Involved in research activities.
Fisheries Research Centre, Jeddah	Involved in research activities.
MEPA (Meteorology and Environmental Protection Administration)	Jurisdiction for prevention of pollution in the territorial sea including effluent from landfill, pollution monitoring; jurisdiction for oil spill response; responsible for setting standards for the environment.
Ministry of Agriculture	Responsible for fishery management, agricultural development, development of groundwater resources and seawater desalination.
Ministry of Agriculture and Water: Dept of Fisheries Affairs	Management and administration: marine fisheries, aquaculture and the marine environment, licensing, regulations, credit facilities for fishermen, imported fishing and farming equipment and research; Responsible for management of national parks; landfills.
Ministry of Agriculture, Sweet Water Conversation Corporation (SWCC), Ministry of Petroleum (Saudi Aramco, oil companies), Ministry of Municipalities and Rural Affairs (Sewage Authority), Ministry of Industry and Electricity (SCECO and industrial cities) and RCJY	Control activities that emit pollutants into the Territorial Sea.
Ministry of Defence	Jurisdiction of military activities within the Territorial Sea.
Ministry of Industry and Electricity	Responsible for industrial development and electricity generation.
Ministry of Municipal and Rural Affairs	Responsible for municipal development, flood water management and disposal of waste.
Ministry of Petroleum	Jurisdiction over oil production and marine mineral extraction activities in the Territorial Sea.
Ministry of Transport	Responsibility for Marine Navigation in the Territorial Sea.
National Commission for Wildlife Conservation and Development (NCWCD)	Responsible for management of protected areas.
Royal Commission for Jubail and Yanbu	Responsible for industrial development within the two industrial cities; also responsible (under a Memorandum of Understanding with MEPA) for environmental management in those cities.
Saudi Coast Guard	Jurisdiction between the border of the Territorial Sea (12 miles offshore) and 10 km inland.
Sea Ports Authority	Responsibility for ports.
Sea Ports Authority	Responsibility for ports.

SUDAN

Name of Authority	Main function
Marine Fisheries Administration under the Red Sea State (Ministry of Animal Wealth)	Manages the fisheries sector and controls the observation of fisheries regulations.
Ministry of Animal Wealth	In overall charge of animal production and fisheries.
Red Sea University, Port Sudan	Marine research and education.
The Marine Fisheries Research Centre (MoAW)	Provides scientific information for the management of fisheries resources. Field station at Dongonab and 2 laboratories at Port Sudan. Over the last 15 years, it has been concentrating on pearl system production.
The Wildlife Research Centre (MoAW)	In charge of providing the scientific background for wildlife conservation and management.
University of Khartoum, Suakin Marine Laboratory	Biological research and training.
University of Khartoum, Faculty of Economic and Social Studies	Research on resources and development.
University of Khartoum, Institute of Environmental Studies	Research on environmental issues.

DJIBOUTI

Name of Authority	Main function
Inter-ministerial Co-ordination, Commission on the Protection of the Marine Fauna and the Sea-bottom	Maritime conservation.
Ministry of Agriculture and Hydraulics Direction de l'Elevage et des Pêches (DEP), Directorate of Stock-farming and Fisheries	Fisheries administration and management.
Ministry of Tourism Office National du Tourisme et de l'Artisanat (O.N.T.A. National Office for Tourism, Arts and Crafts)	Tourism development.
Ministry of Transport and Telecommunications, Direction des Affaires Maritimes (D.A.M., Directorate of Maritime Affairs)	Maritime transport.
National Council of the Sea	According to a decree of 5 July this is presided over by the Prime Minister. Policy towards the marine sector.
Presidency of the Republic Institut Supérieur d'Etudes et de Recherche Scientifiques et Techniques (I.S.E.R.S.T., Institute of Higher Studies, Scientific and Technical Research)	Research and postgraduate training.
Primature, Service de l'Aménagement et de l'Environnement (S.A.E., Service for Management and Environment)	Environmental conservation.

YEMEN

Name of Authority	Main function
Coastal Fisheries Corporation – MFW	Catching, processing and exporting rock lobster.
Environment Protection Council (EPC)	Council of ministers with responsibility for environmental matters. Co-ordinates and monitors environmental protection and conservation policy.
Fisheries Manpower Development Centre (FMDC) - MFW	Manpower training; extension services.
Marine Science and Resources Research Centre (MSRRC) – MFW	Fisheries and oceanographic research.
Ministry of Fish Wealth (MFW)	Fisheries management and administration; fisheries legislation, fish quality control.
National Corporation for Services and Fish Marketing – MFW	Fish purchase and marketing, services (fuel, ice, cold stores), extension services, market operations, fishing port management, fish storage and processing, management of vessel repair facilities.

SOMALIA

Name of Authority	Main function
Ministry of Fisheries and Marine Resources	Development and management of fisheries resources; production, planning, research, marketing, personnel and administration.
Ministry of Marine Transport and Ports	Development of maritime transport and the improvement of port facilities; environmental control of coastal areas, including ports, prevention of marine pollution and safety of navigation; implementation of the Maritime Code, other laws and regulations related to the marine environment, and implementation of regional and international conventions.
Ministry of Minerals and Water Resources	Two main responsibilities included the development of mineral resources including mining and geological survey, and the development of water resources.
Ministry of Tourism	Was in charge of establishing MPAs. Legislation, following the Kenyan model, has been prepared for a network of protected areas.
National Marine Affairs Committee	Oversees the overall development of the fisheries sector. Committee chaired by Ministry of Marine Transport and Ports and members included following ministries: Minerals and Water Resources, Fisheries and Marine Resources, Foreign Affairs, Education and Defence.
National Range Agency (Ministry of Livestock, Forestry and Range)	Was responsible for National Parks.
Somali Ports Authority and the Somali Shipping Agency (Min Marine Transport and Ports)	Port and shipping matters.

Note: Since the civil strife these institutions are no longer functioning.

ANNEX H: FISHERIES OVERVIEW FOR THE PERSGA STATES

A. JORDAN

Present situation

With only 27 km of coastline and around 100 artisanal fishing vessels, Jordan's fisheries sector is very small. Collection of fisheries statistics and most development interest ceased in 1985 with the loss of access to the fishing grounds in neighbouring states. Since 1985 Jordan's artisanal fishery has undergone a sharp decline. Production in 1999 was estimated at around 450 mt, mostly comprising various tunas and small shoaling pelagic species.

Institutions and financial arrangements

Fisheries policy and management is the responsibility of the Ministry of Agriculture. Fisheries research is the responsibility of the Marine Science Station at Aqaba. A number of Jordanian universities also undertake *ad hoc* marine and fisheries research. There is no formal training or extension services provided for the sector. Financial support is available through commercial banks in the same way as any other economic activity.

Legal framework

Law no. 25 is the basic law which sets forth the organisation of fisheries in Jordan. No specific resources are devoted to MCS of the sector given its small size.

B. EGYPT

Present situation

Fish is a traditional and important component of the Egyptian diet and contributes around 20% to the national diet of animal protein. Artisanal fishing is concentrated in the Gulf of Suez. The industrial fleets include shrimp and demersal fish trawlers and purse-seiners targeting small pelagics species. Total domestic harvest in 1998 was around 546,000 mt, mostly originating in the Nile, Mediterranean, northern lakes inland fisheries and fish farms. Only about 10% (around 58,000 mt) comes from Red Sea marine fisheries. Nearly 90% of Red Sea catches are landed in Ataka Port near Suez, principally bound fresh on ice for the Cairo market.

The sector accounted for around 7% of the total value of agricultural production in 1996. Employment accounts for 3.7% of total agricultural workers just under half being involved in marine fisheries. Exports are small, only 2,137 mt in 1998. Exports have been static during the 1990's. The country is a major importer of fish, with 24% of national consumption being imported in 1998 the form of small pelagics.

Egypt's main institutional constraint is the shortage of qualified staff. While control of the artisanal fisheries especially in the Gulf of Suez is a concern, the focus of fisheries management attention is the activities of industrial trawlers targeting shallow-water shrimp and demersal fish species in the Gulf of Suez and also in neighbouring waters. Offshore patrol vessels, coupled with on-board observers are needed to patrol these activities. However, because of the severe shortages of qualified manpower and funds, Egypt requires both a clear economic justification for such a large investment, and an assured capability to operate and maintain such activities.

Assistance is required in the design and application of more effective fisheries and environmental management systems, primarily through training of staff and technical assistance. Co-operation and liaison with the industrial trawl, purse-seine and industries will be necessary. The existing fisheries data collection and analysis system require upgrading and extension. Also no fish stock assessment has been conducted since the eighties. Whether the

fisheries sector warrants the purchase of dedicated vessels for fisheries research and fisheries surveillance and enforcement should be addressed through the benefits such a vessel would bring in relation to operational costs. The industrial shrimp fishery could be a primary subject for the application of high tech monitoring using satellite-based vessel monitoring systems (VMS), although the technical expertise and hardware required would require donor assistance to procure.

A national licensing scheme is in operation. This could usefully be extended to artisanal fisheries. Co-management systems should be examined whereby local communities could greatly assist in managing their own resources.

Co-operation with Saudi Arabia, Yemen and Sudan on crustacean, molluscan and coastal fin-fish fisheries and tuna and shark fishing should be supported.

Institutions and financial arrangements

GAFDR of Ministry of Agriculture is responsible for fisheries and aquaculture management, development, MCS, enforcement of regulations, data collection, training and extension. Training is provided for fisheries managers and fishermen from co-operatives. Training workshops focus on fishing technology, fisheries management, project preparation and appraisal, fish culture, co-operative management and legislation. The Institute of Oceanography and Fisheries and the universities have long experience in developing training and extension programmes. Study tours are arranged in a regular basis to USA, south-east Asia, Italy and elsewhere.

Fisheries research is conducted by a number of institutes, but the Institute of Oceanography and Fisheries is the focal institute primarily involved in fisheries research. The Red Sea branch of the IOF operates field stations at Suez and Hurghada with well equipped laboratories for physical and chemical oceanography, marine and fisheries biology, pollution monitoring and mariculture (shrimps). Egypt has no fisheries research vessel. Universities involved in fisheries research include Suez Canal University and the University of Alexandria.

Law enforcement is the responsibility of GAFRD in co-operation with the Frontiers Corp (Ministry of Defence). No information is available on the level or efficiency of MCS and enforcement activities. The Frontier Guard Corps is based at the fishing ports and main landing centres. They issue permits to fishing vessels and record trip lengths, area fished and names of fishermen on each boat. The Ministry of Scientific Research supervises the IOF that, in turn, supervises the two research stations at Suez and Hurghada.

A number of institutions are involved in fish inspection and quality control. The Department of Inspection and Quality Control and the General Organisation for Control of Export and Import (Ministry of Supply and Trade) are responsible for quality assurance of all agriculture food (including sea products) and industrial products. Laboratories are maintained at all airports and provincial centres.

Legal framework

Law no. 124 (Fisheries) of 1983 sets forth the organisation and provides for the regulation of fisheries and aquaculture. Main articles prescribe allowable grounds and gear, technical measures such as allowable mesh sizes, minimum allowable size, and provides for protection of the environment from pollution. Law no. 4 (Environmental Protection) provides for the management and conservation of the environment. It provides for water pollution land, air and water protection and sets forth the terms of reference for the Egyptian Environmental Affairs Agency. The EEAA has power to set principles and procedures for Environmental Impact Assessment's for development projects.

C. SAUDI ARABIA

Present situation

Saudi Arabia has a sizeable artisanal and industrial fishery. All vessels are owned by Saudi nationals and crewed entirely by immigrant fishermen. Landings from the Red Sea in 1997 comprised 17,420 mt for the artisanal fleet and 8,405 mt. for the industrial fleet (comprising trawlers targeting shrimp and demersal species on the Farasan Bank, and pelagic purse-seiners. The Saudi Fishing company dominated the Red Sea industrial fishery. Catches from the Red Sea have exceeded those taken from the Gulf in recent years. Contribution of fisheries to GDP is very small, around 0.13%. The Kingdom imports around 50,000 mt of fish per year to meet national demand.

A well-developed fisheries data collection system in place which allows well-defined statistics for national fishing activities. However, stock assessment research is not undertaken. Saudi Arabia's fishing grounds extend all along the coast and its industrial vessels operate over considerable distances throughout the Red Sea. Consequently there are more extensive patrol requirements but little in the way of MCS is undertaken. Patrol vessels and aircraft are currently unavailable for fisheries surveillance.

Saudi Arabia hosts the PERSGA Secretariat and SAP Programme Management Unit. As a regional power, it is in a position to assist other states to co-operate on fisheries data transfer and management issues on important shared fisheries, such as demersal fishes, pelagics and shrimps with a view to reaching practical arrangements for the control of these fisheries. Joint surveillance patrols with Egypt and Yemen and common fisheries research methodologies and shared databases would be very beneficial. The operation of fisheries patrol vessels and aircraft to ensure cost effective and comprehensive surveillance is complicated by the lack of clear jurisdiction over marine waters and political realities.

Saudi Arabia's lead role in the formation and hosting of PERSGA underlines its potential important position in the development of regional marine fisheries conservation initiatives on transboundary stocks, such as tuna and sharks.

Institutions and financial arrangements

A Deputy Minister at the Ministry of Agriculture and Water heads the Department of Fisheries Affairs assisted by a General Supervisor and three Director Generals for marine fisheries, aquaculture and marine environment. The Department is in charge of all matters related to the development of fisheries. This includes management, licensing, regulations, MCS and research.

The Meteorology and Environmental Protection Administration (MEPA) is the central environmental agency in Saudi Arabia. It has not, however, been given the extensive enforcement and regulatory authority found in European or north American environmental agencies. Instead, Saudi Arabia has chosen to distinguish between the setting of environmental criteria such as standards, and actual operational management. Thus operational agencies such as the Ministry of Petroleum, Ministry of Agriculture and Ministry of Industry and Electricity retain actual regulatory control over activities carried out under their respective mandates, while MEPA sets environmental performance standards, monitors the activities of operational agencies and serves as a central coordinator for environmental management.

MEPA is also the lead agency for coastal zone management. However, institutional authority for centralized coastal zone management planning has not been fully achieved. Instead, each individual agency operates under its own specific mandate and numerous overlaps and potential conflicts abound. Day-to-day coordination mechanisms and central planning authority specific to the coastal zone are lacking. A draft proposal for development

of a national coastal zone management plan was submitted and approved for final promulgation by the Ministerial Committee for Environment in July 1997.

Applied research studies are designed and executed by the Marine Research Centre of Jeddah. Other academic studies relating to fish biology, oceanography and marine ecology were conducted by researchers of the Faculty of Marine Sciences of King Abdulaziz University. National researchers have undertaken training in various countries for long term and short term training in order to improve their skills in different fisheries disciplines. On the job training is also in use according to the available international expertise. There are approximately 15 enumerators collecting basic catch data at sites along the coast. No fisheries offshore surveillance and enforcement is conducted.

The conservation activities of the marine environment mainly involves the supervision of the regulations application in respect to the following: (a) fishing gears specifications including banning of drifting nets and monofilament nets; (b) the implementation of a closed season for shrimps between April and July every year and (c) closing of nursery areas for fishing and the control of land reclamation and sea dredging along the coast. The marine environment protection also involves the collaboration with MEPA to the control of pollution generated by different sources.

The government provides credit to fishermen and investors in marine fishing and aquaculture in addition to other assistance such as free tax import of fishing and farming equipment, land at a low cost for fish farming.

Legal framework

Ministry of Agriculture and Water is the main body responsible for fishery management, management of national parks, jurisdiction for fishery activities under Royal Decree No. 7/505M, dated 28/3/1406 and Royal Decree No. M/9, dated 27/3/1408. The Saudi Coast Guard has jurisdiction between the border of the Territorial Sea (12 miles offshore) and 10 km inland (Royal Decree No 33, dated 27/7/1377). MEPA is responsible for environmental standards and for carrying out a program of environmental impact assessment; designated coastal zone management agency under Royal Decree No 7/M/8903, dated 2/14/1401)

A code for fishing regulations has been prepared by the Ministry of Agriculture and Water since the early eighties. The code is revised and updated regularly according to the prevailing situations.

D. SUDAN

Present situation

Sudan's fisheries include artisanal, semi-industrial and industrial sectors. Most artisanal craft are locally made, employing traditional methods. The level of mechanisation is low. Handlining and gillnetting for reef-associated species accounts for 80% of the annual catch of 1,500 mt. The industrial sector comprises pelagic purse-seiners and shrimp trawlers. Their catches are however very low, due to poor fleet management and restricted trawling grounds. Fish landed close to Port Sudan are marketed fresh on ice to the local market. The contribution of fisheries to GNP is negligible, the backbone of the local economy being marine transport (national shipping and Sudan Line).

Sudan's fisheries policy is to try and improve the standard of living for coastal communities that depend heavily on fisheries for a livelihood. According to the National Strategy 1992-2002, Sudan is committed to the pursuit of sustainable development and environmentally sound resource management. However the authorities are faced with a contracting public service and budget, the loss of large numbers of experienced staff, obsolete

facilities for fisheries management, poor physical infrastructure and high illiteracy rates in the artisanal fishermen.

Data collection is poorly organised. Very little stock assessment or applied marine research is conducted. No surveillance activities are conducted. The fisheries legislation is not effectively enforced.

At the local level, mechanisms to involve fishing association and communities in the management process are required. The fishermen face considerable hardship, including lack of access to affordable credit, lack of fish handling and processing facilities, unpaved roads and poor communications. There are no harbours or sheltered areas along large stretches of the coast except Suakin fishing harbour, although some coastal lagoons and sheltered bays or 'mersas' form natural harbours and landing places. Maintenance and repair workshops are very scarce. What few ice plants and cold stores there are suffer from water shortages and electricity shortages. Basic living conditions are generally bad and clean drinking water is a scarce commodity. The lack of ice making facilities outside of Port Sudan results in heavy pressure on resources that can be marketed without preservation e.g. trochus, pearl-shell, bêche-de-mer. Fish catches in remote areas (Halaib in the north and Aqiq in the south) are consequently dried or wet salted. Credit is not available to many fishermen to allow investment in intermediate-technology fishing craft which would allow exploitation of the known more distant fishing grounds to the north and south of Port Sudan and thus restricts fishing to the narrow coastal area.

A review of existing policies and support for the artisanal fisheries sector is urgently required. Monitoring, control and surveillance is lacking and thus Sudan's waters are poached by vessels from a number of other states. The Ministry of Defence is in charge of Naval Forces, which are responsible for MCS. The police share maritime protection responsibility. However a lack of equipment, finance and training impairs effective MCS and enforcement in Sudan. The Fisheries Administration performs enforcement of regulations and local ordinances (regulation of landing sites, fish markets, etc.) from its Port Sudan head office and field offices. Level of enforcement is *ad hoc* on land and virtually non-existent at sea because of lack of patrol vessels, trained personnel, equipment and finance. However increase reports of offenders being apprehended indicates an improvement in surveillance in recent years.

Training needs include fish handling and processing, support for co-operatives and the services they can supply especially credit lines, and marketing. Illiteracy rates are high, thus public awareness campaigns are required aimed at educating fishermen of the need for and long-term benefits of fisheries management and resource conservation. Government officials require assistance in planning and policy formulation. Most of the available fisheries resources are best exploited by artisanal craft and methods. Artisanal fishing is thus of paramount socio-economic importance in the rural areas. The best prospects for future development probably lie in revitalising artisanal fisheries through rehabilitating previous programmes and infrastructure that have proved successful in the past.

Institutions and financial arrangements

the Ministry of Animal Wealth is in overall charge of animal production and fisheries. The Marine Fisheries Administration is the main department responsible for fisheries resource management, scientific research and extension services. The Marine Fisheries Research Centre has a field station at Dunganab and two laboratories in Port Sudan. In the past 10 years research has focused solely on pearl oyster culture. Since the conclusion of the Sudan-ODA and Sudan-FAO projects, the Marine Fisheries Administration has not been particularly active in fisheries development and extension services. NGO's active in environmental matters include the Sudanese Environment Conservation Society (Port Sudan and Suakin), the Sea

Friends Association (Port Sudan) and OXFAM UK/Ireland (Port Sudan and Tokar). The Sudan Marine Conservation Committee is a semi-NGO and plays an important role in awareness raising and forming legislation.

The Red Sea University at Port Sudan undertakes marine research and education. The Faculty of Marine Science and Fisheries offers undergraduate courses in marine and fisheries sciences. The Marine Research Institute conducts oceanographic and marine environment research. The University of Khartoum has a laboratory and several research and training activities on Red Sea fisheries. Suakin Marine Laboratory undertakes marine biological research and trains undergraduates from University of Khartoum and other universities. The Institute of Environmental Studies conducts environmental research and supervises graduate students in freshwater and marine environments. The Faculty of Economic and Social Studies has several departments that conduct research on resources and development including coastal and marine areas. The University of Juba offers fisheries, natural resource and environmental studies.

Legal framework

The main law governing resource exploitation and environment is the Marine Fisheries Ordinance of 1937 (amended in 1975 and 1978). The Ordinance provides powers for police, custom officers, navy officers and port authorities to board, search and detain any vessel suspected of violating the fisheries law. However there is virtually no fisheries MCS in the country, and reliance is made on Sudan Line for intelligence of marine industrial fishing activity. The Ordinance provides for the establishment of closed/restricted fishing areas, fisheries licensing and prohibits collection of shells, aquarium fishes and coral. It prescribes minimum allowable sizes for fish species and allowable methods of fishing.

The legislative framework requires updating. A maritime law for Sudan has been drafted by the Maritime Administration but its status is unclear.

E. DJIBOUTI

Present situation

Fisheries are entirely artisanal in Djibouti. Activity is concentrated north and south of the Gulf of Tadjura. The north area has no ice or cold storage facilities and is distant from Djibouti city and therefore is the most productive area. Living marine resources are largely under-exploited, however in over-exploitation is reported in areas near the capital including Doralé, Khor-Ambado, Arta Plage and the islands of Musha, Maskali and Waramous. The pressure on these areas is due to a combination of extensive sport fisheries and artisanal fisheries. These are at the same time the areas where reef destruction is most severe caused by dynamite fishing and anchors of boats on reefs.

Shark resources are heavily fished. An unknown amount of illegal shark fishing by unlicensed national and foreign boats takes place for production of fins for the east-Asian shark-fin market. Illegal capture of marine turtles and the collection of turtle eggs is wide spread.

A new National Maritime Law and appropriate regulations are required. It is important to strengthen enforcement of existing regulations relating to the management of coastal and marine areas and resources. The enforcement of legislation related to the management of coastal and marine areas is currently weak. A national Integrated Coastal Zone Management Plan is urgently needed. Institutions involved in the management of coastal and marine resources and in law enforcement need assistance in this regard. Mangroves are currently under threat and in need of protection. A management programme is also required for the existing marine protected areas (Parc Territorial de Musha, Réserve Intégrale des Maskali-

Sud). Areas for additional marine protected areas could include the Sawabi Islands, Ras Bir and the mangrove of Godoriya.

A framework for visitors to coral reef areas is needed including guidelines and mooring boats in coral areas. Management and conservation of living marine resources are of prime importance for Djibouti, however current monitoring of fishing activities and tourist activities is lacking.

No fisheries management plans are currently in force. Fish stock assessment is not undertaken. A study conducted on the collection and export of ornamental fish for the aquarium trade has been completed and indicates potential for this industry.

An environmental data base containing information on biological resources is required. Fisheries data collection systems are needed in support of fisheries management and enforcement activities. Institutions involved in applied research need strengthening.

In 1990 a sub-regional contingency plan for the Gulf of Aden was developed. An oil spill response mutual aids centre was established for Djibouti, Yemen and Somalia. In 1992, the Maritime Administration issued rules for the management of marine protected areas. The exploitation of reef associated species was strictly regulated. New fisheries regulations were introduced in 1994 with regard to a sustainable development of this resource. In 1996, Djibouti became a signatory to the Convention on Biological Diversity.

Institutions and financial arrangements

The Ministry of Agriculture and Development is responsible for fisheries through the Direction de l'Élevage et des Pêches (D.E.P.). The Institut Supérieur d'Études et de Recherche Scientifiques et Techniques (I.S.E.R.S.T.) undertakes applied research and provides scientific training. The Service de l'Aménagement et de l'Environnement (S.A.E.) is the responsible agency for environmental affairs and conservation.

Legal framework

Fisheries and environmental legislation is well developed in Djibouti. The economic and social orientation law of 1990-2000 (150/AN/91 2°L of 10 February 1991) and the orientation plan for economic and social development projects of 1991-1995 (law 207/AN/92 2°L of 14 May 1992) indicate that the government of the Republic of Djibouti is committed to the protection of marine fisheries and the environment.

The present fisheries law was drafted before independence, with the exception of some useful but insufficient general dispositions, which are part of the Code of the Maritime Administration. These are, among others, the articles 148, 149 and 220 to 225 enacted by law 212/AN/82, and the articles 16 to 19 of law no. 52/AN/78 of 18 January 1979. According to these regulations, certain fishing techniques, such as the use of explosives and poisons, are illegal. They determine the conditions for the exploitation of fishery resources including fishing zones and closed seasons. They also include sanctions in case of violation of these regulations by fishermen.

National regulations on the protection of the marine environment include provisions on marine pollution, protection of endangered species and the creation of protected areas. Djibouti is also a signatory to the CITES Convention. Decree 80-62/PR/MCTT of 25 May 1980 provides for the protection of the sea bottom and the marine fauna. The capture of marine mammals and turtles is illegal, as well as the trade with or export of these animals. It is also forbidden to collect turtle eggs. According to this decree spearfishing is also illegal in Djibouti.

Marine protected areas are presently restricted to the "Parc territorial de Musha and the "Réserve intégrale de Mascali". Musha Parc was first established by regulation 72-1363/SG/CG of 20 September 1972, which prohibits the collection of corals and molluscs. Further on decree 80/062/PR/MCTT of 25 May 1980 extended the protection to the Maskali reserve. This latter one was modified by decree 85/103/PR/AG of 28 October 1985 to strengthen conservation of these areas. Only artisanal fisheries of edible species is allowed in these zones. A number of regulations provide for the protection of the coastal zone.

Conscious of the importance to protect the marine environment and to fight all kinds of pollution, a number of international conventions have been signed. The United Nations convention on the Law of the Sea was approved by law of 11 June 1985. At the regional level, Djibouti has signed an agreement with Yemen and Somalia on the establishment of a subregional centre to combat oil pollution in the Gulf of Aden. Oil spill response facilities are stored at Djibouti. Yemen and Djibouti are currently negotiating a bilateral agreement regarding the use of this equipment.

F. YEMEN

Present situation

With a total catch in 1998 of around 128,000 mt Yemen is by far the largest marine fish producer in the Region mostly comprising small coastal pelagics and yellowfin tuna. Eighty two per cent of this was taken by the large artisanal sector. Fish is an important constituent to the national diet, with per capita consumption at around 40 kg per annum. Industrial fisheries for cuttlefish and artisanal fishing for rock lobster in the Gulf of Aden have traditionally been important earners of exports revenues. Fisheries contributed 1.4% to GDP in 1994. However the present ban of fish to the European market, imposed by the European Commission in July 1998 because of inadequate quality control and hygiene measures, has negatively impacted on export revenues.

Despite the importance of the fisheries sector, problems include a shortage of operating funds for government management, research and regulatory agencies, poorly paid and trained staff, and inadequate equipment, including vessels, vehicles, and communications equipment. There has been no significant assessment of fish and invertebrate stocks since the 1980's, which undermine attempts to implement fisheries management. Yemen's research vessel R/V Ibn Magid is beyond its economic life. The R/V Donafa requires many repairs and in any case is too small to undertake regional survey work. Information systems currently lack organisation and integration. A GIS system is operational and biological survey equipment is available at the Marine Science and Resources Research Centre in Aden, procured under the Fourth Fisheries Development Project.

The fisheries policy framework requires strengthening into a cohesive set of principles and measures which could guide resource management and allocation decisions in a transparent and manageable manner.

Yemen's main high value fisheries for cuttlefish and rock lobster along the Gulf of Aden coast are concentrated along the coast considerably reducing the cost of patrol requirements. However a lack of equipment and finance means that fisheries MCS and enforcement of regulations and licence conditions is virtually non-existent. The Red Sea demersal shrimp and fish fisheries are more disparate, and are more complex to police and control. Considerable progress has been made in implementing a vessel registration system, especially for the Red Sea artisanal fleet.

Training is needed in all aspects of fisheries management, including data collection, analysis, stock assessment methodologies, management planning, MCS operations and

enforcement. The Fisheries Training Institute in Aden lacks basic teaching facilities and expertise. Creation of an integrated fisheries information system would support management operations and MCS cost accounting leading to financially sustainable MCS.

Significant poaching by unlicensed foreign trawlers and purse-seiners is reported, especially in the area east of Mukalla on the Gulf of Aden. The importance of the valuable shrimp stocks in Yemen's Red Sea area to the artisanal fleet is being undermined by fishing by industrial trawlers, mainly from Egypt and Saudi Arabia, operating either under licence or illegally. Licensed national cuttlefish trawlers habitually operate close to shore in this area targeting spawning aggregations of cuttlefish. These vessels ignore licence conditions that prohibit trawling in shallow waters, causing damage to the spawning ground, destruction of eggs attached to substrate and damage to fishing gear belonging to artisanal fishermen.

Closer co-operation is required with near neighbours, Saudi Arabia and Egypt in the Red Sea on the assessment and management of shared stocks, especially prawns, demersal fish and pelagics. Shark fisheries are of particular importance and require special attention, due to the particular biological characteristics of sharks. Yemen and Somalia share important stocks such as rock-lobster and yellowfin tuna. Chartering surveillance assets for joint patrols of the Red Sea could be cost effective. MCS assets are not available.

Institutions and financial arrangements

The Ministry Fish Wealth is responsible for fisheries management, resources utilisation, conservation and protection of fish resources, implementation of programmes for fisheries, development of a national strategy for the management of coastal resources and environment, issues licenses for industrial and semi-industrial fishing vessels, legislation in its fields of competence, monitoring of environmental problems and education, training and awareness building with regard to the environment. The Department of Inspection and Control is responsible for fisheries monitoring, control and surveillance. Fisheries statistics are collected by the Marine Science and Resources Research Centre and collated by the MFW Statistics Unit. A national fisheries advisory committee is charged with providing management and policy advice to the Minister, but has had little impact in improving fisheries management. Fisheries research is carried out at the MSRRC (Ministry of Fish Wealth). There is one institute for fisheries training, the Fisheries Training Institute (FTI). Fisheries credit facilities are provided by the Co-operative and Agricultural Credit Bank. This has been highly successful in funding an expansion of artisanal fisheries, especially in the Gulf of Aden with almost 100% record of repayments and is a model of success in providing finance to the fisheries sector, especially to disadvantaged and poorest fishermen.

Legal framework

Law no. 24 of 1979 is the main fisheries legislation. It provides for licenses, stipulates the powers of inspectors and observers, lists serious infringements and offences and sets penalties. It also provides for various regulations for fishing by foreign vessels in Yemeni waters, rules and terms for licenses, mesh sizes and management measures for artisanal fisheries. During 1996, some minor amendments were made in the area of licensing. However, the law and regulations are not comprehensive and do not provide a satisfactory basis for fisheries management. Penalties for infringements are too low to act as an effective deterrence. The powers of authorised officers is not defined. The Fisheries Law requires strengthening with the incorporation of internationally recognised norms, especially the FAO Code of Conduct for Responsible Fisheries. A complete review of the legal framework was undertaken in 1994 under the Fourth Fisheries Development Project, but these have not been acted upon. Yemen's maritime boundaries with its neighbours have not yet been resolved.

G. SOMALIA

Present situation

Somalia, one of the poorest countries in Africa, is presently suffering from the effects of the civil war that broke out in 1988 and resulted in a collapse of the central government and a breakdown of the national economy. The conflict led to the destruction of dwellings, water points, crops, industrial installations, looting of livestock and the planting of millions of land mines. A major proportion of the rural population has been displaced. In May 1991, former British Somaliland declared itself independent and a government was installed, but the 'Republic of Somaliland', which controls the western part of the north coastline, is not recognised internationally. The remainder of the north coast is known as 'Puntland'.

Fisheries, along with the rest of the economy, has suffered. Fishing along Somalia's north coastline is entirely artisanal. Reliable data are not available. In 1998 production was estimated at between 2,000-4,000 mt. Sharks are the main target group, for food and for production of dried shark fins for export. Rock lobster fishing and trolling for yellowfin and other tunas is also undertaken.

The international community is assisting in rehabilitation and reconstruction. FAO, in collaboration with other international agencies and NGO's, is currently operating relief and rehabilitation programmes (FAO 1995). In the present situation there are no fisheries or environmental initiatives, but even before the collapse of government such initiatives were hampered by a lack of knowledge on resources and habitats, a lack of legislation, training and monitoring capacities.

Institutions and financial arrangements

Control of the fisheries sector by the Ministry of Fisheries discontinued following the collapse of the government of Somalia in 1990. The country has no national policy for the exploitation of marine resources. In the present situation there is no fisheries management or support for the sector. Laws and regulations are not enforced and the national institutions are of no relevance. Here below the status in 1988 is summarised:

A National Marine Affairs Committee had been established to oversee the overall development of the sector. Chaired by the Ministry of Marine Transport and Ports its members included the ministries of Minerals and Water Resources, Fisheries and Marine Resources, Foreign Affairs, Education and Defence. The Ministry of Marine Transport and Ports was responsible for environmental control of coastal areas, including ports, prevention of marine pollution and safety of navigation. The implementation of the Maritime Code, other laws and regulations related to the marine environment, and implementation of regional and international conventions were under the responsibilities of this ministry. The Ministry of Fisheries and Marine Resources was established in 1977 with the objective of developing and managing Somalia's untapped fisheries resources. It received support by staff from the Soviet Union and later on by FAO. It is the Focal Point for PERSGA.

The Ministry of Tourism was in charge of establishing Marine Protected Areas. Legislation, following the Kenyan model, has been prepared for a network of protected areas.

Since the outbreak of civil strife, hardly any fisheries development work has been carried out. In the absence of government, Regional and District Councils and Councils of Elders take up the role of principal co-ordinating organisations for the inflow of aid to their respective jurisdictions. International agencies and NGOs work in co-ordination with the Councils of Elders in the development of a sustainable institutional base. Institutional co-ordination is achieved through the District and Regional Councils to ensure a reasonable level of public

accountability. In the case of research, extension or credit accountability has to be established (FAO 1995).

One of the institutions of the 'Republic of Somaliland' is the Ministry of Fisheries and Coastal Development. Created in 1993, this ministry aims to encourage public and private investment for the exploitation of marine resources; increasing fisheries production within the MSY; protection of the coastline and sea from environmental degradation; initiation and development of research and training facilities for the fisheries sector; and the development of employment opportunities in the marine sector.

Legal framework

Basic marine fisheries legislation is contained in the Maritime Code of 1959. In 1983 the Ministry of Fisheries and Marine Resources issued a joint venture guideline and in 1985 the National Fisheries Law.

Somalia has signed the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1993). It has ratified the following Conventions and Protocols which are relevant to the marine environment: the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (1988); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1985); the Convention on the Conservation of Migratory Species of Wild Animals (1986); the Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region (1988); the Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region (1988); the Protocol Concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (1988); the Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment (1988); and the United Nations Convention on the Law of the Sea (1989).

ANNEX I: FISHERIES AND ENVIRONMENTAL LEGISLATION IN FORCE

JORDAN

Law, Ordinance, Regulation	Concerned agency	Year (in force)
Law no. 25 for the Organisation of Fishing	Council of Ministers	1943

EGYPT

Law, Ordinance, Regulation	Concerned agency	Year (in force)
Law no.124 (Fisheries): Regulation of fisheries and aquaculture	GAFRD	1983
Law no.4 (Environmental Protection): Protection of environment and conservation	Egyptian Environmental Affairs Agency (EEAA)	1990

SAUDI ARABIA

Law, Ordinance, Regulation	Concerned agency	Year (in force)
Council of Ministers decision No 157: Jurisdiction for prevention of Pollution in the Territorial Sea	MEPA	dated 20/11/1411
Royal Decree 7/B/13307: Jurisdiction for oil spill response (co-ordination mechanism established)	MEPA	dated 22/7/1411
Royal Decree No 33: Jurisdiction between border of Territorial Sea (12 miles offshore) and 10 km inland	Saudi Coast Guard	dated 27/7/1377
Royal Decree No 7/505M: Responsibility for ports	Sea Ports Authority	dated 28/3/1406:
Royal Decree No 7/505M: Jurisdiction for fishery activities	MAW	dated 28/3/1406
Royal Decree No 7/505M: Jurisdiction for prevention of pollution including effluent from landfill ports	MEPA	dated 28/3/1406
Royal Decree No 7/505M: Responsible for fishery management	MAW	dated 28/3/1406
Royal Decree No 7/505M: Responsibility for ports	Sea Ports Authority	dated 28/3/1406
Royal Decree No 7/M/8903: Responsible for setting standards for the environment and for carrying out a program of environmental impact assessment; designated coastal zone management agency	MEPA	dated 2/14/1401
Royal Decree No M/22: Responsible for management of protected areas	NCWCD	dated 12/9/1406
Royal Decree No M/9: To enforce a moratorium on landfill ports	MAW	dated 27/3/1408
Royal Decree No M/9: Responsible for fishery management	MAW	dated 27/3/1408

SUDAN

Law, Ordinance, Regulation	Concerned agency	Year (in force)
Amendments to Marine Fisheries Regulations	Marine Fisheries Administration	1975, 1978
Amendments to Marine Fisheries Regulations	Marine Fisheries Administration	1975, 1978
Environmental Health Act	Ministry of Health and Local Councils	1975
Environmental Policy Act	HCENR and Attorney General	Draft proposal 1996
Marine Fisheries Ordinance	Marine Fisheries Administration	1937
Sudan Marine Conservation Committee Regulations	Ministry of Environment and Tourism	1975, 1995
Sudan Maritime Law	Maritime Administration	Draft proposal 1996

DJIBOUTI

Law, Ordinance, Regulation	Concerned agency	Year (in force)
CITES Convention	Maritime Administration	?
Decree 80/062/PR/MCTT extended the protection to the Maskali reserve. This latter one was modified by decree 85/103/PR/AG of 28 October 1985 to strengthen conservation of these areas. Only artisanal fisheries of edible species is allowed in these zones.	Maritime Administration	1980
Decree 80-062/PR/MCTT, on protection of the sea bottom and the marine fauna, establishment of South Maskali Islands Integral Reserve	MCTT	1980
Decree 85/103/PR/AG, on marine protected areas	Maritime Administration	1985
Decree 89-085/PR/AE, on oil spill response	Maritime Administration	1990
Decree 89-085/PR/PM, on passage of foreign vessels	Maritime Administration	1989
Economic and social orientation law of 1990-2000 (150/AN/91 2° L of 10 February 1991)	Maritime Administration	1991
Law 137/AN/85, on hydrocarbon pollution	Maritime Administration	1985
Law 212/AN/82, fisheries regulations	Maritime Administration	1982
Law 52/AN/78 article 16-19, fisheries regulations	Maritime Administration	1979
Law 76-599, on ship based pollution	Maritime Administration	1976
Law 76-600, on pollution caused by combustion	Maritime Administration	1976
Law 9/AN/82, on hydrocarbon pollution	Maritime Administration	1982
Law no. 64/83, which includes the approval of four international conventions on maritime navigation	Maritime Administration	1983
Law no. 94/AN/89 2° L, approves the London Conventions of 1971, 73 and 69	Maritime Administration	1989
Law of 11 June 1985, approves the United Nations Convention on the Law of the Sea.	Maritime Administration	1985
Regulation 72-1363/SG/CG, establishes Musha Parc and prohibits the collection of corals and molluscs.	Maritime Administration	1972
Regulation 72-1363/SG/CG, establishment of Mousha Territorial Park	Maritime Administration	1972
Regulation 90-0534/MPAM, on passage of foreign vessels	Maritime Administration	1990

YEMEN

Law, Ordinance, Regulation	Concerned agency	Year (in force)
Environment Protection Law	Environment Protection Council	1995
Free Zone Law (Law No.4)	Free Zone Authority	1993
Law No. 10 Maritime Law	MFW	1988
Law No. 2 on Amendment of Law No. 8 of 1970	MFW	1972
Law No. 24 on Organising Fishing and Exploitation of Aquatic Living Organisms and their Protection issued on 22/10/79 Published in the Gazette No. 50 on 13/12/79	MFW	1979
Law No. 45 on Territorial Sea, EEZ, Continental Shelf and other Sea Areas - Gazette issue 51 on 22/12/1977. This law was issued on 17/12/1977	MFW	1977
Law No. 6 concerning the Protection of the Marine Environment against Pollution	MFW	1980
Law No. 8 on Territorial Water and the Continental Shelf of the Republic of South Yemen 9/2/70 Published in the Gazette issue 14 on 2/4/1970	MFW	1970
Maritime Law for the Republic of Yemen (Presidential Decree No. 5)	Public Corporation for Maritime Affairs	1995
Ministerial Decree for Specifications of Fishing Vessels and Gear (No. 101)	Ministry of Fish Wealth	1995
Presidential Resolution on Fishing, Exploitation and Protection of Living Aquatic Resources (Law No. 42)	Ministry of Fish Wealth	1991
Presidential Resolution on the Territorial Sea, Adjacent Waters, the Exclusive Economic Zone and the Continental Shelf (Law No. 37)	Ministry of Defence, MFW	1991
Prime Ministerial Decree No. 4 of 1996 establishing Socotra as a protected area	Ministry of Planning and Development	1996
Protection of the Marine Environment from Pollution (Presidential Decree No. 11)	Public Corporation for Maritime Affairs	1993

SOMALIA

Law, Ordinance, Regulation	Government Agency Concerned	Year (in force)
Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region	In abeyance	1988
Convention on International Trade in Endangered Species of Wild Fauna and Flora;	In abeyance	1985
Convention on the Conservation of Migratory Species of Wild Animals	In abeyance	1986
Fisheries Law No. 13	Ministry of Fisheries and Marine Resources	1985
Joint venture guideline and the National Fisheries Law	Ministry of Fisheries and Marine Resources	1985
Law on Somali territorial sea and ports, No. 37	Ministry of Marine Transport and Ports	1972
Maritime Code (Basic marine fisheries legislation)	Ministry of Marine Transport and Ports	1959
Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region	In abeyance	1988
Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region	In abeyance	1988
Protocol Concerning Regional Co-operation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency	In abeyance	1988
Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment	In abeyance	1988
Sewage and Drainage Law No. 3	Water Development Agency	1983
Tourism Development Act	Ministry of Tourism	1984
United Nations Convention on the Law of the Sea	In abeyance	1989

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