



# Supplementary Appendixes of the Report and Recommendation of the President to the Board of Directors

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Project Number: 33418  
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Proposed Loan and Technical Assistance Grant  
Kingdom of Cambodia: Tonle Sap Environmental  
Management Project

Asian Development Bank

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## TONLE SAP INLAND FISHERIES SECTOR ANALYSIS<sup>1</sup>

### A. Fish Production

1. Cambodia's geography favors inland fisheries, whose production of over 400,000 tons per annum is the fourth largest in the world (after the People's Republic of China, India, and Bangladesh). The value of catch at landing sites is estimated at about \$200 million, while its retail value is reckoned at \$300 million, at least. Estimates of exports are unreliable but exceed 50,000 tons per annum, mainly to Thailand. At about 230,000 tons, the annual catch from the Tonle Sap is substantial and plays an important role largely through subsistence fishing. More than 100 species occur regularly in catches and up to 200 species have been recorded in the Tonle Sap. No species are found only in the Tonle Sap but there are some Mekong endemics.

### B. Population and Food Security

2. More than 1.2 million people in the Tonle Sap region depend on fishing and fish products for their livelihood: a socioeconomic survey of 4.2 million people in central Cambodia estimated that average fish consumption was 67 kilograms (kg) per person per annum, in fresh weight equivalents (1995–1996).<sup>2</sup> (Nationwide fish consumption is about 40 kg per person per annum.) As a result, fish provides 40–70% of the protein intake of Cambodia's population. Fresh fish or fish products are still very cheap and affordable and are, after rice, the most important food item that people spend money on. Most of the fish caught is consumed directly, or processed without much value adding. No other readily available and cheap source of food can replace it in the diet of the Cambodian people.

### C. Fish Catch Rates

3. Overall, catches are higher now than in the past, although individual catch rates have declined because the increase in population and number of fishers has outstripped the increase in catch. Understandably, fishers perceive the strong decrease in the catch rate as overfishing. Overall, however, there is no overfishing and, if fishing pressure increased further, one would expect the catch to continue to increase, at least for a while. However, the situation is more complicated at the species level: the composition of fish catches is changing, with a decline in catches of larger, high value species.

**Table A.1: The Tonle Sap's Fisheries**

Period	Cambodian Population	Tone Sap Fishing Population	Increase in Tonle Sap Fishing Population	Tonle Sap Fish Catch (tons)	Increase in Tonle Sap Fish Catch	Tonle Sap Fish Catch/ Fisher/ Year	Decline in Tonle Sap Fish Catch/ Fisher
1940s	3,200,000	360,000		125,000		347 kg	
1995–1996	10,700,000	1,200,000	3.3 x	235,000	1.9 x	196 kg	44%

Source: N. van Zalinge. 2002. *Update of the Status of the Cambodian Inland Capture Fisheries Sector, with Special Reference to the Tonle Sap Great Lake.*

<sup>1</sup> See also R. Shouten. 2001. Current Situation of the Fisheries Sector. Background paper toward the final report of REG-5822: *Protection and Management of Critical Wetlands in the Lower Mekong Basin*; and Oxfam. 2000. *Inland Aquatic Resources and Livelihoods in Cambodia: A Guide to the Literature, Legislation, Institutional Framework and Recommendations*, prepared by W. Gum.

<sup>2</sup> The national average for rice is 151 kg.

## 1. Long-Distance Migratory Species

4. Long-distance migratory species, or "white" fish, make up more than 60% of the total catch. Annually, migrations take place between the spawning areas in the Mekong in southern Laos and north-eastern Cambodia and the floodplains around the Tonle Sap, south of Phnom Penh and the Vietnamese Mekong delta and back.

- (i) **Larger fish species.** Larger fish species tend to spawn later in life. Many species have strongly declined, some nearly to extinction, such as the famous giant Mekong River catfish. This fish is reported to spawn for the first time when it is about 20 years old. Its weight is then 160 kg or more. Clearly, very few individuals survive the heavy fishing pressure long enough to reach sexual maturity: in 2000, 11 giant Mekong River catfish were caught; only 7 were caught in 2001. Thus, the later in life a species matures, the more vulnerable it is to overfishing.
- (ii) **Smaller fish species.** Smaller fish species are early spawners. Most have not declined and such fish dominates present catches. Good examples are Cyprinidae (minnows and carps), which spawn for the first time when about 1 year old. Such species could be fished harder and are not overfished.

## 2. Short-Distance Migratory Species

5. Short-distance migratory species, or "black" fish, make up 40% of the total catch. Their movements are more limited than those of "white" fish and they travel between the flooded forest and the Tonle Sap or Tonle Sap River. Probably, stocks have not declined as "black" fish does not face the pressures that long-distance migratory species do. Snakeheads are the most important species and the most valuable part of the catch in fishing lots. However, due to the reduction of larger "black" fish species in the catch and the shift to smaller sizes, average value per kilogram has decreased. Thus, not only has the catch rate per fisher dropped but the value of the catch per fisher has diminished as well. Nevertheless, the overall tonnage of fish caught is still increasing. A number of larger "black" fish species are overfished but most smaller species are not.

## D. Fisheries Management

6. Cambodian inland fisheries can be categorized into:

- **Limited access fisheries.** The most productive part of the Cambodian inland fisheries domain has been privatized for more than a century through a system of Government leases, the "fishing lots". However, nowadays less than half remains. The other part is open-access. In the recent past the lot system provided annually over \$2 million in tax revenues, and more in an informal way. The open-access fisheries, however, do not contribute to public taxes. Fishing lots vary from a simple anchoring position in the Tonle Sap River to a large piece of floodplain (the largest lot on the Tonle Sap extends over 500 square kilometers). Their value depends on the perceived fish production. Many fishing lots occupy relatively large areas of floodplain. The fishing lots of the Tonle Sap contain mostly natural habitats, but there are also rice fields and sometimes villages in them. The natural habitats comprise flood forests, shrub forest, and grasslands, which are essential to the feeding and breeding of many fish species.
- **Open-access fisheries.** Open-access fisheries have grown strongly in the past two decades and have contributed to the recent increase in fishing pressure. They comprise (i) middle-scale fisheries, which require licensing of fishing gear

such as gillnets, seines, and arrow-shaped traps, (ii) small-scale (family) fisheries, which allow the use of smaller fishing gear such as small castnets, small dipnets, small gillnets, and certain traps, and (iii) illegal fisheries, which are characterized by the use of illegal gears and methods such as brush parks, explosives, poisons, and electric gears. Open-access has led to a rapid expansion of fishing effort in waters outside the lots. Catch rates have been falling and this has exacerbated conflict over fish resources between lot operators and local villagers. Conflict has occurred because of (i) different interpretations of the boundaries of the lot and the public access areas, (ii) conversion of flood forest for other uses (e.g., rice cultivation) by the villagers, (iii) illegal fishing operations by lot operators and villagers, and (iv) competing uses of water for fishing and irrigation.

7. The open fisheries season for the large and middle-scale fisheries of the Tonle Sap and the Tonle Sap River is from 1 October to 31 May. Before the 15 June, all fishing gear used in the fishing lots must be removed. The closed season for these fisheries is from 1 June to 30 September. Small-scale fisheries are allowed year round, except in fishing lots. In fishing lots, small-scale fisheries are allowed in the “closed” season of 1 June to 30 September. In some fishing lots, designated areas allow open access to small scale fisheries during the open season, as described and defined on maps in the burden book of each fishing lot.

**Table A.2: Fishing Season**

Type of Fisheries	8 Months per Year	4 Months per Year
	1 October to 31 May	1 June to 30 September
Small Scale Family Fisheries <sup>a</sup>	Open Season, Fishing Allowed <sup>b</sup>	Fishing Allowed
Middle Scale Fisheries <sup>a</sup>	Open Season, Fishing Allowed	Closed Season, Fishing Prohibited
Large Scale Fisheries <sup>a</sup>	Open Season, Fishing Allowed	Closed Season, Fishing Prohibited

<sup>a</sup> Year round, no fisheries are allowed in fish sanctuaries.

<sup>b</sup> Small-scale fisheries are not allowed in fishing lots from 1 October to 31 May, unless stated otherwise in the burden book.

## **E. Illustration of Fisheries Conflicts**

8. Conflicts, intimidation, and violence have escalated in recent years as more compete over a limited resource. Conflict has occurred between fishing lot employees, local communities, local authorities, the military, and the police. Its forms have been protests, arrests, petitions, confiscation of fishing gear, injuries, and killings of fisher folk and fisheries officers. All are widely reported in the media. However, since nongovernment organizations—not central authorities—tend to be the focus for complaints in the absence of good governance, it is not possible to assess accurately the scale of abuses. Conflicts rarely come to court for resolution and evidence is not often brought forward for investigation.

**Box: History of Main Events in Inland Fisheries, 1999–2001**

- (i) In the late 1990s, violent incidents, including killings, begin to occur in the Tonle Sap region. They involve fisheries officers, fishing lot operators, local officials, the military, and fishers.
- (ii) In 1998, a fisheries officer is shot and killed while investigating illegal catch and trade of fingerlings.
- (iii) In June 1999, the Prime Minister issues a “Proclamation on the Anarchy in Fisheries”. He orders military and navy detachments to stop preventing access to fishing grounds and to halt destructive fishing practices such as the use of explosives.
- (iv) In 2000, the Department of Fisheries within the Ministry of Agriculture, Forestry, and Fisheries alters the fishing lot auction system. Rights to fishing lots are sold without auction to former fishing lot owners at the price of the last auction plus 10%. Reforestation, dredging and digging of canals, research, as well as boundary demarcation are to be carried out by fishing lot operators under the banner of research, development, and rehabilitation,
- (v) Fishing communities from Battambang and Kompong Thom provinces protest in Phnom Penh against fishing lot operators who restrict the access of small-scale fishers to designated areas within fishing lots. In Siem Reap and Kompong Thom provinces, fishing lot operators expand the boundaries of fishing lots illegally.
- (vi) In late 2000, the Prime Minister dismisses key personnel of the Department of Fisheries and its provincial offices.
- (vii) In January 2001, the newly established Community Fisheries Development Office within the Department of Fisheries circulates a draft subdecree on community-based fisheries for comments. It expects that the subdecree will be approved by mid-2001.
- (viii) In January 2001, the Department of Fisheries reduces the fishing lot area by 56%. The area cut out is given over to communities for management.
- (ix) In February 2001, the Prime Minister signs a subdecree prohibiting the collection of fees for artisanal fisheries licenses.
- (x) In February 2001, the Acting Minister of Agriculture, Forestry, and Fisheries recalls all provincial and district level fisheries inspectors from the field. He instructs the Department of Fisheries to train provincial fisheries officers in management of community-based fisheries.
- (xi) On 18 February 2001, a representative of the World Conservation Society charges fishing lot operators in Battambang Province of preventing personnel of the Ministry of Environment from monitoring the nesting of Spot-billed Pelicans. The 1,500 strong pelican colony at Prek Toal is the only remaining breeding colony in Southeast Asia. The fishing lot operators of Battambang Province are also accused of disturbing the colony by allowing egg and chick collection. The representative predicts that the pelicans will not lay a second clutch that year. He expresses concerns about a possible collapse of the pelican colony.
- (xii) In March 2001, the Royal Decree on the Establishment and Management of the Tonle Sap Biosphere Reserve is submitted to King Norodom Sihanouk for signature. It is signed in April 2001.

## **F. Toward Improved Management**

9. Conflict is predicated on competing claims over the Tonle Sap's fisheries. These arise from commercial interest, a rapidly growing subsistence population, illegal fishing, and demand for agricultural land, water, and firewood. The Tonle Sap's fisheries are under threat and the inland fisheries sector needs to be reformed in integrated, cross-sectoral, and multidisciplinary fashion. The long-term goal of reform should be sustainable management and conservation of natural resources and biodiversity in the Tonle Sap Basin. In the immediate, it is necessary to enhance systems and develop capacity for natural resource management coordination and planning, community-based natural resource management, and biodiversity conservation.

## DETAILED COST TABLES

### Allocation of Loan Proceeds, (\$'000)

	Suggested Allocation of Loan Proceeds		Total Project Cost			Average Disbursement %			Loan Amounts				
	Loan Amount	Disbursement %	Total	Local	Foreign	Total	Local	Foreign	Total	Unallocated			
										Total	Local	Foreign	Total
1. Civil Works	292	65	496	322	174	65	46	100	321	29	13	16	292
2. Vehicles	628	58	1,201	625	576	58	37	79	691	63	21	42	628
3. Equipment	204	46	487	170	316	46	31	54	225	20	5	16	204
4. Training/Workshops	317	25	1,405	1,124	281	25	23	33	348	32	23	8	317
5. Consulting Services	-	-	-	-	-	-	-	-	-	-	-	-	-
6. International Consultants	3,322	71	5,155	-	5,155	71	-	71	3,654	332	-	332	3,322
7. Domestic Consultants	1,967	69	3,134	3,134	-	69	69	-	2,164	197	197	-	1,967
8. Local Contracts	1,497	66	2,484	1,379	1,106	66	43	96	1,647	150	54	96	1,497
9. Operation and Maintenance	1,456	40	3,930	3,072	858	40	29	77	1,562	106	46	60	1,456
10. Project Administration	-	-	769	769	-	-	-	-	-	-	-	-	-
Unallocated	929	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>10,612</b>	<b>56</b>	<b>19,062</b>	<b>10,596</b>	<b>8,466</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10,612</b>	<b>929</b>	<b>359</b>	<b>570</b>	<b>9,683</b>
Financial Charges During Implementation	298	100	298	-	298	100	-	100	298	-	-	-	298
<b>Total Costs to be Financed</b>	<b>10,910</b>	<b>56</b>	<b>19,360</b>	<b>10,596</b>	<b>8,764</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>10,910</b>	<b>929</b>	<b>359</b>	<b>570</b>	<b>9,981</b>

Loan amounts financed by ADB

## Components by Financiers, (\$'000)

	ADB		Global Environment Facility		Capacity 21		GOC		To
	Amount	%	Amount	%	Amount	%	Amount	%	Amount
<b>A. Strengthening Natural Resource Management Coordination &amp; Planning</b>									
1. Coordination Framework & Information Dissemination Mechanisms Established	1,967	85.5	-	-	-	-	333	14.5	2,300
2. The TSBR is Mapped	1,425	85.4	-	-	-	-	243	14.6	1,667
3. Regulation & Management Planning are Improved	133	35.9	-	-	192	51.6	46	12.5	371
4. Project Management	-	-	-	-	-	-	404	100.0	404
<b>Subtotal Strengthening Natural Resource Management Coordination &amp; Planning</b>	<b>3,525</b>	<b>74.3</b>	<b>-</b>	<b>-</b>	<b>192</b>	<b>4.0</b>	<b>1,026</b>	<b>21.6</b>	<b>4,742</b>
<b>B. Organizing Communities for Natural Resource Management</b>									
1. An Implementation Structure is Formulated	2,905	56.6	-	-	420	8.2	1,808	35.2	5,132
2. Communities are Empowered	3,708	91.4	-	-	-	-	349	8.6	4,057
3. Technical Packages are Evaluated	235	99.1	-	-	-	-	2	0.9	237
4. Project Management	-	-	-	-	-	-	227	100.0	227
<b>Subtotal Organizing Communities for Natural Resource Management</b>	<b>6,848</b>	<b>70.9</b>	<b>-</b>	<b>-</b>	<b>420</b>	<b>4.3</b>	<b>2,387</b>	<b>24.7</b>	<b>9,654</b>
<b>C. Building Management Capacity for Biodiversity Conservation</b>									
1. Capacity for Management is Enhanced	240	11.6	1,593	77.3	-	-	227	11.0	2,060
2. Systems for Monitoring & Management are Developed	-	-	1,705	96.1	-	-	70	3.9	1,774
3. Biodiversity Conservation Awareness, Education and Outreach are Promoted	-	-	632	91.2	-	-	61	8.8	693
4. Project Management	-	-	-	-	-	-	138	100.0	138
<b>Subtotal Building Management Capacity for Biodiversity Conservation</b>	<b>240</b>	<b>5.1</b>	<b>3,930</b>	<b>84.2</b>	<b>-</b>	<b>-</b>	<b>496</b>	<b>10.6</b>	<b>4,665</b>
<b>Total PROJECT COSTS</b>	<b>10,612</b>	<b>55.7</b>	<b>3,930</b>	<b>20.6</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.5</b>	<b>19,062</b>
Interest During Implementation	298	100	-	-	-	-	-	-	298
<b>Total Disbursement</b>	<b>10,910</b>	<b>56.4</b>	<b>3,930</b>	<b>20.3</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.2</b>	<b>19,360</b>

## Components Project Cost Summary

	(R Million)			(\$ '000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
<b>A. Strengthening Natural Resource Management Coordination &amp; Planning</b>								
1. Coordination Framework & Information Dissemination Mechanisms Established	3,226	4,644	7,870	827	1,191	2,018	59	12
2. The TSBR is Mapped	1,621	4,094	5,715	416	1,050	1,465	72	9
3. Regulation & Management Planning are Improved	745	542	1,287	191	139	330	42	2
4. Project Management	1,487	-	1,487	381	-	381	-	2
<b>Subtotal Strengthening Natural Resource Management Coordination &amp; Planning</b>	<b>7,079</b>	<b>9,280</b>	<b>16,359</b>	<b>1,815</b>	<b>2,380</b>	<b>4,195</b>	<b>57</b>	<b>25</b>
<b>B. Organizing Communities for Natural Resource Management</b>								
1. An Implementation Structure is Formulated	11,826	5,704	17,529	3,032	1,462	4,495	33	27
2. Communities are Empowered	8,005	5,664	13,669	2,053	1,452	3,505	41	21
3. Technical Packages are Evaluated	66	742	808	17	190	207	92	1
4. Project Management	835	-	835	214	-	214	-	1
<b>Subtotal Organizing Communities for Natural Resource Management</b>	<b>20,733</b>	<b>12,110</b>	<b>32,842</b>	<b>5,316</b>	<b>3,105</b>	<b>8,421</b>	<b>37</b>	<b>50</b>
<b>C. Building Management Capacity for Biodiversity Conservation</b>								
1. Capacity for Management is Enhanced	3,371	3,666	7,038	864	940	1,805	52	11
2. Systems for Monitoring & Management are Developed	3,412	2,640	6,052	875	677	1,552	44	9
3. Biodiversity Conservation Awareness, Education and Outreach are Promoted	1,263	1,086	2,349	324	278	602	46	4
4. Project Management	507	-	507	130	-	130	-	1
<b>Subtotal Building Management Capacity for Biodiversity Conservation</b>	<b>8,553</b>	<b>7,392</b>	<b>15,945</b>	<b>2,193</b>	<b>1,895</b>	<b>4,088</b>	<b>46</b>	<b>24</b>
<b>Total BASELINE COSTS</b>	<b>36,364</b>	<b>28,782</b>	<b>65,146</b>	<b>9,324</b>	<b>7,380</b>	<b>16,704</b>	<b>44</b>	<b>100</b>
Physical Contingencies	2,867	2,878	5,745	735	738	1,473	50	9
Price Contingencies	4,466	2,875	7,341	536	348	884	39	5
<b>Total PROJECT COSTS</b>	<b>43,697</b>	<b>34,536</b>	<b>78,233</b>	<b>10,596</b>	<b>8,466</b>	<b>19,062</b>	<b>44</b>	<b>114</b>
Interest During Implementation	-	1,212	1,212	-	298	298	100	2
<b>Total Costs to be Financed</b>	<b>43,697</b>	<b>35,748</b>	<b>79,445</b>	<b>10,596</b>	<b>8,764</b>	<b>19,360</b>	<b>45</b>	<b>116</b>

## Expenditure Accounts by Years—Base Costs, (\$'000)

	(R Million)			(\$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exchange	Base Costs
<b>I. Investment Costs</b>								
<b>A. Civil Works</b>								
Contracts	1,105	595	1,700	283	153	436	35	3
<b>B. Equipment</b>								
Office Equipment	435	809	1,244	112	207	319	65	2
Other equipment	150	279	429	39	72	110	65	1
<b>Subtotal Equipment</b>	586	1,088	1,673	150	279	429	65	3
<b>C. Vehicles</b>								
Vehicles	764	796	1,560	196	204	400	51	2
Motorcycles	405	753	1,158	104	193	297	65	2
Boats	969	415	1,385	249	107	355	30	2
<b>Subtotal Vehicles</b>	2,139	1,964	4,103	548	504	1,052	48	6
D. Training/Workshops /a	3,758	939	4,697	964	241	1,204	20	7
E. Training Contracts	-	-	-	-	-	-	-	-
F. Workshops	-	-	-	-	-	-	-	-
<b>G. Consulting Services /b</b>								
International Consultants	-	17,566	17,566	-	4,504	4,504	100	27
Domestic Consultants	10,614	-	10,614	2,722	-	2,722	-	16
<b>Subtotal Consulting Services</b>	10,614	17,566	28,180	2,722	4,504	7,226	62	43
<b>H. Local Contracts</b>								
Surveys, Investigations, and NGO & Other Contracts /c	3,876	1,292	5,168	994	331	1,325	25	8
Aerial photography & mapping	829	2,486	3,315	213	638	850	75	5
<b>Subtotal Local Contracts</b>	4,704	3,778	8,483	1,206	969	2,175	45	13
<b>I. Operating and Maintenance</b>								
Operation and Maintenance /d	4,863	-	4,863	1,247	-	1,247	-	7
Office Operations	2,776	1,495	4,271	712	383	1,095	35	7
Vehicle Operation /e	1,845	1,230	3,075	473	315	789	40	5
Field Operations /f	1,146	127	1,273	294	33	326	10	2
<b>Subtotal Operating and Maintenance</b>	10,630	2,852	13,482	2,726	731	3,457	21	21
J. Project Administration	2,829	-	2,829	725	-	725	-	4
<b>Total BASELINE COSTS</b>	36,364	28,782	65,146	9,324	7,380	16,704	44	100
Physical Contingencies	2,867	2,878	5,745	735	738	1,473	50	9
Price Contingencies	4,466	2,875	7,341	536	348	884	39	5
<b>Total PROJECT COSTS</b>	43,697	34,536	78,233	10,596	8,466	19,062	44	114
Interest During Implementation	-	1,212	1,212	-	298	298	100	2
<b>Total Costs to be Financed</b>	43,697	35,748	79,445	10,596	8,764	19,360	45	116

\a Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

\b Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

\c Covers surveys & investigations, preparation of training & educational programs, and progress audits.

\d Includes salary and per diem of incremental staff.

\e Covers vehicles, motorcycles, and boats.

\f Covers field travel and other related costs where these are not covered by standard Government allowances.

## Expenditure Accounts Breakdown

	(R Million)			(\$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exchange	Base Costs
<b>I. Investment Costs</b>								
<b>A. Civil Works</b>								
Contracts	1,105	595	1,700	283	153	436	35	3
<b>B. Equipment</b>								
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D. Training/Workshops /a	3,758	939	4,697	964	241	1,204	20	7
E. Training Contracts	-	-	-	-	-	-	-	-
F. Workshops	-	-	-	-	-	-	-	-
<b>G. Consulting Services /b</b>								
International Consultants	-	17,566	17,566	-	4,504	4,504	100	27
Domestic Consultants	10,614	-	10,614	2,722	-	2,722	-	16
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<b>Subtotal Local Contracts</b>	4,704	3,778	8,483	1,206	969	2,175	45	13
<b>I. Operating and Maintenance</b>								
Operation and Maintenance /d	4,863	-	4,863	1,247	-	1,247	-	7
Office Operations	2,776	1,495	4,271	712	383	1,095	35	7
Vehicle Operation /e	1,845	1,230	3,075	473	315	789	40	5
Field Operations /f	1,146	127	1,273	294	33	326	10	2
<b>Subtotal Operating and Maintenance</b>	10,630	2,852	13,482	2,726	731	3,457	21	21
J. Project Administration	2,829	-	2,829	725	-	725	-	4
<b>Total BASELINE COSTS</b>	36,364	28,782	65,146	9,324	7,380	16,704	44	100
Physical Contingencies	2,867	2,878	5,745	735	738	1,473	50	9
Price Contingencies	4,466	2,875	7,341	536	348	884	39	5
<b>Total PROJECT COSTS</b>	43,697	34,536	78,233	10,596	8,466	19,062	44	114
Interest During Implementation	-	1,212	1,212	-	298	298	100	2
<b>Total Costs to be Financed</b>	43,697	35,748	79,445	10,596	8,764	19,360	45	116

\a Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

\b Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

\c Covers surveys & investigations, preparation of training & educational programs, and progress audits.

\d Includes salary and per diem of incremental staff.

\e Covers vehicles, motorcycles, and boats.

\f Covers field travel and other related costs where these are not covered by standard Government allowances.

### Expenditure Accounts by Financiers

	ADB		Global Environment Facility				Capacity 21		GOC		Total		For. Exch.	Local (Excl. Taxes)	Duties & Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%			
<b>I. Investment Costs</b>															
<b>A. Civil Works</b>															
Contracts	321	64.8	-	-	-	-	175	35.2	496	2.6	174	248	74		
<b>B. Equipment</b>															
Office Equipment	225	61.9	75	20.7	9	2.3	54	15.0	362	1.9	236	72	54		
Other equipment	-	-	106	85.0	-	-	19	15.0	124	0.6	81	25	19		
<b>Subtotal Equipment</b>	225	46.1	181	37.1	9	1.7	73	15.0	487	2.5	316	97	73		
<b>C. Vehicles</b>															
Vehicles	203	45.1	71	15.8	14	3.2	162	36.0	451	2.3	230	59	162		
Motorcycles	246	71.2	23	6.8	-	-	76	22.0	345	1.8	225	45	76		
Boats	242	59.8	82	20.2	-	-	81	20.0	404	2.1	121	202	81		
<b>Subtotal Vehicles</b>	691	57.5	176	14.7	14	1.2	319	26.6	1,201	6.2	576	306	319		
D. Training/Workshops	348	24.8	441	31.4	358	25.5	257	18.3	1,405	7.3	281	913	211		
E. Training Contracts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
F. Workshops	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>G. Consulting Services</b>															
International Consultants	3,654	70.9	1,501	29.1	-	-	-	-	5,155	26.6	5,155	-	-		
Domestic Consultants	2,164	69.0	970	31.0	-	-	-	-	3,134	16.2	-	3,134	-		
<b>Subtotal Consulting Services</b>	5,818	70.2	2,471	29.8	-	-	-	-	8,289	42.8	5,155	3,134	-		
<b>H. Local Contracts</b>															
Surveys, Investigations, and NGO & Other Contracts	823	54.3	96	6.3	73	4.8	524	34.6	1,515	7.8	379	909	227		
Aerial photography & mapping	824	85.0	-	-	-	-	145	15.0	969	5.0	727	97	145		
<b>Subtotal Local Contracts</b>	1,647	66.3	96	3.9	73	2.9	669	26.9	2,484	12.8	1,106	1,006	373		
<b>I. Operating and Maintenance</b>															
Operation and Maintenance	547	40.8	162	12.1	83	6.2	547	40.8	1,338	6.9	-	1,338	-		
Office Operations	510	39.9	184	14.4	37	2.9	549	42.9	1,279	6.6	448	639	192		
Vehicle Operation	342	36.7	198	21.2	13	1.4	379	40.7	932	4.8	373	419	140		
Field Operations	164	43.0	21	5.4	25	6.5	172	45.1	381	2.0	38	286	57		
<b>Subtotal Operating and Maintenance</b>	1,562	39.7	564	14.4	158	4.0	1,646	41.9	3,930	20.3	858	2,683	389		
J. Project Administration	-	-	-	-	-	-	769	100.0	769	4.0	-	769	-		
<b>Total PROJECT COSTS</b>	10,612	55.7	3,930	20.6	611	3.2	3,909	20.5	19,062	98.5	8,466	9,157	1,439		
Interest During Implementation	298	100.0	-	-	-	-	-	-	298	1.5	298	-	-		
<b>Total Disbursement</b>	10,910	56.4	3,930	20.3	611	3.2	3,909	20.2	19,360	100.0	8,764	9,157	1,439		

## Expenditure Accounts by Years—Base Costs

	Base Cost					Foreign Exchange		
	2003	2004	2005	2006	2007	Total	%	Amount
<b>I. Investment Costs</b>								
<b>A. Civil Works</b>								
Contracts	36	400	-	-	-	436	35.0	153
<b>B. Equipment</b>								
Office Equipment	117	163	20	10	10	319	65.0	207
Other equipment	45	65	-	-	-	110	65.0	72
<b>Subtotal Equipment</b>	162	228	20	10	10	429	65.0	279
<b>C. Vehicles</b>								
Vehicles	180	220	-	-	-	400	51.0	204
Motorcycles	27	180	-	-	90	297	65.0	193
Boats	15	340	-	-	-	355	30.0	107
<b>Subtotal Vehicles</b>	222	740	-	-	90	1,052	47.9	504
D. Training/Workshops /a	116	345	386	183	175	1,204	20.0	241
E. Training Contracts	-	-	-	-	-	-	-	-
F. Workshops	-	-	-	-	-	-	-	-
<b>G. Consulting Services /b</b>								
International Consultants	677	2,408	1,420	-	-	4,504	100.0	4,504
Domestic Consultants	107	1,481	1,048	43	43	2,722	-	-
<b>Subtotal Consulting Services</b>	783	3,889	2,468	43	43	7,226	62.3	4,504
<b>H. Local Contracts</b>								
Surveys, Investigations, and NGO & Other Contracts /c	50	1,163	38	38	38	1,325	25.0	331
Aerial photography & mapping	-	850	-	-	-	850	75.0	638
<b>Subtotal Local Contracts</b>	50	2,013	38	38	38	2,175	44.5	969
<b>I. Operating and Maintenance</b>								
Operation and Maintenance /d	30	293	308	308	308	1,247	-	-
Office Operations	219	219	219	219	219	1,095	35.0	383
Vehicle Operation /e	19	183	187	187	212	789	40.0	315
Field Operations /f	63	66	66	66	66	326	10.0	33
<b>Subtotal Operating and Maintenance</b>	332	762	780	780	805	3,457	21.2	731
J. Project Administration	168	124	161	111	161	725	-	-
<b>Total BASELINE COSTS</b>	1,868	8,499	3,852	1,164	1,321	16,704	44.2	7,380
Physical Contingencies	167	808	338	74	85	1,473	50.1	738
<b>Price Contingencies</b>								
<b>Inflation</b>								
Local	21	343	302	184	263	1,112	-	-
Foreign	14	167	113	20	34	348	100.0	348
<b>Subtotal Inflation</b>	35	509	414	204	297	1,459	23.8	348
Devaluation	-10	-172	-158	-97	-139	-575	-	-
Subtotal Price Contingencies	24	338	256	107	159	884	39.3	348
<b>Total PROJECT COSTS</b>	2,060	9,645	4,446	1,345	1,565	19,062	44.4	8,466
Taxes	193	803	160	126	156	1,439	-	-
Foreign Exchange	1,151	4,765	1,958	251	340	8,466	-	-

/a Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

/b Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

/c Covers surveys & investigations, preparation of training & educational programs, and progress audits.

/d Includes salary and per diem of incremental staff.

/e Covers vehicles, motorcycles, and boats.

/f Covers field travel and other related costs where these are not covered by standard Government allowances.

## Expenditure Accounts by Components—Base Costs

	Strengthening Natural Resource Management								Building Management Capacity for Biodiversity Conservation					Physical Contingencies	
	Coordination & Planning				Organizing Communities for Natural Resource Management				Systems for Biodiversity Conservation Awareness, Education and Outreach						
	Coordination Framework & Information Dissemination Mechanisms Established	Regulation Management	Planning	Project Management	An Implementation Structure Formulated	Communities are Empowered	Technical Packages are Evaluated	Project Management	Capacity for Management is Enhanced	Monitoring & Management are Developed	Biodiversity Conservation Awareness, Education and Outreach are Promoted	Project Management	Total	%	Amount
	is Mapped	are Improved			is Formulated	are Empowered	are Evaluated		is Enhanced	are Developed	are Promoted				
<b>I. Investment Costs</b>															
<b>A. Civil Works</b>															
Contracts	-	-	-	-	144	-	-	-	292	-	-	-	436	10.0	44
<b>B. Equipment</b>															
Office Equipment	85	20	9	-	68	60	-	-	75	3	-	-	319	10.0	32
Other equipment	-	-	-	-	-	-	-	-	45	65	-	-	110	10.0	11
<b>Subtotal Equipment</b>	85	20	9	-	68	60	-	-	120	68	-	-	429	10.0	43
<b>C. Vehicles</b>															
Vehicles	60	-	20	-	220	-	-	-	100	-	-	-	400	10.0	40
Motorcycles	-	-	-	-	270	-	-	-	27	-	-	-	297	10.0	30
Boats	40	-	-	-	225	-	-	-	-	30	60	-	355	10.0	36
<b>Subtotal Vehicles</b>	100	-	20	-	715	-	-	-	127	30	60	-	1,052	10.0	105
D. Training/Workshops /a	160	-	37	-	355	199	8	-	69	214	163	-	1,204	10.0	120
E. Training Contracts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F. Workshops	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>G. Consulting Services /b</b>															
International Consultants	978	366	86	-	359	1,211	189	-	568	552	195	-	4,504	10.0	450
Domestic Consultants	275	63	-	-	141	1,385	11	-	210	561	76	-	2,722	10.0	272
<b>Subtotal Consulting Services</b>	1,253	429	86	-	500	2,596	200	-	778	1,113	271	-	7,226	10.0	723
<b>H. Local Contracts</b>															
Surveys, Investigations, and NGO & Other Contracts /c	-	-	-	-	575	650	-	-	-	30	70	-	1,325	10.0	133
Aerial photography & mapping	-	850	-	-	-	-	-	-	-	-	-	-	850	10.0	85
<b>Subtotal Local Contracts</b>	-	850	-	-	575	650	-	-	-	30	70	-	2,175	10.0	218
<b>I. Operating and Maintenance</b>															
Operation and Maintenance /d	139	54	78	-	826	-	-	-	107	43	-	-	1,247	-	-
Office Operations	131	87	62	-	630	-	-	-	185	-	-	-	1,095	10.0	110
Vehicle Operation /e	75	-	13	-	503	-	-	-	105	54	38	-	789	10.0	79
Field Operations /f	75	25	25	-	181	-	-	-	21	-	-	-	326	10.0	33
<b>Subtotal Operating and Maintenance</b>	420	166	178	-	2,139	-	-	-	418	97	38	-	3,457	6.4	221
J. Project Administration	-	-	-	381	-	-	-	214	-	-	-	130	725	-	-
<b>Total BASELINE COSTS</b>	2,018	1,465	330	381	4,495	3,505	207	214	1,805	1,552	602	130	16,704	8.8	1,473
Physical Contingencies	188	141	25	-	367	350	21	-	170	151	60	-	1,473	-	-
<b>Price Contingencies</b>															
<b>Inflation</b>															
Local	96	37	23	49	391	245	1	28	94	92	37	17	1,112	-	-
Foreign	48	41	5	-	80	85	9	-	40	28	13	-	348	-	-
<b>Subtotal Inflation</b>	144	78	28	49	471	330	10	28	133	120	50	17	1,459	-	-
Devaluation	-50	-17	-12	-26	-201	-129	-1	-15	-48	-48	-19	-9	-575	-	-
<b>Subtotal Price Contingencies</b>	94	61	16	23	271	201	9	13	85	72	31	8	884	7.7	68
<b>Total PROJECT COSTS</b>	2,300	1,667	371	404	5,132	4,057	237	227	2,060	1,774	693	138	19,062	8.1	1,541
Taxes	125	168	33	-	639	158	1	-	184	70	61	-	1,439	9.1	131
Foreign Exchange	1,357	1,196	158	-	1,689	1,682	218	-	1,074	773	319	-	8,466	9.1	770

la Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

lb Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

lc Covers surveys & investigations, preparation of training & educational programs, and progress audits.

ld Includes salary and per diem of incremental staff.

le Covers vehicles, motorcycles, and boats.

lf Covers field travel and other related costs where these are not covered by standard Government allowances.

## Expenditure Accounts by Components—Totals Including Contingencies

	Strengthening Natural Resource Management								Building Management Capacity for Biodiversity Conservation					Total
	Coordination & Planning				Organizing Communities for Natural Resource Management				Systems for Biodiversity Conservation					
	Coordination Framework & Information Dissemination Mechanisms	Regulation & Management Planning	Project	Project	An Implementation Structure is Formulated	Communities are Empowered	Technical Packages are Evaluated	Project	Capacity for Management is Enhanced	Monitoring & Management are Developed	Biodiversity Conservation Awareness, Education and Outreach are Promoted	Project		
	Established	The TSBR is Mapped	Improved	Management	is	are	are	Management	is	are	are	Management		
<b>I. Investment Costs</b>														
<b>A. Civil Works</b>														
Contracts	-	-	-	-	163	-	-	-	333	-	-	-	496	
<b>B. Equipment</b>														
Office Equipment	95	22	10	-	77	70	-	-	85	3	-	-	362	
Other equipment	-	-	-	-	-	-	-	-	51	73	-	-	124	
<b>Subtotal Equipment</b>	95	22	10	-	77	70	-	-	137	76	-	-	487	
<b>C. Vehicles</b>														
Vehicles	67	-	22	-	251	-	-	-	111	-	-	-	451	
Motorcycles	-	-	-	-	315	-	-	-	30	-	-	-	345	
Boats	46	-	-	-	256	-	-	-	-	34	68	-	404	
<b>Subtotal Vehicles</b>	112	-	22	-	823	-	-	-	141	34	68	-	1,201	
D. Training/Workshops /a	186	-	41	-	416	233	9	-	80	247	192	-	1,405	
E. Training Contracts	-	-	-	-	-	-	-	-	-	-	-	-	-	
F. Workshops	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>G. Consulting Services /b</b>														
International Consultants	1,113	416	98	-	408	1,403	216	-	649	630	222	-	5,155	
Domestic Consultants	315	72	-	-	161	1,603	13	-	241	643	87	-	3,134	
<b>Subtotal Consulting Services</b>	1,429	488	98	-	569	3,006	229	-	889	1,273	309	-	8,289	
<b>H. Local Contracts</b>														
Surveys, Investigations, and NGO & Other Contracts /c	-	-	-	-	655	747	-	-	-	34	78	-	1,515	
Aerial photography & mapping	-	969	-	-	-	-	-	-	-	-	-	-	969	
<b>Subtotal Local Contracts</b>	-	969	-	-	655	747	-	-	-	34	78	-	2,484	
<b>I. Operating and Maintenance</b>														
Operation and Maintenance /d	149	58	83	-	887	-	-	-	115	47	-	-	1,338	
Office Operations	153	102	72	-	736	-	-	-	216	-	-	-	1,279	
Vehicle Operation /e	88	-	15	-	595	-	-	-	123	64	45	-	932	
Field Operations /f	88	29	29	-	211	-	-	-	24	-	-	-	381	
<b>Subtotal Operating and Maintenance</b>	478	188	200	-	2,429	-	-	-	479	111	45	-	3,930	
J. Project Administration	-	-	-	404	-	-	-	227	-	-	-	138	769	
<b>Total PROJECT COSTS</b>	2,300	1,667	371	404	5,132	4,057	237	227	2,060	1,774	693	138	19,062	
Taxes	125	168	33	-	639	158	1	-	184	70	61	-	1,439	
Foreign Exchange	1,357	1,196	158	-	1,689	1,682	218	-	1,074	773	319	-	8,466	

/a Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

/b Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

/c Covers surveys & investigations, preparation of training & educational programs, and progress audits.

/d Includes salary and per diem of incremental staff.

/e Covers vehicles, motorcycles, and boats.

/f Covers field travel and other related costs where these are not covered by standard Government allowances.

**Expenditure Accounts by Years—Totals Including Contingencies**

	Totals Including Contingencies					Total
	2003	2004	2005	2006	2007	
<b>I. Investment Costs</b>						
<b>A. Civil Works</b>						
Contracts	40	456	-	-	-	496
<b>B. Equipment</b>						
Office Equipment	130	185	23	12	12	362
Other equipment	50	74	-	-	-	124
<b>Subtotal Equipment</b>	180	259	23	12	12	487
<b>C. Vehicles</b>						
Vehicles	200	251	-	-	-	451
Motorcycles	30	205	-	-	110	345
Boats	17	388	-	-	-	404
<b>Subtotal Vehicles</b>	247	844	-	-	110	1,201
D. Training/Workshops	129	393	450	218	214	1,405
E. Training Contracts	-	-	-	-	-	-
F. Workshops	-	-	-	-	-	-
<b>G. Consulting Services</b>						
International Consultants	753	2,745	1,657	-	-	5,155
Domestic Consultants	119	1,688	1,223	51	52	3,134
<b>Subtotal Consulting Services</b>	872	4,433	2,881	51	52	8,289
<b>H. Local Contracts</b>						
Surveys, Investigations, and NGO & Other Contracts	56	1,325	44	45	46	1,515
Aerial photography & mapping	-	969	-	-	-	969
<b>Subtotal Local Contracts</b>	56	2,294	44	45	46	2,484
<b>I. Operating and Maintenance</b>						
Operation and Maintenance	30	304	327	334	342	1,338
Office Operations	244	250	256	262	268	1,279
Vehicle Operation	21	209	218	223	260	932
Field Operations	71	75	77	79	80	381
<b>Subtotal Operating and Maintenance</b>	366	838	877	898	951	3,930
J. Project Administration	170	128	171	121	179	769
<b>Total PROJECT COSTS</b>	2,060	9,645	4,446	1,345	1,565	19,062

## Expenditure Accounts Breakdown

	Base Cost				Physical Contingencies				Price Contingencies				Total Incl. Cont.				Base Costs + Price Cont. on Base Costs	Physical Cont. Plus Price Cont. on Physical Cont.	
	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total			
<b>I. Investment Costs</b>																			
<b>A. Civil Works</b>																			
Contracts	153	218	65	436	15	22	7	44	6	8	2	16	174	248	74	496	451	45	
<b>B. Equipment</b>																			
Office Equipment	207	64	48	319	21	6	5	32	8	2	2	12	236	72	54	362	330	33	
Other equipment	72	22	17	110	7	2	2	11	2	1	0	3	81	25	19	124	113	11	
<b>Subtotal Equipment</b>	279	86	64	429	28	9	6	43	10	3	2	15	316	97	73	487	442	44	
<b>C. Vehicles</b>																			
Vehicles	204	52	144	400	20	5	14	40	6	1	4	11	230	59	162	451	410	41	
Motorcycles	193	39	65	297	19	4	7	30	12	2	4	19	225	45	76	345	314	31	
Boats	107	178	71	355	11	18	7	36	4	7	3	14	121	202	81	404	368	37	
<b>Subtotal Vehicles</b>	504	268	280	1,052	50	27	28	105	22	11	11	44	576	306	319	1,201	1,092	109	
<b>D. Training/Workshops /a</b>	241	783	181	1,204	24	78	18	120	16	52	12	80	281	913	211	1,405	1,277	128	
<b>E. Training Contracts</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>F. Workshops</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>G. Consulting Services /b</b>																			
International Consultants	4,504	-	-	4,504	450	-	-	450	201	-	-	201	5,155	-	-	5,155	4,686	469	
Domestic Consultants	-	2,722	-	2,722	-	272	-	272	-	140	-	140	-	3,134	-	3,134	2,849	285	
<b>Subtotal Consulting Services</b>	4,504	2,722	-	7,226	450	272	-	723	201	140	-	341	5,155	3,134	-	8,289	7,536	754	
<b>H. Local Contracts</b>																			
Surveys, Investigations, and NGO & Other Contracts /c	331	795	199	1,325	33	80	20	133	14	35	9	58	379	909	227	1,515	1,378	138	
Aerial photography & mapping	638	85	128	850	64	9	13	85	25	3	5	34	727	97	145	969	881	88	
<b>Subtotal Local Contracts</b>	969	880	326	2,175	97	88	33	218	40	38	14	92	1,106	1,006	373	2,484	2,258	226	
<b>I. Operating and Maintenance</b>																			
Operation and Maintenance /d	-	1,247	-	1,247	-	-	-	-	-	91	-	91	-	1,338	-	1,338	1,338	-	
Office Operations	383	548	164	1,095	38	55	16	110	26	37	11	74	448	639	192	1,279	1,163	116	
Vehicle Operation /e	315	355	118	789	32	35	12	79	26	29	10	64	373	419	140	932	847	85	
Field Operations /f	33	245	49	326	3	24	5	33	2	17	3	22	38	286	57	381	347	35	
<b>Subtotal Operating and Maintenance</b>	731	2,394	331	3,457	73	115	33	221	54	174	24	252	858	2,683	389	3,930	3,694	236	
<b>J. Project Administration</b>	-	725	-	725	-	-	-	-	-	44	-	44	-	769	-	769	769	-	
<b>Total</b>	7,380	8,076	1,248	16,704	738	610	125	1,473	348	471	66	884	8,466	9,157	1,439	19,062	17,520	1,541	

<sup>a</sup> Includes study tours, local training, workshops, field demonstrations, training materials, maps, reports, and other related costs including living cost payments to trainees.

<sup>b</sup> Includes remuneration rate, per diems, international & local travel, report preparation, and office operations.

<sup>c</sup> Covers surveys & investigations, preparation of training & educational programs, and progress audits.

<sup>d</sup> Includes salary and per diem of incremental staff.

<sup>e</sup> Covers vehicles, motorcycles, and boats.

<sup>f</sup> Covers field travel and other related costs where these are not covered by standard Government allowances.

## Procurement Arrangements

	Procurement Method							Total
	International Competitive Bidding	Local Competitive Bidding	Consulting Services: QCBS	International Shopping	Local Shopping	From U.N. Agencies	N.B.F.	
Civil Works	0	496	0	0	0	0	0	496
	0	(321)	0	0	0	0	0	(321)
Vehicles	0	0	0	1,201	0	0	0	1,201
	0	0	0	(691)	0	0	0	(691)
Equipment	0	0	0	487	0	0	0	487
	0	0	0	(225)	0	0	0	(225)
Training/Workshops	0	189	0	0	1,217	0	0	1,405
	0	(131)	0	0	(217)	0	0	(348)
Consulting Services	0	0	2,161	0	0	6,128	0	8,289
	0	0	(2,161)	0	0	(3,657)	0	(5,818)
Local Contracts	969	1,515	0	0	0	0	0	2,484
	(824)	(823)	0	0	0	0	0	(1,647)
Operation and Maintenance	0	0	0	0	3,930	0	0	3,930
	0	0	0	0	(1,562)	0	0	(1,562)
Administration	0	0	0	0	0	0	769	769
	0	0	0	0	0	0	0	0
<b>Total</b>	969	2,200	2,161	1,687	5,147	6,128	769	19,062
	(824)	(1,276)	(2,161)	(915)	(1,779)	(3,657)	0	(10,612)

Note: Figures in parenthesis are the respective amounts financed by ADB

## Disbursement Accounts by Financiers

	ADB		Global Environment Facility		Capacity 21		GOC		Total		For. Exch.	Local (Excl. Taxes)	Duties & Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%			
	1. Civil Works	321	64.8	-	-	-	-	175	35.2	496			
2. Vehicles	691	57.5	176	14.7	14	1.2	319	26.6	1,201	6.2	576	306	319
3. Equipment	225	46.1	181	37.1	9	1.7	73	15.0	487	2.5	316	97	73
4. Training/Workshops /a	348	24.8	441	31.4	358	25.5	257	18.3	1,405	7.3	281	913	211
5. Consulting Services	-	-	-	-	-	-	-	-	-	-	-	-	-
6. International Consultants	3,654	70.9	1,501	29.1	-	-	-	-	5,155	26.6	5,155	-	-
7. Domestic Consultants	2,164	69.0	970	31.0	-	-	-	-	3,134	16.2	-	3,134	-
8. Local Contracts /b	1,647	66.3	96	3.9	73	2.9	669	26.9	2,484	12.8	1,106	1,006	373
9. Operation and Maintenance	1,562	39.7	564	14.4	158	4.0	1,646	41.9	3,930	20.3	858	2,683	389
10. Project Administration /c	-	-	-	-	-	-	769	100.0	769	4.0	-	769	-
<b>Total PROJECT COSTS</b>	<b>10,612</b>	<b>55.7</b>	<b>3,930</b>	<b>20.6</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.5</b>	<b>19,062</b>	<b>98.5</b>	<b>8,466</b>	<b>9,157</b>	<b>1,439</b>
Interest During Implementation	298	100	-	-	-	-	-	-	298	1.5	298	-	-
<b>Total Disbursement</b>	<b>10,910</b>	<b>56.4</b>	<b>3,930</b>	<b>20.3</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.2</b>	<b>19,360</b>	<b>100.0</b>	<b>8,764</b>	<b>9,157</b>	<b>1,439</b>

\a Includes local training, workshops, demonstrations, training materials, and other related costs including payments to trainees.

\b Includes NGO contracts, mapping, aerial photography and advertising agency services.

\c Government's incremental project administration costs.

### Procurement Accounts by Financiers

	ADB		Global Environment Facility		Capacity 21		GOC		Total		For. Exch.	Local (Excl. Taxes)	Duties & Taxes
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%			
Civil Works	321	64.8	-	-	-	-	175	35.2	496	2.6	174	248	74
Equipment and Vehicles	-	-	-	-	-	-	-	-	-	-	-	-	-
Vehicles	691	57.5	176	14.7	14	1.2	319	26.6	1,201	6.2	576	306	319
Equipment	225	46.1	181	37.1	9	1.7	73	15.0	487	2.5	316	97	73
Training/Workshops	348	24.8	441	31.4	358	25.5	257	18.3	1,405	7.3	281	913	211
Consulting Services	5,818	70.2	2,471	29.8	-	-	-	-	8,289	42.8	5,155	3,134	-
International Consultants	-	-	-	-	-	-	-	-	-	-	-	-	-
Domestic Consultants	-	-	-	-	-	-	-	-	-	-	-	-	-
Local Contracts	1,647	66.3	96	3.9	73	2.9	669	26.9	2,484	12.8	1,106	1,006	373
Aerial Photography & Mapping	-	-	-	-	-	-	-	-	-	-	-	-	-
Surveys and Investigations	-	-	-	-	-	-	-	-	-	-	-	-	-
Operation and Maintenance	1,562	39.7	564	14.4	158	4.0	1,646	41.9	3,930	20.3	858	2,683	389
Administration	-	-	-	-	-	-	769	100.0	769	4.0	-	769	-
<b>Total PROJECT COSTS</b>	<b>10,612</b>	<b>55.7</b>	<b>3,930</b>	<b>20.6</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.5</b>	<b>19,062</b>	<b>98.5</b>	<b>8,466</b>	<b>9,157</b>	<b>1,439</b>
Interest During Implementation	298	100.0	-	-	-	-	-	-	298	1.5	298	-	-
<b>Total Disbursement</b>	<b>10,910</b>	<b>56.4</b>	<b>3,930</b>	<b>20.3</b>	<b>611</b>	<b>3.2</b>	<b>3,909</b>	<b>20.2</b>	<b>19,360</b>	<b>100.0</b>	<b>8,764</b>	<b>9,157</b>	<b>1,439</b>

## TERMS OF REFERENCE FOR CONSULTANTS

1. Over the 5 years of Project implementation, 271 person-months of international and 1,402 person-months of domestic consulting services will be needed as detailed in Tables C.1, C.2, and C.3.

### A. Strengthening Natural Resource Management Coordination and Planning for the TSBR

2. The consulting services needed to strengthen natural resource management coordination and planning for the Tonle Sap Biosphere Reserve (TSBR) are:

**Table C.1: Summary of Consulting Services for Component 1**

Duty Station and Supervising Authority	Contract Package	Position	Person-Months	
			International	Domestic
PMCO	Contract A	Project Management Advisor	30.0	
		Strategy and Policy Advisor	6.0	
		Finance and Administration Specialist		30.0
PIO/TSBR Secretariat	UNESCO-1	Environmental Database Designer	4.0	
		Publicity and Information Specialist		6.0
		Database Programmer		6.0
		Data Entry Technician (1)		6.0
		Data Entry Technician (2)		6.0
		Map Digitizer		6.0
		Environmental Journalist/Writer		8.0
PIO/DOF	Contract B	Fisheries Management Advisor	30.0	
		Imagery and Mapping Specialist	3.0	
		GIS/Land Use Specialist	6.0	
		Data Entry Technician (1)		6.0
		Data Entry Technician (2)		6.0
		Map Digitizer		6.0
PIO/DOF	FAO Technical Assistance	Fisheries Legal Specialist (International)	5.0	
		Fisheries Legal Specialist (Domestic)		11.0
		Fisheries Management Specialist (International)	5.0	
		Fisheries Management Specialist (Domestic)		18.0
		Fisheries Biologist (International)	3.0	
		Fisheries Biologist (Domestic)		3.0
		Resource Planning and Inland Fisheries Specialist (International)	3.0	
		Resource Planning and Inland Fisheries Specialist (Domestic)		3.0
		Community Specialist (International)	3.0	
		Community Specialist (Domestic)		6.0
Training Specialist (Domestic)		6.0		
PIO/MOE	UNESCO-2	Environmental Education Specialist (International)	6.0	
		Environmental Education Specialist (Domestic)		18.0
		Media Specialist (Domestic)		18.0
<b>Total</b>			<b>104.0</b>	<b>169.0</b>

## 1. **PMCO Contract A**

### a. **Project Management Advisor** – One International Consultant (30 person-months)

3. He/she will ensure efficient and effective monitoring and coordination of all aspects of the Project. Specifically, he/she will:

- (i) Advise on confirmation and, as necessary, elaboration or revision of the terms of reference for consultants engaged under the Project, with close reference to the Project framework and the schedule of activities detailed in the Project documents.
- (ii) Advise on the preparation and conclusion of contractual arrangements between the executing and implementing agencies for the Project, consultants, and the service providers to be engaged under the Project, including the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and nongovernment organizations (NGOs).
- (iii) Assist in the establishment and high performance of the Project monitoring and coordination office (PMCO) in respect of its facilities, equipment, staffing, and operating procedures.
- (iv) Oversee the development and implementation of an overall Project monitoring and evaluation system to routinely track and report on Project performance.
- (v) Assist in ensuring the timely establishment of Project implementation offices (PIOs) and Project implementation units (PIUs), and in setting standardized systems for their preparation of harmonized annual work plans.
- (vi) Formulate guidelines for the preparation of quarterly and 6-monthly reports that conform to the Asian Development Bank (ADB)'s reporting requirements.
- (vii) Monitor and galvanize manpower assigned by the central and provincial agencies involved to ensure that qualified, competent, and motivated staff are made available on schedule to Project activities and training programs.
- (viii) Advise the PMCO in arranging Project training programs, either directly or through consultants.
- (ix) Facilitate continuous dialogue amongst the central and provincial agencies involved in the Project.
- (x) Support the Project Coordinator in the preparation of papers for the quarterly interministerial and 6-monthly Project steering committee meetings and the minutes of the meetings.
- (xi) Incorporate, in the 6-monthly reports, an analysis of output accomplishment and improvement of activities using the format laid out in Figure C.1.
- (xii) Monitor impacts from outputs, based on the brief monthly progress notes and end-of-assignment reports prepared by consultants, initiate performance diagnostics analyses, and recommend corrective or follow-up actions as necessary.
- (xiii) Transfer project management and coordination skills to ensure that these capabilities exist in the PMCO by the time his/her inputs into the Project are completed.

**Figure C.1: Analysis of Output Accomplishment and Improvement of Activities**

<b>Component</b>		No.
<b>Output</b>		No.
<b>Targets</b>		No.
		No.
		No.
<b>Is the output being accomplished?</b>	Yes	Partially
<b>Are the targets being achieved?</b>		No
No.		
No.		
No.		
<b>How are the activities being implemented?</b>		
<b>Strength</b>		<b>Weakness</b>
No.	No.	No.
No.	No.	No.
No.	No.	No.
<b>How can the activities be improved?</b>		
<b>Proposed Change</b>		<b>Justification</b>
No.	No.	No.
No.	No.	No.
No.	No.	No.
<b>Action plan to improve the activities</b>		
<b>Action</b>		<b>Target Date</b>
No.	No.	No.
No.	No.	No.
No.	No.	No.

**b. Strategy and Policy Advisor – One International Consultant (6 person-months)**

4. He/she will assist the TSBR Secretariat to develop its role as the coordinating body for the TSBR and effect cross-sectoral policy and strategy coordination. Specifically, he/she will:
  - (i) Discuss the mission, strategic objectives, and operational procedures of the TSBR Secretariat and its interactions with the Cambodia National Mekong Committee (CNMC) with all central and provincial agencies with responsibilities for or interests in the TSBR, and with other concerned elements of civil society.
  - (ii) Advise on the elaboration or revision of the mission, strategic objectives, and operational procedures of the TSBR Secretariat and on its lines of reporting and communication with CNMC and concerned central and provincial agencies.
  - (iii) Propose, in the light of developments foreseen in the role and functions of the TSBR Secretariat, the structural or staffing profile changes needed to accommodate changes, and advise on the training needed to support the changes.
  - (iv) Assist the TSBR Secretariat in its analysis of sectoral interests impacting the TSBR and in the establishment and facilitation of the quarterly interministerial meetings needed to review these.
  - (v) Support the development of a shared interministerial vision for management of the TSBR.
  - (vi) Assist in the formulation of common policy objectives for management of the TSBR taking into account the 5-year Tonle Sap fisheries management plan and other policy instruments for natural resource management.
  - (vii) Guide the TSBR Secretariat in the conduct of a nationwide awareness and mobilization campaign for the protection and sustainable use of the Tonle Sap

- and its watershed, giving priority to Project activities for formulation and implementation of a national environmental education and awareness campaign.
- (viii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**c. Finance and Administration Specialist – One Domestic Consultant (30 person-months)**

5. He/she will be responsible for setting up harmonized financial and administrative procedures for use in all Project executing and implementing agencies. Specifically, he/she will:
- (i) Advise on establishing appropriate administrative systems for application in the PMCO, PIOs, and PIUs.
  - (ii) Oversee the establishment and maintenance of a uniform and sound accounting procedures to be used throughout the Project, based on appropriate proprietary software and in conformity with the accounting, auditing, and reporting procedures of ADB and the Government, and train financial support staff in the PMCO, PIOs, and PIUs in the implementation of these.
  - (iii) Advise on disbursement procedures in accordance with ADB's Loan Disbursement Handbook (January 2001).
  - (iv) Ensure the harmonization of equipment specifications and procurement procedures amongst all elements of the Project, following ADB's Guidelines for Procurement and ADB's Guidelines on the Use of Consultants.
  - (v) Oversee the preparation of the consolidated annual financial reports for the Project, for submission to the Government and ADB.
  - (vi) Contribute, with other members of the PMCO, to the development and implementation of the Project monitoring and evaluation system.
  - (vii) Transfer financial management and administration skills to ensure that these capabilities exist in the PMCO by the time his/her inputs into the Project are completed.
  - (viii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**2. PIO/TSBR Secretariat UNESCO-1**

**a. Environmental Database Designer – One International Consultant (4 person-months)**

6. He/she will build in the TSBR Secretariat an efficient information clearing-house mechanism, establish a database to support management planning, environmental assessment, and public information, and establish and maintain a TSBR web site. Specifically, he/she will:
- (i) Carry out detailed consultations and surveys with stakeholders in the TSBR on data needs, existing data sources, and data collection activities.
  - (ii) Carry out consultations on technical establishment of the TSBR Environmental Information Database (TSBR-ED) especially regarding equipment required and communication arrangements.
  - (iii) Prepare specific technical schemes on the design and establishment of the TSBR-ED, based on the consultations and survey conducted earlier, and submit the technical documents, including draft data and information exchange agreements, to the TSBR Secretariat and the PMCO for approval.

- (iv) Initiate implementation of the TSBR-ED, including identification and recruitment of technical staff, and arrange equipment procurement and installation.
- (v) Intervene as necessary to adjust workplans and technical arrangements during Project implementation.
- (vi) Assist in organizing technical meetings related to coordination, implementation, and reporting.
- (vii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**b. Publicity and Information Specialist – One Domestic Consultant (4 person-months)**

7. He/she will develop in the TSBR Secretariat TSBR publications on natural resource management in the TSBR, and establish a documentation center. Specifically, he/she will:

- (i) Assist in the development of a publicity and information strategy for the TSBR, focusing on the best use of TSBR-ED products and mechanisms.
- (ii) Lead the design and development of prototype TSBR-ED information materials, including a Tonle Sap Environment and Development Data Report, a bimonthly newsletter titled "*Tonle Sap Update—Bulletin of the TSBR*", and meta-databases in forms ready for public release.
- (iii) Advise on the design, especially the interface, of a web-based information service to make the TSBR-ED web site user-friendly and attractive to a broad audience.
- (iv) Assist in organizing meetings for information exchange and diffusion, including official press release information on the environmental status of the TSBR.
- (v) Build up local contacts and partnerships at both national and local levels for information collection, production, and distribution.
- (vi) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**c. Database Programmer – One Domestic Consultant (6 person-months)**

8. He/she will:

- (i) Implement the technical schemes of TSBR-ED under the coordination of TSBR-ED Designer.
- (ii) Develop detailed tasks and works concerning databases, including data collection, data formulation, data integration, database interface design, and database maintenance arrangements, and distribute as well as monitor the progress of the workflow.
- (iii) Configure the software and tools that fit the needs of TSBR-ED requirement.
- (iv) Carry out necessary programming work required by the databases, including programming to integrate geographic databases with other databases.
- (v) Be responsible for developing data security arrangements.
- (vi) Provide detailed documentation and technical briefing on database structure, function, data quality control, modification, and software specifications so that staff can handle management of the TSBR-ED by the time his/her inputs into the Project are completed.

- (vii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.
  - d. Data Entry Technicians** – Two Domestic Consultants (6 person-months each)
9. They will:
- (i) Follow the instructions given by the TSBR-ED Designer and the TSBR-ED Programmer regarding work on data entry for TSBR-ED.
  - (ii) Collect data from other existing data sources, within the framework of TSBR-ED information exchange agreements.
  - (iii) Sort, check, and enter data in accordance with the technical requirements given by the TSBR-ED Programmer.
  - (iv) Maintain an efficient filing system for the collected data and information, as backup to the TSBR-ED.
  - (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.
- e. Map Digitizer** – One Domestic Consultant (6 person-months)
10. He/she will:
- (i) Follow the instructions given by the TSBR-ED Designer and the TSBR-ED Programmer regarding work on digitizing of geographic data for the TSBR-ED.
  - (ii) Collect geographic data from other existing data sources, within the framework of TSBR-ED information exchange agreements.
  - (iii) Sort, check, and digitize geographic data in accordance with the technical requirements given by the TSBR-ED Programmer.
  - (iv) Assist the production of maps and graphic data products and assist in technical discussions when data processing needs to be carried out by a third party.
  - (v) Maintain a good filing of the collected data and information, as backup stock of the TSBR-ED.
  - (vi) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.
- f. Environmental Journalist/Writer** – One Domestic Consultant (8 person-months)
11. He/she will:
- (i) Assist the TSBR Secretariat to collect, prepare, and distribute public-oriented information on sustainable management and conservation of natural resources and biodiversity in the TSBR.
  - (ii) Collect information and stories, especially those associated with Project activities and meetings related to the TSBR, and formulate the information collected in forms appropriate for publishing in the "*Tonle Sap Update—Bulletin of the TSBR*" and on the TSBR-ED web site.
  - (iii) Maintain liaison with all the sectors, NGOs, provinces, and communities for information exchange, particularly with respect to Project activities for formulation

and implementation of a national environmental education and awareness campaign covering the Tonle Sap.

- (iv) Coordinate with and support as necessary and appropriate Project activities for formulation and implementation of a national environmental education and awareness campaign covering the Tonle Sap.
- (v) Assist the TSBR Secretariat in the preparation of public information releases as well as other information material such as posters and leaflets.
- (vi) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

### 3. **PIO/DOF Contract B**

#### a. **Fisheries Management Advisor** – One International Consultant (30 person-months)

12. He/she will provide high-level technical advisory inputs to support DOF in all aspects of the Project that come within DOF's jurisdiction. Specifically, he/she will:

- (i) Advise on technical aspects and coordination of all Project activities at the central and provincial levels that come under the responsibility of DOF.
- (ii) Assist in the establishment of PIUs in the provincial Departments of Agriculture, Forestry, and Fisheries (DAFFs), oversee Project activities in the five Project provinces, and oversee the consolidation of the standardized quarterly reports from the five PIUs and the preparation of the consolidated quarterly progress reports from the PIO in DOF.
- (iii) Monitor the progress of the mapping program, the technical assistance accompanying the Project, and the services provided by FAO for organizing communities for natural resource management.
- (iv) Follow up the work of the technical assistance accompanying the Project by progressing the preparation of the subdecrees, proclamations, and directives or circulars associated with the Fisheries Law, updating the 5-year Tonle Sap fisheries management plan, and training staff of DOF to sustain these processes.
- (v) Using the standards and guidelines prepared under the technical assistance accompanying the Project, the revised burden book, and with the involvement of central and provincial fisheries staff of DOF, prepare an example fisheries management plan for a commercial fisheries lot and a community fisheries lot in each of the five Project provinces.
- (vi) Guide all training activities falling under the responsibility of DOF and assist in the development of a training manual for trainers.
- (vii) Transfer fisheries management skills to staff of DOF, with particular regard to fisheries legislation and planning and to the community management of fisheries, so that these capabilities exist in DOF by the time his/her inputs into the Project are completed.
- (viii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**b. Imagery and Mapping Specialist – One International Consultant (3 person-months)**

13. He/she will be responsible for supporting DOF in acquiring cost-effective and high-quality aerial photography and maps of the TSBR. Specifically, he/she will:

- (i) Delineate the final boundary of the area to be covered with new aerial photography and the orthophotomaps maps and draw up the detailed specifications for these.
- (ii) Advise DOF on procedures to be followed for the international tendering of the photography and mapping contract.
- (iii) Prepare a comprehensive evaluation sheet for the selection of the best bid in accordance with ADB's *Guidelines for Procurement*.
- (iv) Design a quality check procedure for the traditional and laser photography and the orthophotomaps maps, assist staff of DOF in the initial application of the quality checking process, and train staff to continue this process throughout the map production process.
- (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**c. GIS/Land Use Specialist – One International Consultant (6 person-months)**

14. He/she will provide the technical expertise required to map the TSBR in terms of its natural and administrative zonation and train staff of DOF to be able to update this on a continuing basis. Specifically, he/she will:

- (i) Set up the Geographic Information System (GIS) facility in DOF, identify sources of relevant data held in other agencies within Cambodia, and assist in the acquisition of these.
- (ii) Advise on the acquisition of remotely sensed imagery, including satellite imagery required to supplement the aerial photography flown under the Project.
- (iii) Direct the data entry technicians and the map digitizer in compiling the geo-referenced and other databases required by DOF, ensuring comprehensive linkages amongst all elements of the database.
- (iv) Institute a system for ground-truthing of all elements of the remotely sensed imagery and for collection of data relating to administrative and other legal boundaries to be carried out by staff of DAFF.
- (v) Carry out initial ground truthing and provide training to staff of DAFF to enable them to repeat these procedures for subsequent updating of land use mapping.
- (vi) Delineate biosphere zonation, boundaries of commercial and community fishing lots, fish sanctuaries, administrative regions, and physiographic features, and train staff of DAFF in the processes of updating these boundaries.
- (vii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**d. Data Entry Technicians – Two Domestic Consultants (12 person-months in toto)**

15. They will:
- (i) Assist in the gathering of data from all available sources.
  - (ii) Assist in the formatting of data to conform to the data management system established within DOF.
  - (iii) Effect entry of data into the established system and, where appropriate, train staff of DOF in this process.
  - (iv) Ensure that all digitized data are properly backed up and protected against loss or corruption.
  - (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**e. Map Digitizer – One Domestic Consultant (6 person-months)**

16. He/she will:
- (i) Assist the GIS/Land Use Specialist in determining the system and procedures most appropriate to the digitization of all geo-referenced data.
  - (ii) Undertake digitization of data and, where appropriate, provide training to staff of DOF in this process.
  - (iii) Maintain digitizing equipment in good working order.
  - (iv) Ensure that all digitized data are properly backed up and protected against loss or corruption.
  - (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**4. PIO/DOF FAO Technical Assistance**

17. The outline terms of reference for consultants are detailed in the Report and Recommendation of the President. The services will accomplish the outputs specified in the Project framework of the technical assistance and improve the regulatory and management framework for inland fisheries based on the methodology, activities, and implementation arrangements detailed in the report.

**5. PIO/MOE UNESCO-2**

**a. Environmental Education Specialists – One International Consultant (6 person-months) and One Domestic Consultant (18 person-months)**

18. They will be responsible for developing formal and non-formal environmental education. Specifically, they will:
- (i) Review existing environmental education material, assess its distribution and use, identify needs for printing, reprinting, or preparation of additional material, and propose a plan for development of formal and non-formal education activities.
  - (ii) Advise on the content of additional material if the production of such material is deemed necessary.
  - (iii) Advise on the selection of pilot schools, taking into account the cluster system.

- (iv) Review the situation of the formal monk education program and propose follow-up to this program on the basis of the national workshop held in 1998.
- (v) Advise the Ministry of Ministry of Education, Youth, and Sports (MEYS) on program for teacher's training.
- (vi) Carry out a comprehensive survey of ongoing activities in non-formal education, with reference to the main partners involved, including NGOs, and identify activities that could be extended or replicated and associated possible partnerships.
- (vii) Reactivate the Inter-Ministerial Steering Committee for Environmental Education (IMSCEE) and organize its meetings, including preparing the agenda for meetings, taking care of logistics, sending invitations, and drafting the minutes of meetings.
- (viii) Ensure follow-up of the decisions taken by the IMSCEE with the ministries concerned.
- (ix) Prepare education material with the ministries concerned and ensure its distribution among schools.
- (x) Organize teacher-training sessions in the teacher-training centers in Battambang, Kompong Chhnang, Kompong Thom, and Siem Reap.
- (xi) Advise regularly MEYS, the Ministry of Environment, and the Ministry of Religion and Cults of the non-formal education activities to be undertaken and of the progress of their implementation.
- (xii) Contact Phnom Penh University to set up special training and organize field trips and exchanges for students.
- (xiii) Organize field visits for school children in the TSBR, particular to Prek Toal.
- (xiv) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**c. Media Specialist – One Domestic Consultant (18 person-months)**

19. They will be responsible for publicizing the Tonle Sap's environmental importance and integrating concern for natural resources. Specifically, they will:
- (i) Define the main elements of the environmental awareness campaign.
  - (ii) Contact the partners to be involved in the environmental awareness campaign and jointly define their roles.
  - (iii) Propose a list of special events, e.g., the Water Festival, Clean Up Day, and Peace Walks, that could be catalyzed in support of in the environmental awareness campaign and contact the organizers of these events to determine their nature and extent of involvement.
  - (iv) Build links with the media, e.g., television, radio, and press.
  - (v) Advise on the design of television spots, quiz shows, and radio broadcasts and contribute, as appropriate, to their realization.
  - (vi) Contact the Cambodian Communication Institute to define information sessions for journalists and provide support for their organization.
  - (vii) Prepare a brochure targeted at decision makers and journalists on the objectives of the TSBR.
  - (viii) Organize periodic information sessions for decision makers at national and provincial levels.
  - (ix) Keep regular contacts with the various partners involved in the environmental awareness campaign.

- (x) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

## B. Organizing Communities for Natural Resource Management in the TSBR

20. The consulting services needed to organize communities for natural resource management in the TSBR are:

**Table C.2: Summary of Consulting Services for Component 2**

Duty Station and Supervising Authority	Contract Package	Position	Person-Months			
			International	Domestic		
PIU/DAFF	FAO Service Contract	Natural Resource Management Specialist and Team Leader	24.0			
		Community Fisheries Specialist	20.0			
		Agriculture and Forestry Specialist	12.0			
		Environment Specialist		12.0		
		Training Organizer		12.0		
		Community Development Specialist	24.0			
		Agricultural Economist (International)	3.0			
		Agricultural Economist (Domestic)		6.0		
		Fish Product Utilization Specialist	3.0			
		<b>Provincial Teams</b>				
		Community Organization Specialist (1 per province)		160.0		
		Community Fisheries Specialist (1 per province)		120.0		
		Agriculture and Forestry Specialist (1 per province)		120.0		
		Environment Specialist (1 per province)		120.0		
Surveyor (3 per province)		360.0				
<b>Total</b>		<b>86.0</b>	<b>910.0</b>			

### a. Natural Resource Management Specialist and Team Leader – One International Consultant (24 person-months)

21. He/she will be responsible for managing the FAO experts, and provide high-level guidance throughout the process of organizing communities for natural resource management. Specifically, he/she will:

- (i) Ensure the timely mobilization of all necessary resources in all project provinces in a harmonized and coordinated manner.
- (ii) Lead the process of developing a standardized strategy and methodology for community forestry and community fisheries development in the TSBR with emphasis on participatory approaches.
- (iii) Contribute to policy and legislation discussions and strengthening of community fisheries at the national level.
- (iv) Take a lead role in encouraging formulation by communities of natural resource management plans.
- (v) Advise on the terms of reference, selection, and recruitment of NGOs to be contracted under the Project, and support the DAFFs in the supervision of these.

- (vi) Manage the FAO experts and the international and domestic consultants and other parties subcontracted by FAO.
- (vii) Assist in the organization of the training and study tour program.
- (viii) Prepare technical and Project reports and submit them to the PIO in DOF and the PMCO in a timely manner.
- (ix) Transfer natural resource management planning skills to ensure that this capability exists in the DAFFs by the time his/her inputs into the Project are completed.
- (x) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**b. Community Fisheries Specialists** – One International Consultant (20 person-months) and One Domestic Consultant Per Province (120 person-months in toto)

22. They will be responsible for providing support to communities for community-based fisheries management in a manner consistent with sustainable management and conservation of natural resources and biodiversity in the TSBR. Specifically, they will:

- (i) Review the current organizational approaches to community management of fisheries and assist counterpart staff with refinement and improvement in these, in consultation with NGOs.
- (ii) Assist counterpart staff with standardization of the format of community fisheries management plans and the preparation of guidelines and training materials.
- (iii) Participate in the process of boundary delineation of community fisheries areas.
- (iv) Prepare technical guidelines on best fishery practices in the TSBR and assist communities in formulation and implementation of natural resource management plans.
- (v) Establish a provincial database for all community fisheries management activities carried out under the Project.
- (vi) Assess the training needs of staff of DAFF and NGOs and organize the training required.
- (vii) Transfer community fisheries skills to ensure that this capability exists in the Community Fisheries Development Office within DOF and in the Offices of Fisheries within the DAFFs by the time their inputs into the Project are completed.
- (viii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**c. Agriculture and Forestry Specialists** – One International Consultant (12 person-months) and One Domestic Consultant Per Province (120 person-months in toto)

23. They will be responsible for ensuring that activities within agriculture and forestry are consistent with the overall approach to community-based natural resource management, and sustainable management and conservation of natural resources and biodiversity in the TSBR. Specifically, they will:

- (i) Review practices for utilization of forestry resources and the regulatory framework determining these.
- (ii) Review current agricultural practices and the agricultural extension system.

- (iii) Assist counterpart staff to refine and improve the organizational and technical practices employed in the utilization of agriculture and forest resources, with emphasis on community approaches to these.
- (iv) Assist counterpart staff to prepare guidelines and training materials for community forestry management.
- (v) Support agricultural extension workers in the adoption of a consumer-driven approach to the provision of extension services based on community participation.
- (vi) Participate in the process of boundary delineation with particular regard to areas designated for community forestry.
- (vii) Prepare technical guidelines on best agriculture and forestry practices in the TSBR and assist communities in formulation and implementation of natural resource management plans.
- (viii) Establish a provincial database for all community forestry and agriculture management activities carried out under the Project.
- (ix) Assess the training needs of staff of DAFF and NGOs and organize the training required.
- (x) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**d. Environment Specialists** – One International Consultant (12 person-months) and One Domestic Consultant Per Province (120 person-months in toto)

24. They will be responsible for assisting provincial staff to ensure that all activities in the TSBR are compatible with sustainable management and conservation of natural resources and biodiversity in the TSBR. Specifically, they will:

- (i) Review the current programs of staff in provincial DOEs and identify opportunities to expand community management of activities.
- (ii) Assist counterpart staff with standardization of the process and preparation of guidelines and training materials for environmental management and provide support in day-to-day work of supervising staff involved in the Project.
- (iv) Participate, with other organizations, NGOs, and volunteer staff in development of best practice management guidelines.
- (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**e. Training Organizer** – One Domestic Consultant (12 person-months)

25. He/she will be responsible for ensuring that an appropriate program of training is planned and implemented for staff and NGOs within the five Project provinces. Specifically, he/she will:

- (i) Review the experience in training approaches developed by FAO under its Participatory Natural Resource Management project and discuss the approaches with staff of that project.
- (ii) Develop a methodology for initial staff selection across the Project based on aptitude for and past experience in community based natural resource management approaches. The methodology developed will be suitable for rapid

screening of large numbers of staff over a short period and be repeatable across the five Project provinces.

- (iii) Train trainers in the implementation of methodologies for training selection, training needs analysis program design, and evaluation.
- (iv) Conduct a training needs analysis on the staff selected.
- (v) Develop a training program for staff working in community fisheries, community forestry, agriculture, and environmental protection. The specialist will need to visit all five Project provinces and work with existing supervisory staff, international volunteers, and other FAO experts.
- (vi) Develop a methodology for training evaluation by both contracted NGOs using participatory surveys of beneficiaries and by supervisory staff and peers.
- (vii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**f. Community Development Specialist** – One International Consultant (24 person-months)

26. He/she will have the overall responsibility for ensuring that the Project takes a fully participatory approach in all aspects of community development, and for organizing communities for natural resource management. Specifically, he/she will:

- (i) Collate and review existing socioeconomic surveys.
- (ii) Design and supervise socioeconomic surveys to establish baseline information on communities.
- (iii) Participate in the selection of sites for community activities.
- (iv) Provide training at central, local government and at community level in participatory approaches to resource management.
- (v) Assist in the development of action plans for the selected sites.
- (vi) Assist in the development of suitable educational materials for training courses.
- (vii) Transfer community development skills to ensure that this capability exists in the DAFFs by the time their inputs into the Project are completed.
- (viii) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**g. Agricultural Economists** – One International Consultant (3 person-months) and One Domestic Consultant (6 person-months)

27. They will be responsible for determining the most appropriate technical approaches in support of livelihood activities that do not threaten biodiversity in the core areas. Specifically, they will:

- (i) Survey previous and ongoing approaches to the design and dissemination of technical packages in support of alternative livelihoods.
- (ii) Prepare full financial and economic analyses for all alternative livelihood packages.
- (iii) Select and recommend technical packages for further development.
- (iv) Develop proposals for attracting financial support for broad-scale application of select packages from bilateral or multilateral financial institutions, including the Japan Fund for Poverty Reduction.

- (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**h. Fish Product Utilization Specialist** – One International Consultant (3 person-months)

28. He/she will be responsible for advising communities on improved post-harvest fisheries. Specifically, he/she will:

- (i) Carry out an inventory of the catch utilization and fish processing practices of community fisheries with particular attention to the use of by-catch and low-value species.
- (ii) Identify opportunities for reducing post-harvest losses and adding commercial value with particular attention to by-catch and low-value species and to the role of women.
- (iii) Recommend small-scale, low-investment improved post-harvest processing.
- (iv) Identify opportunities to improve community marketing and distribution of fresh and processed fish, giving priority to improvements that involve reductions in transaction costs with particular attention to the role of women.
- (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**i. Community Organization Specialists** – One Domestic Consultant Per Province (160 person-months in toto)

29. They will:

- (i) Participate in the selection and training of provincial staff and NGOs in the methods to be used for strengthening communities in organization, and financial and technical management.
- (ii) Design and deliver training-of-trainer courses in community organization for natural resource management.
- (iii) Assist in the process of boundary delineation of areas of communal interest.
- (iv) Work with communities in the preparation of plans for community-based natural resource management.
- (v) Assist in the design and supervision of socioeconomic surveys to establish baseline information on communities.
- (vi) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

**m. Surveyors** – Three Domestic Consultants Per Province (360 person-months in toto)

30. They will be responsible for gathering data on all technical, organizational, and social matters related to the Project. Specifically, they will:

- (i) Gather data related to land use, land cover and other physiographic features needed to develop the ground-truthing model for land zonation.
- (ii) Train communities in techniques required for the delineation of boundaries using Global Positioning System (GPS) and other appropriate technologies, and assist in the process of mapping of community areas.

- (iii) Work with the community development and community organization specialists in collecting data needed for participatory community assessments and social analysis.
- (iv) Provide input to the collection of all baseline data.
- (v) Prepare, for review by the Project Management Advisor and the Project Coordinator, brief monthly progress notes and an end-of-assignment report providing activity-output indicators and making recommendations.

### C. Building Management Capacity for Biodiversity Conservation in the TSBR

31. The consulting services needed to build management capacity for biodiversity conservation in the TSBR are:

**Table C.3: Summary of Consulting Services for Component 3**

Duty Station and Supervising Authority	Contract Package	Position	Person-Months	
			International	Domestic
PIO/MOE - DNCP- ONCP - DEEC	UNDP/GEF	Protected Area Management Specialist and Team Leader	24.0	
		Environmental Training Specialist (International)	18.0	
		Environmental Training Specialist (Domestic)		20.0
		Biodiversity Specialist	15.0	
		Protected Area Manager (International)	12.0	
		Protected Area Manager (Domestic, 3 in toto)		36.0
		Workshop Facilitator		24.0
		Sustainable Livelihood Specialist (International)	6.0	
		Sustainable Livelihood Specialist (Domestic)		9.0
		Trainers (2 per core area)		108.0
		Education and Communication Specialist	6.0	
		Surveyor (Inventory and monitoring, 3 per core area)		126.0
	<b>Total</b>	<b>81.0</b>	<b>323.0</b>	

32. The terms of reference for consultants are detailed in the GEF Project Brief.

### D. Monitoring and Progress Reporting Activities

33. The major monitoring and progress reporting activities of the Project will be recorded in quarterly and 6-monthly reports and in a project completion report.

- (i) *Quarterly reports* in standardized formats will be submitted by the PIUs to their PIO for consolidation and submission to the PMCO.<sup>3</sup>
- (ii) 6-monthly progress reports will be submitted by the PMCO to ADB. These reports will specifically cover the provision of inputs, conduct of activities, and achievement of outputs and related benefits and impacts in accordance with the Project framework.
- (iii) A Project completion report will be made publicly available by the PMCO in the standard ADB format within 3 months of Project completion.

<sup>3</sup> The PIO in the Department of Nature Conservation and Protection within MOE and the PIO in the TSBR Secretariat will submit quarterly reports to the PMCO through MOE and CNMC, respectively.

## SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

### A. Introduction

1. The goal of the Tonle Sap Environment Management Project is sustainable management and conservation of natural resources and biodiversity in the Tonle Sap Basin. Its objective is to enhance systems and develop capacity for natural resource management coordination and planning, community-based natural resource management, and biodiversity conservation in the Tonle Sap Biosphere Reserve (TSBR). The Project will provide major environmental benefits and will not have direct negative environmental impacts that need to be mitigated. Even so, it was classified as environmental category B because the Tonle Sap is a unique wetland that has globally significant biodiversity. Accordingly, a summary initial environmental examination (SIEE) was prepared following ADB's requirements for environmental assessment to identify environmental benefits from the Project and evaluate remaining areas of concern and measures to address them. The SIEE was prepared based on preliminary feasibility studies of the Project, field visits and investigations, and discussions with staffs of the Ministry of Environment (MOE), the Ministry of Agriculture, Forestry, and Fisheries (MAFF), and other related agencies and experts.

### B. Project Description

2. The Tonle Sap is the largest freshwater lake in Southeast Asia. It has defined Cambodia's national identity. It also provides 40–70% of the protein intake of Cambodia's population. The lake is of global significance and was successfully nominated as a Biosphere Reserve in October 1997 under the Man and the Biosphere Program of the United Nations Educational, Scientific, and Cultural Organization. For the last 20 years, the Tonle Sap's natural resources, especially its fisheries, have been characterized by inequity of distribution, fraudulent transactions and widespread corruption, accelerating environmental degradation from unsustainable patterns of exploitation, and escalating conflict. In recent years, environmentalists have become more and more concerned that development, especially unsustainable logging, threatens the Tonle Sap. Analysis of key problems and opportunities reveals that (i) natural resource management coordination and planning for the TSBR is weak, (ii) communities are not organized for natural resource management in the TSBR, and (iii) management capacity for biodiversity conservation in the TSBR is inadequate.

3. Based on analysis of key problems and opportunities, it was recognized that sustainable management and conservation of natural resources and biodiversity in the Tonle Sap Basin is a long-term goal. Accordingly, it was identified that the objective of the Project should be to promote systems and capacity for natural resource management coordination and planning, community-based natural resource management, and biodiversity conservation in the TSBR. To accomplish the Project's objective, three closely interrelated components are proposed under the Project, i.e., (i) strengthening natural resource management coordination and planning for the TSBR, (ii) organizing communities for natural resource management in the TSBR, and (iii) building management capacity for biodiversity conservation in the TSBR. The Project area encompasses the TSBR. This comprises the core areas, the buffer zone, and the transition area that extends to and is ultimately bounded by Highways No. 5 and No. 6.

### C. Description of the Environment

4. The Tonle Sap is a vast wetland connected to the Mekong River by the Tonle Sap River. It covers more than a million hectares at full flood. The ecosystem supports diverse habitats,

particularly within the flooded zone, highly productive fisheries, and unique biodiversity, in particular some of Asia's last remaining breeding populations of large water birds. Although much of the Tonle Sap is open water, there are also large expanses of flooded forest, along with deepwater rice fields and other forms of cultivation. The lake is home to at least 200 species of fish, 225 species of birds, almost 200 plant species, along with crocodiles, turtles, water snakes, mollusks, and amphibians that flourish in an area subject to deep annual inundation that may last for many months. The Tonle Sap provides critical habitat for numerous water birds, including numerous migratory species and globally endangered species. Many fish migrate into the Tonle Sap floodplain from the Mekong River during peak floods, utilizing the river for spawning and dry season survival, and the floodplain and its flooded forests for shelter, growth, and maturation.

5. The Tonle Sap has been affected by continually increasing pressure from agricultural encroachment and development, deforestation, overexploitation of fisheries, and hunting and collecting of wildlife and other resources. Pressure on the living resources of the Tonle Sap is already intense, to the point where some stocks are in danger of being permanently damaged or becoming extinct. Maintaining the ecology and hydrology of the system, and thus its very high productivity, will potentially improve the welfare of the riparian communities by providing increased opportunities for employment and income, further development of the local markets and economy, and improved social infrastructure.

6. The Tonle Sap is of great significance to the Cambodian people, and is often described as the heart of the country's culture and economy. Ancient Khmer civilization, exemplified by the Angkor temple complexes, was based on the shores of the Tonle Sap, and the two products that formed the basis of this civilization are still produced in abundance, namely rice and fish. The Government has nominated Tonle Sap as a Biosphere Reserve under UNESCO's Man and the Biosphere Program. This nomination was strengthened nationally by approval of the Subdecree on the Establishment, Role, and Functions of the Secretariat of the TSBR in September 2001.

7. The TSBR consists of three core areas, each surrounded by a buffer zone, which in turn is embedded in a transition area. The core areas, Prek Toal, Boeng Tonle Chhmar, and Stung Sen, are designated for conservation based on their importance for maintenance of biodiversity. The outer boundary of the buffer zone marks the approximate area inundated on or about 1 August and the transition area corresponds to the area between the buffer zone and Highways No. 5 and No. 6.

8. Five provinces border the Tonle Sap. They are Battambang, Kompong Chhnang, Kompong Thom, Pursat, and Siem Reap. The population of the Tonle Sap subcatchments is estimated at three million, many of whom derive at least part of their subsistence needs or income from the lake's resources. A significant number of these move to the lake on a seasonal basis, due to lack of dry season resources in areas further away from the Tonle Sap. The population is young, with 57% being under 20 years of age, and 20% of households are headed by women.

9. The level of education of fishers is generally low. The literacy rate is about 80% for men and 60% for women. Access to education is limited in the floating villages, which in general have only primary schools. The health situation in the area is poor, and only 15% of the rural population have access to safe drinking water.

10. Cultivation covers 23% of the floodplain, extending over 350,000 ha. Much of this is rice, along with mung beans, melons, and other vegetables that are planted as floodwaters recede. Rice production totals 450,000 tons per year, or 12% of Cambodia's total production. Shifting cultivation is a very minor element, covering less than 300 ha. The flooded forests are a source of firewood, construction materials, and many non-timber forest products such as honey, rattan, snakeskin, and meat.

11. The Tonle Sap supports one of the most productive freshwater fisheries in the world, with annual yields of 230,000 tons, equivalent to about half of the country's total production. The value of fish caught in the area (based on landing data) is \$150–200 million per annum. Nevertheless, little of this wealth has found its way into the local economies as, until recently, the majority of fishing areas were leased out in 57 large commercial fishing lots that left local fishers marginalized. (In October 2000, 56% of the lot area were released for community fisheries.) The average per capita income of fishing families is lower than that of non-fishing families, being \$110 and \$180, respectively, per annum. Both averages are significantly lower than Cambodia's per capita gross domestic product of \$257.

#### **D. Screening of Environmental Issues**

12. Over the past 10 years, rapid population growth in the Tonle Sap region and associated pressures on natural resources have driven ecological change. These include loss and degradation of flooded forests and other habitats, decreases in fisheries resources and fish diversity, decline of wildlife resources, and, to a lesser degree, changes in water quality and hydrology. The major threats driving this change are associated with (i) overexploitation of forest resources, (ii) encroachment and land clearance, (iii) overexploitation of fisheries resources, (iv) exotic species impacting on native flora and fauna, and, (v) overexploitation of wildlife resources.

13. The increasing overexploitation of forest resources around the Tonle Sap is leading to widespread loss and degradation of the flooded forests. Specifically, this includes loss of mature trees and gallery forests as well as loss of areas of regenerating forest. The underlying factors behind the overexploitation are the high domestic and industrial demand for cheap, locally available firewood and charcoal, the need for construction materials for houses and fishing gear, and lack of cheap and easily accessed alternatives.

14. Dry season encroachment and land clearance of flooded forests are increasing, resulting in a direct loss in area of these habitats. Specifically, large trees are being lost and annual burning prevents regeneration. The underlying factors behind encroachment and land clearance are the increased demand for agricultural land (leading to high conversion pressures), dry season burning (both accidental and to facilitate hunting) and increased seasonal influx by migrants (during the dry season due to lack of alternatives outside the TSBR). Encroachment and land clearance are rooted in the resource needs of the growing population in the Tonle Sap area. More specifically, the causes are believed to be weak policies and laws on land use rights and tenure, perception of low values and open rights over common resources, particularly amongst the poorer villages and transient migrants, a weak regulatory and management framework, especially for inland fisheries, and lack of examples and incentives for managing natural resources sustainably.

15. There are clear indications that overexploitation of the fisheries resources of the Tonle Sap is taking place. Despite statistics indicating that annual catch levels have remained fairly constant, it is evident that high levels of exploitation have led to a decrease in the numbers,

species, and relative sizes of the fish being caught. Species such as the threatened Mekong giant catfish are also caught and the impact of this catch on the remaining populations, although unknown, is likely to be negative.

16. Although the impact of exotic species on the native flora and fauna of Tonle Sap is not well understood, evidence suggests that they could be a potentially major threat in the long term. The two main underlying factors behind the threat of exotic species on native fauna and flora are accidental release or escape of exotic fauna from farming or culture operations and uncontrolled and unmonitored spread of exotic flora, in particular the giant mimosa (*Mimosa pigra*) and water hyacinth (*Eichhornia crassipes*). There is a general lack of awareness of the need to control exotic species and a complete lack of management programs.

17. Overexploitation of wildlife resources is having a direct negative impact on many rare bird, reptile, and mammal species. This has led to population declines and contributed to the loss of biodiversity in the TSBR. The cause of much of the hunting and overexploitation is widespread regional poverty and lack of food security. There are often few alternative sources of food and hunting for wildlife has become a cultural norm even when food is available. This is compounded by economic incentives and high demands in foreign markets for some wildlife species, the lack of a formally approved Wildlife Protection Law, lack of ratification of international conventions, low levels of enforcement, and low levels of literacy and awareness regarding the need for biodiversity conservation.

18. Although changes in water quality and siltation rates have occurred, their present impact on globally significant biodiversity appears to be less important than the aforementioned threats. There has been an increase in domestic waste, untreated industrial effluents, use of agrochemicals, and discharges and spillage of oil and fuel. However, monitoring programs indicate that the general level of pollution is fairly low, although some problems exist locally, for instance in and around floating villages. Although sediment deposition may be high locally, it is insignificant when viewed from a lake-wide perspective.

19. Many of the policies developed are not very effective. The National Environmental Action Plan, 1998–2003, for example, suffers from a general lack of endorsement by line agencies, while the Governance Action Plan did not originally include the fisheries sector and describes resource management as a specific issue rather than a multisectoral concern. There is also an absence of clear and integrated sectoral policies on land and water at the national level. Although many ministries involved in natural resources and the environment have formulated their own policies and action plans to cover their areas of responsibility, these policies are often broad in focus and do not reflect institutional capacity. Furthermore, some of these policies are not coordinated or linked to the existing legal framework.

20. At present, there is no law in Cambodia to regulate and conserve wildlife. Although Cambodia signed the Convention on International Trade in Endangered Species in 1997, the National Assembly still has not ratified it. A draft Wildlife Protection Law is being considered by Government and is likely to be approved by the time of Project implementation. Other legislation that has been drafted but awaits consideration by the Council of Ministers includes a Forest Law (2001) and a Land Law (2001).

## **E. Potential Environmental Impacts and Mitigation Measures**

21. Activities under the Project will enhance systems and develop capacity for natural resource management coordination and planning, community-based natural resource

management, and biodiversity conservation in the TSBR. The Project will have no direct adverse physical impacts on the environment. However, to ensure that the policies, standards, and guidelines to be developed under the Project bring maximum benefits, and to avoid potential indirect adverse physical impacts that might stem from implementation of inappropriate approaches, it is essential that MAFF, MOE, and the TSBR Secretariat within the Cambodia National Mekong Committee be fully involved in their formulation.

#### **F. Institutional Requirements and Environmental Monitoring**

22. To ensure that all applicable national and local environmental laws and regulations, as well as the requirements of ADB, are adhered to during implementation of the Project, it is required that the Project monitoring and coordination office should monitor the implementation of the Project and report to ADB in 6-monthly reports. In such reporting, the Project monitoring and coordination office shall draw on staff of the TSBR Secretariat to encourage a focus on natural resource management.

#### **G. Conclusion**

23. The Project will have no direct adverse impacts on the environment. Positive environmental impacts, both direct and indirect, include (i) improvement of the regulatory and management framework for the Tonle Sap, (ii) identification and protection of globally significant biodiversity in and around the Tonle Sap, (iii) identification and encouragement of sustainable natural resource management practices at the community level, (iv) strengthening of the capacity of Government agencies and local communities to sustain conservation management activities, (v) strengthening of the capacity of the TSBR Secretariat, and (vi) support for implementation of the National Environmental Action Plan, 1998–2003 and the Second Socioeconomic Development Plan, 2001–2005. A detailed environmental impact assessment for the Project, or further special studies, are not warranted.

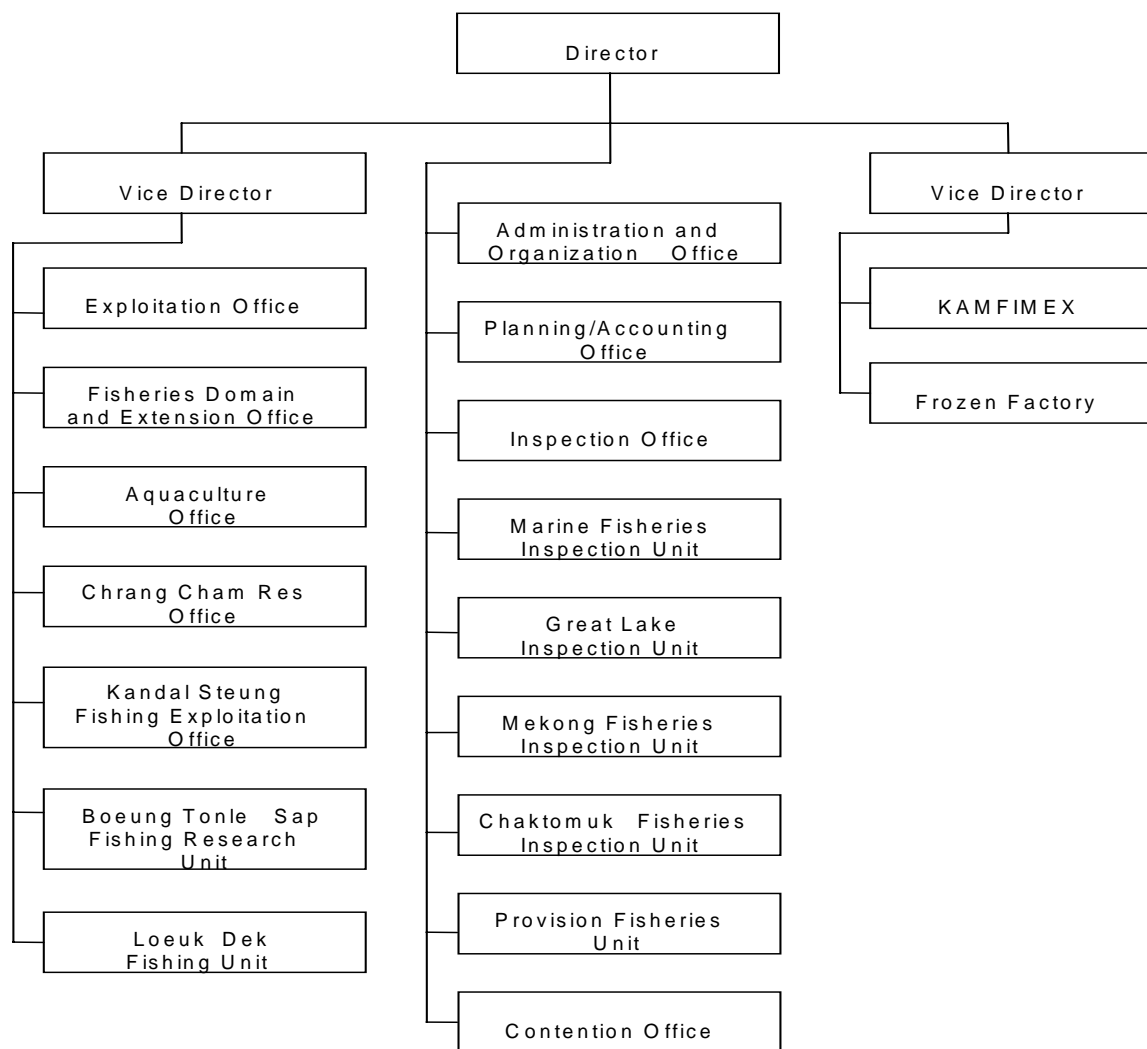
## EVALUATION OF EXECUTING AND IMPLEMENTING AGENCIES

### A. DEPARTMENT OF FISHERIES

#### 1. Organization

1. A Director and two Deputy Directors, one of whom is responsible for the fishery trade section, head the Department of Fisheries (DOF) in the Ministry of Agriculture, Forestry, and Fisheries (MAFF). DOF comprises seven offices for management and administration, four fisheries inspection units, the Chrang Cham Res fisheries research station in Phnom Penh, and the Kampuchea Fishery Import Export Company (KAMFIMEX), together with other state enterprises dealing with commercial fisheries. More recently, DOF established a Community Fisheries Development Office. In 2000, the total number of staff employed by DOF was 1,557, of which 702 worked in DOF and 855 worked in provincial and district offices. In terms of gender equality, 235 staff out of the total of 1,557 are women.

DEPARTMENT OF FISHERIES - ORGANIZATION CHART  
(as of February 2001)



## **2. Responsibility for the Tonle Sap**

2. The draft Fishery Conservation, Management, and Development Law (August 1999) stipulates that the Department of Fisheries has paramount authority in fishery conservation and sustainable development, and direction over the provincial and municipal fishery authorities. The draft Law assigns to DOF responsibility for (i) protection of inundated forest from the standpoint of timber removal which is prohibited, (ii) management of inundated forest areas, and (iii) monitoring, control, and surveillance of fishing operations. The draft Law also stipulates that it is illegal to pollute the fishery domain or destroy habitat in any way including discharge of any substance, but does not assign specific agency responsibility for controlling pollution or habitat destruction.

3. In DOF, some departments have specific responsibility for fisheries in the Tonle Sap, namely, one exploitation office and one inspection unit. The Tonle Sap Inspection Unit in Pursat has a total of 65 staff, of whom 6 are graduates and 33 have diploma/certificate level education. The Tonle Sap Exploitation Research Unit is based at Anlong Tnaut Commune, Kroko District, Pursat Province. It has 27 staff, all of which are classed as unskilled. Other exploitation and inspection offices are responsible for different geographical areas.

## **3. Organization of Commercial Fisheries**

4. The commercial aspects of the fishing lot concessions are managed by the Exploitation Office and overseen by the Inspection Office, which is also responsible for instituting legal proceedings. Other aspects of commercial fisheries are managed by KAMFIMEX, the fishery trade section of DOF. It purchases fishery products from the provinces and either distributes them for local demand or exports them. Data on fish exports is imprecise: figures for the 1998 report of the Ministry of Commerce reckon that 517 tons were exported, whereas DOF statistics for the same year report 40,240 tons. These figures do not include an active informal trade with Thailand and Vietnam. Fishery products are exported to the United States, Australia, and Pacific Rim countries. KAMFIMEX is staffed by a total of 50 people, three of whom are graduates. It has a subsidiary commercial unit, Frozen Fishery Industry No. 1, with 21 people, two of whom are graduates.

## **4. Institutional Capacity**

5. DOF, as other government departments, lacks human resources. In 2000, 33 fishery officers had postgraduate degrees, 310 had first degrees and 479 had diploma or certificate level training. No officer holds a doctorate. Fisheries education is provided at the Royal University of Agriculture, which offers a 4-year bachelor degree, and at Prek Leap Agricultural College, which offers a 3-year certificate in fisheries training. DOF has links with a wide variety of institutions concerned with fisheries research and education. These include the Mekong River Commission (MRC), the Asian Institute of Technology Outreach program, and the Food and Agriculture Organization of the United Nations (FAO).

6. Most of the departments include staff training in their responsibilities but it is not clear if and how this is effected. The Fishery Domain and Extension Office has several subsections, with a total of 70 staff, with a high number of qualified staff: five postgraduates, and 52 graduates. The Domain office is responsible for technical aspects of fishing lot management. The Research section researches the causes of water pollution, identifies and monitors different types of fishing gear, and research fish processing technology for export. The Extension section produces documentation on fisheries technology, and manages the library. It does not appear to

have a training or outreach function. The newly established Aquaculture Office has a specific training and extension role. It also has a high number of qualified staff: nine postgraduates and 28 graduates.

7. Specialist fisheries education is provided at the Royal University of Agriculture and at Prek Leap Agricultural College. The former offers a 4-year Bachelor degree course, and the latter a 3-year certificate course. However, these institutions lack well-qualified staff, equipment and teaching materials. Since 1999, DOF have required all graduates to pass an examination before joining the staff of the Fisheries Department. Approximately 25–30 graduates are taken per year.

8. The fisheries curriculum has been earmarked for change, with additional emphasis requested on technical aspects of fish production, including aquaculture, and on fisheries management techniques. A range of different methods of delivery has been requested: short-term as well as long-term training, and overseas study tours. Students seeking postgraduate qualifications currently go elsewhere in Asia, to Europe or Australia. The need for training for Fisheries officers in financial, statistical, and human resources skills has also been identified in order to increase management capacity.

## **5. Institutional Constraints**

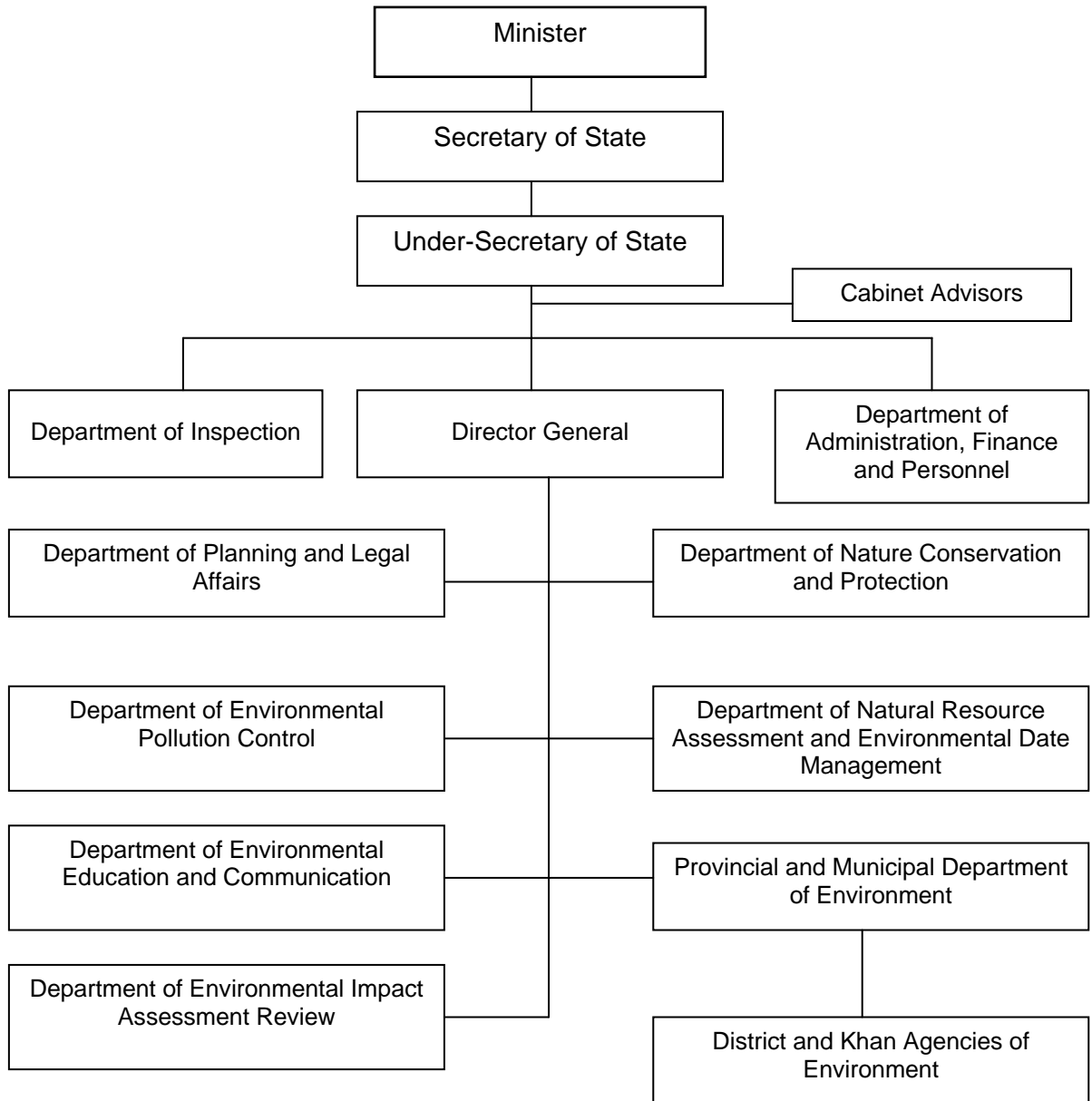
9. DOF is institutionally weak in several areas. There is insufficient differentiation of roles and responsibilities between departments. This happens at central and provincial levels and leads to conflict, inconsistency, overlap, and omission. Also, capacity is very low, even among staff with tertiary education. DOF's remit is especially wide and, with ongoing legislative and policy changes, is increasing. It is ill equipped to meet challenges but recognizes these deficiencies and is actively seeking donor assistance to build management capacity.

## **B. MINISTRY OF ENVIRONMENT**

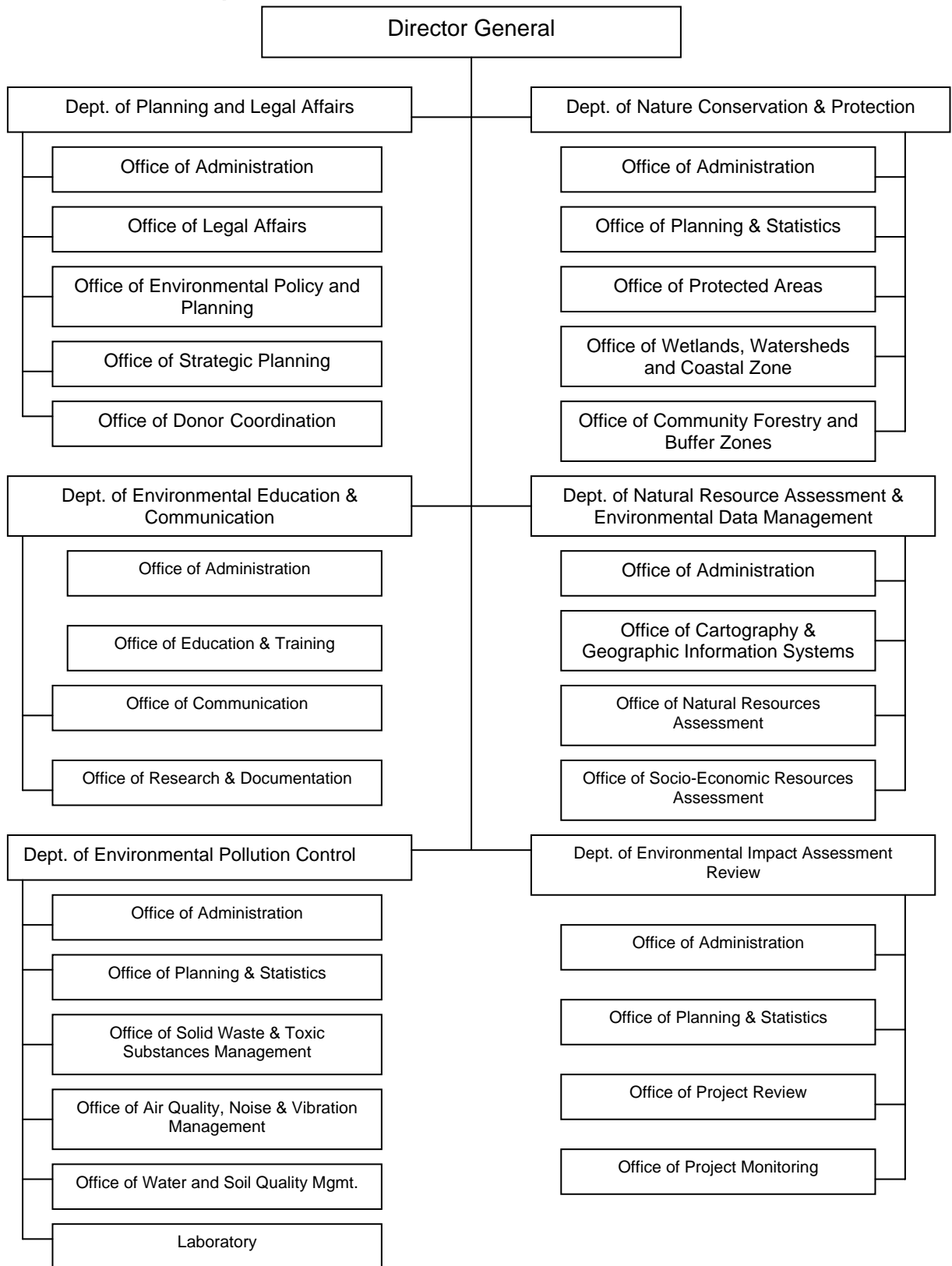
### **1. Mandate**

10. The mandate of the Ministry of Environment (MOE) is to function as the primary environmental protection agency in Cambodia with responsibility for environmental protection and natural resources management with participation by and assistance from other ministries along with provincial and village governmental offices in the area.

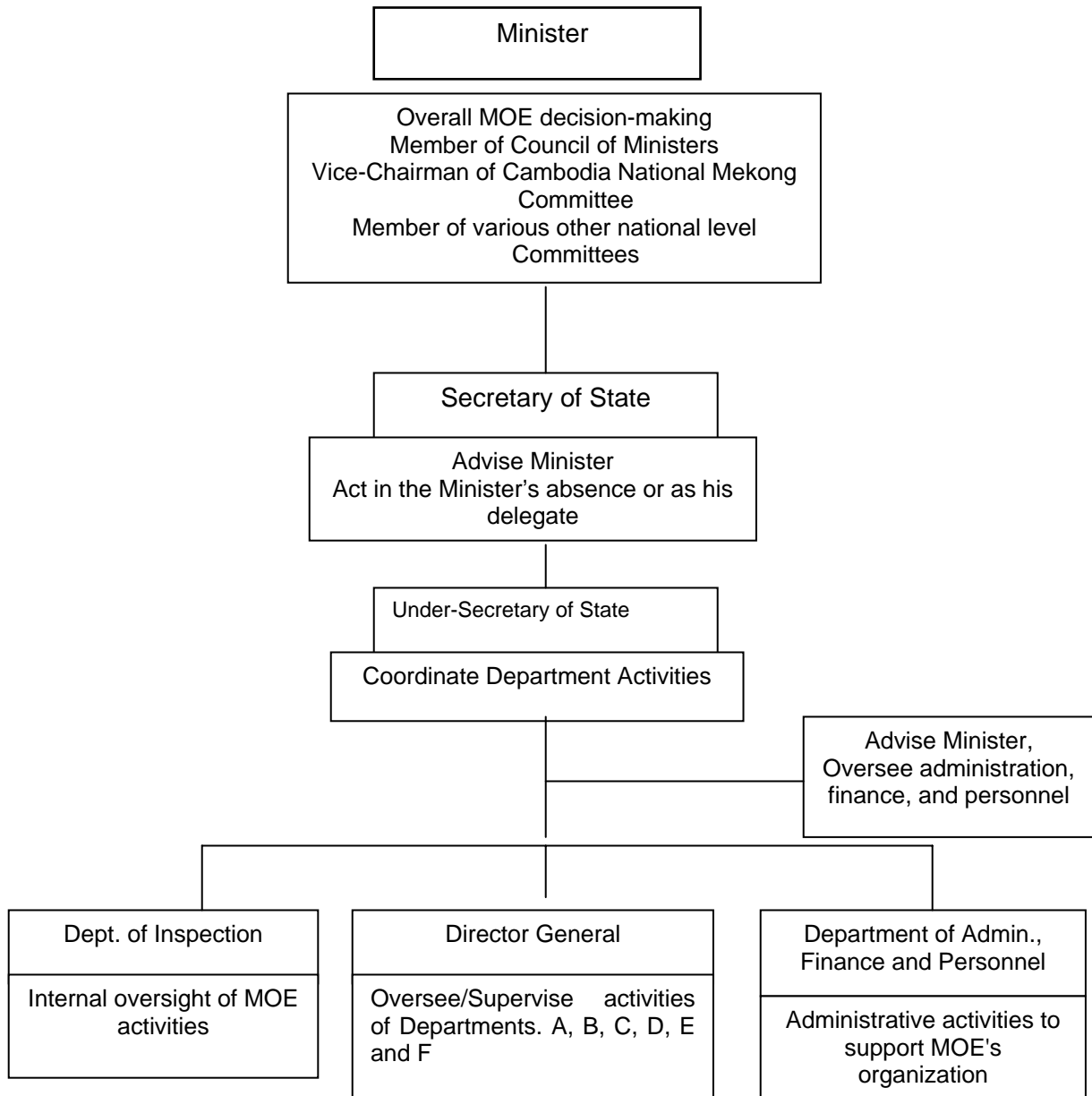
**MINISTRY OF ENVIRONMENT—ORGANIZATION CHART  
(as of February 2001)**



## 2. Technical Departments



**3. Management Functions**



### **3. Institutional Capacity**

#### **i. Administrative Capacity**

11. Each Department of MOE has an Office of Administration. Office staff are familiar with the budgeting, accounting, and tracking concepts inherent to project management and disbursements of funds.

#### **ii. Technical Capacity**

12. MOE is a relatively new institution but has acted as implementing agency for about 13 technical assistance (TA) projects in the last 5 years. Most of these TAs had a training component that increased MOE staff capability for environmental impact assessment (EIA); pollution control; resource management and biodiversity protection; ambient and effluent monitoring; and data management, including geographic information systems (GIS). Training has instilled basic concepts of environmental protection, impact evaluation, monitoring, and data management in MOE. What is needed to supplement past human resource development efforts is on-the-job training for central and provincial staff; development of ambient environmental standards for water, air, soil, noise, and vibration; preparation of effluent permits; development and implementation of monitoring programs; and enforcement of environmental protection laws, regulation, and directives.

#### **iii. Cooperation and Coordination Experience**

13. Since its original establishment as the Secretariat of Environment, MOE has a history of involvement with other national, provincial, and local agencies in administering its programs. Examples include (i) pollution control, in which MOE and provincial Environment Departments advise and work with other ministries during development planning and implementation and in coordinating monitoring and enforcement, (ii) environmental impact assessment, in which MOE chairs screening committees to review initial environmental impact reports, and (iii) protected area management, in which MOE staff work daily with resource ministries, provincial and local officials, and communities. Regarding the Tonle Sap, MOE formed and chaired the Tonle Sap Technical Coordination Unit (TCU) that, for several years, has collected data and coordinated efforts for resource management and protection in the five Project provinces. The TCU was recognized as a successful coordination entity by other Government institutions, NGOs, and donor organizations.

#### **iv. Implementing Agency for Donor-Assisted Technical Assistance**

14. In the past 5 years, MOE has served as the implementing agency for technical assistance projects funded by the United Nations Development Programme, DANIDA, the Asian Development Bank, the European Union, the World Bank, the Japan Bank for International Cooperation, and several independent nongovernment organizations such as the World Wildlife Fund, Wetlands International, and the International Crane Foundation. MOE's departments have all been involved as counterparts with one or more of these projects. Experiences gained include technical, coordination, negotiation, and administrative skills along with an understanding of Cambodia's institutional structures at the national, provincial, and local levels.

**C. CAMBODIA NATIONAL MEKONG COMMITTEE**

15. The Cambodian National Mekong Committee (CNMC) is the primary interagency institution covering the Tonle Sap, with a membership of 10 ministries and a linkage with the Mekong River Commission. CNMC's role is to advise the Government on all matters related to the formulation of water policy, strategy, management, preservation, investigation, planning, and restoration and the development of the water and other natural resources of the Mekong River basin within Cambodia. The Tonle Sap Biosphere Reserve Secretariat is located in it and is administered by a director and three deputy directors assigned from MAFF, MOE, and the Ministry of Water Resources and Meteorology. Although CNMC has a strong remit, as a national institution, it has yet to fulfill this role. It fails to project a strong sense of identity or purpose, and one of the reasons for this may be that its role is usurped by the proximity of MRC as well as by the relative power of individual ministries with responsibility for different aspects of the Mekong and its natural resources. If CNMC's capacity can be built up to a sufficiently high level, there is a logical role for it as the unitary authority for the long-term management of the Tonle Sap.