APPENDIX 4

BANGLADESH

General Information*

Surface area:	143,998 km^2
Population (1995):	118,000,000
GDP (1996/1997):	US$ 14,000 million
Agricultural GDP (1996/1997):	US$ 4,508 million
Capture Fisheries as % of GDP[1]:	1.88%
Aquaculture as % of GDP[1]:	2.69%
Indicative exchange rate (1999) US$ 1 = Tk 48.5	

* FAO World Fisheries Statistics – Country profile, 1999
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers**

Total area Rivers and estuaries		4,047,316 ha
Total Length of 700 Rivers		22,155 km
The Padma-Ganges and its distribution System		
	Annual catch:	6,489 tonnes (1996-97)[3](capture)
i)	Ganges, Padma	305 km
	Surface area:	69,481 ha[2]
	Annual catch:	1,641 tonnes[2] (1991-92)
		50.6 kg/ha[2] (1991-92)
		0.34% contribution to production[2] (1991-92)
ii)	Mathabhanga	128 km
iii)	Ichhamati	285 km
iv)	Bhairab	559 km
v)	Kumar	443 km
vi)	Kobadak	280 km
vii)	Chitra	188 km
viii)	Nabaganga	210 km
ix)	Garai, Madhumati	314 km
x)	Arial Khan	266 km
The Meghna and Surma System		
	Surface area:	73,999 ha[2]
	Annual catch	84,737 tonnes (1989-90)
		54,244 tonnes[2] (1991-92)
		1,369.60 kg/ ha[2] (1991-92)
		11.3% contribution to production[2] (1991-92)
i)	Surma	350 km
ii)	Kushiyara	110 km

Jamuna-Brahmaputra System

	Surface area:	73,666 ha2
	Annual catch:	2,280 tonnes (1989-90)
i)	Brahmaputra	350 km
	Annual catch:	505 tonnes (1989-90)
		391 tonnes[2] (1991-92)
		0.081% contribution to production[2] (1991-92)
ii)	Jamuna	531 km
	Annual catch:	1,775 tonnes (1989-90)
		2,253 tonnes[2] (1991-92)
		30.58 kg/ ha[2] (1991-92)
		0.46% contribution to production[2] (1991-92)

Other Rivers in West region

i)	Nagar	238 km
ii)	Tangan	119 km
iii)	Purnabhaba	133 km
iv)	Mahananda	90 km
v)	Baral	20 km
vi)	Karatoya Atrai, Hurasagar Gum, Gumani	841 km
vii)	Dharla	62 km

Rivers in Chittagong Region

i)	Karnaphuli	180 km
ii)	Sangu	287 km
iii)	Matamuhari	161 km

** Bangladesh Bureau of Statistics (1994)
[2] FAO (1994) 2: Productivity and Exploitation of Inland Open Water Fisheries
[3] Payne *et al.,* (2003) A Review of the Ganges Basin: Its Fish and Fisheries

Inland fisheries ***

Inland fisheries surface area: 4,047,316 ha[1]
Inland fishermen 768,632 fishermen (1988-89)[2]
Inland catches as % of total catches:
90% (1960's) 77,9 % (1995-96)
total production 1,264,435 t
total inland production 985,265 t

Year 95-96	Inland open water (capture)					Inland close water (culture)		
Inland water	River and Estuaries	Sundarban	Depression (beels & haors)	Kaptai Lake	Flood Land	Ponds	Oxbow Lake (baors)	Shrimp Farm
Production tonnes	146,744	7,857	63,014	7,449	370,105	310,130	3,018	76,948

*** Liaquat and Zahirul (1997) An Assessment of the Economic Benefits from Stocking Seasonal Floodplains in Bangladesh.
[1] FAO (1994) Productivity, Exploitation and Fishing Technology of Inland Open-Water Fisheries, Bangladesh
[2] Bangladesh Bureau of Statistics (1994)

Fisheries data §

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	1,170	0.3	38	1,128	9.5
Fish for animal feed & other purposes	5	-	-	-	

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	
Full time fisherfolk:	570,000
Part time	1,196,000
(ii) Secondary sector:	N/A
Gross value of fisheries output (1997) (at ex-vessel prices, estimate)	US$ 1,000 million (=3.12% of GDP)
Trade (1994/5)	
Value of fisheries imports (estimate):	US$ 590,000 (Average 1994-1995)
Value of fisheries exports:	US$ 325.11 million (9.38% of total export)

Inland fisheries §

Changes in patterns of land use and the widespread development of flood-control schemes nationwide have had an important impact on the extent of natural floodplain available for fish feeding and reproduction. Fishing pressure from a growing population has increased dramatically and has seriously affected the abundance of some species (particularly valuable migratory carps) and may even be putting the availability of more resilient floodplain fish at risk. Siltation, often a result of upstream changes in catchments, has reduced water flows and cut off vital access routes for fish from one habitat to another. Increased use of pesticides and fertilizers in agriculture and growing industrial pollution are also contributing to the deterioration of the aquatic environment.

Increasing fishing pressure has translated into greater competition for access to fisheries resources. The value of formal access arrangements to these resources, such as leasing, has increased rapidly, providing important revenue for the government but encouraging more complete depletion of the resource by leaseholders. Access to

fisheries resources is frequently marked by confrontation and violence, illustrating both the importance of the resource and the pressure to which it is subjected. Declining availability of fish to subsistence part-time fishermen traditionally using floodplain fisheries to provide protein to their families is another issue facing the sector.

The Government of Bangladesh is addressing these issues through a strategy which includes: (i) conserving aquatic resources; (ii) shifting priorities in management from revenue-generation to biological production and sustainability; (iii) increasing production by involving resource-users in management and enhancement; and (iv) rehabilitation of degraded habitats. The negative impacts of flood control and road infrastructure on floodplain fisheries are being mitigated through a program of floodplain stocking and fish pass construction. The introduction of gear-based licensing schemes for selected fisheries has also been tried with some success, and has been seen to contribute to a more equitable distribution of fisheries benefits among resource users.

[§] Source: FAO World Fisheries Statistics – Country profile, 2005

CAMBODIA

General information *

Surface area:	181,040 km^2
Water area:	4,520 km^2
Population (2004):	Est. 13,363,421
Population growth (2004):	1.8%
GDP at purchaser's value (2003):	US$25.02 billion
Agricultural, fisheries and forestry % of GDP (2002):	8.6%
Fisheries GDP (2003):	US$442 million (12%)
Capture Fisheries as % of GDP[1]:	10.03%
Aquaculture as % of GDP[1]:	0.89%

* FAO World Fisheries Statistics – Country profile, 2005
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers

Mekong River (originates in China passes through Myanmar, Laos, Thailand, Cambodia and Viet Nam)

Total length: 4,225 km
Length (in Cambodia): 500 km
Total annual catches: 279,000–441,000 tonnes (1999) (excludes aquaculture)[1]
The Mekong River in Cambodia flows into 4 main branches:

- Great Lake
  - Surface area: Dry season: 2,000 – 3,000 km^2
    Wet season: 10,000 – 12,000 km^2
  - Annual Catch 235,000 tonnes (1995-96)[3]
- Tonle Sap River

- Lower Cambodian Mekong River
  Length: 90 km
- Bassac River
  Length: 100 km

[1] Van Zalinge and Thuok (1999) Summary of Project Findings Present Status of Cambodia's Freshwater Capture Fisheries and Management Implications
[2] Sverdrup-Jensen, S (2002). Fisheries in the Lower Mekong Basin: Status and Perspectives

Inland fisheries **

Inland fisheries include rivers, lakes, ponds, floodplains, ricefields and swamps. The following table presents the type of land and water resources in Cambodia[1].

Table 1. Areas of various types of land and water resources which support Cambodia's freshwater capture fisheries [1]

Type of Land and Water Resources in Cambodia	Areas (ha) 1992-93
Permanent water (river, lake, ponds, etc)	411,100
Flooded forests	370,700
Flooded secondary forests	259,800
Flooded grassland	84,900
Receding and floating ricefields	29,300
Seasonally flooded crop fields	529,900
Swamp	1,400
Total	1,687,000

Inland catches as % of total catches: 89.6% (1999)
Inland fisheries production by different scale of fisheries

Rice-field production: 45,000 - 110,000 tonnes
Small-scale fisheries: 115,000 - 140,000 tonnes
Middle-scale fisheries: 85,000 -100,000 tonnes
Large-scale fisheries: 34,000 - 91,000 tonnes
Total 279,000 - 441,000 tonnes

** Van Zalinge and Thuok (1999) Summary of Project Findings Present Status of Cambodia's Freshwater Capture Fisheries and Management Implications
[1] Ahmed *et al.*, 1996 Sustaining the gift of the Mekong: the future of the freshwater capture fisheries of Cambodia

Fisheries data §

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	412.7	1.6	31.6	382.7	28.4
Fish for animal feed & other purposes	-	-	-	-	

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	812,500
(ii) Secondary sector:	> 2,000,000
Trade (2003)	
Value of fisheries imports:	US$ 5.4 million
Value of fisheries exports:	US$ 34.5 million

Inland fisheries §

The inland fishery of Cambodia is one of the richest natural resources in the Mekong river region and in the world, due to its seasonal changes of water regime and its ecological diversity. The high productivity stems from the annual inundation by the Mekong River of the large floodplains found in central Cambodia around the Tonle Sap Great Lake and the Mekong floodplains northeast and south of Phnom Penh, where important fish habitats such as flood forests are found. The inland fisheries can be divided into large, middle and small-scale fisheries.

Large-scale fisheries are licensed fisheries, which operate for commercial purpose. Large-scale fisheries are mainly dominated by a system of lots, or concessions, auctioned out by the government to private businesses.

Middle-scale fishing indicates the use of medium-size fishing gear operating in the protected open water of the inland fisheries domain. There are 24 types of middle-scale fishing gear defined in the sub-decree. Usually, employment of this scale of fishing gear varies from two units to not higher than a dozen units. Fish caught by these methods are not as good quality as fish caught in the fishing lots as fish are killed and injured during capture and sold immediately to markets or to fish processors in the immediate area.

Small-scale fisheries are family fisheries, based on small-size fishing gear that can be operated by one or two persons. Also rice field fishing is considered small-scale. Formerly, these fisheries were excluded from the official fisheries statistics and ignored by the fisheries administration.

Source: Fisheries Action Coalition Team.

Fishing production means

Cambodians use an amazing variety of gears of all sizes, many of which were developed to suit local conditions. Many gears and methods reflect the accumulated knowledge of generations of Cambodian fishers. The largest gears, such as lots, dais (stationary trawls) and barrages are rather non-selective and target fish which are migrating in large numbers. Most, smaller, traditional gears are specialized for fishing particular habitats in a particular way to catch a few target species. The diversity of gears parallels the diversity of fish, as more than 150 types of gears are known from Cambodia.

Large scale fisheries are licensed fisheries. The commercial inland fisheries, especially the adjudicative fishing lots, are one of the big industries in Cambodia in terms of employment and production. Each fishing lot is demarcated and licensed for operation to a private corporation or individual through an auction process for two years. Production is both high value and high volume, which makes the fishing lots a lucrative fishing ground for the wealthy. There are three types of fishing lots: lacustrine, riverine-lacustrine, and riverine.

Middle scale gears are medium mobile and fixed fishing gear operations, such as giant cast nets, seine nets, surrounding nets, long gillnets, giant push nets, longlines, arrow-shaped traps, and short-barrage bamboo traps.

Small-scale fisheries use short gillnets, cast nets, scoop nets, shrimp scoop nets, hand push nets, small bamboo traps, short hook lines, single hook lines, spears, harpoons, etc.

§ Source: FAO World Fisheries Statistics – Country profile, 2005

INDIA

General information *

Surface area:	3.3 million km^2
Population (1999):	approximately 1,000 million
Population growth (2004):	1.8%
GDP (1997-1998):	US$ 319,733 million
Agricultural GDP (1997-98):	US$ 89,479 million
Currency: rupee. Indicative exchange rate (1999) US$ 1 = Rs 43.3	

* FAO World Fisheries Statistics – Country profile, 2000

Main Rivers**

The catch from rivers does not contribute significantly to the total inland fish production in terms of volume. On the other hand, reservoirs are considered the prime resource as regards capture fisheries and extensive aquaculture.

Total riverine fisheries production

Number of fishermen 190,000 fishermen

Riverine production 150 kg/fisher/year

Flow into the Bay of Bengal

Indus

Total length: 1,114 km

Catchment area: 312,289 km^2

Ganges River (Starts in the Himalayas through China, India, Nepal & Bangladesh)

Total length 2525 km.

Length (India): 2071 km

Number riverine fishermen 7.8 fishers/km^1

Potential river production 198.3 kg/ha/year^2

Actual river production 30 kg/ha/year^2

River production (1993-94) 49.4 mt/year(from Patna Market Centre)^1

Ganges River Basin (Catchments area: India 80.1%, Nepal 19.3%, Bangladesh 0.6%)

Surface area: 1,060,000 km^2

Main Tributary:

Yamuna River (main tributary from the Ganges)

Tributaries:

Ramgange

Gomati

Ghagra
Gandak
Saptkosi
Mahananda

Length:	1,300 km
River production (1979-80)	128 – 174 tonnes /year (from Allahabad Market Centre)[1]

Brahmaputra River

Total length	2,580 km
Length (India):	885 km
River production:	No data available

Brahmaputra River Basin

Surface area	1,000 km^2

Mahanadi River

Length:	857 km

Sabarmati River

Length:	371 km
Catchment area:	21,674 km^2

Mahi River

Length:	583 km
Catchment area:	34842 km^2

Godavari River

Length:	1,465 km
Catchment area:	312,812 km^2

Krishna River

Length:	1,401 km
Catchment area:	258,948 km^2

Pennar

Length:	597 km
Catchment area:	55,213 km^2

Cauvery

Length:	800 km
Catchment area:	81,155 km^2

Brahmani

Length:	799 km
Catchment area:	39,033 km^2

Mahanadi

Length:	851 km
Catchment area:	141,589 km^2

Flow into the Arabian Sea

Narmada River

Length:	1,312 km
Catchment area:	98,796 km^2

Tapti River

Length:	724 km
Catchment area:	65,145 km^2

** Sugunan, V. V (1997) India. In: Fisheries management of small water bodies in seven countries in Africa, Asian and Latin America

[1]Payne *et al.*, (2003) A review of the Ganges Basin: Its Fish and Fisheries.

[2] Das, M. K (2002) Social and economic impacts of disease in inland open-water and culture-based fisheries in India

Inland Fisheries**

Inland fisheries include rivers, floodplains, estuaries, mangroves, estuarine impoundments, lagoons, upland lakes, reservoirs and ponds.

Inland Fisheries resources of India	
Resource	**Size**
Rivers and canals	173,287 km
Swamps and other wetlands	1,097,787 ha
Floodplain lakes	202,213 ha
Upland lakes	72,000 ha
Mangroves	356,500 ha
Estuaries	285,000 ha
Lagoons	190,500 ha
Reservoirs	3,153,366 ha
Freshwater ponds	2,254,000 ha
Brackishwater ponds	1,235,000 ha

Inland catches as percentage of total catches:

43.03% (1994-95)	52.10% (1998-1999)
total production: 4,950,000 t	total production: 6,158,000 t

Inland catches description year 1994-1995; total inland catches: 2,130,000 t

Capture fisheries	**Production**
Rivers & Canals	28,500 t
Reservoirs	93,650 t
Other capture	507,850 t
Freshwater aquaculture	1,500,000 t

** Sugunan, VV (1997). India. In: Fisheries Management of Small water bodies in seven countries in Africa, Asia and Latin America.

Fisheries data §

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	5,378	NIL	385	4,670	4.8
Fish for animal feed & other purposes	780	-	-	-	

Estimated employment (1997)	
(i) Primary sector:	
Full time fisherfolk	2.40 million
Part time	1.45 million
Occasional	2.11 million
TOTAL	**5.96 million**
(ii) Secondary sector:	n.a.
Gross value of fisheries output (1997-98) (at ex-vessel prices, estimate):	US$ 4,845 million (=1.47% GDP)
Trade (1998-99):	
Value of fisheries imports:	nil
Value of fisheries exports:	US$ 1,107 million

Inland fisheries §

During the period 1987-1997, there was a steady increase in inland fisheries production, registering 45.4% during the ten-year period. Inland production, including farming, is now catching up with production from the marine sector and is likely to overtake marine capture fisheries in the next millennium. Inland production includes catches from rivers, upland lakes, peninsular tanks, reservoirs and oxbow lakes. The major states contributing are West Bengal (33%), Andhra Pradesh (9.09%), Bihar (8.71%), Assam (6.92%) Uttar Pradesh (6.49%), Orissa (6.01%), Tamil Nadu (4.82%), Madhya Pradesh (4.07%), Karnataka (3.89%) and Maharashtra (3.4%).

§ Source: FAO World Fisheries Statistics – Country profile, 2000

INDONESIA

General information*

Surface area:	1,900,000 km^2
Population (2003):	214,500,000
Population growth (1998-03):	1.3 %
GDP (2003):	US$ 208.3 billion
Agricultural GDP (2003):	US$ 34.6 billion (16.6 %)
Capture Fisheries as % of GDP[1]:	2.35 %
Aquaculture as a % of GDP[1]:	1.66 %

* World Bank (2003) Indonesia at a Glance
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers

Five main islands

Kalimantan island (539,460 km^2)

- Sungai Kapuas River (longest river in Indonesia)
  - Length: 1,400 km
- Makakam River
  - Length: 920 km
  - Catchment area: 77,700 km^2
- Barito River(largest river in Indonesia, 3 km wide and 10-30 m deep in places)
  - Tributaries
    - Martapura River
    - Length: 600 km
- Kupas River

Sumatra (473,606 km^2)

- Lempuing River (one of the most productive inland fisheries in Indonesia)
  - Fishermen density 3-4/km^2 (1997)[1]
  - Fishing activity 4 hours/day (1997) [1]
  - Catch/fisherman 2.2 – 3.3 tonnes/year (1997) [1]
  - Catch/area 72 – 118 kg/ha/yr (1997) [1]
- Siak River
- Asahan River
- Hari River
- Musi River
  - Length: 2,000 km
  - Catchment area: 60,000 km^2
  - Annual catches: 22,833 kg (average river catches 1979-94)[1]
- Indragiri River
- Batanghari River
- Kampar River

Sulawesi (189,216 km^2)

Jeneberang River
Length: 75 km
Surface area: 760 km^2
Walanae River (feeds lake Tempe)

Irian Jaya (Papua) (421,981 km^2)
Mamberamo River System (largest river on the island)
Length: 1,300 km
Baliem River
Length: 400 km

Java (132,187 km^2)
Bengawan Solo River Basin (largest river on the island)
Length: 600 km+
Surface area: 16,100 km^2
Brantas River (2nd largest river on the island)
Tributaries
Konto River
Widas River
Ngrowo River
Length: 320 km
Catchment area: 11,800 km^2
Wawar River
Catchment area: 780 km^2
Flooded area (annual): 15,000 hectares
Tarum River
Manuk River
Serang River
Catchment area: 281 km^2
Serayu River

Main Lakes

Kalimantan
Jempang
Surface area: 10,875 ha
Melintang
Surface area: 7,062.5 ha
Potential fish production: 55 kg/ha/yr
Semayang
Surface area: 8,937 ha
Potential fish production: 54 kg/ha/yr
Luar
Sentarum
Siawan

Sumatra
Toba (largest of Indonesia's lakes, largest lake in South-east Asia)

Surface area: 1,145 km^2

Tempe (important for fisheries)
Maniinjau
Kerinci
Singkarak

Sulawesi
Towuti
Sidenreng
Poso
Tondano
Matan

Irian Jaya
Pania
Sentani

[1] Koeshendrajana and Cacho (2001) Management Options for the Inland Fisheries Resource in South Sumatra, Indonesia: I Bioeconomic Model

Inland fisheries**
Indonesia has a huge inland open water covering 55 million hectares, this comprises of natural lakes, man-made lakes, rivers and swamps.
In 1991, it was estimated that respectively, Kalimantan and Sumatra produced 50% and 30% of all the freshwater open water fish production in Indonesia. It was also estimated that at this time 43% of Indonesian freshwater ponds were located in Western Java.

Inland catches as a % of total catch (2000)[a]: 5.8 %
Brackish/freshwater aquaculture as a % of total catch (2000)[a] : 14.54 %
Inland fisheries production (2000): 297,300 tonnes
Backish water pond cultured (2000): 360,800 tonnes
Freshwater pond cultured (2000): 185,200 tonnes
Cage cultured (2000): 97,300 tonnes
Paddy field cultured (2000): 100,800 tonnes

Inland fisheries potential and actual (1998) yield per island[1]:

Potential capture inland fisheries yield per island[1]			
Island	Area (ha)	Potential yield (T)	Actual yield (T) (1998)*
Java	96,400 ha	30,000 – 35,000	?
Sumatra	4,053,850	300,000 – 330,000	86,365
Kalimantan	9,029,000	400,000 – 450,000	118,227
Sulawesi	492,200	50,000 – 55,000	34,438
Maluku & Irian Jaya	63,300	13,000 – 20,000	2,582
Bali & Nusa Tenggara	17,500	7,000 – 10,000	?
* The author estimated the actual catches were two to three times the official figure			

[a] Inland/aquaculture catch % generated using year 2000 figures from BPS Statistics Indonesia.
** BPS Statistics Indonesia, (2000)
[1] Coates (2002) Inland capture fishery statistics of South-East Asia: current status and information needs

Fisheries data [§]

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				kg/yr
Fish for direct human consumption	4,066,630	19,169	715,498	3,370,301	16.3
Fish for animal feed & other purposes	329,100	197,935	95,029	432,006	

(Source: FAO world fisheries statistics, 2000)

Estimate employment (1997)	
(i) Primary sector:	4,600,000
(ii) Secondaty sector:	N/A
Trade (1999)	
Value of fisheries imports:	US$ 49 million
Value of fisheries exports:	US$ 1,640 million

Inland fisheries and aquaculture [§]

Inland and culture fisheries produced 711 612 t in 1988 and 966 805 t in 1997, 304 258 t and from capture and 662 547 t from aquaculture. Brackishwater cultivation in tambaks produced 370 259 t, freshwater ponds produced 171 768 t, and rice-cum-fish culture produced 94 384 t. Cage culture, which is still in its infancy, produced 26 186 t.

Almost all of the landings from open water capture fishery (285 360 t) was finfish of various species (94.38 percent). Most came from Kalimantan (54.89 percent), Sumatra (18.66 percent), Java (12.94 percent) and Sulawesi (11.37 percent). Of total landings, set gillnets contributed 20.78 percent of the landings, followed by traps (15.53 percent), handlines (10.79 percent), guiding barriers (10.21 percent) and longlines (4.99 percent). Based upon the type of open waters, river fishery contributed 61.80 percent, swamps 21.24 percent, lakes 12.27 percent and reservoirs 4.68 percent. The disposition of the landings was mainly as fresh (more than 90 percent), drying/salting, freezing and smoking.

A total of 154 302 fishing boats were employed for open-waters fishery. Most of them were unpowered (93 percent), while the rest were powered boats, mostly with outboard engine (85 percent). A variety of fishing gears (748 341 units) were used in the fishery, namely handlines, set gillnets, longlines, scoop nets, drift gillnets, etc.

A total of 461 619 fishers were engaged in the open waters fishery in 1988 and 508 626 in 1997. Many of them were part-time fishers (63.52 percent). They were mostly in Sumatra (35.04 percent), Kalimantan (28.58 percent), Java (25.38 percent) and Sulawesi (4.82 percent).

The number of fish farmers increased from 1 691 922 in 1988 to 2 052 725 in 1997. Most of them were engaged in fresh water pond aquaculture (65 percent), paddy field aquaculture and brackish-water aquaculture, with a few using cage aquaculture). Most aquaculture activities were located in Java (68.46 percent of the farmers), while the rest were spread out around the country, especially in Sumatra (18.24 percent), Sulawesi, Kalimantan and Lesser Sunda Islands.

Culture areas occupied 507 513 ha, comprising brackish-water aquaculture (60.44 percent of the area), followed by paddy field aquaculture (27.67 percent) and pond aquaculture (11.95 percent). The main areas of brackish-water aquaculture were in Java (35.81 percent), Sulawesi (30.63 percent) and Sumatra (26.18 percent). For paddy field aquaculture, Java had an area of 102 889 ha (73.28 percent), followed by Sumatra (15.47 percent) and Sulawesi (7.15 percent). Sumatra led in pond aquaculture, with 28 701 ha (47.55 percent), followed by Java (37.02 percent) and Sulawesi (9.22 percent).

In terms of production, brackish-water aquaculture contributed 370 259 t (55.88 percent), followed by pond aquaculture (25.93 percent) and paddy-field aquaculture (14.24 percent). Production of finfish from brackish-water aquaculture consisted of milkfish (72.98 percent), Mozambique tilapia (11.66 percent), mullets (6.27 percent), giant sea perch and others.

Pond aquaculture produced 171 768 t of fish, which consisted of common carp (31.18 percent), catfish (13.51 percent), Nile tilapia (10.01 percent), Mozambique tilapia (9.46 percent) and Java carp (8.92 percent) and others. Paddy-field aquaculture produced 94 334 t, composed of common carp (75.51 percent), Java carp (8.84 percent), Mozambique tilapia (2.91 percent), Nile tilapia (2.20 percent) and others. Cage culture produced 26 186 t, dominated by common carp, Nile tilapia and Mozambique tilapia.

LAO PDR

General information *

Surface area:	236,725 km^2
Population (1995):	5,032,000
GDP at purchaser's price (1995):	US$ 1,500 million
Agricultural GDP (1995):	US$362
Fisheries GDP (1995):	US$900 million
Capture Fisheries as % of GDP[1]:	1.43%
Aquaculture as % of GDP[1]:	5.78%

* FAO World Fisheries Statistics – Country profile, 1999
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers**

Mekong River (originates in China passes through Myanmar, Laos, Thailand, Cambodia and Viet Nam)

Total length:	4,220 km
Length (Laos):	886 km
Surface area:	202,000 km^2 (97% of total country area)
Annual catch:	182,700 tonnes (2000) (capture fisheries) (The capture fisheries figure is five times the officially reported figure)
	16,700 tonnes (2000) (reservoir)

5,400 tonnes (2000) (aquaculture)

** Sverdrup-Jensen, S (2002). Fisheries in the Lower Mekong Basin: Status and Perspectives

Inland Fisheries

Inland catches as percentage of total catches: 100%

Fisheries data §

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	40.0	3	0.01	42.99	8.54

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	200,000
(ii) Secondary sector:	25,000
Gross value of fisheries output (ex-vessel prices)	US$ 48 million
Trade (2003)	
Value of fisheries imports:	US$ 4 million
Value of fisheries exports:	N/a

Inland fisheries §

Lao PDR is a landlocked country bordering China, Myanmar, Thailand, Cambodia and Viet Nam. The borders between Lao PDR and China, Myanmar and Viet Nam are in highland and mountainous regions with little infrastructure; in contrast, the Mekong river forms the major part of the 1 800-km border between Laos and Thailand. The greatest population density is found along the Mekong river, in the central Lao PDR plain and in lower Lao PDR. The Mekong river has traditionally been, and remains the primary access route to the rest of the world, although there is now significant cross-border trade between Lao PDR and China and Viet Nam with the expanding road network.

The Mekong river and its tributaries are the main source of capture fisheries. Catch there represents over 60% of all landings. The main fishing methods are beach seines and drifting gillnets, although longlines and traps are also used. Most boats in use are flat-bottomed riverine style canoes; however, boats equipped with longtail engines are becoming more common, similar to those in use in coastal zones in the region.

The main landing zones are near the urbanized areas of Vientiane, Thakhek, Savannahket and Pakse; landings take place along the bank of the Mekong river and its tributaries. A proportion of the catch is probably landed in Thailand due to the higher market prices (almost 100%).

Rice fields are another important source of capture fisheries landings; during the production season they are stocked by nature, mostly by small so-called "opportunists" with a short life span and rapid growth. All species are taken and

utilized by the Lao – crabs, shrimp, fish, snails, frogs and insects. The acceptability of all aquatic species for consumption can confuse fisheries statistics since collection of data may often emphasize fish ignoring the significant contribution of other rice field species. Catches from hydropower reservoirs also contribute to landings, but productivity is usually low.

[§] Source: FAO World Fisheries Statistics – Country profile, 2002

MALAYSIA

General information*

Surface area:	329,758 km^2
Population (2003):	24,800,000
Population growth (1998-03):	2.2 %
GDP (2003):	103.7 US$ billion
Agricultural GDP (2003):	10.0 US$ billion (9.7 %)
Capture Fisheries as % of GDP [1]:	1.13 %
Aquaculture as a % of GDP [1]:	0.37 %

* World Bank (2003) Malaysia at a Glance
[1] Asia-Pacific Fishery Commission (2005)

Malaysia comprises of the Malay Peninsular (West Malaysia, 154, 680km^2) and the northwestern part of Borneo Island (East Malaysia, 202,020 km^2)

Main Rivers**
East Malaysia

Rajang River
- Length: 565 km
- Est. productivity: 100 kg/ha/yr

Kinabatangan River
- Length: 565 km
- Catchment: +17,000 km^2

Batak Lupar
- Length: 228 km

Baram River
- Length: 402 km
- Est. productivity: 142-169 kg/ha/yr

Limbang River
- Length: 196 km

Sarawak
- Length: 115 km

West Malaysia

Pahang River system
- Length: 459 km
- Annual catches (2000-2002 average)[2]: 131 tonnes

Kelantan River
- Length: 400 km

Perak River
- Length: 522 km
- Est. productivity: 11.64 kg/ha/yr

Gombak River
- Length:
- Est. productivity: 180 kg/ha/yr

Klang River
- Length: 120 km
- Catchment: 1200 km^2

Langat River
- Length: 160 km
- Catchment: 1240 km^2

Main Lakes
West Malaysia

Lake Kenyir (largest reservoir in Malaysia and sustains a small scale commercial fishery)
- Area: 360 km^2
- Mean Depth: 37 m
- Annual catches[a]: 720 tonnes

Lake Temengor
- Area: 152 km^2
- Est. annual catches[1]: 100 tonnes

Lake Bera (largest natural lake)
- Area: 61.5 km^2
- Annual catches: No data available

Bukit Merah
- Storage: 75 million m^3
- Annual catches: 100 tonnes

Chenderoh (oldest reservoir in Malaysia)
- Annual catches (late 80s): 2.57 tonnes
- Value of landings: 63,179 RM (US$ 24,300)

** Jackson & Marmulla (2001)
[a] This figure has been synthesised based on a yield figure of 20 kg/ha/year derived by Yusoff et al, (1995)
[1] Khoo et al, (2003)
[2] Johari, Isa, Muda (2003)

Inland Fisheries***

Freshwater fish catch (2000): 22,636 tonnes
Freshwater aquaculture production (1997): 20,303 tonnes

*** Earthtrends Water Resources and Freshwater Ecosystems (2003) Malaysia

Fisheries data [§]

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				kg/yr
Fish for direct human consumption	1,252	343	94	1003	45.9
Fish for animal feed & other purposes	210	47	58	221	-

(Source: FAO world fisheries statistics, 2000)

Estimate employment (1997)	
(i) Primary sector (excluding FW fisheries sector):	79,000
(ii) Secondaty sector:	N/A
Trade (1999)	
Value of fisheries imports:	US$ 258.7 million
Value of fisheries exports:	US$ 181.2 million

Inland Fisheries [§]

Malaysia has no large river systems, but there are a number of sizeable reservoirs that are being developed for inland fisheries, notably recreational fisheries in the Perak and Terengganu dams located in Peninsular Malaysia. The inland fisheries contributed an insignificant production of 3 336 t in 1999.

Man made lakes dominate the Malaysian lentic environment, estimated to be about 1000 km^2. Inland capture fisheries are dominated by cyprinids and silurids in the countries largest river systems (Khoo et al, 1987). The aquaculture industry provided 129 009 t, or about 10 percent of total fish production, valued at RM 726.5 million in 1998.

[§] Source: FAO World Fisheries Statistics – Country profile, 2001
[1] Khoo et al, (1987)

MYANMAR (BURMA)

General information *

Surface area:	676,577 km^2
Population (2001-2002):	47,114 million
GDP at purchaser's price (1999-2000):	2,190,301 kyat million
Agricultural GDP:	29,151 kyat million
Aquaculture as % of GDP[1]:	0.17%

* World Fisheries Statistics – Country profile (2001)
1 Asia-Pacific Fishery commission (2005)

Main Rivers**
The Mekong River and the Irrawaddy system have great similarities in the fisheries. So the fisheries of Myanmar and Cambodia are usually compared. A very small proportion of the Mekong River passes through Myanmar. Nevertheless, we will not include this River as it covers a very small area in Myanmar.

Total aquatic resource area of the river systems: 8.2 million ha[1]

Irrawaddy system

Ayeyarwaddy River (or Irrawaddy River)
- Length: 2,150 km
- Catchment: 424,000 km^2
- Annual catch: No data available[a]

Chindwin River (tributary of Ayeyarwaddy River)
- Length: 844 km
- Annual catch: No data available[a]

Sittaung River
- Length: 563 km
- Annual catch: No data available[a]

Salween (Thanlwin) River
- Length: 2,400 km
- Annual catch No data available[a]

[a] No data available for specific permanent water bodies and seasonal floodplains
** FAO (2003) Myanmar aquaculture and Inland fisheries
[1] Coates (2002) Inland capture fishery statistics of Southeast Asia: comment status and information needs

Inland fisheries**

Inland fisheries production comes mainly from floodplains, the water surface of which covers six million ha during 4-5 months of the year[1]

Inland catches as percentage of total catches: 25%
(total fisheries production 1,300,648 tonnes (2000-2001))

Degree of exploitation:
- Inland freshwater fishers: 1,398,410 fishermen[2]
- Inland capture potential: 600,000 – 900,000 tonnes[b]
- Inland capture fisheries (2000-2001): 253,373 tonnes[a]
- Inland culture fisheries (2000-2001): 109,188 tonnes[a]
- Inland prawn farming (2000-2001) : 6,603 tonnes[a]

[a] including lakes, rivers, floodplain, reservoirs and lagoons
[b] Estimate based on revised valuation of the Mekong River system capture potential
** FAO (2003) Myanmar aquaculture and Inland fisheries
[1] Oo (2002) Inland fisheries of the Union of Myanmar
[2] Coates (2002) Inland capture fishery statistics of Southeast Asia: comment status and information needs

Fisheries data §

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	793.9	1	97.2	723.2	15.4
Fish for animal feed & other purposes	151.9	0.565	-	-	

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	540,845 persons employed (full time)
(ii) Secondary sector:	3,082 persons
Gross value of fisheries output (at ex Vessel prices 1999-2000)	106,763 million kyats
Trade (2003)	
Value of fisheries imports:	-
Value of fisheries exports:	US$ 158.56 million

Inland fisheries §

Myanmar's inland water body encompasses a total of 8.2 million hectares made up of the mingling of main riverine and estuaries system of the Ayeyarwady, Chindwin, Sittaung and Thanlwin rivers.

Permanent freshwater bodies, including two main lakes Inlay and Inndawgyi, cover about 1.3 million hectares. In addition, there are over one hundred major man-made reservoirs covering a total water capacity of approximately 1.2 percent of Myanmar's total annual water resources. About 23 594.64 hectares are currently in use for aquaculture purposes. There are three types of inland fishery: *floodplain*, *leaseable* and *open fisheries*.

Floodplain fishery takes place during and towards the end of the monsoon season when excessive rainfall causes main river systems and their tributaries to overrun, eventually flooding a greater part of the Delta region. At the end of the monsoon season, the rain fall level attenuates, water flow rates of major rivers and tributaries decrease, the weather also stabilizes, and floodwaters along the Delta starts subsiding. It is the period when the Delta begins to bare open its rich alluvial soil deposit and once again land is available for cultivation; the paddy-cultivating season starts. It is also the best season for floodplain fishery.

In the process of seasonal changes, water catchments areas are amplified, transforming into pockets of small lakes and ponds. As floodwaters recede, these catchment basins trap many fish species. Some species instinctively follow the receding floodwaters tracing their way back into creeks, tributaries and rivers. It is also the period when fishermen employ bamboo screens and fixed traps at suitable points along the waterways of decreasing floodwaters. This type of fishing method is known as the *Myanmar Inn*, which produced about 90 948.44 mt of fish as against 108 926.08 mt from aquaculture in 2000-2001. Because this type of fishing method is economically advantageous, it has been the most important (inland) fishing method.

Leasable fishery presents itself in streams and various forms of water catchments areas. This fishery is seasonal in nature and during such periods, the lease agreements are distributed to the fishing operators. Out of 3 721 designated leasable areas, 3 481 were given out for lease in 2000-2001.

Open water fishery occurs in permanent freshwater bodies e.g., streams, rivers and lake waters fishing licenses are issued to fishing operators. The fish species that are locally in great demand are the air-breathers, snakeheads, climbing perch and feather

back. The private sector accounts for ninety six percent (96 percent) of the total inland fish catch and the cooperative sector accounts for only four percent (4 percent).

[§] Source: FAO World Fisheries Statistics – Country profile, 2001

PHILIPPINES

General Information*

Surface area:	300,000 km^2
Total number of islands	7,107 islands
Population (1998):	73,130,000
GDP (1998) current prices:	US$ 65,100 million
Agricultural GVA (1998) (current prices):	US$ 11,000 million
Based on an exchange rate of US$ 1 = peso 40.8931 (1998)	

* FAO World Fisheries Statistics – Country profile, 2000

Main Rivers, Lakes and Swamps/Marshes**

Total number of islands: 7,100 islands

Largest island: Luzon

Surface area: 104,688 km^2

Main Rivers:

Abra River Basin (Northwestern Luzon):

Surface area: 5,125 ha

Cagayan River Basin (Northern Luzon)

Length: 190 km

Surface area: 25,649 ha

Agno River Basin (West Central Luzon)

Surface area: 13,800 ha

Pampanga River Basin (Central Luzon)

Surface area: 9,759 ha

Pasig-Laguna River (Southern Luzon)

Length: 25 km

Surface area: 4,678 ha

Main Lakes

Laguna de Bay O

Surface area: 90,000 ha

Annual catch: 20,400 tonnes (1979-80)[1]

Taal O

Surface area: 24,356.40 ha

Annual catch: 11,800 tonnes (1984)[1]

Main Swamps/Marshes

Candaba Swamp, Bulacan and Pampanga Provinces

Surface area: 32,000 ha

2nd largest island: Mindanao

Surface area: 94,630 km^2

Main Rivers:

Mindanao River (Central Mindanao)

Length: 320 km

Surface area: 23,169 ha

Agusan River (East Mindanao)

Length: 390 km

Surface area: 10,921 ha

Main Lakes:

Mainit O

Surface area: 17,430.20 ha

Annual catch: 13,000 tonnes (1980-84)[1]

Lanao O

Surface area: 34,700 ha

Annual catch: 10,000 tonnes (1984)[1]

Main Swamps/Marshes

Agusan Marsh (in Agusan River Basin)

Surface area: 90,000 ha

Liguasan Marsh (in Mindanao River Basin)

Surface area: 220,000 ha

** Bureau of Fisheries and Aquatic Resources (2004) Current information on Inland capture fisheries in the Philippines

[1] De la Cruz (1997) Social, Economic and Cultural Aspects in Implementing Inland fishery enhancements in the Philippines

Inland fisheries**

Philippines inland resources consist of lakes, rivers, reservoirs, swamps, marshes, and small water impoundments. Lakes and reservoirs are the most important environments for inland fisheries with a total surface area of 219,000 ha[1].

Inland catches as percentage of total catches[a]:

Year 1992, 8.75% (inland fisheries 229,673 mt – total 2,625,607 mt)[a]

Year 2002, 3.95% (inland fisheries 131,644 mt – total 3,329,118 mt)[a]

(decline in inland fisheries production over time)

Inland fishery resource area in the Philippines[1]	
Environment	Surface area (ha)
Swamplands	*246,063*
Freshwater	106,328
Brackishwater	139,735
Existing fishpond	*253,854*
Freshwater	14,531
Brackishwater	239,323
Other Inland resources	*250,000*
Lakes	200,000
Rivers	31,000
Reservoirs	19,000

[a] Inland production includes lakes, rivers, reservoirs and marshes

** Bureau of Fisheries and Aquatic Resources (2004) Current information on Inland capture fisheries in the Philippines

[1] Coates (2002) Inland capture fishery statistics of South-East Asia: current status and information needs

Fisheries Data §

	Production (1)	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	1,950.8	121.7	180.5	1892.0	25.9
Fish for animal feed & other purposes	193.7	87.8(2)	43.2	238.3	-

Notes: (1) Excludes 642,319 t of seaweed (wet weight). (2) Includes 42,989 t fishmeal (>> 85,978 t live weight)

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	Approximately 1 million of which 57,000 employed on large vessels and 259,000 in fish culture activities, and the remainder in municipal fisheries
(ii) Secondary sector:	Approximately 35,000 operating shore facilities and involved in fish drying and other post-harvest activities
Gross value of fisheries output (at ex-vessel prices; 1998)	US$ 1.8 billion
Trade (1998)	
Value of fisheries imports:	US$ 83.3 million
Value of fisheries exports:	US$ 530 million

Inland fisheries §

Municipal fishing activities are also carried out in a large number of inland waterbodies throughout the Philippines. Total production from inland fisheries has declined steadily, from 237 000 t in 1990, 186 674 t in 1995, to 146 471 t in 1998. This decline is attributed to widespread overfishing, resource use conflicts in inland water areas (such as the extensive development of fish pens), and pollution and siltation due to discharge of urban and industrial effluent. Inland municipal fishing activities take place in the four major lakes in the country, namely: Laguna de Bay (89 076 ha) and San Pablo Lake in Laguna; Taal Lake (24 356 ha) in Batangas; and Lake Bato (3 792 ha) in Bicol. Laguna de Bay, which is the largest and the most productive inland water in the Philippines, serves as an extreme example of a system that has been under intense pressure from local development activities.

§ Source: FAO World Fisheries Statistics – Country profile, 2000

SRI LANKA

General information *

Surface area:	65,610 km^2
Population (2004):	19,400,000
Population growth (1998-04):	1.3%
GDP (2004):	US$ 18.2 billion
Agricultural GDP (2004):	US$ 3.24 billion (17.8%)
Capture Fisheries as % of GDP[1]:	1.428 %
Aquaculture as a % of GDP[1]:	0.468 %

* World Bank (2004) Sri Lanka at a Glance

[1] Asia-Pacific Commission (2005)

Main rivers **

There are 103 distinct river basins covering over 4,500 km in length. The four main rivers all originate in the central hills and pass through the lower plains to the sea;

Mahaweli
- Length: 335 km
- Catchment area: 2,442 km^2

Kelani
- Length: 145 km
- Catchment area: 2292 km^2

Kalu
- Length: 129 km
- Catchment area: 2719 km^2

Walawe
- Length: 138 km
- Catchment area: 2,471 km^2

** Ministry of Irrigation and Water Management of Sri Lanka, (2002)

Perennial reservoirs***

The inland capture fishery of Sri Lanka is confined to its perennial reservoirs (1,550 km^2 in total)[1].

The culture fishery tends to be confined to the seasonal tanks (1,000 km^2) [1].

Main reservoirs

Senanayake Samudra (largest reservoir)
- Area: 76.8 km^2
- Catchment area: 983 km^2

Maduru Oya
- Area: 63.9 km^2
- Catchment area: 433 km^2

Moragahakanda
- Area: 40.5 km^2
- Catchment area: 782 km^2

Udawalawe Reservoir
- Area: 34.2 km^2

Lunugamwehera
- Area: 30.2 km^2
- Catchment area: 904 km^2

Randenigala
- Area: 23.5 km^2
- Catchment area: 2,333 km^2

The overwhelming majority of the reservoirs in the country can be classified as small water bodies[2].

Estimated surface area of inland lentic water bodies in Sri Lanka including the recently constructed Manhaweli reservoirs[2]		
Type	**Number**	**Area (ha)**
Major irrigation reservoirs (ancient)	73	70,850
Medium scale reservoirs (ancient)	160	17,004
Minor irrigation reservoirs (ancient)	10,000	39,271
Floodplain lakes	-	4,049
Upland hydro-electric reservoirs (recent)	7	8,097
Mahaweli reservoirs	5	
Maduru Oya	-	6,280
Victoria	-	2,270
Kotmale	-	970
Randengala	-	2,750
Ulhiyia-Ratkinda	-	2,270
Total	**10,245**	**153,811**

*** Individual reservoir details from FAO Reservoirs of Sri Lanka and their Fisheries, (1988)
[1] Ministry of Fisheries and Aquatic resources, (2005)
[2] FAO (1997) 5: Fisheries Management of Small Water Bodies in Seven Countries in Africa, Asia and Latin America

Inland fisheries

It is reported that there is no riverine fishery worth mentioning, whilst the floodplains are a productive ecosystem. The main share of inland production is from the reservoirs[2]. Most of the large reservoirs are constructed storages for hydroelectric power generation, the medium ones are ancient (capture fisheries). Small reservoirs and seasonal tanks are culture fisheries.

Inland catches as a % of total catch (2003)[a]: 10.6 %
Freshwater aquaculture as a % of total catch[3] : 3 %
inland fisheries production, includes aquaculture (2003)[4]: 30,280tonnes

[a] Inland catch % generated from 2003 figures obtained from the Ministry of Fisheries and Aquatic resources.
*** Individual reservoir details from FAO Reservoirs of Sri Lanka and their Fisheries, (1988)
[1] Ministry of Fisheries and Aquatic resources, (2005)
[2] FAO (1997) 5: Fisheries Management of Small Water Bodies in Seven Countries in Africa, Asia and Latin America
[3] Freshwater aquaculture % from ICLARM The World Fish Centre, (2002);
[4] Catch figures from Ministry of Fisheries and Aquatic resources, (2005);

Fisheries data [§]

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				kg/yr
Fish for direct human consumption	228,550	132,000	8,400	352,150	19.2
Fish for animal feed & other purposes	-	N/A	-	-	-

(Source: FAO world fisheries statistics, 2000)

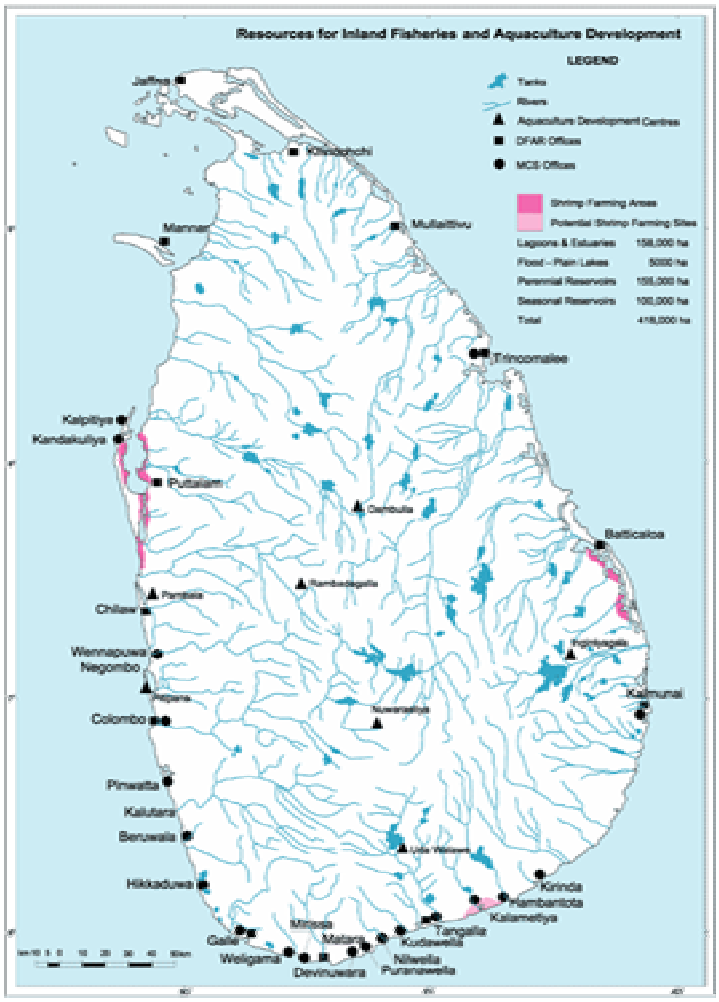
Estimate employment (1997)	
(i) Primary sector:	150,000
(ii) Secondary sector:	30,000
Trade (1999)	
Value of fisheries imports:	US$ 64.9 million
Value of fisheries exports:	US$ 75 million

Inland fisheries and aquaculture [§]

The resources available for the development of inland fisheries and aquaculture constitute 260,000 ha of freshwater bodies which include 70,000 ha of large irrigation reservoirs, 17,000 ha of medium scale reservoirs, 100,000 ha of seasonal village tanks, 39,000 ha of minor irrigation tanks, 4,000 ha of flood lakes, 8,000 ha of upland reservoirs, and 22,000 ha of Mahaweli reservoirs. In addition, about 15,000 ha of coastal zone and 5,000 ha of water area have been identified as suitable for the development of brackishwater aquaculture and sea farming. Lagoons cover an area of 120 000 ha.

In recent years, there has been a steady growth of fish production in the inland fisheries sector and several exotic food fish species from India and China have been introduced. In 1995, the production reached about 23,000 mt. In the same year, production of cultured shrimps increased to about 3,500 mt.

The current development programme for inland fisheries and aquaculture includes the stocking of water bodies with fingerlings, raising of fish in ponds, cages, and pens, and the provision of subsidy for purchase of canoes and fishing gear. Actions are being taken by the newly established Aquaculture Development Division of the Ministry of Fisheries & Aquatic Resources Development to rehabilitate the two fish breeding stations at Dambulla and Udawalave and to encourage fish feed production by the farmers, fishermen and NGOs.



Inland fisheries resources in Sri Lanka
Source: Ministry of Fisheries and Aquatic Resources

§ Sources: FAO world fisheries statistics – Country profile, 1998

THAILAND

General Information*

Surface area:	514,000 km^2
Population (2004):	62,400,000
Population growth (1998-04):	0.7%
GDP (2004):	US$ 163.5 billion
Agricultural GDP (1996):	US$ 12,695.8 million
Capture Fisheries as % of GDP[1]:	2.04%
Aquaculture as % of GDP[1]:	2.07%

* FAO World Fisheries Statistics – Country profile, 2000
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers **

Thailand has 47 major rivers

Estimated total riverine production 200,000 – 500,000 tonnes/year[1]

Mekong River (originates in China and passes through Myanmar, Laos, Thailand, Cambodia and Viet Nam)

- Total length: 4,225 km
- Length along the Thai-Laos border: 850 km (approx.)
- Total annual catches:
  - 875,000 tonnes (2000)[2] (capture fisheries)
  - 68,100 tonnes (2000)[2] (aquaculture)
  - 187,500 tonnes (2000)[2] (reservoirs)
- Tributary
  - Mun River
    - Length: 673 km
  - Pak River
  - Songkhram River Only River without a main stream dam

Salween (originates in the Tibetan plateau it flows southward through China, down through the East of Burma (Myanmar), and along the Thai-Burma border, before continuing through Burma and emptying into the Andaman Sea. It is the last free-flowing international river in Asia)

- Total length: 2,800 km
- Total length along the Thai-Burma border: 120 km
- Total floodplain: 320,000 km^2
- Floodplain within Thailand: 16,000 km^2 (5%)

Chao Phraya (forms in Pak Nam Pho. The river connects with three tributaries; Sakaekrung and Tachin from western, Pasak from the Petchabun Range, northeastern and Bangpakong from the Bantad Range, southeastern, then the system runs off to the Gulf of Thailand.)

- Length: 230 km
- Floodplain: 21,521 km^2 (overall Chao Phraya system: 160,000km^2)
- Tributaries
  - Ping (major tributary)
    - Length: 480 km
    - Catchment area: 35,535 km^2
  - Yom
    - Catchment area: 19,516 km^2
  - Nan
    - Length: 800 km
    - Catchment area: 32,854 km^2
  - Wang
    - Floodplain: 11,084 km^2

Tapi River (biggest river of southern Thailand)

- Length: 230 km
- Catchment: 5460 km^2

Kwai Noi River
Mae Klong River
Kwae Yai River
Songrkham River
Production: 91 kg/ha
Pa Sak River
Length: 513 km
Catchment area: 18,000 km^2

** Sources; Department of fisheries (2002) The Working Group of the Office of Natural Water Resources Committee of Thailand.
[1] Coates (2002) Inland capture fishery statistics of South-East Asia: current status and information needs
[2] Sverdrup-Jensen, S (2002). Fisheries in the Lower Mekong Basin: Status and Perspectives

Inland fisheries

The inland fishery in Thailand is primarily concern with reservoir fisheries production. Therefore, the national figure provided for inland capture fisheries represents mainly reservoir fisheries production[1].

Inland fishery resources of Thailand:

Inland fishery resources of Thailand[2]

Resource	**Number**	**Area**
		(ha)
Rivers and canals	47	120000
Natural lakes and swamps	8000	300000
Large reservoirs	21	292590
Medium and small reservoirs	1745	425500
Village ponds	4947	25676
Brackishwater lakes	1	96000
Other public waters	10859	143000
Total		**1285420**

Inland catches:

Inland capture fisheries as a % of total catch:

48.2%(2000)[3] 38.5% (2002)[3]
Total production: 477,552 tonnes[3] Total production: 533,393 tonnes[3]
Inland capture: 205,500 tonnes[3] Inland capture: 206,350 tonnes[3]
Reservoir (estimate): 122,314 – 318,909 tonnes[1]

[1] Coates (2002) Inland capture fishery statistics of South-East Asia: current status and information needs
[2] Sugunan, V. V (1997) Fisheries management of small water bodies in seven countries in Africa, Asian and Latin America
[3] FAO – Fishstat Plus Database

Fisheries data [§]

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				kg/yr
Fish for direct human consumption	2,420	735	1,732	1,423	23.6
Fish for animal feed & other purposes	1,050	59	126	983	-

(Source: FAO world fisheries statistics, 2000)

Estimate employment (1997)	
(i) Primary sector:	530,401
(ii) Secondaty sector:	196,105
Trade (1999)	
Value of fisheries imports:	US$ 840.7 million
Value of fisheries exports:	US$ 4.1 billion

Inland fisheries [§]

General overview

Inland fisheries have long been a part of Thai culture. It is an open access resource for animal protein for the Thai rural population. Rivers and their tributaries, flood plains, lakes, swamps and reservoirs throughout the countries are important for inland fisheries. The production from inland capture fisheries in 1996 was about 208 400 t. The inland catch composition includes local carp, catfish, snakehead fish, gourami, shrimp and others. Despite widespread constraints due to habitat degradation and increased pollution from industrial wastes, inland capture fisheries production has continued to increase, but the rate of increase is slowing. This is due to rehabilitation efforts and fish re-stocking programmes to augment freshwater fish resources in public waters. Fishing gear commonly used for catching inland fish include gill nets, longlines, hook-and-line, scoop nets, cast nets and lift nets.

Utilization of the catch

All freshwater fish production (437 100 t) was used for human food, with 80 percent consumed fresh, 9 percent processed into salted and dried fish, and 5 percent preserved as fermented products.

Development prospects

Inland fisheries development focuses on intensification of fish stocks in public waters. In 1998, the Department of Fisheries released 650 million fish fry countrywide, with 720 million released in 1999. It is estimated that between 3 and 10 percent of these survive to food-fish size.

§ Source: FAO world fisheries statistics – Country profile, (2000)

VIETNAM

General information *

Water area (inland):	329,560 km^2
Population (2004):	Est. 82,689,518
Population growth (2004):	1.3%
GDP at purchaser's value (2003):	US$203.7 billion
Agricultural % of GDP (2003):	21%
Fisheries GDP (2003):	4%
Capture Fisheries as % of GDP[1]:	3.7%
Aquaculture as % of GDP[1]:	3.5%

* FAO World Fisheries Statistics – Country profile, 2005
[1] Asia-Pacific Fishery Commission (2005)

Main Rivers**

Total number of Rivers 2,500 rivers

Red River system

Annual catches: 6,000 tonnes (1980's) (Capture fisheries)

Thao
- Length: 902 km
- Catchment area: 51,750 km^2

Da
- Length: 1,013 km
- Catchment area: 52,610 km^2

Lo
- Length: 469 km
- Catchment area: 38,970 km^2

Hong
- Length: 1,126 km
- Catchment area: 154,720 km^2

Red River Delta

Surface area: 19,000 km^2

Annual catches: 136,000 tonnes (Capture fisheries)

Thai Binh System

Cau
- Length: 288 km
- Catchment area: 6,064 km^2

Thuong
- Length: 164 km
- Catchment area: 3,580 km^2

Luc Nam
- Length: 175 km
- Catchment area: 3,066 km^2

Thai Binh
- Length: 385 km
- Catchment area: 15,520 km^2

Kycung-BacGiang s.

Bang Giang

Length: 108 km

Catchment area: 4,565 km^2

Kycung

Length: 243 km

Catchment area: 6,663 km^2

Ma system

Ma

Length: 538 km

Catchment area: 28,370 km^2

Chu

Length: 325 km

Catchment area: 7,552 km^2

Ca system

Ngan Sau

Length: 135 km

Catchment area: 3,813 km^2

Hieu

Length: 228 km

Catchment area: 5,330 km^2

Ca

Length: 531 km

Catchment area: 27,224 km^2

Gianh

Length: 158 km

Catchment area: 4,676 km^2

Quang Tri

Length: 156 km

Catchment area: 2,500 km^2

Thu Bon

Length: 205 km

Catchment area: 10,590 km^2

Ba system

Length: 13,814 km

Catchment area: 13,814 km^2

DongNai-SaiGon s.

Dong Nai

Length: 586 km

Catchment area: 29,520 km^2

La Nga

Length: 272 km

Catchment area: 4,000 km^2

Be

Length: 344 km

Catchment area: 8,200 km^2

Sai Gon

Length: 256 km

Catchment area: 5,560 km^2

Mekong system

Bassac River

Total Length:	420 km (Cambodia, Viet Nam)
Length:	320 km
Annual capture:	119 kg/ha/year[1]

Cuu Long (Mekong River)

Total Length:	4,225 km km (originates in China passes through Myanmar, Laos, Thailand, Cambodia and Viet Nam)
Length (Vietnam)	350 km
Catchment area:	795,000 km^2
Annual capture:	>30,000 tonnes (63 kg/ha/year[1])
	20,000 tonnes (1980's)

Mekong Delta

Surface area in Viet Nam:	39,500 km^2 (16,000 km^2 Cambodia)
Annual capture:	190,000 tonnes[3] (2000) capture fisheries
	438,000 tonnes[2] (2000) (totalproduction)

** UNEP (1998) National Report of Viet Nam

[1] De Graaf & Chinh (2002) Floodplain fisheries in the Southern Provinces of Vietnam

[2] Van Zalinge *et al.*, (2000) Where there is water there is fish? Cambodian fisheries issues in a Mekong River Basin perspective

[3] Baran (2005) Cambodia inland fisheries: facts, figures and context

Inland fisheries**

Inland catches % of total catches: 43.8% (2003); total (2,536,361 tonnes)

Degree of exploitation (2003):

Inland catches: 1,110,926.12 tonnes

Estimated amount of captured fresh water fishes in different types of water bodies and socio-economical regions in Viet Nam in the 80's (tonnes)

	Aquaculture	Lakes Reservoirs	Ricefields	Rivers	Total
North	120,000	5,000	5,000	6,000	136,000
South	90,000	4,000	30,000	20,000	144,000
Center	5,000	3,000	900	3,000	11,900
High lands	5,000	1,000	100	500	6,600
Total	220,000	13,000	36,000	29,500	298,500

** UNEP (1998) National Report of Viet Nam

Fisheries Data [§]

	Production	Imports	Exports	Total Supply	Per capita supply
	'000 tonnes liveweight				Kg/year
Fish for direct human consumption	1,434 (2002)	21	482	973	19.4 (2001)
Fish for animal feed & other purposes	990 (MOFI, 25% of total = 634)	54	8	1,036	

Estimated employment (2002)	
(i) Primary sector (including aquaculture):	553,900
(ii) Secondary sector:	3.4 million
Gross value of fisheries output (2003)	1.7 billion US$
Trade (2003)	
Value of fisheries imports:	52.1 million US$
Value of fisheries exports:	2.24 billion US$ (2.35 billion in 2004, estimated in January 2005)

Inland fisheries [§]

Fishing Production Means

In recent years, the number of fishing boats has increased considerably in Vietnam. The Vietnamese capture fishing industry had a total of 81 000 motorized fishing vessels with a total capacity of 4 038 000 hp (2003).

Inshore Fisheries

There is an ancient tradition for both collecting and capturing fish direct from the beach or in shallow mangroves, estuaries, lagoons and river deltas, helped by the influence of tidal water. A variety of simple, as well as sophisticated, fishing gear is used for capture of all kinds of fish and shellfish species. This provides a substantial amount of protein to the coastal population. Due to the increase in human population, there is an enormous pressure on these resources.

Inshore fishery (up to 4-5 nm from the coast) depends on a fleet of about 28 000 non-mechanized canoes and boats and approximately 45 000 smaller mechanized boats with attached long-tailer or stationary 1-cylinder diesel engines up to approximately 20 hp, mainly of Chinese and Japanese make. All these vessels operate directly from the beach without using harbour facilities. The most popular fishing gears are gillnet, longline, lift-net, push net and traps.

Fishermen Communities

Most of the fishermen communities are poor. Fishing and aquaculture contributes an average 75% to the fisher household income. Those in the South Central Coast are particularly dependent on marine fishing. Households commonly lack access to formal credit and other fishery support services, such as high quality seed and fingerlings, professional extension, disease control and market information. As opportunities of other sources of income are quite limited, labor migration to other areas is common, including work on foreign fishing fleets, including Korean,

Japanese and Taiwanese. The development of the seafood processing industry is attracting many people, mainly women (85%), to come and work in the city.

There are some initial forms of association among households, e.g., credit group and cooperative groups, which associated about 21 000 fishers in 4 300 cooperative groups in 2 000 and has subsequently grown significantly.

Inland sub-sector

The total area of natural inland water bodies (lakes and rivers) is estimated to be about 4 200 km^2, and ponds and seasonal flooded areas are an additional 6 000 km^2. The total area is still increasing by the construction of new dams and reservoirs.

In the past, freshwater capture fisheries were important for the economy in many regions. During the 1970s there were more than 70 fishing cooperatives with annual production of several thousand tonnes. However, overexploitation led to a reduction in the resource and the end of operation for most cooperatives with fishers converting to other activities. Inland (river, lake, dam and rice field) fisheries remain important for rural dwellers in many inland areas. The main data source for inland data is the GSO statistics that suggest a peak of 244 000 tonnes in 2001, declining to 209 000 tonnes in 2003, probably due to drought. Inland capture fishery landings include culture-based-capture, through the stocking of lakes, dams and other inland waters, mainly with carp and tilapia. However, the FAO fish consumption survey (Lem 2002) identified freshwater fish consumption averaging 14 kg/person or 1.1 million tonnes. The difference is likely to be due to inclusion of aquaculture products in the FAO survey and likely underestimation by the GSO, a feature common to most inland fisheries statistics of the Mekong region (FAO/MRC 2003). Vietnam's rivers are generally quite productive. The Mekong River for example provides more than 30 000 tonnes of fish annually, landed by around 48 000 fishers in 250 communes (MOFI Master Plan). However, the Red River delta in the north, which was once highly productive, is now almost devoid of fish, due to extensive flood control and the closure of flood plain fish breeding and nursery areas1

[§] Source: FAO World Fisheries Statistics – Country profile, 2005