

3. MARINE FISHERY RESOURCES

The coastal waters of Cambodia support a large number of marine fish and invertebrate species. Try (2003) gives the scientific, English and Kmer names for those marine species recorded from the country: 476 species of marine finfish, 20 species of marine crabs, 42 species of marine gastropods and 24 species of marine bivalves.

In the marine fisheries statistics published by the Department of Fisheries (DoF, 2002), nine different groups are given. The 2001 landings of these groups by province/municipality are provided in Table 2 below. Little quantitative information is available on the composition of the finfish component.

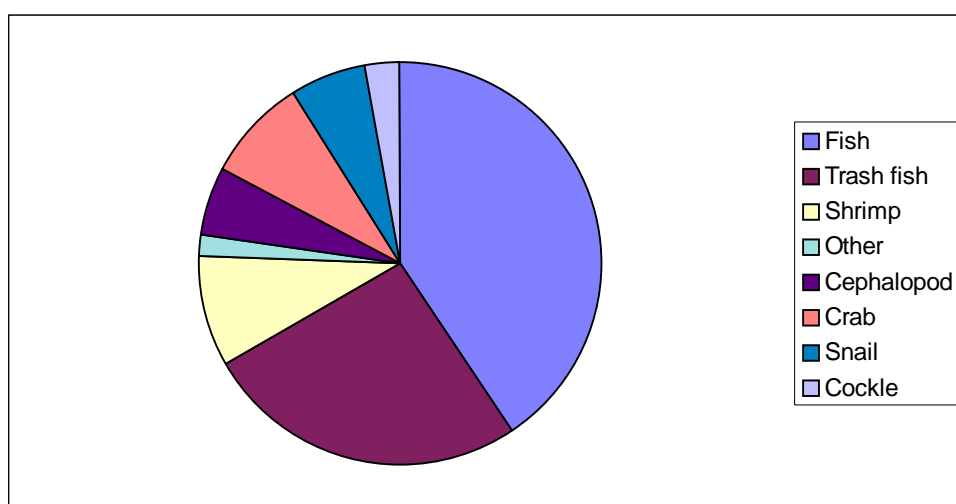
Table 2 Marine fishery landings recorded by DoF, 2001

Province	Fish	Trash fish	Shrimp	Ray	Cephalopod	Slipper lobster	Crab	Snail	Blood cockle	Sea cucumber	Krill	Total
Kampot	2 703	1 786	284	165	247	0	870	176	199	0	0	6 430
Sihanouk	6 943	4 287	1 730	0	1 496	40	897	1 236	226	210	0	17 065
Koh Kong	7 104	4 764	1 606	42	604	0	1 410	1 082	762	0	26	17 400
Kep	123	10	42	2	8	0	285	0	0	470	123	1 063
Total	16 873	10 847	3 662	209	2 355	40	3 462	2 494	1 187	680	149	41 958

Source: DoF, 2002.

These recorded 2001 landings are depicted in Figure 2 below. It can be seen that about two-thirds of the catch consists of “fish” and “trash fish”.

Figure 2. Marine fishery landings recorded by DoF, 2001



Source: Table 2.

The following descriptive accounts offer some insight into the important species:

- Try (2003) indicated that 33 species of finfish are commonly exploited, but only five species are very abundant in the landings: *Megalaspis cordyla* (torpedo scad⁶), *Scomberomorus commersoni* (narrowbarred spanish mackerel), *Rastrelliger brachysoma* (short mackerel), *Rastrelliger kanagurta* (indian mackerel) and *Atule mate* (yellowtail scad).
- A World Bank study (APIP, 2001b) stated that the catch mainly consists of “*Atule mate* (Scads), *Sela crumenophthalmus* (big eyes scads), *Decapterus maruadsi* (yellowtail round scads) and others such as Leiognathidae (pony fishes), Scombridae (tunas, mackerels), Lutjanidae (snappers).”
- Touch and Todd (2002) name the target and secondary species caught by 16 types of fishing gear (see Section 6), but indicate that in the official statistics, estimates of production quantities by fish species are completely absent.
- During the present review, heads of the provincial/municipal fisheries offices were questioned on the major finfish species. As expected, the responses varied considerably between areas. In Kep the groupers and snappers are the most important by weight. In Kampot and Koh Kong the rastrelliger mackerels are the most important, while in Sihanoukville both groupers and rastrelliger mackerels are important.

Csavas *et al.* (1994) state that information on the landings of marine fish in Cambodia can be inferred from records of fish landings from the Thai portion of the Gulf of Thailand. In this area the major finfish in order of decreasing abundance are: Indian mackerels, sardinellas, longtail tuna, carangids, Indian scad, threadfin bream, frigate and bullet tunas and kawakawa, big eyes, lizard fishes, croakers, and drums.

In some respects, mangroves are considered a “fishery” resource in Cambodia. This is partly due to the fact that the harvest of mangroves is covered by the present fisheries law. According to Tana (1997), mangrove forests in Cambodia cover an area of about 85 100 ha of which about three quarters are in the Koh Kong province. The International Center for Living Aquatic Resource Management (ICLARM) cites a study which identified 34 species of mangroves along the Cambodian coast (ICLARM, 1999).

4. THREATS TO FISHERIES RESOURCES

The various reviews of Cambodia’s marine fisheries cite a wide variety of serious threats to the resources. These mainly fall under the categories of excess fishing effort and habitat destruction.

Excess fishing effort and associated declines in abundance of target species is thought to be a serious problem for most of Cambodia’s marine fisheries. The key causes appear to be population increases coupled with: (a) an economy that is not expanding rapidly enough to cater to rising needs; and (b) the Government policy of allowing everyone the opportunity to fish for subsistence or income. Unregulated foreign fishing activity is another reason. Improved management in the forestry sector, however desirable, has produced an increase in migration of people to the coastal zone. Many become involved in fishing, where entry costs are low. Export demand also encourages additional fishing effort, especially the high value species in overseas markets.

Habitat destruction is another threat to Cambodia’s marine resources. Important causes include destructive fishing (dynamiting, cyanide fishing) and mangrove forest destruction (firewood, shrimp aquaculture). The use of trawling gear is believed to have negative impacts

⁶ English names are according to the latest FAO Species Identification Guide covering the area.

on the sea floor ecology. Siltation and the effects of urbanization/industrialization are on the rise.

ADB (1999) reports perceptions of threats from the perspective of coastal villagers. Causes of the declines in important fisheries often cited by residents are the increasing use of large trawlers in shallow waters, the use of push nets, destructive fishing methods, the increasing number of fishers, and aquaculture.

The threat to marine fishery resources posed by population deserves additional emphasis. Cambodia's 2.6 percent population increase brings more than 300 000 new entrants into the economy annually. With about 39 percent of the population under the Government's poverty line, there are many poor people and the number is quickly growing. Whether legal or illegal, natural resource use tend to become the poor person's last resort for food and income (Master Plan for Fisheries). Furthermore, there is some indication that the population is growing faster in coastal areas than in the rest of the country. In the period 1993 to 1998 the population of the four coastal provinces/municipalities increased by 25 percent (APIP, 1999b), primarily through migration from areas that offer fewer livelihood opportunities (UNEP-GEF 2003).

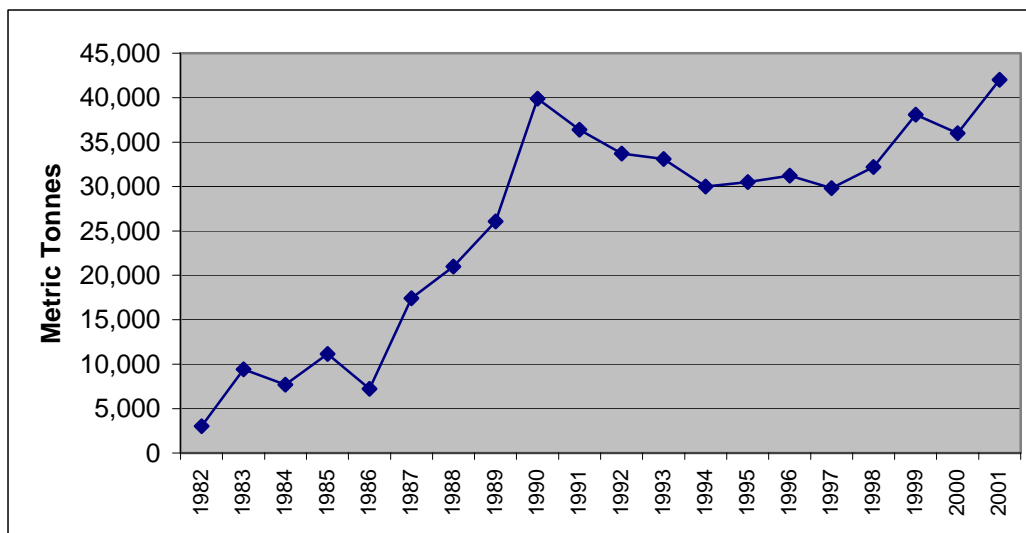


Three important marine fishery resources: grouper (top left), anchovy (top right), and mackerel (bottom right) [Photos: R. Gillet]

5. MARINE FISHERY PRODUCTION

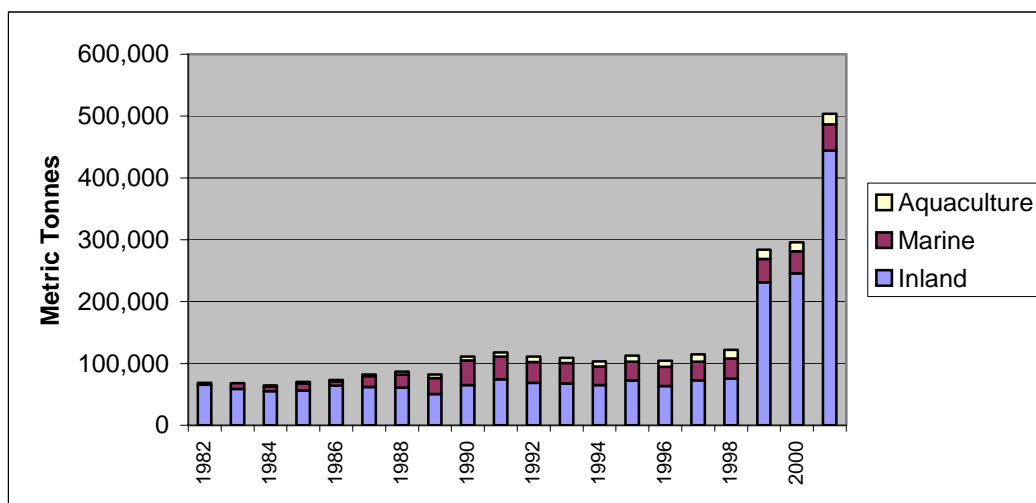
Department of Fisheries statistics (DoF, 2002) on the production from marine fisheries are given in Figure 3. Marine production is compared to all fishery production in Figure 4.

Figure 3. Production from marine fisheries in Cambodia



Source: DoF (2002).

Figure 4. Inland, marine and aquaculture production



Source: DoF (2002).

Try (2003) and the Agriculture Productivity Improvement Project of the World Bank (APIP, 2001b) offer several comments on the above official statistics:

- Since 1999, the annual inland production figures have included rice field fisheries (about 45 000 mt) and inland family fisheries (about 115 000 mt);
- in the late 1990s the inland fisheries data system was refined⁷ but such improvements did not occur for the marine fisheries;
- catches by subsistence fishers in marine areas are not included; and
- catches by Cambodian and foreign vessels landed outside Cambodia, estimated to be about 25 percent of all marine fisheries production in Cambodia, are not included.

From the figures and above comments, a number of observations can be made:

- comparisons between marine and inland fisheries using the official figures above are not valid as the inland statistics are much more comprehensive;
- inclusion of fish landed outside Cambodia and catches by marine subsistence fishers would result in a remarkable increase in the marine production estimate;
- the half-decade starting in the mid-1980s was a period of extremely fast growth in marine fisheries landings;
- a secondary period of expansion in landings starting from the mid-1990s, appears to have taken place during a time in which some fisheries (e.g Rastrelliger, anchovy) were in decline. It appears that “trash fish” landings in Sihanoukville municipality were responsible for much of the increase, suggesting a situation of “fishing down the food web”.

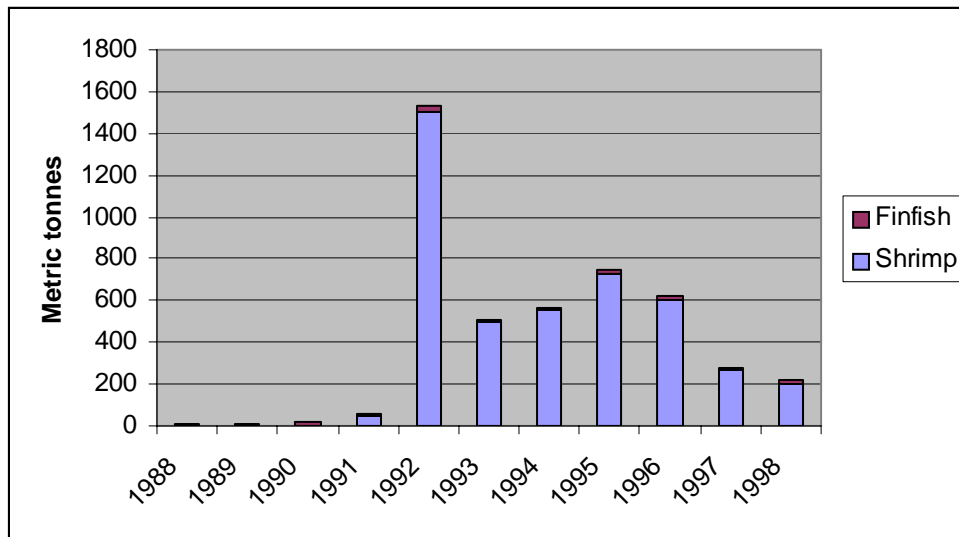
Not much information is available on the production of vessels fishing offshore. According to DoF internal reports, catches from the licensed Thai vessels in Cambodian waters are estimated to be from 26 500 mt to 37 500 mt. If this is indeed the case, this amount would approach the total marine catch recorded for all Cambodian vessels. Furthermore, it is thought that there is a substantial amount of illegal fishing by non-licensed vessels from both Thailand and Viet Nam.

Butcher (1999) studied the situation of illegal Thai trawlers and indicated that between 40 and 60 percent of the total catch of Thai vessels came from outside Thai waters. The report stated that Thai trawlers had long fished in Cambodian waters under unofficial agreements. Butcher concluded that Thailand has a huge number of trawlers, and not many fish, while at the same time there are far more fish in the waters of nearby countries.

Some mention should be made of marine aquaculture production. According to Try (2003), marine shrimp culture was established in the early 1990s in Koh Kong province and quickly expanded to Sihanoukville and Kampot municipalities. The technology and investment was mostly sourced from Thailand, which was also where the product was marketed. In the mid-1980s many farmers faced disease and pollution problems and subsequently abandoned their ponds resulting in a reduction of the cultured area to 20 percent of that of the early 1990s. Limsong (2001) indicates that finfish (seabass, grouper and snapper) cage culture was operated mainly in Kampot and Koh Kong province. It suffered a decline in 1993 due to the impact of freshwater runoff during heavy rainfall. Seaweed culture was introduced in 2001. Other forms of coastal aquaculture are presently not significant. Production from shrimp and finfish culture activities in Cambodia is shown in Figure 5. Presently coastal aquaculture accounts for less than one percent of all fishery production from Cambodia's marine areas and about two percent of the production of all aquaculture in the country.

⁷ According to Gum (2001a) the improvements included consideration of data from direct measurement of catches and fish consumption studies; in addition, information from the fishing taxation system was also used.

Figure 5. Production from shrimp and finfish culture activities



Source: Limsong, 2001.

It is very difficult to estimate the number of illegal foreign vessels operating in Cambodian waters.

6. GEAR, FLEET AND INDUSTRY

Touch and Todd (2002) contains a description of the major fishing gear and associated target and bycatch species for Cambodia's marine fisheries. This is reproduced in Table 3.

According to Try (2003), a proclamation of the Ministry of Agriculture, Forestry and Fisheries divides Cambodia's marine capture fisheries into two categories.⁸

- *Middle-scale fisheries* use relatively efficient fishing gear that have the capacity to fish offshore. Participants in these fisheries are required to pay a fishing tax to the Government.
- *Small-scale or artisanal fisheries* use traditional gear or those of relatively low efficiency and non-motorized or motorized boats of less than five horsepower. Small-scale fishers are not required to pay a fishing tax.

⁸ In other reports, e.g. APIP (2001b), different criteria are used to distinguish the two categories.

Table 3. Fishing gear, target species, and bycatch

Gear	Target species or group	Bycatch
Mackerel purse seines	Mackerels (<i>Rastrelliger brachysoma</i> ; <i>R. kanagurta</i>)	Torpedo scad (<i>Megalaspis cordyla</i>); longtail tuna (<i>Thunnus tonggol</i>)
Anchovy purse seines	Indian anchovy (<i>Stolephorus indicus</i>)	Mackerels, tunas, bonitos
Shrimp trawls	Penaeid shrimp (<i>Penaeus semisulcatus</i> , <i>P. canaliculatus</i> , <i>P. latisulcatus</i> , <i>P. merguensis</i>)	Black tiger shrimp (<i>Penaeus monodon</i>); <i>P. silasi</i> , swimming crabs (Portunidae), trash fish
Crab gillnets	Swimming crabs (Portunidae); mud crab (<i>Scylla serrata</i>)	Sea bass and grouper (Serranidae), scorpionfish (Scorpaenidae); mantis shrimp (Squillidae); scallops (Pectinidae)
Mantis shrimp gillnets	Mantis shrimp (Squillidae)	Swimming crabs (Portunidae); scorpionfish (Scorpaenidae); <i>merguensis</i>
Shrimp gillnets	<i>Penaeus merguensis</i>	Trash fish; squid (Loliginidae); <i>merguensis</i>
Fish gillnets	Indo-pacific king mackerel (<i>Scomberomorus guttatus</i>); bluefin tuna (<i>Thunnus thynnus</i>); sharks; catfish (Ariidae); jacks (Carangidae); mullet (<i>Liza argentea</i> , <i>Valamugil seheli</i>); snapper (Lutjanidae); mackerels (<i>Rastrelliger brachysoma</i> ; <i>R. kanagurta</i>); torpedo scad (<i>Megalaspis cordyla</i>); silver pomfret (<i>Pampus argenteus</i>); black pomfret (<i>Formio niger</i>); stingrays (Dasyatidae); barramundi (<i>Lates calcarifer</i>); barracuda (Sphyraenidae); terapons (Terapontidae)	Sea bass and grouper (Serranidae); breams (Memipteridae); drums and croakers (Sciaenidae); sicklefish (Drepaneidae); rabbitfish (Sigandae); cutlassfish (Trichiuridae); butterfish (Stromateidae); wolf herring (Chirocentridae); lizardfish (Synodontidae)
Crab traps	Swimming crabs (Portunidae); mud crab (<i>Scylla serrata</i>)	
Squid traps	Squid (Loliginidae)	
Fishing wiers	Mixed fish species	
Hook lines	Nurse shark (Orectolobidae); requiem sharks (Carcharhinidae); stingrays (Dasyatidae); seabass and grouper (Serranidae); snapper (Lutjanidae)	
Push nets	Mixed fish species; peregrine shrimp (<i>Metapenaeus</i> sp.); sepiolid squid (Sepiolidae); octopus (<i>Octopus</i> sp.); very small shrimps	Multispecies juvenile fish and shrimp
Stow nets	Mixed fish species; sepiolid squid (Sepiolidae); squid (Loliginidae); penaeidae and metapenaeid shrimp	
Live coral reef fish and shellfish collection	Grouper (Serranidae); mixed coral reef fish	Giant clams (<i>Tridacna</i> sp.); spidershell (<i>Lambis</i> sp.)
Shellfish collection by hand and boat dredges	Giant clams (<i>Tridacna</i> sp.); spidershell (<i>Lambis</i> sp.); rock oyster (Ostreidae); abalone (<i>Haliotis</i> sp.); limpet (<i>Collicela</i> sp.); stromb (<i>Strombus</i> sp.); cowrie (<i>Cypraea</i> sp.); blood cockle (<i>Anadara granosa</i>); undulated surf clam	
Beach seines	Mixed fish species; sepiolid squid (Sepiolidae); squid (Loliginidae)	

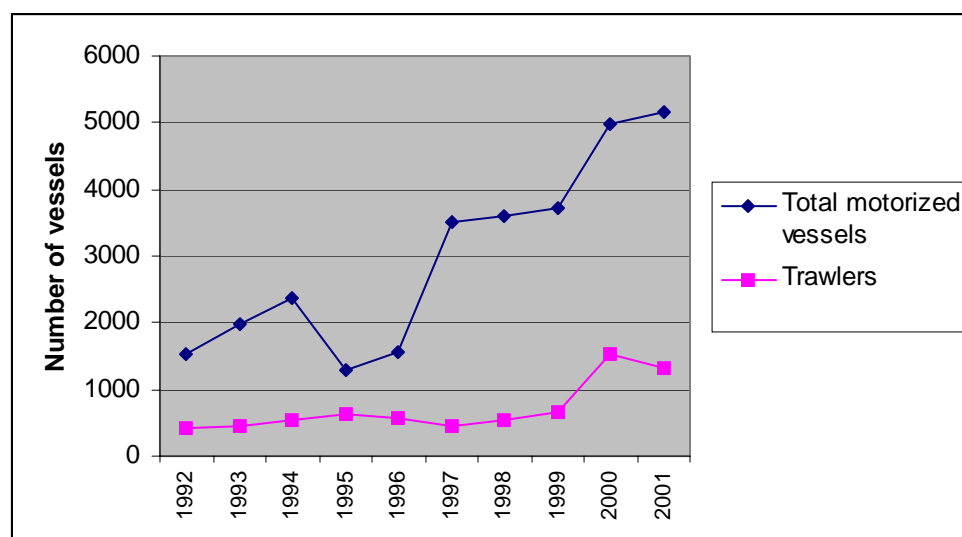
Source: Touch and Todd (2002).

There is considerable geographic and annual variation in the use of the various gear types along the Cambodian coast. About 90 percent of the trawlers are based in Sihanoukville and Koh Kong, presumably due to the bottom topography. Almost all of the anchovy purse seining presently occurs off Sihanoukville. Much of the beach seining is done in Kep and Kampot. FAO (1997) states that the fishing season for the purse seiners is from July to August (during the southwest monsoon), while longliners and gillnetters operate all year round.

Shrimp trawling deserves special mention. Trawling was introduced to Cambodia in the 1960s and in the mid-1990s the number of small trawlers greatly increased (Figure 6). The official statistics show 1 310 trawlers in 2001. To reduce conflict between trawlers and small-scale fishers, the fishery law bans trawling in the area between the shore and the 20 metre isobath. A major difficulty arises because most of the trawlers are relatively small and are unsuitable for use in offshore areas. This results in a situation where much of the trawling is done illegally in areas where there is considerable small-scale fishing activity. This is the major source of conflict between groups of marine fishers in Cambodia. Despite the fact that inshore trawling is clearly illegal, the DoF is reluctant to enforce the ban due to various reasons, including the perceived financial difficulties it would cause the trawler operators. On the other hand, those that suffer from the trawling are frustrated at the lack of Government action to halt the illegal activity.

Cambodian vessels participating in marine fisheries are characteristically small, operate close to shore, and return to port each day. The official statistics on the growth in the number of motorized marine fishing vessels are given in Figure 6. The composition of the fishing fleet in 2001 is given in Table 4.

Figure 6 Growth in the number of motorized fishing vessels 1992-2001



Source: DoF (2002).

Table 4. Cambodian fishing vessel numbers in 2001

	Boats w/o engines	< 10 HP	10-30 HP	30-50 HP	> 50 HP	Total
Kep	133	140	52	0	0	325
Kampot	133	151	252	1	12	549
Sihanoukville	286	167	809	33	269	1 564
Koh Kong	71	2 518	597	93	217	3 496
Total	623	2 976	1 710	127	498	5 934

Source: DoF (2002).

There is also the issue of foreign vessels operating in Cambodian waters. Jurisdiction over waters claimed by Cambodia is complex (Section 17) and the number of such vessels is very difficult to estimate because licensing authority is shared between several Government

agencies. Moreover, determining the number of legally licensed foreign vessels is not straightforward. By one estimate (DoF internal documentation), from 167 to 226 Thai fishing vessels (mostly ring net boats) were licensed in late 2002.

The large fleets of neighbouring countries whose fishery resources are depleted, combined with Cambodia's very limited offshore surveillance capability, suggests that the number of illegal foreign vessels could be large. Butcher (1999) quoting Foreign Ministry of Thailand sources, estimated that 2 810 Thai fishing vessels were operating illegally in the waters of neighbouring countries in the mid-1990s.

Most businesses in the fisheries sector are single proprietor enterprises. The consolidation that has taken place appears to be confined to processing/export operations. O'Brien (2003), citing recent industry studies, states that the lack of major investment in the fisheries sector is due to several factors, including: lack of information regarding fishery products; excessive export taxes; and inefficient and expensive customs and shipping agencies. Many industry participants feel that other major constraints on the fisheries business include recent resource declines and the need to meet "unofficial" facilitating and gratuity payments. On the other hand, affordable locations and cheap labour are seen as important competitive advantages for Cambodia.



*Two major components of the fishing fleet:
small trawlers (top) and a non-motorized vessel (bottom) [Photos: R. Gillet]*

