

# Shellfish in Indonesia

Soemarno

Directorate-General of Fisheries, Jakarta, Indonesia

## Introduction

Indonesia is an expansive archipelago consisting of more than 13 000 islands and a long coastline that under the new law of the sea exceeds 80 000 km. Its coast is endowed with extensive tidal mud flats, bays, estuaries and lagoons that support large populations of shellfish of commercial significance. These resources have so far been only lightly tapped by low-income small-scale coastal fishing communities as the demand for molluscs is generally limited and rather localized. In 1981, total shellfish production stood at 50 947 metric tons, valued at Rp 8657 million (Table 1).

In the Fourth Five-Year Development Programme of the Government of Indonesia, increases in shellfish production will be brought about by the farming of the species in a suitable environment using applicable technology and directing the benefits to the needy rural coastal communities. Increases in production will help

compensate for production losses arising from the banning of the trawl, on the one hand, and provide additional animal protein supplies to the people at large.

## Present Shellfish Production

### Species

Table 1 shows the eight important taxa (including cephalopoda) produced from 1977-1981. The three cephalopods, however, are incidental to trawl and seine catches, whereas the others are collected using various manual methods. Species of commercial significance include cockles (*Anadara* spp.), clams (*Meretrix* spp. and others), mussels (*Mytilus* spp.), and oysters (*Crassostrea* spp. and others). As development progresses, other commercial taxa will be stressed. For cultivation purposes, a list of 30 potential commercial species have been identified during a nationwide survey in 19 areas (Table 2, Fig. 1).

Table 1. Production and value<sup>a</sup> of shellfish, 1977-1981.

Molluscs	1977		1978		1979		1980		1981	
	Tonnage	Value	Tonnage	Value	Tonnage	Value	Tonnage	Value	Tonnage	Value
Cupped oyster	1274	645	186	23	912	566	1141	643	1131	642
Scallops	79	6	453	40	484	87	166	49	225	25
Hand clams	2702	64	4319	95	2556	166	2281	171	2053	200
Blood cockles	31360	546	40980	1074	32183	1140	32383	1245	37410	2896
Squid <sup>b</sup>	7088	1414	8691	1937	12812	3243	11142	3950	8867	4170
Cuttle fish <sup>b</sup>	2396	406	1804	364	1827	538	1995	847	862	391
Octopus <sup>b</sup>	102	21	65	12	37	8	54	14	44	11
Others	839	99	1838	870	258	60	736	199	355	323

Source: Fisheries Statistics of Indonesia (1981).

<sup>a</sup>Million Indonesia rupiahs.

<sup>b</sup>Cephalopoda.

Table 2. Cultivable shellfish collected from surveyed areas.

	Banten Bay	Kenjeran	Pasuruan	Probolinggo	Socha Kwanyan	Demak	Tayu	Rembang	Jepara	Tan. Balai	Tangerang	Pari Island	Lombok	Bima	Sape	Kupang	Maros	Lokotoi
<i>Anadara granosa</i>		x	x	x	x	x	x	x	x	x				x				
<i>A. inflata</i>		x	x	x	x	x	x	x	x	x							x	
<i>A. nodifera</i>		x	x	x	x	x	x	x	x	x	x					x	x	
<i>A. indica</i>										x	x							
<i>A. antiquata</i>		x	x	x	x	x	x	x										
<i>A. pilula</i>		x	x				x	x										
<i>A. maculosa</i>												x	x		x	x	x	x
<i>A. pausigranosa</i>														x				
<i>Meretrix lyrata</i>		x	x	x	x	x	x	x	x	x			x	x		x		
<i>Mytilus viridis</i>	x	x	x	x	x				x	x	x							
<i>Musculista senhausia</i>							x	x										
<i>Crassostrea cucullata</i>		x	x	x	x	x			x		x		x	x		x	x	
<i>Pinctada maxima</i>																		x
<i>P. margaritifera</i>												x	x					x
<i>P. martensii</i>	x									x					x			x
<i>Pteria penguin</i>												x						x
<i>Placuna placenta</i>		x	x			x										x		
<i>Polymela coakans</i>														x				
<i>Lucina edentula</i>														x				
<i>Mactra maculata</i>													x					
<i>Soligna madriata</i>														x				
<i>Lutria maxima</i>														x				
<i>Gafrarium gibbia</i>																	x	
<i>Tellina</i> sp.			x	x	x	x				x		x				x		
<i>Atrina</i> spp. (Pinna)												x			x			
<i>Pecten</i> sp.										x		x				x		
<i>Cardium flavum</i>		x	x									x			x			
<i>Tapes</i> sp.		x	x	x	x				x				x		x			
<i>Cleone isabellina</i>				x														
<i>Tridacna</i> sp.												x			x			

Note: Refer to Fig. 1 for location of areas surveyed.

### Collection Method

Present methods of collecting shellfish can be broadly classified as follows:

(1) Collecting cockles and clams on mud flats during low tide using a skateboard (Fig. 2), to cover a wide area, and a spade or spatula for digging (Fig. 3).

(2) Collecting cockles and clams during low tide on foot using a spade or spatula for digging, in which case the area covered is restricted.

(3) Collecting cockles and clams in substrate of soft-bottomed seabed using a wooden- or bamboo-handled hand dredge from a boat (Fig. 4).

(4) Collecting cockles and clams in substrate of soft-bottomed seabed using a dredge towed from a sailboat (Fig. 5).

(5) Collecting cockles and clams in substrate of soft-bottomed seabed using a rake attached to a collecting bag (Fig. 6).

(6) Diving or wading to collect green mussels and oysters from submerged hard substrates.

### Production and Value

Table 1 gives the production and value of eight taxa of molluscs for the period 1977-1981. As there seems to be no consistent trend in production, it is assumed that the supply and demand trend at the time fluctuated inconsistently throughout the period. This inconsistency is a reflection of the harvesting methods utilized, which are dependent upon the weather. The highest production occurred in 1978 and amounted to 58 336 tons.

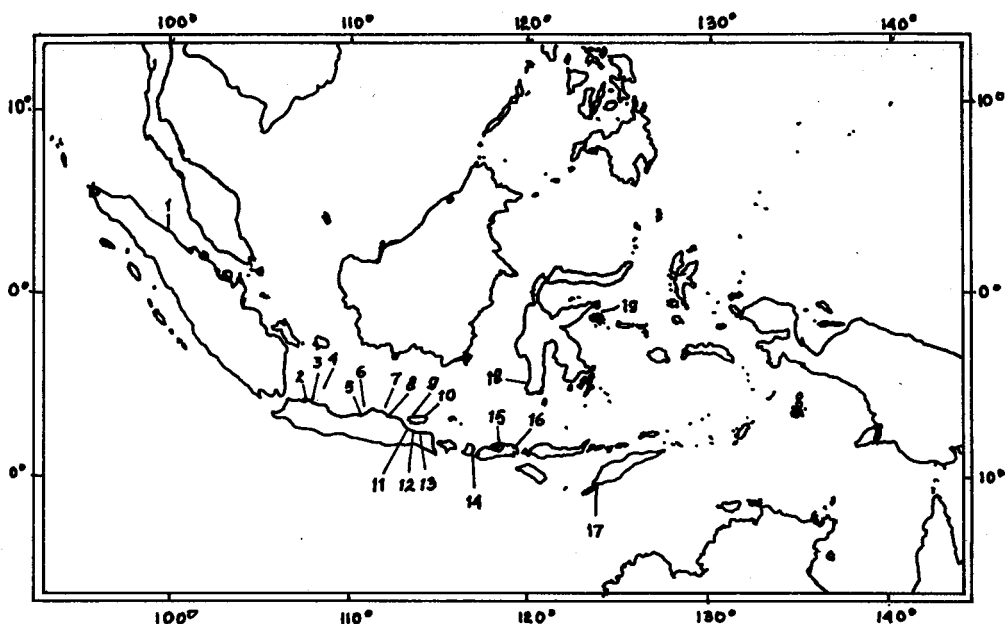


Fig. 1 Locations of sites surveyed.

- |                                     |   |
|-------------------------------------|---|
| 1. Tanjung Balai, North Sumatra     | 11. Kenjeran, Surabaya, East Java             |
| 2. Banten Bay, West Java            | 12. Pasuruan, East Java                       |
| 3. Ketapang Bay, West Java          | 13. Probolinggo, East Java                    |
| 4. Pari Island, Jakarta             | 14. Lombok Island, West Nusa Tenggara         |
| 5. Demak, Central Java              | 15. Bima Bay, Sumbawa Is., West Nusa Tenggara |
| 6. Jepara, Central Java             | 16. Sape Bay, Sumbawa Is., West Nusa Tenggara |
| 7. Tayu, Pati, Central Java         | 17. Kupang, East Nusa Tenggara                |
| 8. Rembang, Central Java            | 18. Maros, South Sulawesi                     |
| 9. Desa Soca, Madura Is., East Java | 19. Lokotoi, Banggai, Central Sulawesi        |
| 10. Kwanyar, Madura Is., East Java  |   |

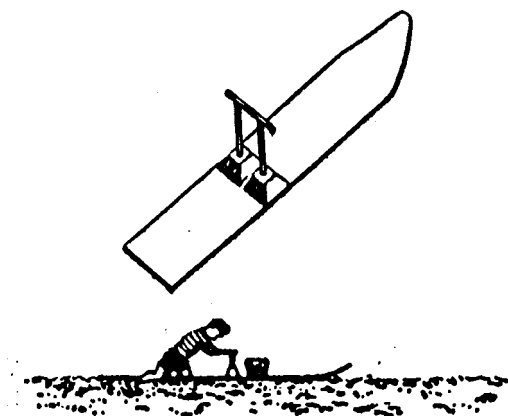


Fig. 2. Wooden skateboard.

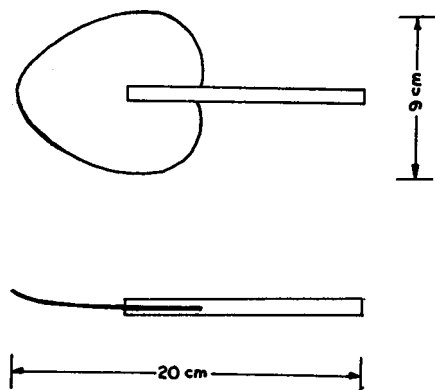


Fig. 3. Spatula used for digging bivalve.

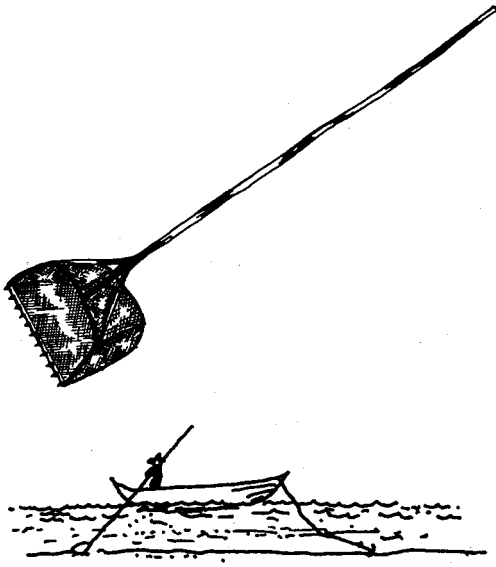


Fig. 4. Hand dredge.

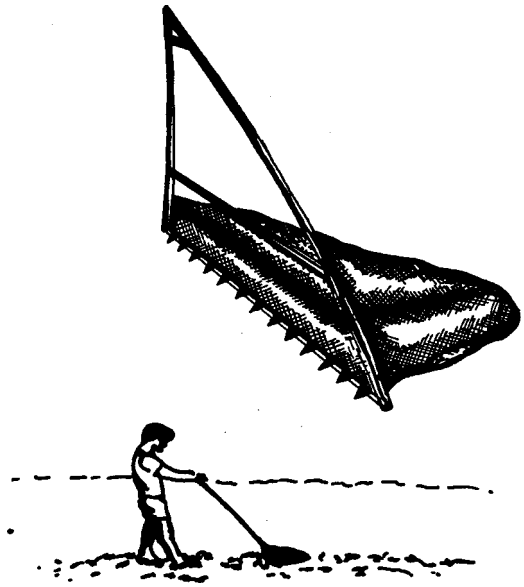


Fig. 6. Rake with collecting bag.

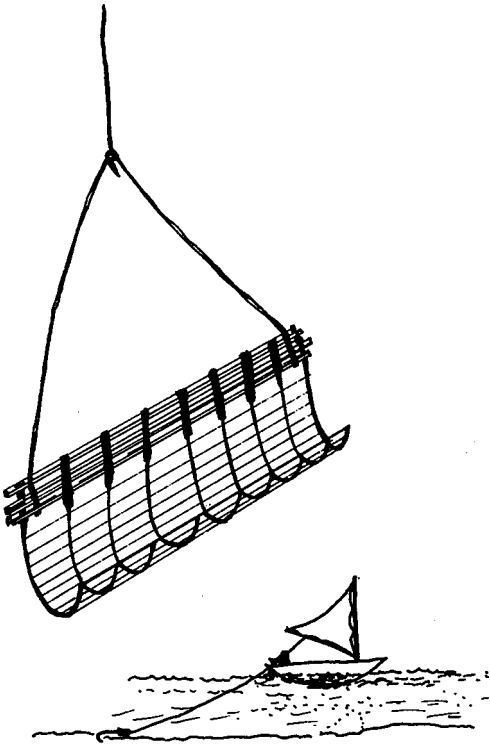


Fig. 5. Dredge towed by sailboat.

Regarding the value of the shellfish, the average value increased from approximately Rp 70 per kg in 1977 to Rp 170 per kg in 1981. In this tabulation, the cephalopod taxa are incidental to fishing gear and are not used for comparison.

#### Utilization

Other than the three cephalopods, whose disposal pattern and practice follow those of fish, the molluscs produced are mainly utilized fresh, some dried, by communities next to the place of capture. To relay the product beyond that would require post-harvest development considerations.

All molluscs produced are utilized for human consumption. The *Pinctata* oysters are used for pearl culture. The shells of some molluscs are used for making ornamental handicrafts, a practice that merits further development.

#### Discussions

The present Five-Year Development Programme calls for increases in fish production. It is anticipated that the development of shellfish farming would significantly contribute toward this end. Farming enables much greater control over the harvesting and production schedules, making systematic post-harvest development undertakings possible and more manageable. Thus, market development and product utilization would be possible. Successful shellfish farming also protects

the wild shellfish stock from overexploitation and the environment in the substrate, which forms the habitat of many species.

From the viewpoint of socioeconomic development of the primary sector, shellfish farming is also expected to contribute towards the betterment of small-scale fishing and rural coastal communities by creating meaningful job opportunities and uplifting the present adverse socioeconomic status of these communities.

Recognizing these benefits, the Government of Indonesia has conducted various preliminary investigations into the future prospects of seafarming as a whole. Of particular note is the preparatory assistance in seafarming development carried out by the Directorate-General of Fisheries of the Ministry of Agriculture supported by the United Nations Development Programme (UNDP) and the Food and Agriculture Organization of the United Nations (FAO). The assistance of the

Japan International Cooperation Agency (JICA) to the Marine Fisheries Research Institute of the Agency of Agriculture Research and Development of the Ministry of Agriculture is also important.

In a forthcoming 3-year seafarming development project, the Directorate-General of Fisheries, supported by FAO and UNDP, will undertake the introduction and development of seafarming systems and technologies applicable to Indonesia. In this project, shellfish will be included.

Because shellfish, being filter feeders, are prone to the adverse effects of some pollutants, the project plans to work on post-harvest development problems as well as the depuration of the products to ensure health standards and edible quality. To protect shellfish culture grounds, the project will also look into pollution aspects, particularly the toxic effects of spilled oils, oil dispersants, industrial and domestic sewage effluents, and toxins in natural or induced dinoflagellate blooms.