



**THE MFRDMD/SEAFDEC FIRST REGIONAL WORKSHOP ON  
REMOTE SENSING OF PHYTOPLANKTON**

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**COUNTRY STATUS REPORT  
INDONESIA**

**REMOTE SENSING TECHNOLOGY FOR  
UTILIZING FISHERY RESOURCES IN INDONESIA**

By:

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## **1.0 Introduction**

Geographically, Indonesia, which is located at the equator consists of two-third of marine area. This tropical country comprises of 17,508 islands. It has a very large and complex biodiversity such as many kinds of fish species.

To utilise these potential fish resources, traditional fishing gears that are suitable for this area and species are often used. Traditional fishing gears are mostly used by the fishermen to catch fish in coastal areas. The modern technology, such as purse seines, gill nets, and fish nets are operated in the off shore waters in Indian Ocean, North Irian Jaya Sea, South China Sea, and Arafuru Sea.

Nowadays, remote sensing technology has been developed for detecting fishery resources. Its application in Indonesia is still limited. This technology still cannot be used to track the migration of pelagic fish from one area to another area.

The application of remote sensing technology for fishery in Indonesia is still on trial. Hopefully that this technology could be used in utilizing the marine fish resources in the future.

## **2.0 Fisheries Development in the South China Sea**

In Indonesia, the East Coast of Sumatra which bordering the Malacca Straits, also referred to as the South China Sea. Northern area is Exclusive Economic Zone (EEZ) of Indonesia, while in the south there is coastal area of Sumatra.

### **2.1. Fisheries Production**

The quantity of the fish captured is depended on various factors such as type and effectiveness of catching equipment, the size of fishing area, fishing intensity and season.

Total marine fish captured was 220,587 tons in 1994. In 1996, the production was 260,584 tons. The annual increment was 1.08%.

### **2.2. Fishing boats.**

In terms of fishing units, the number of fishing boats was risen from 21,066 units in 1994 to 21,324 units in 1996, with an average annual increment of 1.22%.

### **2.3. Equipment and Technology**

The statistics of the Fishery Service of East of Sumatra mentioned that in the years of 1995 to 1996 the number of boats and fishing equipment in South China Sea are as in Table 1.

Types	1994	1995	1996
<b>Boats</b>			
1. Non-power boat	8,526	8,234	8,359
2. Out board engine	3,630	3,687	3,979
3. In board engine	9,373	8,662	8,966
<b>Fishing equipment</b>			
1. Seine nets	2,107	2,603	2,684
2. Purse seine	-	-	-
3. Gill nets	6,386	6,461	6,928
4. Lift nets	6,122	6,832	6,607
5. Hook and line	7,916	8,271	8,672
6. Traps	4,580	4,511	4,811
7. Others	180	107	199

Table 1: Number of boats and fishing equipment, 1994 – 1996

The total number of marine fishing units in South China Sea was 29,899 units in 1996.

#### 2.4. Fisheries Resources in the South China Sea

The potential of fishery resources in the South China Sea is about 1,210,662 ton (1987). The resources include demersals, pelagics, penaeids, lobsters, coral fishes, and squids (loligo). Table 2 below shows the potential of fishery commodities.

No	Commodities by group	Ton per annual
1	Pelagics	513,000
2	Demersals	656,000
3	Penaeids	11,000
4	Lobsters	400
5	coral fishes	27,565
6	squids (loligo)	2,697
	<b>T o t a l</b>	<b>1,210,662</b>

Table 2: The potential of marine fisheries in South China Sea:

The types of fish that are common in Indonesia are listed in Table 3.

No	Indonesian name	Scientific name
1.	Manyung	<i>Trychurus</i> spp.
2.	Gerot-gerot	<i>Pomadasys</i> spp.
3.	Bambangan	<i>Lutjanus</i> spp.
4.	Kerapu	<i>Epinephelus</i> spp
5.	Lencam	<i>Lithinus</i> spp
6.	Kakap	<i>Lates calcalifer</i>
7.	Ekor kuning	<i>Caesio</i> spp
8.	Gulamah	Scianidae
9.	Cucut	Spyrinidae
10.	Pari	Trigonidae
11.	Bawal hitam	<i>Formio niger</i>
12.	Layang	<i>Decapterus</i> spp
13.	Selar	<i>Selaroides</i> spp
14.	Kuwe	<i>Caranx</i> spp
15.	Tetengkek	<i>Megalaspis cordyla</i>
16.	Daun bambu	<i>Chorinemus</i> spp
17.	Belanak	<i>Mugil</i> spp
18.	Kuro/Senangin	<i>Polynemus</i> spp
19.	Teri	<i>Stolephorus</i> spp
20.	Tembang	<i>Sardinella fimbriata</i>
21.	Golok-golok	<i>Chirocentrus</i> spp
22.	Kembung	<i>Rastrelliger</i> spp
23.	Tenggiri	<i>Scomberomorus guttatus</i>
24.	Tongkol	<i>Euthynus</i> spp

Table 3: Common marine fish species in the South China Sea is listed below.

### 3.0 Remote Sensing Technology for Fishery

Directorate General of Fisheries Indonesia has been implementing research on the application of remote sensing technology using NOAA AVHRR data for fisheries in cooperation with LAPAN. The study is focused on analysis of physical oceanographic phenomena such as distribution of sea surface temperature for detecting movement of pelagic fish. The sea surface temperature of Sunda Strait or Sunda Shelf (south of Java) was about 29°C to 30°C. This temperature range covers quite large areas, and has a significant relationship with fish production. For example, the total fish landed at Labuhan (normal sea surface temperature of 29°C) is high, while in the other areas, which have a sea surface temperature of around 30°C to 32°C, the total fish landed is low. Therefore, we conclude that the sea surface temperature of around 29°C provides suitable habitat for small pelagic fish such as scads (*Decapterus* spp).

#### **4.0 Remote Sensing Technology for Fish Stock Assessment**

Remote sensing technology is used to investigate stock of fisheries resources. A working group has been established to assess the stock as well as to implement detailed study for analysing fish stock.

Currently, the remote sensing technology for detecting phytoplankton distribution has yet to be implemented in Indonesia. Indonesia doesn't have "satellite sea watch" program for monitoring of phytoplankton and fish resource.