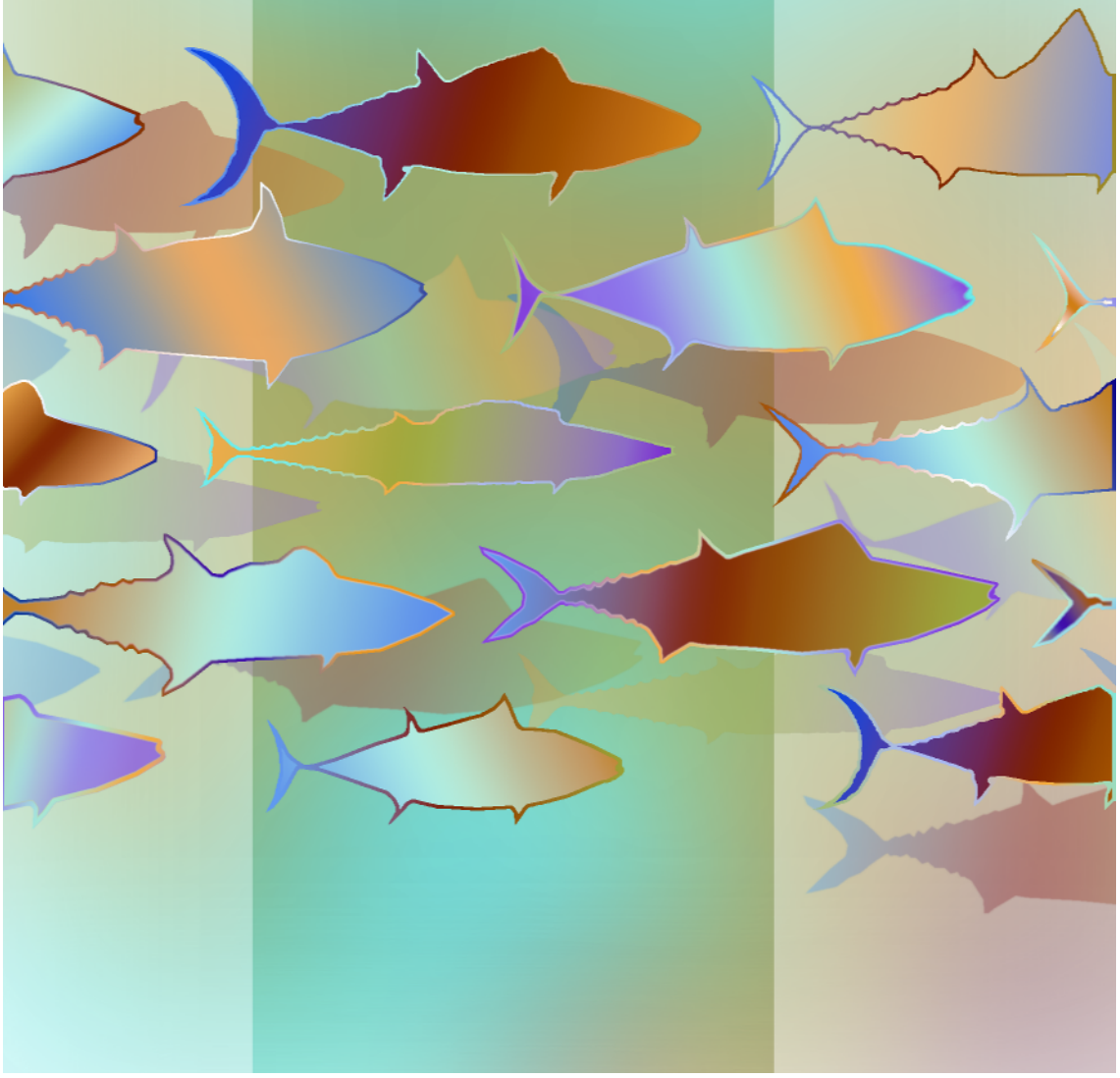
# Status of Exploited Marine Fishery Resources of India



# STATUS OF EXPLOITED MARINE FISHERY RESOURCES OF INDIA

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# 32

# Trends in Landings

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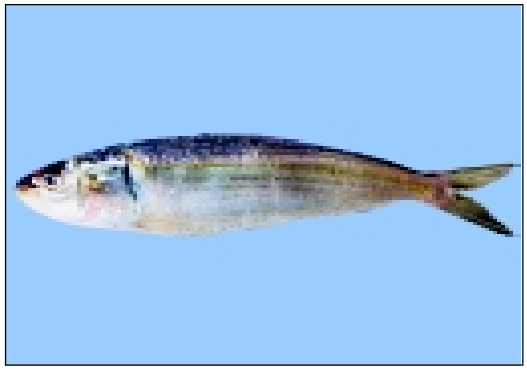
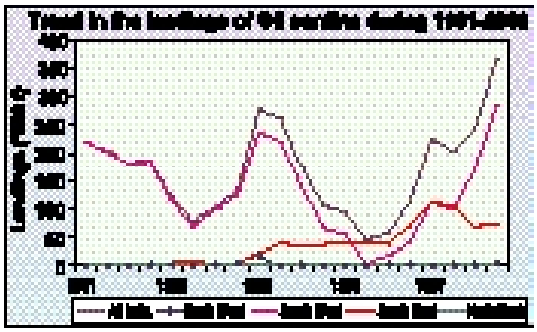
## 1. Oil Sardine



The Indian Oil sardine (Sardinella longiceps) is one of the major pelagic resources of India. Nearly 98% of the landings take place in the southern peninsular coast in which the southwest coast accounts for the major share.

The characteristic feature of the landings has been the very wide interannual fluctuations. The landings reached an all time high of 3,67,000 tonnes in the year 2000 and all time low of 47,000 tonnes in 1994. Significantly, oil sardine has emerged as a major resource along the southeast region since 1996. The southwest which was traditionally been the most productive region for the resource has been totally marginalised during 1994, the production realized being about 3,000 tonnes only. However, since then the landings in this region have improved, regained its premier position by attaining on high production level of about 2,74,000 tonnes in the year 2000.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 184 (12.2) | 170 (8.9) | 97 (4.2) | 107 (4.1) |

| Minimum and maximum landings | 47 (1994) | 367 (2000) |
|---|---|---|

| Potential yield (2000) 267 | Current yield (2001) 268 |
|---|---|

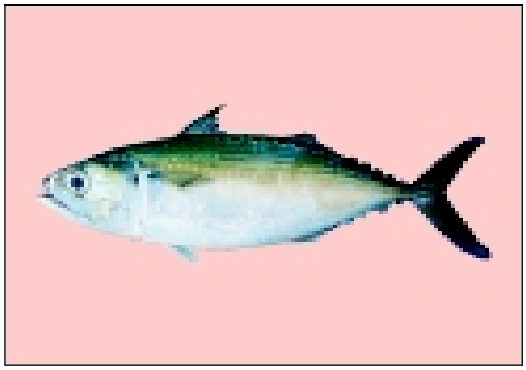
Regionwise contribution (%) (Average for last five years)

| Northeast 0.3 | Southeast 37.5 | Southwest 61.5 | Northwest 0.7 |
|---|---|---|---|

| Major gears used | Purse seine, Ring seine, Gill net |
|---|---|

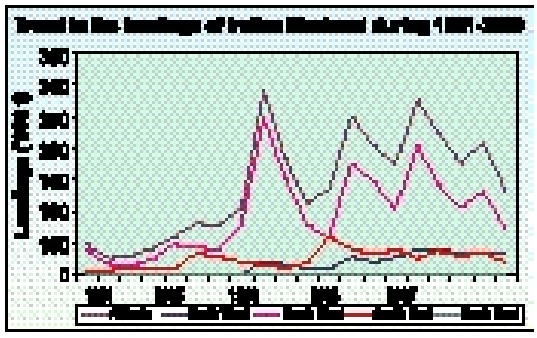
Note: Landings and yield in thousand tonnes

## 2. Indian Mackerel



The Indian mackerel supported by a single species namely, Rastrelliger kanagurta is one of the most important pelagic resources. It has a wide distribution along both the coast, with very high concentrations along the southwest coast. Nearly 80% of the landings is accounted by the west coast.

Post-monsoon is the most productive period along the southwest coast. In the southeast region peak landings occur during January-March.



The landings recorded an all time high of about 2,91,000 tonnes during the last two decades. However, the trend in the landing has since been sliding downward. The size in the landings consequent to the use of large seines and powerful out-board engines does not seem to sustain during subsequent years.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 42 (2.8) | 148 (7.8) | 177 (7.7) | 204 (7.9) |

| Minimum and maximum landings | 28 (1982) | 291 (1989) |
|---|---|---|

| Potential yield (2000) 295 | Current yield (2001) 90 |
|---|---|

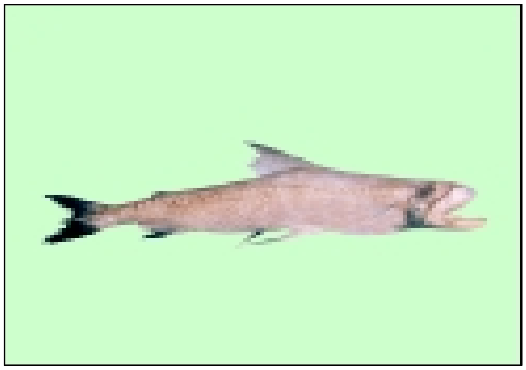
Regionwise contribution (%) (Average for last five years)

| Northeast 0.5 | Southeast 15.5 | Southwest 64.7 | Northwest 18.6 |
|---|---|---|---|

| Major gears used | Gill net, Ring seine, Trawl net, Purse seine |
|---|---|

Note: Landings and yield in,000 tonnes

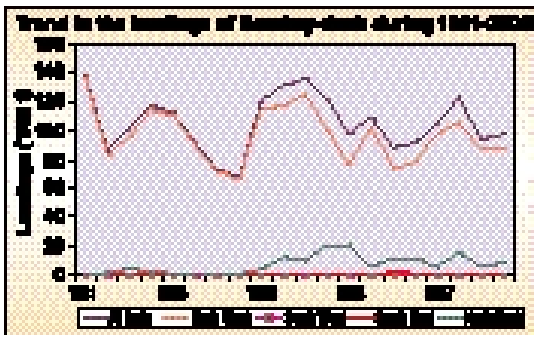
## 3. Bombay-duck



The Bombay-duck fishery is supported by a single species namely, Harpadon nehereus most abundant in the northwest region of peninsular India.

The season for Bombay-duck lasts from September to June with bulk of landings taking place during October-December.

The all India landings touched an all time high of 1,38,000 tonnes during 1981 and subsequently declined and again reached a new peak of 1,36,000 tonnes in 1991. The trend in the all India landings are governed by the landings in the northwest region. Since 1993, the landings are fluctuating around annual average of about 90,000 tonnes. It was also observed, although there is a gradual decline in the landings in Maharashtra, the increased landings in Gujarat has been maintaining the total production around the annual average of about 85,000 tonnes in the northwest coast.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 111 (7.4) | 97 (5.1) | 111 (4.8) | 102 (3.9) |

| Minimum and maximum landings | 67 (1988) | 138 (1981) |
|---|---|---|

| Potential yield (2000) 116 | Current yield (2001) 86 |
|---|---|

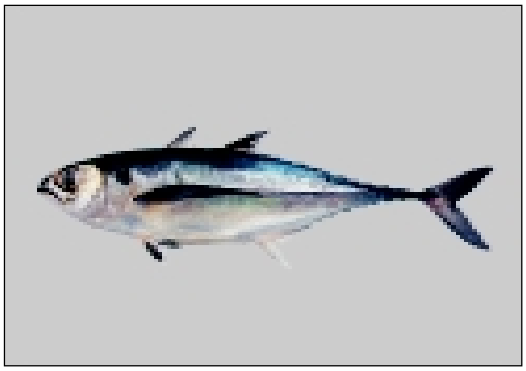
Regionwise contribution (%) (Average for last five years)

| Northeast 9.6 | Southeast 0.9 | Southwest 0.0 | Northwest 89.4 |
|---|---|---|---|

| Major gears used | Dol net, Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

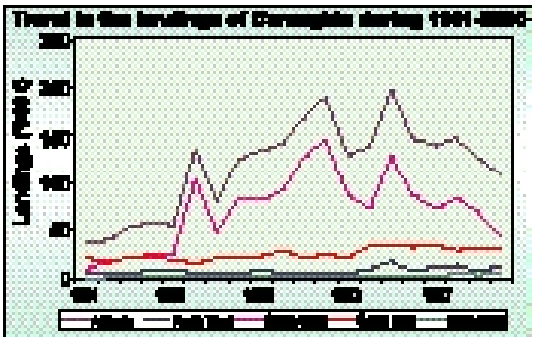
## 4. Carangids



Horse mackerel (Megalaspis cordyla), scads (Decapterus spp.) leather jackets (Scomberoides spp.) and other carangid species of Alepes, Selar, Caranx form the components of the carangid landings in India.

Southern peninsular coast accounts for more than 80% of the landings followed by the northwest coast.

The landings have been gradually increasing since 1981 and at the all India basis reached a peak of about 1,97,000 tonnes in 1995 and therafter a gradual decline in the landings is noted. However, the landings along the southwest peaked in 1992 and dwindled to about 40,000 tonnes in the recent years. The landings along the southeast coast fluctuate around an annual average of about 30,000 tonnes since 1994.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 49 (3.3) | 123 (6.5) | 165 (7.2) | 134 (5.2) |

| Minimum and maximum landings | 37 (1981) | 197 (1995) |
|---|---|---|

| Potential yield (2000) 238 | Current yield (2001) 118 |
|---|---|

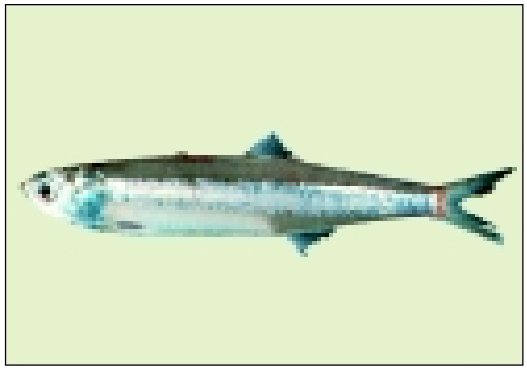
Regionwise contribution (%) (Average for last five years)

| Northeast 1.7 | Southeast 26.7 | Southwest 56.3 | Northwest 14.5 |
|---|---|---|---|

| Major gears used | Trawl net, Gill net, Hooks & line |
|---|---|

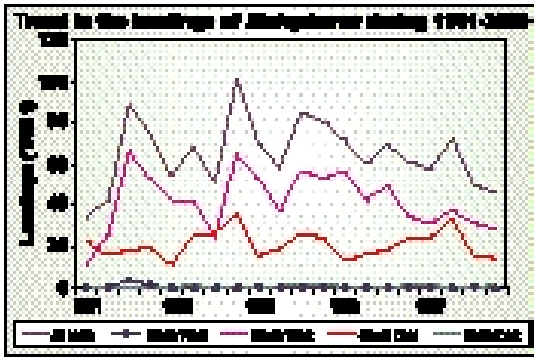
Note: Landings and yield in thousand tonnes

## 5. Whitebaits



Only six species were reported to be forming the constituents of the landings with varying degrees of abundance over the region. Among these, Encrasicholina devisi, Stolephorus waitei, S. commersonii and S. indicus form the bulk of the landings.

More than 95% of the landings in India are accounted by the southern peninsular coast in which southwest region is more productive



The all India landings attained an all time peak of about 1,01,000 tonnes and thereafter there was a gradual decline in the landings, chiefly due to declining trends in the southwest coast. In the southeast coast the landings are fluctuating around an annual average of about 20,000 tonnes.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 59 (3.9) | 70 (3.7) | 73 (3.2) | 57 (2.2) |

| Minimum and maximum landings | 33 (1981) | 101 (1988) |
|---|---|---|

| Potential yield (2000) 142 | Current yield (2001) 45 |
|---|---|

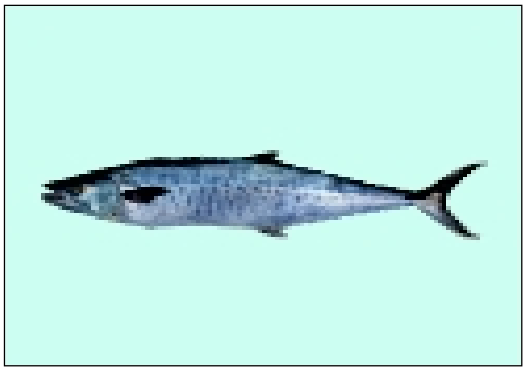
Regionwise contribution (%) (Average for last five years)

| Northeast 1.9 | Southeast 38.7 | Southwest 56.6 | Northwest 0.4 |
|---|---|---|---|

| Major gears used | Ring seine, Trawl net |
|---|---|

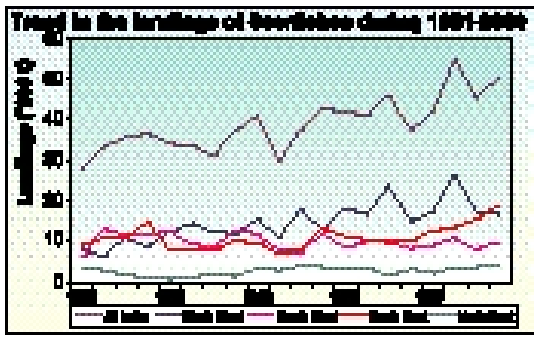
Note: Landings and yield in thousand tonnes

## 6. Seerfishes



Scomberomorus commerson, S. guttatus, S. lineolatus and Acanthocybium solandri are the components of the seerfish landings in India of which the first two species constitute more than 90% of the landings.

The west coast accounts for more than 60% of the landings. Bulk of the landings along the east coast is accounted by southern coastal states of Tamil Nadu and Andhra Pradesh.



During the last twenty years, the landings have been increasing. Along the northwest coast wide interannual variations were observed. The landings along the southwest coast have been fluctuating around an annual average of about 8,000 tonnes, during the last ten years. The southeast coast has been emerging as a major contributor to the seerfish landings in India.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 33 (2.2) | 34 (1.8) | 42 (1.8) | 46 (1.8) |

| Minimum and maximum landings | 28 (1981) | 55 (1998) |
|---|---|---|

| Potential yield (2000) 62 | Current yield (2001) 43 |
|---|---|

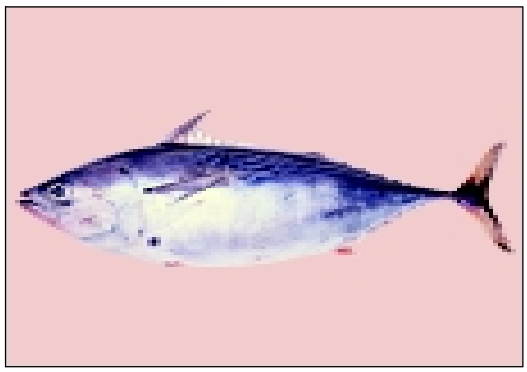
Regionwise contribution (%) (Average for last five years)

| Northeast 7.2 | Southeast 28.2 | Southwest 25.6 | Northwest 37.6 |
|---|---|---|---|

| Major gears used | Gill net, Trawl net, Hooks & line |
|---|---|

Note: Landings and yield in thousand tonnes

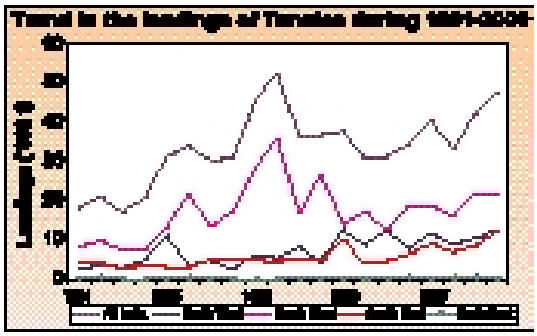
## 7. Tunas



The coastal tunas comprising Euthynnus affinis, Auxis thazard and Thunnus tonggol are the main components of tunnies. Skipjack tuna (Katsuwonus pelamis) exploited from coastal waters are also included in this group. Nearly 50% of the tunnies is accounted by the little tuna (E. affinis).

Southern peninsular coast of India accounts for the bulk of the landings especially the little tuna. T. tonggol forms the major component of tuna landings along the northwest coast.

The quarter of April to June and October to December are more productive periods. Productive period for tuna fishery was observed to be during April-June in the southwest coast and July to September in the southeast coast. Along the northwest coast, October to December is observed to be most productive period.



The all India landings attained an all time high of 52,000 tonnes in 1990 and since then there was a gradual decline with indications of revival in the recent years mainly due to increased landings along the southeast and northwest region.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 21 (1.4) | 38 (2.0) | 34 (1.5) | 39 (1.5) |

| Minimum and maximum landings | 17 (1983) | 52 (1990) |
|---|---|---|

| Potential yield (2000) 65 | Current yield (2001) 48 |
|---|---|

Regionwise contribution (%) (Average for last five years)

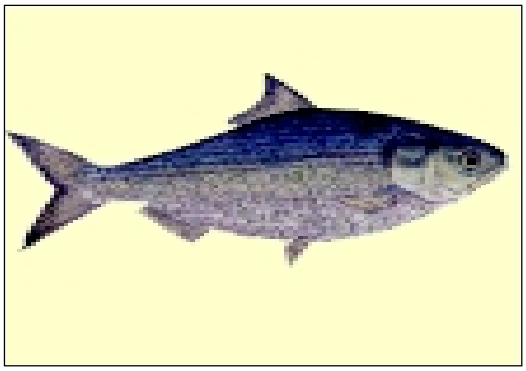
| Northeast 0.6 | Southeast 16.8 | Southwest 51.5 | Northwest 21.8 |
|---|---|---|---|

| Major gears used | Gill net, Hooks & line |
|---|---|

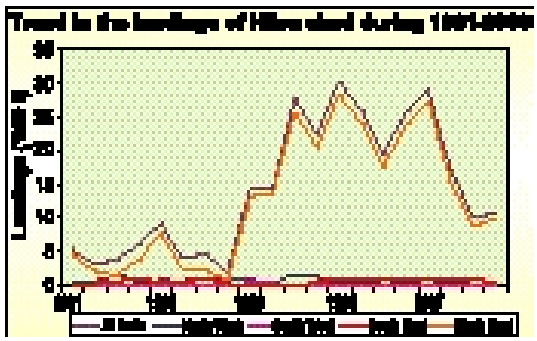
Note: Landings and yield in thousand tonnes

## 8. Hilsa shad

The Hilsa shad (Hilsa ilisha) forms a prominent fishery along the northeast region, more so along the West Bengal coast.



The all India landings attained an all time peak of about 30,000 tonnes and subsequently the landings declined gradually, the production falling to nearly a third of the peak.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 6 (0.4) | 8 (0.4) | 25 (1.1) | 18 (0.7) |

| Minimum and maximum landings | 2 (1988) | 30 (1993) |
|---|---|---|

| Potential yield (2000) 26 | Current yield (2001) 17 |
|---|---|

Regionwise contribution (%) (Average for last five years)

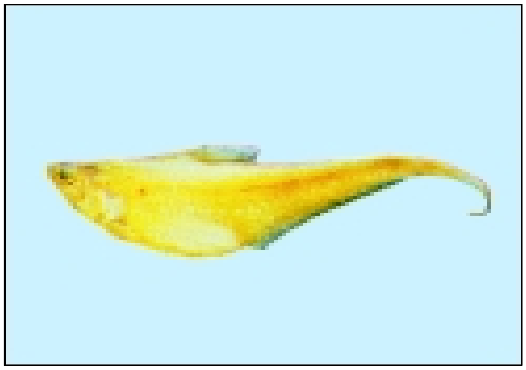
| Northeast 92.1 | Southeast 4.8 | Southwest 0.3 | Northwest 2.8 |
|---|---|---|---|

| Major gears used | Gill net |
|---|---|

Note: Landings and Yield in thousand tonnes

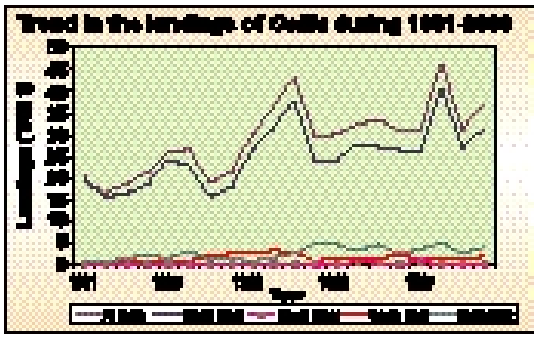
## 9. Golden Anchovy

The golden anchovy (Coilia dussumieri) fishery is limited to the northwest coast and to a lesser extent in the northeast coast.



Since the northwest region contributes to the bulk of the landings in India, the overall trend resembles to that in the northwest coast.

During the last decade the landings have been fluctuating around annual average of 34,000 tonnes and in the northeast region particularly along the West Bengal coast, the landing were fluctuating around 4,000 annually.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 20 (1.4) | 27 (1.4) | 34 (1.5) | 35 (1.4) |

| Minimum and maximum landings | 16 (1982) | 46 (1998) |
|---|---|---|

| Potential yield (2000) NA | Current yield (2001) 32 |
|---|---|

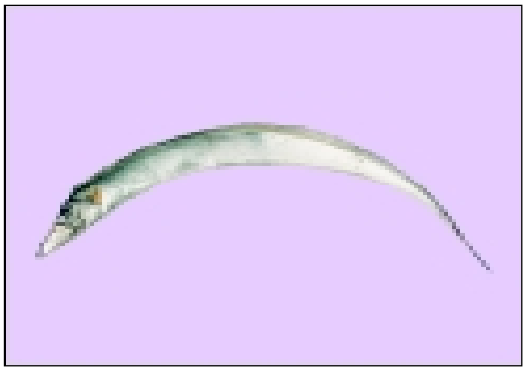
Regionwise contribution (%) (Average for last five years)

| Northeast 10.0 | Southeast 4.2 | Southwest 0.3 | Northwest 85.5 |
|---|---|---|---|

| Major gears used | Trawl net, Dol net |
|---|---|

Note: Landings and yield in thousand tonnes

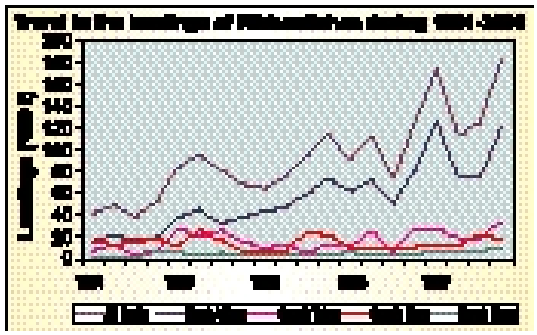
## 10. Ribbonfishes



The four species Trichiurus lepturus, Lepturacanthus savala, Eupleurogrammus intermedius and E. muticus are found along both the east and west coasts with varying dominance. From the fishery point of view, T. lepturus is the dominant component, constituting more than 75% of the ribbonfish landings.

Generally, the peak landings take place during the post monsoon followed by the premonsoon period except along the Kerala coast where the maximum landings are observed during the monsoon period.

Earlier, the southern peninsular coast was accounting for the bulk of ribbonfish landings in India, but, since the last two decades the northwest coast has emerged as the leading producer.



The all time high landings of about 1,82,000 tonnes were recorded in the year 2000. The landings along the west coast have been generally showing upward trend.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 53 (3.6) | 77 (4.0) | 98 (4.3) | 145 (5.6) |

| Minimum and maximum landings | 39 (1983) | 182 (2000) |
|---|---|---|

| Potential yield (2000) 194 | Current yield (2001) 176 |
|---|---|

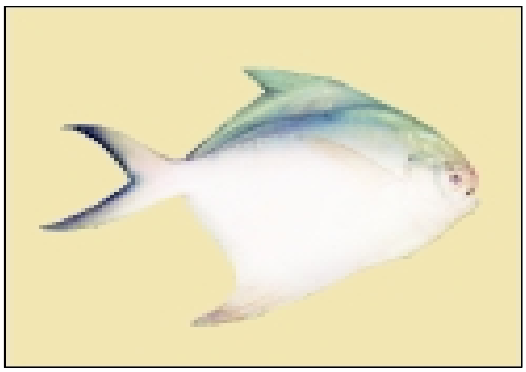
Regionwise contribution (%) (Average for last five years)

| Northeast 5.1 | Southeast 10.6 | Southwest 17.8 | Northwest 66.2 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

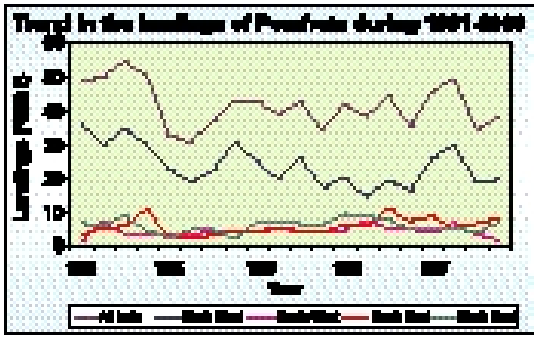
## 11. Pomfrets



Silver Pomfret (Pampus argenteus), black pomfret (Parastromateus niger) and the Chinese pomfret (P. chinensis) form the pomfret landings in India, of which the silver pomfret dominates the landings followed by the black pomfret.

More than half of the landings in India is accounted by the northwest region. Higher landings are obtained during January-March and July-September.

All India trend shows that the landings are fluctuating with minor variations, around 40,000 tonnes annually during last decade and half. However, in the northwest region, there was a gradual decline in the landings, then some revival from 1997 onwards, owing mainly to increased landings along the Gujarat coast. The landings along the southeast region have also been sliding down in the recent years. There was no significant change in the trend along the northeast and southwest regions.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 47 (3.2) | 39 (2.0) | 40 (1.8) | 41 (1.6) |

| Minimum and maximum landings | 31 (1986) | 54 (1983) |
|---|---|---|

| Potential yield (2000) 46 | Current yield (2001) 39 |
|---|---|

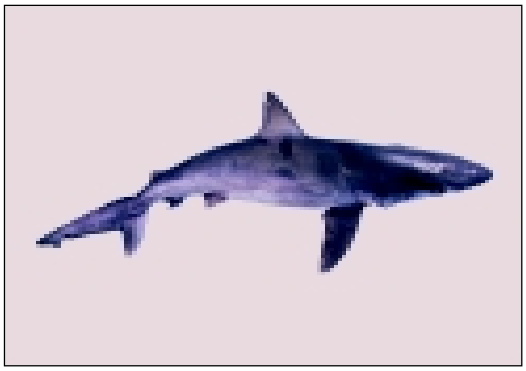
Regionwise contribution (%) (Average for last five years)

| Northeast 15.4 | Southeast 11.5 | Southwest 14.8 | Northwest 57.9 |
|---|---|---|---|

| Major gears used | Gill net, Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

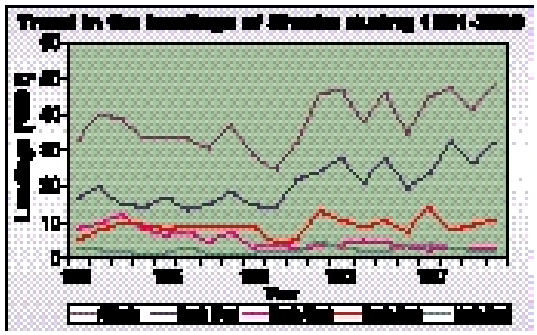
## 12. Sharks



Nearly 66 species of sharks are known from the Indian seas of which only about 30 species are commercially important and out of these only a dozen species form the major components of the fishery.

Nearly two thirds of the landings in India is accounted by the west coast in which northwest region dominates the landings. More than 80% of the landings along the east coast is accounted by the southeast region.

The all India production has declined from about 40,000 tonnes in 1982 to about 25,000 tonnes in 1990. Consequently the landings have improved since 1992 though the landings are fluctuating around an annual average of about 40,000 tonnes.



In the northwest region the landings are increasing with large inter annual variations, where as in southwest and northeast region, the production show declining trend. Important species are Scoliodon laticaudus, Rhizoprionodon acutus, Carcharhynus sorrah, C.macloti, C.melanopterus, C.hemiodon, Eusphyra blochii and Sphyrna lewini

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 36 (2.4) | 31 (1.6) | 42 (1.8) | 43 (1.7) |

| Minimum and maximum landings | 25 (1990) | 48 (2000) |
|---|---|---|

| Potential yield (2000) 45 | Current yield (2001) 34 |
|---|---|

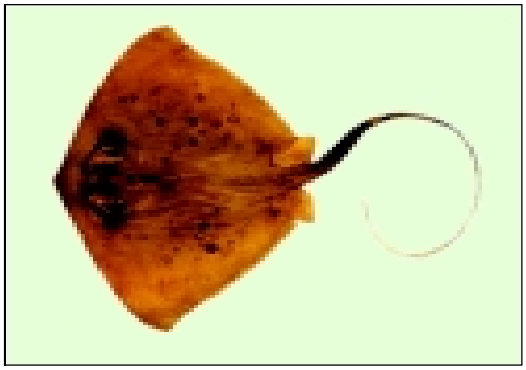
Regionwise contribution (%) (Average for last five years)

| Northeast 6.8 | Southeast 22.8 | Southwest 6.3 | Northwest 62.0 |
|---|---|---|---|

| Major gears used | Hooks & line, Gill net, Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

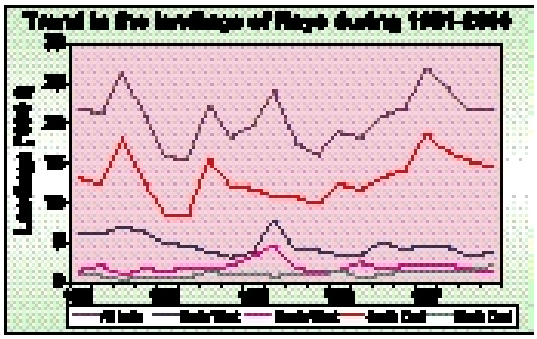
## 13. Rays



Although about 32 species of Rays are known from the Indian seas, only a dozen contribute to the fishery with varying degree of dominance in each region.

Maximum landings occur along the southeast region particularly along the Tamil Nadu coast followed by the northwest region. Important species are Dasyatis bleekeri, D. kuhlii, Hypolophus sephen

The all India landings declined from about 26,000 tonnes in 1983 to 16,000 tonnes in 1992 and since then there was a revival in the landings reaching a peak of 27,000 tonnes in 1997. In the northwest region the landings are fluctuating around 4,000 tonnes annually since 1991.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 36 (2.4) | 31 (1.6) | 42 (1.8) | 43 (1.7) |

| Minimum and maximum landings | 16 (1986) | 27 (1997) |
|---|---|---|

| Potential yield (2000) 23 | Current yield (2001) 20 |
|---|---|

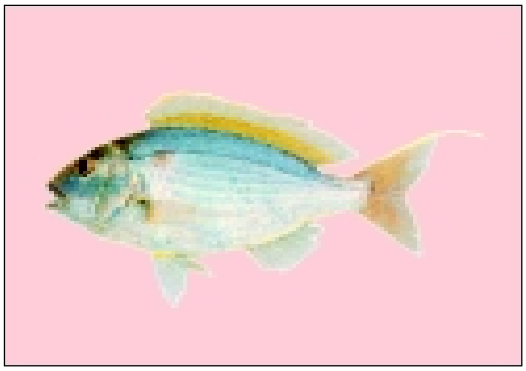
Regionwise contribution (%) (Average for last five years)

| Northeast 5.1 | Southeast 62.5 | Southwest 9.5 | Northwest 22.9 |
|---|---|---|---|

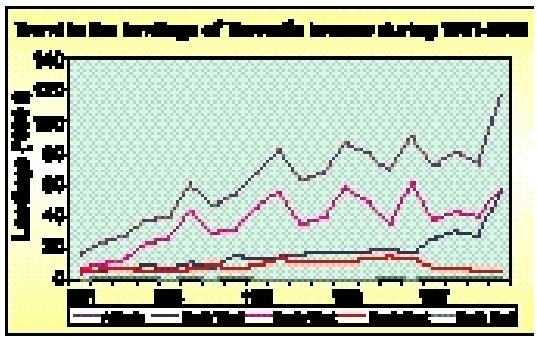
| Major gears used | Hooks & line, Bottom-set gill net |
|---|---|

Note: Landings and yield in thousand tonnes

## 14. Threadfin Breams



Among the five species contributing to the fishery, the two most dominant species are Nemipterus japonicus and N. mesoprion, while the former is dominant along the coasts of Andhra Pradesh, Tamil Nadu, Gujarat and Kerala, the latter is more so in Karnataka and Maharashtra.



More than 85% of the production in India is accounted by the west coast. There is a general upward trend in the all India landings. The landings along the southwest region exhibited large interannual variations. There is spurt in the landings along the northwest coast, chiefly due to increased landings in Gujarat. Contrastingly, the landings in the southeast region is showing downward trend since 1996.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 29 (1.9) | 62 (3.3) | 74 (3.2) | 87 (3.4) |

| Minimum and maximum landings | 16 (1986) | 27 (1997) |
|---|---|---|

| Potential yield (2000) 128 | Current yield (2001) 114 |
|---|---|

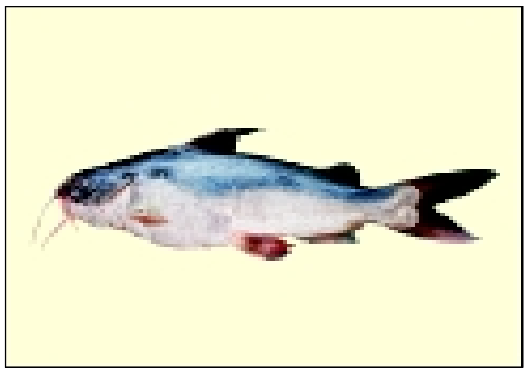
Regionwise contribution (%) (Average for last five years)

| Northeast 0.8 | Southeast 8.8 | Southwest 54.6 | Northwest 35.8 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

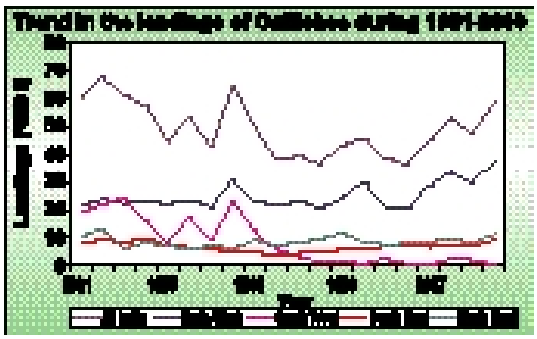
Note: Landings and yield in thousand tonnes

## 15. Catfishes



Nearly a dozen species of catfish are caught along the coasts of India and only five species are of importance from the fisheries point of view, namely Tachysurus thalassinus, T. serratus, T. tenuispinis and Osteogeneiosus militaris

Currently, the northwest region contributes to the bulk of the landings, although prior to eighties the southwest region was also a significant contributor. The trend in all India landings showed a decline in the landing upto 1996 and subsequently there is an upward trend, chiefly due to increased landings. Similarly, in the southeast region also the landings have been increasing gradually. Significantly, there has been decline in the catfish landings along the southwest coast and in the recent years the landings are very marginal.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 58 (3.9) | 50 (2.6) | 41 (1.8) | 48 (1.9) |

| Minimum and maximum landings | 36 (1996) | 68 (1982) |
|---|---|---|

| Potential yield (2000) 51 | Current yield (2001) 49 |
|---|---|

Regionwise contribution (%) (Average for last five years)

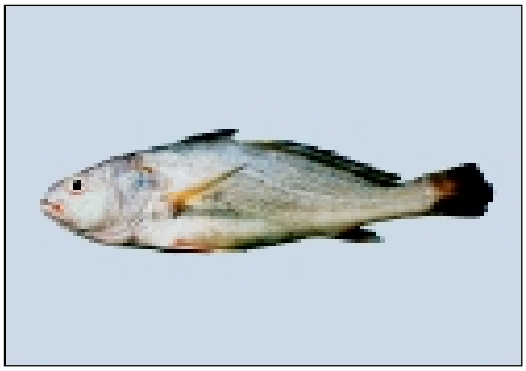
| Northeast 18.8 | Southeast 15.2 | Southwest 2.5 | Northwest 62.3 |
|---|---|---|---|

| Major gears used | Purse seine, Trawl net, Gill net, Dol net |
|---|---|

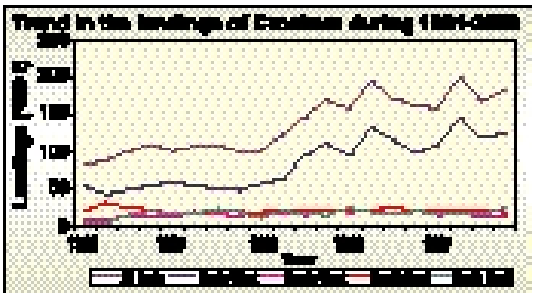
Note: Landings and yield in thousand tonnes

## 16. Croakers

The landings of sciaenids consisted of both larger forms mainly represented by Otolithoides biauritus and Protonibea diacanthus and a large number of smaller sciaenids with more than ten species supporting the fishery.



Some of the smaller sciaenids are Otolithes ruber, O. cuvieri, Johnius glaucus, J. carutta and Johnieops vogleri.



The northwest region accounts for bulk of the landings. During the last two decades, the landings have been increasing in this region and in recent years the landings are fluctuating around 120,000 tonnes annually. In all other regions the landings have more or less stabilized.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 96 (6.4) | 10.8 (5.6) | 168 (7.3) | 174 (6.7) |

| Minimum and maximum landings | 83 (1981) | 200 (1998) |
|---|---|---|

| Potential yield (2000) 273 | Current yield (2001) 121 |
|---|---|

Regionwise contribution (%) (Average for last five years)

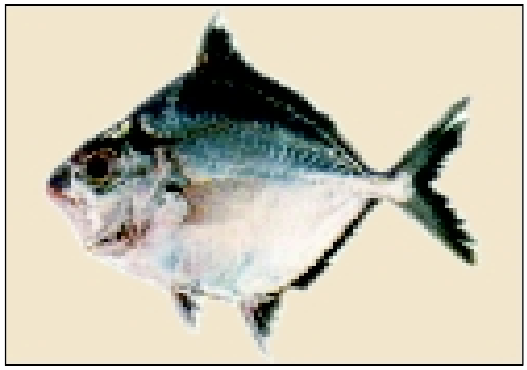
| Northeast 10.5 | Southeast 11.5 | Southwest 9.4 | Northwest 68.5 |
|---|---|---|---|

| Major gears used | Trawl net, Bottom-set gill net, Bag net |
|---|---|

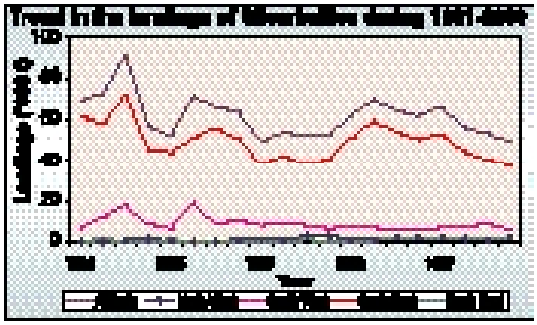
Note: Landings and yield in thousand tonnes

## 17. Silverbellies

The landings of silverbellies consist of multitude species, the species composition differing from region to region. Leiognathus bindus, L. brevirostris, L. splendens, L. dussumieri, and Secutor insidiator are some of the dominant species of the landings.



The southern peninsular coast contributes more than 90% of the landings, more so the southeast region particularly the Tamil Nadu coast.



The landings attained an all time peak of 92,000 tonnes in 1983 and thereafter showed a downward slide but reached a peak of about 70,000 in 1994. Since 1994, there was a gradual declining trend.

Average landings & percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 69 (4.6) | 61 (3.2) | 60 (2.6) | 58 (2.2) |

| Minimum and maximum landings | 49 (1989) | 92 (1983) |
|---|---|---|

| Potential yield (2000) 67 | Current yield (2001) 50 |
|---|---|

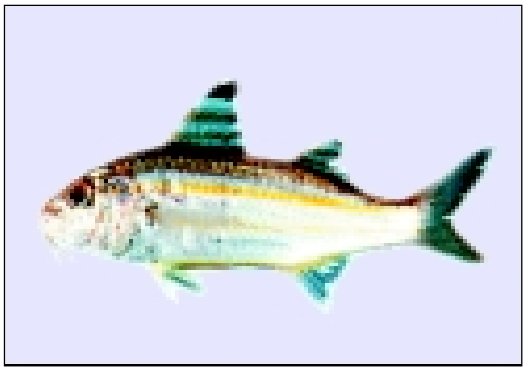
Regionwise contribution (%) (Average for last five years)

| Northeast 2.9 | Southeast 78.5 | Southwest 12.8 | Northwest 3.4 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

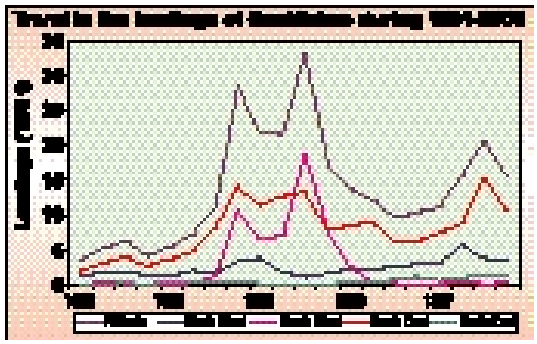
Note: Landings and yield in thousand tonnes

## 18. Goatfishes



Eight species contributed to the fishery along the different regions of the Indian coast with varying degree of dominance. The dominant species are Upeneus sulphureus, U. tragula, U. sundaicus, U.moluccensis, U. vittatus and U. taeniopterus.

More than 75% of the total landings is accounted by the southern peninsular coast. The all India landings recorded the highest landing of about 33,000 tonnes during 1991 and subsequently there was drastic reduction in the landings. The landings along the southwest region (chiefly Kerala coast) have recorded maximum of about 19,000 tonnes in 1991 and subsequently suffered a drastic decline and in the recent year the landings were only marginal. The landings along the other regions indicate a general increasing trend.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 5 (0.3) | 18 (0.9) | 17 (0.8) | 15 (0.6) |

| Minimum and maximum landings | 3 (1981) | 33 (1991) |
|---|---|---|

| Potential yield (2000) 20 | Current yield (2001) 10 |
|---|---|

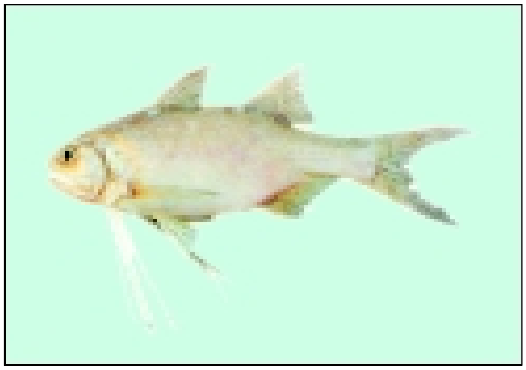
Regionwise contribution (%) (Average for last five years)

| Northeast 7.5 | Southeast 65.5 | Southwest 1.4 | Northwest 25.5 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

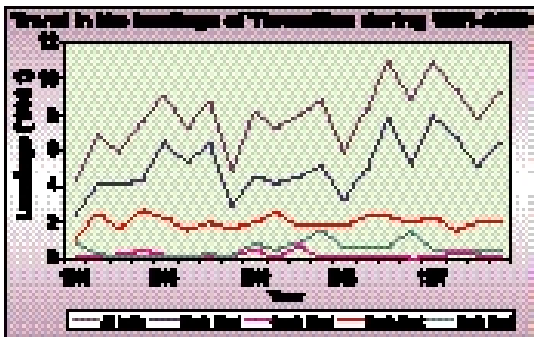
# 19. Threadfins



The bulk of Threadfin landings in India is constituted by (1) Eleutheronema tetradactylum (2) Polynemus indicus and (3) P. heptadactylus.

The northwest region particularly the Gujarat coast accounts for the bulk of landings in India followed by the southeast region.

Although the landings exhibit upward trend there are wide interannual variations, especially so along the northwest region. The landings along the southeast region are fluctuating around an annual average of about 1900 tonnes.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 7 (0.5) | 7 (0.4) | 8 (0.4) | 9 (0.4) |

| Minimum and maximum landings | 4 (1981) | 11 (1995) |
|---|---|---|

| Potential yield (2000) 9 | Current yield (2001) 7 |
|---|---|

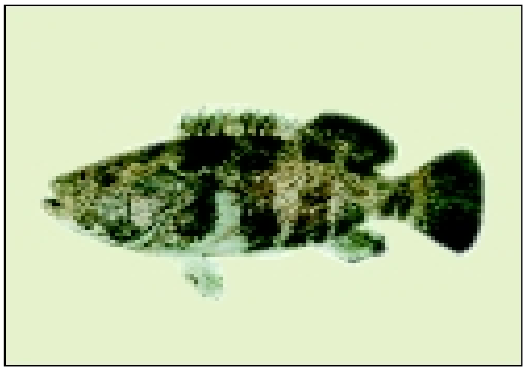
Regionwise contribution (%) (Average for last five years)

| Northeast 7.2 | Southeast 21.1 | Southwest 1.1 | Northwest 68.2 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

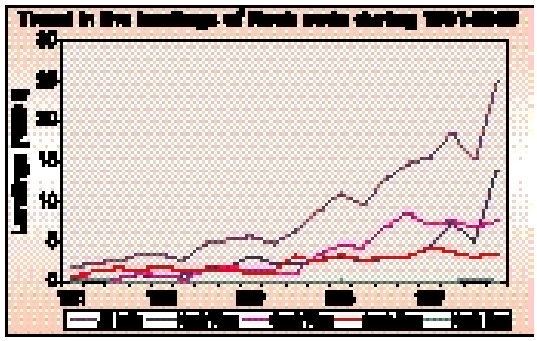
Note: Landings and yield in thousand tonnes

## 20. Rock cods



Three species namely, Epinephelus diacanthus, E. tauvina and E. areolatus form bulk of the landings of which the first species dominates in the west coast and the other two species along the southeast coast particularly along the Tamil Nadu.

More than 70% of the landings is accounted by the west coast followed by the southeast coast. The all India landings have been increasing over the years with a spurt in 2000 mainly due to heavy landings along the northwest coast. The landings in the southern peninsular coast appears to have been stabilized. The overall increase in the landings of groupers over the years could be attributed to increased fishing operations in the deeper waters.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 3 (0.2) | 5 (0.2) | 10 (0.4) | 18 (0.7) |

| Minimum and maximum landings | 2 (1981) | 25 (2000) |
|---|---|---|

| Potential yield (2000) 16 | Current yield (2001) 26 |
|---|---|

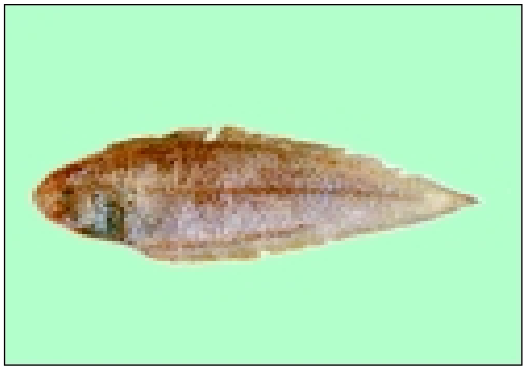
Regionwise contribution (%) (Average for last five years)

| Northeast 0.3 | Southeast 19.7 | Southwest 42.1 | Northwest 37.8 |
|---|---|---|---|

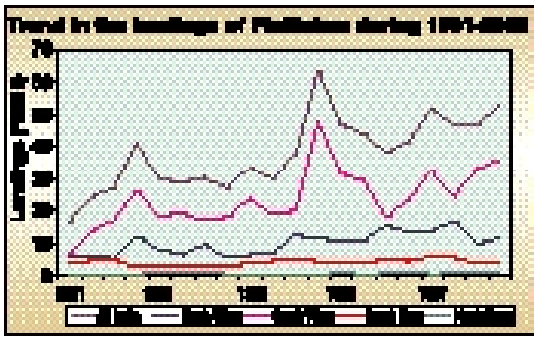
| Major gears used | Hooks & line, Bag net, Trawl net |
|---|---|

Note: Landings and yield in thousand tonnes

## 21. Flatfishes



The landings of flatfishes comprised of halibut, flounders and soles, and more than 95% being contributed by the soles. Dominant species are Cynoglossus macrostomus, C. macrolepidotus and Psettodes erumei. Nearly 85% of the landings accounted by the west coast of which the southwest region comprising Kerala, Karnataka and Goa dominated. Bulk of the landings in east coast occurs in Tamil Nadu and Andhra Pradesh. The landings showed wide interannual variations along the southwest coast reaching an all time high of about 46,000 tonnes in 1992. The landings in the northwest region has been fluctuating around 15,000 tonnes annually.



Flatfishes are landed throughout the year. During pre-monsoon and post-monsoon these resources are available in the inshore grounds in fairly good concentration.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 27 (1.8) | 30 (1.6) | 46 (2.0) | 48 (1.9) |

| Minimum and maximum landings | 16 (1981) | 63 (1992) |
|---|---|---|

| Potential yield (2000) 47 | Current yield (2001) 39 |
|---|---|

Regionwise contribution (%) (Average for last five years)

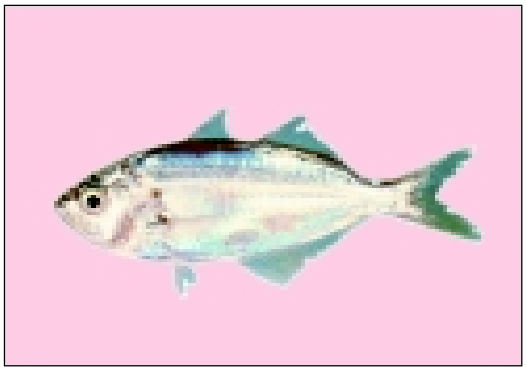
| Northeast 1.1 | Southeast 10.7 | Southwest 65.2 | Northwest 22.9 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

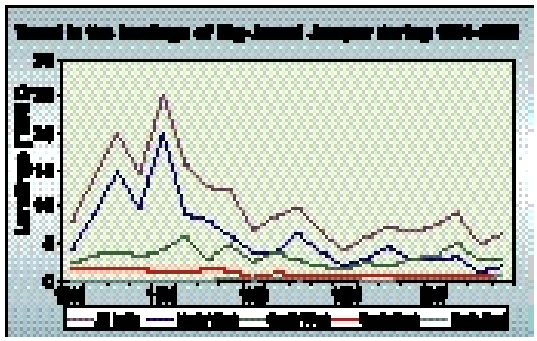
Note: Landings and yield in thousand tonnes

## 22. Big-jawed jumper

The big-jawed jumper (False Trevelly or whitefish) landings are contributed by a single species Lactarius lactarius.



Its abundance is more in the west coast, especially so along the northwest coast. The landings have declined to about 7,000 tonnes from the peak landings of about 25,000 tonnes in 1985. During the past decade the landings are fluctuating around 7,000 tonnes with minor interannual variation.



Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 16 (1.1) | 11 (0.6) | 7 (0.3) | 7 (0.3) |

| Minimum and maximum landings | 4 (1993) | 25 (1985) |
|---|---|---|

| Potential yield (2000) NA | Current yield (2001) 5 |
|---|---|

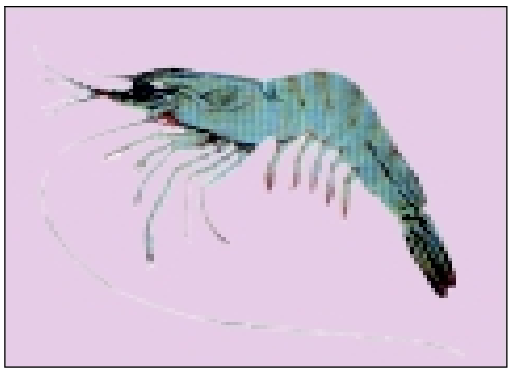
Regionwise contribution (%) (Average for last five years)

| Northeast 4.6 | Southeast 11.2 | Southwest 49.4 | Northwest 34.8 |
|---|---|---|---|

| Major gears used | Trawl net |
|---|---|

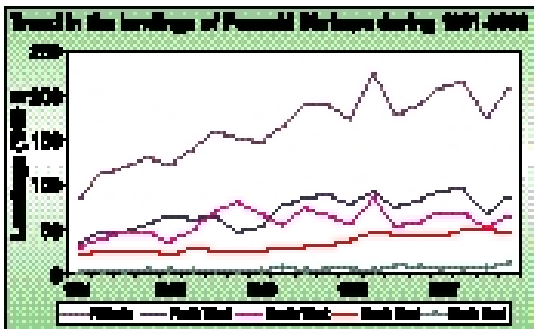
Note: Landings and yield in thousand tonnes

## 23. Penaeid Shrimps



The landings of penaeid shrimps comprise multiplicity of species among which Parapenaeopsis stylifera, Metapenaeus dobsoni, M. monoceros, M. affinis, Solenocera crassicornis and Penaeus indicus are predominant.

The penaeid shrimps are landed throughout the year with lesser intensity during the monsoon period along the west coast.



More than 75% of the landings in India are observed along the west coast dominated by the northwest region along the coasts of Maharashtra and Gujarat. The trend in the landings in the west coast exhibited wide interannual variation. In the southeast region, the landings seemed to have reached the asymptotic level.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 113 (7.5) | 152 (8.0) | 192 (8.4) | 199 (7.7) |

| Minimum and maximum landings | 84 (1981) | 225 (1994) |
|---|---|---|

| Potential yield (2000) 194 | Current yield (2001) 176 |
|---|---|

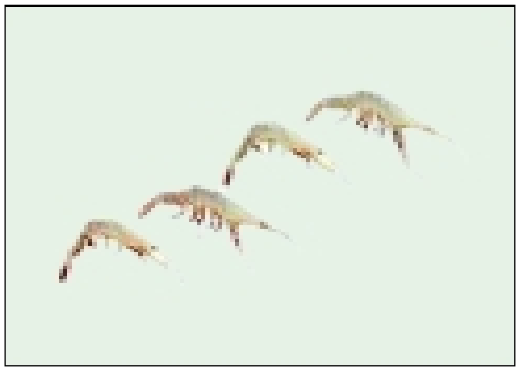
Regionwise contribution (%) (Average for last five years)

| Northeast 3.7 | Southeast 22.8 | Southwest 31.1 | Northwest 42.3 |
|---|---|---|---|

| Major gears used | Trawl net, Dol net, Trammel net |
|---|---|

Note: Landings and yield in thousand tonnes

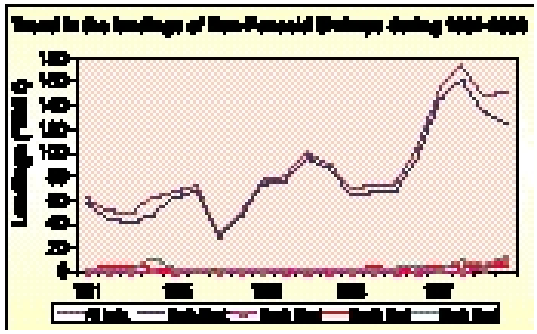
## 24. Non-penaeid Prawns



The most abundant species are Acetes spp., Nematopalaemon tenuipes and Exhippolysmata ensirostris.

Along the northwest coast the fishery has two peaks one during October-November and other during April-May. In the southeast region along the coast of Andhra Pradesh peak landings take place during July-September.

More than 90% of the landings occur in the northwest region, Gujarat recording the higher landings. They also form a fishery in the northeast region along the West Bengal coast and in the southeast region along the coast of Andhra Pradesh.



Since bulk of the landings is from the northwest coast, the production from this region determines the all India trend. There was a significant increase in the landings during the last twenty years reaching an all time high of about 174,000 tonnes in 1998. Since then the landings showed a declining trend.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 58 (3.9) | 62 (3.2) | 82 (3.6) | 146 (5.7) |

| Minimum and maximum landings | 31 (1987) | 174 (1998) |
|---|---|---|

| Potential yield (2000) 139 | Current yield (2001) 145 |
|---|---|

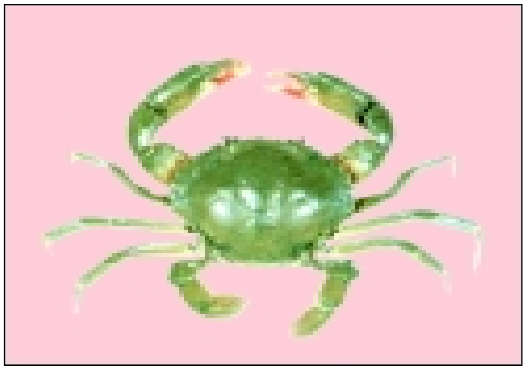
Regionwise contribution (%) (Average for last five years)

| Northeast 4.5 | Southeast 3.1 | Southwest 1.9 | Northwest 90.6 |
|---|---|---|---|

| Major gears used | Trawl net, Dol net |
|---|---|

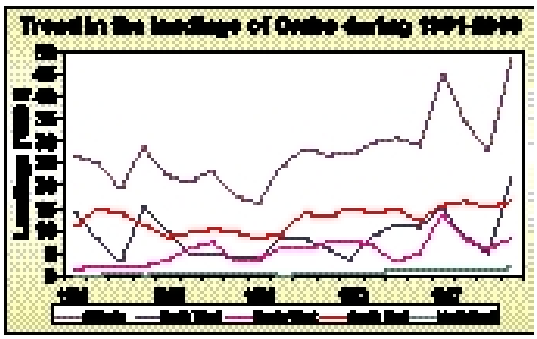
Note: Landings and yield in thousand tonnes

## 25. Crabs



The crab resource landings are supported by multi-species stocks, dominated by Portunus pelagicus and P. sanguinolentus. The other important constituents are Charybdis feriatus C. annulata, Scylla tranquebarica and Podophthalmus vigil.

The trend of landings along the northwest coast exhibits large interannual variation. Along the southeast, the landings exhibited a general increasing trend with indications of levelling off in the recent years.



Regions of northwest, predominantly the Gujarat coast and that of the southeast, mainly off Tamil Nadu, are more productive areas.

Overall there was an increase in the landing during the last two decades and in the recent years the landings showed large interannual variations.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 24 (1.6) | 20 (1.1) | 29 (1.3) | 37 (1.4) |

| Minimum and maximum landings | 16 (1989) | 48 (2000) |
|---|---|---|

| Potential yield (2000) 32 | Current yield (2001) 30 |
|---|---|

Regionwise contribution (%) (Average for last five years)

| Northeast 3.4 | Southeast 41.1 | Southwest 22.1 | Northwest 33.0 |
|---|---|---|---|

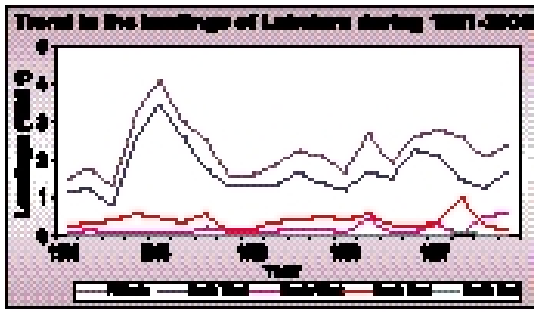
| Major gears used | Trawl net, Bottom-set gill net |
|---|---|

Note: Landings and yield in thousand tonnes

## 26. Lobsters

Out of the nine species of spiny lobsters (Palinuridae) distributed along the coast only four are commercially exploited. Among the eight species of slipper lobsters (Scyllaridae) only one species is reported in the commercial landings. Important species are Panulirus homarus, P.ornatus, P.penicillatus, P.polyphagus, P. versicolor and Puerulus sewelli.

The post monsoon was observed to be the peak period of landing in the northwest and southwest region. Whereas in the southeast region peak landings were reported during the early months of the year.



More than 75% of the landings take place in the northwest region (more so along the Gujarat coast) followed by the southwest coast (especially along Kerala). Bulk of the landings in the east coast is only reported from the southeast region particularly along the Tamil Nadu coast.

Heavy demand and high price for lobsters in the international markets have induced increased exploitation. However, the recent trends in the indicate that there will not be significant increase in the landings from the presently exploited regions.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 2.4 (0.2) | 2.1 (0.1) | 2.1 (0.1) | 2.5 (0.1) |

| Minimum and maximum landings | 1.3 (1983) | 4.1 (1985) |
|---|---|---|

| Potential yield (2000) NA | Current yield (2001) 1.4 |
|---|---|

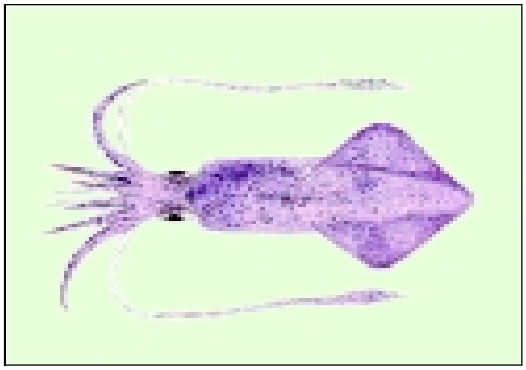
Regionwise contribution (%) (Average for last five years)

| Northeast 1.1 | Southeast 16.3 | Southwest 12.7 | Northwest 69.9 |
|---|---|---|---|

| Major gears used | Trawl net, Bottom-set gill net |
|---|---|

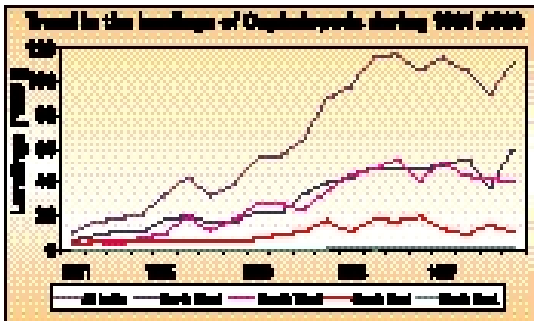
Note: Landings and yield in thousand tonnes

## 27. Cephalopods



The exploited cephalopod resources mainly comprise squids, cuttlefishes and octopods. Among the squids, the neretic Indian squid, Loligo duvauceli formed the bulk of the landings. Among cuttle fishes, Sepia aculeata and S. pharaonis formed the major components of the landings. Among octopus, Octopus membranaceous and O. dollfusi dominated the landings along the west coast.

Peak catch rates of cephalopods along the west coast were observed during premonsoon and postmonsoon periods. Along the east coast the premonsoon and monsoon periods were more productive. More than 80% of the landings of cephalopods take place in the west coast. The northwest region comprising the states of Gujarat and Maharashtra accounted for bulk of the landings.



The recent trends indicate that production had reached asymptotic level in the most productive regions.

Average landings and percentage to the total landings

| Period | 1981-85 | 1986-90 | 1991-95 | 1996-2000 |
|---|---|---|---|---|
| Average and (%) | 19 (1.3) | 45 (2.3) | 97 (4.2) | 106 (4.1) |

| Minimum and maximum landings | 10 (1981) | 117 (1995) |
|---|---|---|

| Potential yield (2000) 101 | Current yield (2001) 101 |
|---|---|

Regionwise contribution (%) (Average for last five years)

| Northeast 0.6 | Southeast 12.1 | Southwest 41.0 | Northwest 46.3 |
|---|---|---|---|

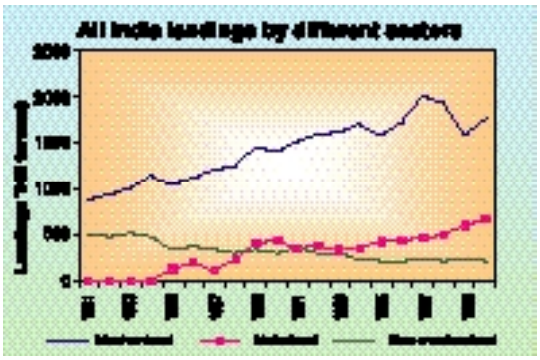
| Major gears used | Trawl net, Hooks & line |
|---|---|

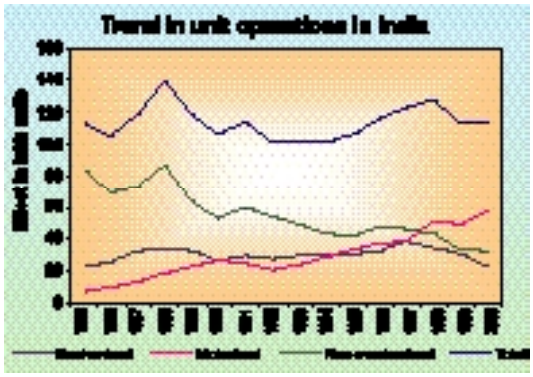
Note: Landings and yield in thousand tonnes

## 28. Sectoral trends

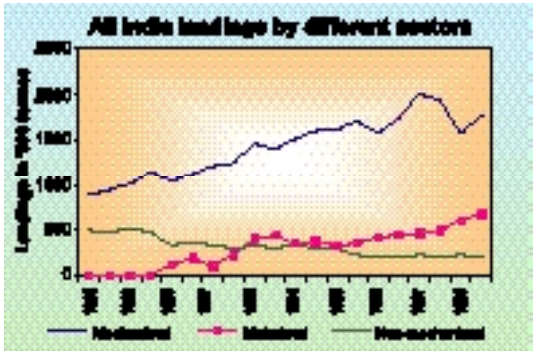
### All India

Among the different gears, drift and set gill nets and bag nets of varied mesh sizes are widely used along the east and west coasts while ring seines, purse seines and mechanised gill nets are confined to the southwest coast. Trawlers upto 11 m OAL are operated along the entire coast, while the second-generation large trawlers (13-17m) are employed from selected harbours along both the coasts. The share of mechanised sector to the total landings increased from 20% in 1969 to 67% during the year 2000. The landings from mechanised sector increased from about 1.8 lakh tonnes in 1969 to 17.9 lakh tonnes in the year 2000. The motorised fishing craft accounted for 25% of the total landings in India. The landings by this sector have increased from about 1.3 lakh tonnes in 1985 to 6.6 lakh tonnes in the year 2000. The unit-operations by the mechanised craft during the last 15 years has been fluctuating around 3.05 million operations annually. However, the unit operations by the motorised sector have significantly increased from about 0.94 million unit operations in 1986 to about 5.52 million in the year 2000. The constancy in the unit operations by the mechanised sector does not however imply that the fishing activity has remained constant over the years. The amount of time expended for actual fishing by this sector has almost doubled during the last 15 years raising from about 17.4 million hours during 1986 to 33.5 million hours during the year 2000. This was mainly due to introduction and increase in voyage fishing activity by this sector in all the maritime states of India. In the motorised sector not only has there been increase in the unit operations but also in the fishing hours from about 3.3 million hours in 1986 to about 23 million hours during the year 2000. Consequent to the growth in these sectors, the purely artisanal sector has gradually been marginalized over the years.





Northeast



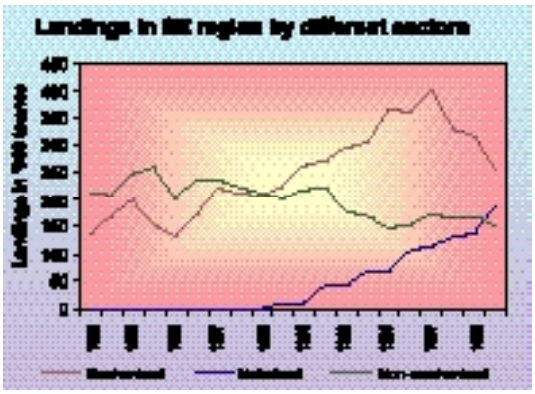
The landings by mechanized units operating the gill net, trawl and bag net account for the bulk of the production followed by the contributions from motorised units that engage gill net and hooks & lines.

The annual landings from mechanized sector in the northeast region have increased from 32,000 tonnes in 1981 to 84,000 tonnes in 2000 with a peak of 1,28,000 tonnes during 1993. The CPU (Catch per Unit) has increased from about 332 kg in 1991 to 558 kg in 2000. The CPH (Catch per Hour) has been fluctuating around 30 kg annually. The landings by the motorised craft (outboard) has increased from 2,000 tonnes in 1989 to about 42,000 tonnes in 2000. The CPU has increased from 24 kg in 1991 to 114 kg in 2000. The CPH during the last five years has been increasing from 7.8 kg in 1996 to 25 kg in 2000, chiefly due to higher catch rates observed in West Bengal.

It was observed that the unit operations of the trawlers in a year had declined from about 1,12,000 during 1993 to about 38,000 during 2000. Similarly, the unit operations of the mechanised gill-netters decreased from 1,18,000 to 68,000 during the same period. However, in tune with increased motorization of indigenous craft, unit operations of motorised boats (operating gill nets) had increased from 10,000 to 2,82,000 in a year.

Southeast

The significant feature of the fishery along the southeast region has been the phenominal increase in the landings by the motorised craft. Landings by gill nets and hooks and lines form the bulk of landings by motorized units. The landings increased from a meagre 600 tonnes in 1989 to 1.64 lakh tonnes in 2000, chiefly through enhanced operations along the Tamil Nadu coast. The CPU has increased from about 43 kg in 1989 to 62 kg in 2000 with a peak of 85 kg in 1992. The CPH has also increased from 7 kg in 1989 to 16 kg in 2000. During the last three years, both the CPU and CPH got more or less stabilized around 60 kg and 16 kg respectively.

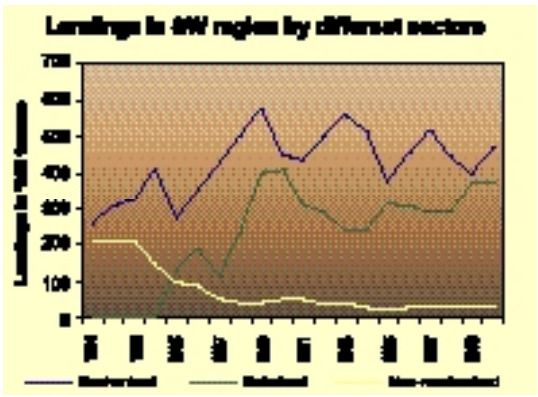


The landings by mechanised craft increased from 1.34 lakh tonnes in 1981 to 2.54 lakh tonnes in 2000 with a peak of 4 lakh tonnes in 1997. More than 90% landings is by the trawlers. In the recent years a decline in the landings was noticed along the Tamil Nadu coast. The CPU during 1992-97 has been around 300 kg annually which has declined to about 260 kg in the recent years. The CPH has, however, been gradually declining from about 36 kg in 1990 to 22 kg in 2000. This declining trend was noticed uniformly along the constituent states of the region.

The unit operations by the trawlers, of Andhra Pradesh varied from 98,000 during the year 1991 to 1,15,000 during 2000, with an annual average of about 1,03,000 unit operations. However, the actual time spent for fishing for unit operations increased from 18 hours during 1991 to 36 hours during 2000. Along the Tamil Nadu coast, the unit operations by the trawlers increased from 4,71,000 in 1991 to 5,18,000 in 2000. The fishing time spent per unit operation increased from 10 to 14 hours during the same period.

Southwest

The catches by trawlers and purse seiners account for bulk of the mechanised landings along the southwest region. The landings have increased from 2.6 lakh tonnes in 1991 to about 4.6 lakh tonnes in 2000 with a peak of 5.8 lakh tonnes in 1989. During the last five years the landings have stabilized. However, along the Kerala coast, a declining trend was observed since 1994. The CPU has been fluctuating between 483 kg to 685 kg during 1991-2000. However, the CPH has been gradually declining from about 114 kg in 1991 to 62 kg in 2000. The catches from the ring seines, gill nets and boat seines form the bulk of landings by motorised craft and more than 95% of the landings take place along the Kerala coast. The CPU had shown a declining trend from about 249 kg in 1992 to 135 kg in 1998 and recovered to 224 kg in 2000 mainly because of

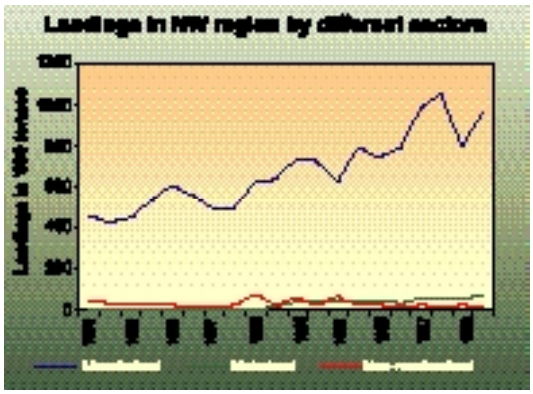


increased pelagic fish landings along the Kerala coast. The CPH also exhibited a similar trend from 62 kg in 1992 to 36 kg in 1998 latter increasing to 68 kg in 2000.

The unit operations by trawlers during the year did not vary significantly during 1991-2000 in Kerala. It fluctuated around an annual average of about 5,61,000, whereas the actual fishing time per unit operation increased from 5 to 10 hours. In Karnataka, the unit operations declined from 20,95,000 during 1991 to 1,39,000 in the year 2000. However, the fishing time spent per unit operation increased from 10 hours to 19 hours during the same period. Regarding the ring seine unit operations, there were no significant inter annual variations in both Kerala and Karnataka and they fluctuated around 239 and 10,000 unit operations respectively. In Kerala, the effort expended by motorised craft employing the gill nets and trawl nets had doubled since 1989, whereas in Karnataka gill net operations by the motorised craft witnessed a four fold increase since 1989.

Northwest

More than 85% of total landings along the northwest region is accounted by the mechanised sector. The catches from trawlers, Dol nets and purse seines (only along Maharashtra coast) form the bulk of the landings. The landings have increased from 4.6 lakh tonnes in 1981 to 9.6 lakh tonnes in 2000 attaining a peak of 10.5 lakh tonnes in 1998. This increase was due to increased landings along the Gujarat coast. Along the Maharashtra coast, the landings have been fluctuating around an annual average of about 3.3. lakh tonnes. The CPU has been fluctuating from 797 kg in 1991 to 1168 kg in 2000. The CPH, however, has been observed to decline from 98 kg in 1992 to 71 kg in 1999.



In Maharashtra the unit operations of dol net per year declined during 1989 to 1994 and since 1995 they were steadily increasing. Similarly the purseseine unit operations had increased from about 8,000 in 1989 to 18,000 in 1998.

In Gujarat, there was no significant variations over the years with respect to dol net operations. The unit operation of motorised craft employing gill nets had been gradually increasing in Gujarat from about 1,80,000 in 1990 to 5,09,000 in 2000. In Maharashtra, the unit operations of trawlers had increased from 1,71,000 to 2,44,000 in 2000 with a peak of 4,81,000 in 1998. However, the actual fishing time per unit operation observed an increase to about 19 hours in 2000 from 16 hours in 1991.