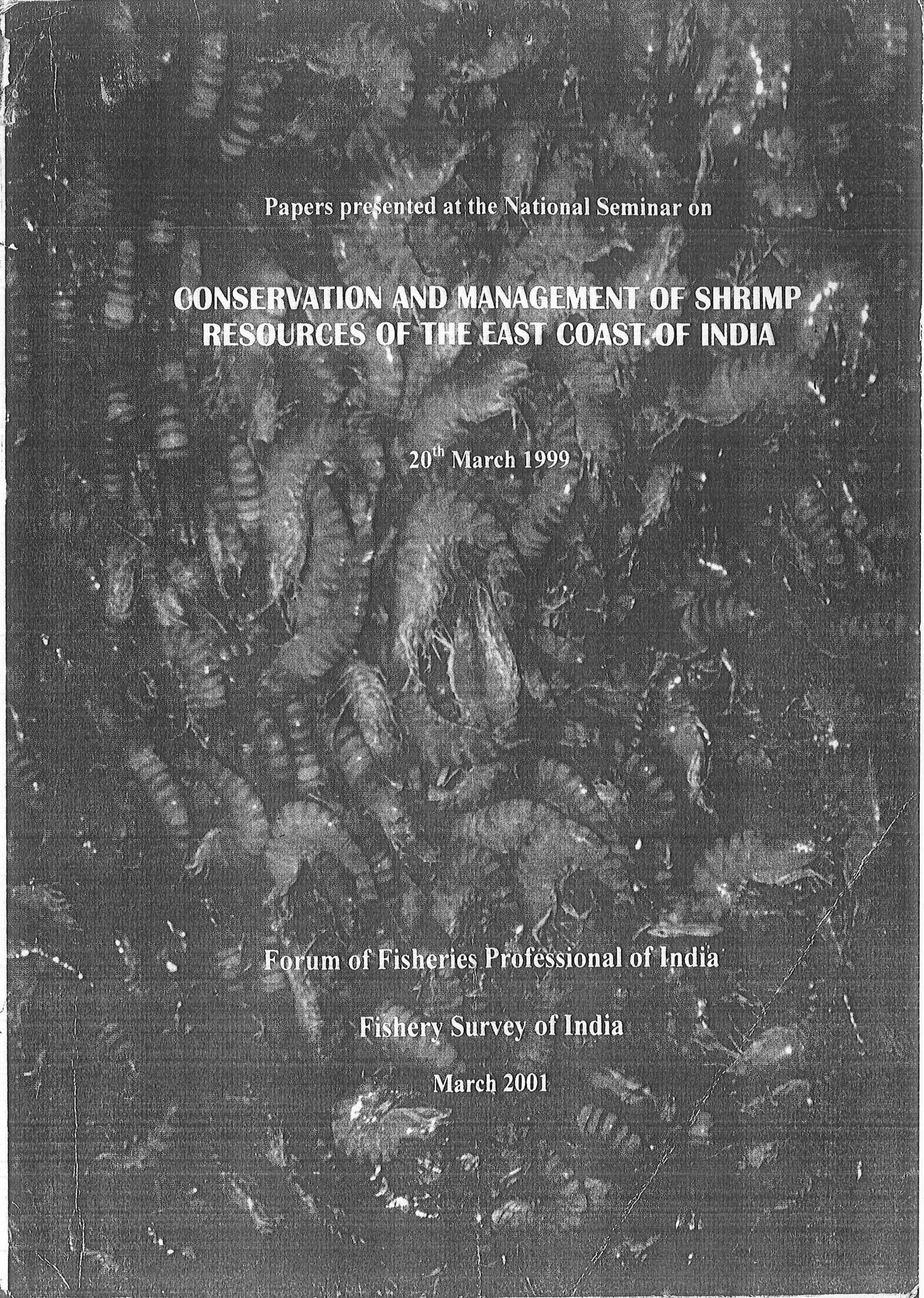

Papers presented at the National Seminar on

CONSERVATION AND MANAGEMENT OF SHRIMP RESOURCES OF THE EAST COAST OF INDIA

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PRESENT STATUS OF EXPLOITATION OF SHRIMP RESOURCE ALONG THE EAST COAST OF INDIA WITH SPECIAL REFERENCE TO KAKINADA COAST

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Introduction

Marine fish production in India increased steadily from a meagre 0.5 million t in 1950 to 2.69 million t in 1997. During 1990's the annual average marine fish production in India was 2.33 million t and out of this Andhra Pradesh contributed 145,848 which formed 6.27%. Andhra Pradesh ranked 6th next to Kerala, Gujarat, Maharashtra, Tamil Nadu and Karnataka. Among the important fishery resources along the Andhra Pradesh coast, penaeid and non-penaeid shrimps constitute 9.2% and 2.7% in the total production. Among the nine coastal districts, East Godavari tops in marine fish production contributing 36.0%. Muthu *et al.*, (1975) and Narasimham *et al.*,(1979) have studied the trawl fishery of the Kakinada coast in detail. Rao (1975, 1979, 1980, 1985, 1987, 1988 a,b,c, 1989, 1990, 1993 and 1994) and Lalitha Devi (1986, 1987 and 1988) have studied the shrimp fishery in general and the biology and stock assessment of the component species of the shrimp resource in detail along the Kakinada coast. No report has been made on the recent developments on the shrimp fishery along the Kakinada coast and the present paper attempts to bring out the present status of the shrimp fishery resource along the East Coast in general and the Kakinada coast in particular.

Database

The data on the state-wise production along the East Coast and district-wise production of penaeid and non-penaeid shrimps in Andhra Pradesh were obtained from the FRA Division, CMFR Institute. The data on the catch and effort by four types of trawlers, shrimp production and species composition were collected by observing the landings at Kakinada Fisheries Harbour 18 days in a month as per the standardised sampling method of the FRA Division, CMFR Institute.

Production from East Coast

Estimated penaeid and non-penaeid shrimp landings by different maritime states along the coast during 1969-'93 are given in Table-1. During 1969-'78 the average annual catch along the East Coast was 20,076 t. Andhra Pradesh landed an average annual catch of 8,600 t followed by Tamil Nadu 7,704 t, West Bengal 3,086 t, Orissa 422 t, Pondicherry 218 t and Andaman & Nicobar Islands 46 t. Penaeid shrimp was the dominant group. Tamil Nadu landed 7,318 t of penaeid shrimps followed by Andhra Pradesh 6,568 t and West Bengal 2,267 t. Whereas, Andhra Pradesh landed more non-penaeid shrimps, (2,032 t.) followed by West Bengal (819 t.) and Tamil Nadu (386 t.). During the subsequent 10-year period, 1979-'88, the average annual catch increased to 30,773t. of this, Tamil Nadu landed 14,263 t followed by Andhra Pradesh (11,082 t.), West Bengal (2,614 t.) and Orissa (2,212 t.). Tamil Nadu landed more penaeid shrimps followed by Andhra Pradesh, Orissa and West Bengal. Andhra Pradesh landed more non-penaeid shrimps followed by West Bengal, Tamil Nadu and Orissa. During the latter 5 year period, 1989-'93, the shrimp landings increased further to an average annual catch of 38,714 t. in which Tamil Nadu landed 19,152 t followed by Andhra Pradesh (12,388 t.), West Bengal (3,674 t.) and Orissa (2,978 t.). Penaeid shrimp landing was also in the same order. However, West Bengal topped in non-penaeid shrimp landings with 1,726 t followed by Andhra Pradesh (1,569 t), Tamil Nadu (225 t.) and Orissa (224 t.). Overall production of shrimps along the East Coast indicates that Tamil Nadu was the leading state with 45% contribution followed by Andhra Pradesh (37%), West Bengal (11%), Orissa (6%), Pondicherry (1%) and Andaman & Nicobar Islands (0.2%). The yield per km of coastline reveals that the shrimp production was good in Tamil Nadu (13 t/km) followed by Andhra Pradesh (11 t/km), Pondicherry (5 t/km), West Bengal (5 t/km), Orissa (3 t/km) and Andaman & Nicobar Islands (0.02 t/km) (Table - 1).

Production along the Andhra coast

District-wise production:

The district-wise catch composition of shrimps in Andhra Pradesh during 1996 is given in Table-2. In the total fish catch of 162,862 t from Andhra Pradesh, the shrimp constituted 19,382 t (11.9%) of which the penaeid shrimp formed 9.2% and non penaeid shrimps formed 2.7%. The district-wise shrimp production reveals that East Godavari topped in landings with 12,862 t (66.4%) followed by Visakhapatnam 2,678 t (13.8%), Nellur 2,012 t (10.4%), Prakasam 823 t (4.2%), Guntur 550 t (2.8%), Krishna 254 t (1.3%), Srikakulam 89 t (0.5%), West Godavari 61 t (0.3%) and Vizianagaram 53 t (0.3%). The non-penaeid landing was good only in East Goadavari district where it constituted 33% of the total shrimp catch and it was moderate in

Prakasam and Srikakulam districts constituting 14.3% and 11.2% respectively. While non-penaeid landings were very poor in Nellore (0.09%) and Visakhapatnam (0.07%) districts, there were no landings in the other districts.

Gear-wise production:

The gear-wise average annual catch composition of penaeid and non-penaeid shrimps in Andhra Pradesh during 1993-'94 is given in Table-3. The penaeid shrimps constituted 90.6% of the total shrimp landings and the balance 9.4% was non-penaeids. Mainly five types of gears, trawl, gillnet, shore seine, boat seine and hooks & lines exploit the shrimp resource along Andhra Pradesh coast. Among them the trawl exploits the shrimp resource more efficiently as out of the total shrimp catch of 17,678 t, the trawls have landed 14,789 t which formed 83.7%. The gillnet was operated by motorised, non-mechanised and outboard vessels and it contributed 8.7% to the total shrimp catch, in which the non-mechanised gillnet alone contributed 7.3%. The rest was contributed by the non-mechanised vessels operating boat seine and gillnet together (4.2%), outboard hooks & lines (0.2%), non-mechanised boat seines (1.6%) and shore seines (1.6%).

Production from Kakinada

Pablo (9.14m):

Estimated average annual landings of penaeid shrimps by Pablo, Royya, Sorrah and Sona type of wooden trawlers along Kakinada coast during the three decades, 1969-'78, 1979-'88 and 1989-'98 are given in Table-4. Total shrimp production by Pablo type trawlers was 314.9 t at a CPUE of 48.8 kg and CPH of 8.3 kg during 1969-'78. This increased to 331.0 t at a CPUE of 68.5 kg and CPH of 10.4 kg during 1979-'88 and then declined to 73.3 t at a CPUE of 52.7 kg and CPH of 8.7 kg during 1989-'98. The effort input by Pablo type trawlers increased from 1969 to reach the peak during the end of 1970's and then continued to decline with minor fluctuations. The average annual catch rates of shrimps during the 3 decades under study reveals that the abundance of shrimp resource increased from 1969-'78 to 1979-'88 and then declined during 1989-'98. Similarly, the average annual catch rates of penaeid and non-penaeid shrimps during 1979-'88 and 1989-'98 also reveals a decline during the latter decade.

Royya (9.75 & 10 m):

Total shrimp catch by these units was 1000.5 t at a CPUE of 71.5 kg and CPH of 10.1 kg during 1969-'78. This increased to 2,960.4 t at the increased CPUE of 82.0 kg and CPH of 10.7 kg during 1979-'88 and then declined to 2,050.5 t at the higher CPUE of 97.1 kg and lower CPH of 9.0 kg when compared to the previous decade. Both

penaeid and non penaeid shrimps exhibited a decline in the catch due to decline in the abundance of these groups during 1989-'98. The catch per unit effort does not seem to reflect the true abundance of shrimp resource along the Kakinada coast as these units shifted to voyage fishing in later years during 1989-'98. Whereas, the Pablo type of boats being small could not switch to voyage fishing for want of storage facilities for ice and salt and owing to their shorter period of endurance.

Sorrah (11.41 m):

The average annual shrimp production by these units was 334.7 t at a CPUE of 76.1 kg and CPH of 10.1 kg during 1969-'78. This increased to 419.0 t at a CPUE of 101.6 kg and CPH of 12.1 kg during 1979-'88 and further increased to reach 1,428.0 t during 1989-'98 at a higher CPUE of 146.3 kg and lower CPH of 9.5 kg. The true picture of the abundance of shrimp resource in the trawling grounds of Sorrah type trawlers can be seen from the data on the catch per hour. In spite of the decline in the abundance of both penaeid and non-penaeid shrimps the catch has increased during 1989-'98 owing to the adoption of voyage fishing and higher effort input by the Sorrah type trawlers. Hence, the catch per unit effort has continued to increase though there was a continued decline in the catch per hour. This shows that the shrimp resource is under higher fishing pressure off Kakinada coast.

Sona (13.1 m):

The Sona type trawlers introduced in 1988 have landed an average annual catch of 2925 t at a CPUE of 207.9 kg and CPH of 9.9 kg during 1988-'98. The penaeid shrimp production was 2,364.8 t at a CPUE of 168.1 kg and CPH of 8.0 kg and that of non-penaeid shrimp was 560.2 t at a CPUE of 39.8 kg and CPH of 1.9 kg (Table-4). The penaeid shrimp production by Sona type trawlers increased continuously from 1988 due to increased effort input and there was very little variation in the abundance of penaeid shrimps during 1988-'98 as indicated by the CPUE and CPH. However, the non-penaeid production increased due to higher effort input and better abundance. As indicated by the CPH, it increased from 0.1 kg in 1988 to attain a peak of 6.3 kg in 1992 and it fluctuated between 0.7 kg in 1995 and 3.0 kg in 1998.

The increasing trend in the catch per unit by all the four types of boats is mainly due to the influence of voyage fishing and consequently the total shrimp production also continued to increase year after year, with minor fluctuations as shown in Table-4. The detailed scrutiny of the data on the catch per unit and catch per hour by all the four types of trawlers reveals that the average annual catch per unit by all the units except the Pablo type continued to increase progressively during the subsequent three decades (Table-4). Whereas, the average annual catch per trawling hour shows an increase in the catch rate during 1978-'89, which declined in the subsequent decade. The

continued increase in the total catch and CPUE in the following decades is mainly due to the voyage fishing undertaken by all the units except the Pablo type. The Pablo type boats undertake mostly daily fishing for want of larger fish hold for storing ice and salt. The other three types of boats usually undertake voyage fishing of duration varying from 2 to 4 days by Royya, 4 to 9 days by Sorrah and 10 to 15 days by Sona. Therefore, the catch per hour is considered as more reliable measure of the abundance than the catch per unit along the Kakinada coast.

Species composition:

The penaeid shrimp fishery along the Kakinada coast is supported by many species belonging to the genera *Metapenaeus, Penaeus, Solenocera, Parapenaeopsis, Metapenaeopsis* and *Trachypenaeus.* The annual landings of penaeid shrimp are given in Table-5. for the period from 1993-'94 to 1998-'99. An estimated average annual catch of 6941 t of penaeid shrimps was landed during 1993-'99. *M. dobsoni* was the most dominant species constituting 2111 t (30.4%) followed by *M. monoceros* 1749 t (25.2%), *S. crassicornis* 603 t (8.7%), *M. brevicornis* 463 t (6.7%), *P. stylifera* 436 t (6.3%), *P. hardwickii* 225 t (3.2%), *M. affinis* 211 t (3.0%), *P. indicus* 175 t (2.5%), *P. monodon* 159 t (2.3%), *P. semisulcatus* 94 t (1.4%). Other species such as *Penaeus merguiensis, M. lysianassa, P. japonicus, P. longipus, P. sculptilis, P. cornuta, P. uncta, S. hextii, P. acclivirostris, Metapeneaopsis stridulans, M. toloensis, Trachypenaeus curvirostris, T. sedli* and *Atepopenaeus stenodactylus etc* formed the rest of the catch.

Estimated species composition of non-penaeid shrimp landings at Kakinada during 1993-'99 is given in Table-6. Total non penaeid landing fluctuated from 815 t during 1993-'94 to 3009 t during 1998-'99 with an average annual catch of 1817 t during the six year period. More than four species constituted the non-penaeid shrimp fishery at Kakinada in which *Nematopalaemon tenuipes* was the dominant species forming 850 t (47%) followed by *Acetes spp.* 493 t (27%), *Exhyppolismata ensirostris* 240 t (13%), *Paparapandalus longicauda* 46 t (3%). *Exopalaemon styliferus, Macrobrachium malcomsoni* and other species comprised the balance 10%.

Stock assessment

Stock assessment of the shrimp resource was attempted as per Schaefer (1954) model from the catch and catch rate data for the period 1969-'98. Reliable estimate of the stock could not be obtained as the regression of the data did not yield any dependable relation between the effort and the CPUE/CPH..

Discussion

Present study shows that over the years the shrimp fishery exhibited a continued increase due to perpetual increase in the effort input. However, the catch rate of different fishing fleet indicate that the abundance of shrimp resource increased initially during 1960's and 1970's to attain a peak during 1980's and then declined during 1990's. This suggests that the exploitation of shrimp resources along Kakinada has crossed the optimum production level and has now entered into over-exploitation phase. The declining CPH, reduction in the size composition and share of most of the commercially important species, high operational cost and a resultant low profit prompts an immediate action to regulate the trawl fishery along the Andhra Pradesh coast, not only to optimise the production but also to improve the quality of the catch. Rao (1988) estimated the MSY and the corresponding effort for commercially most important species like *M. dobsoni* to be 1084 t with 9,12,142 hrs, *M. monoceros* 361t with 4,46,035 hrs, *P. indicus* 142t with 4,33,878 hrs and for *P. monodon* 112t with 2,93,550 hr. The MSY for total penaeid shrimps was estimated to be 2,589 t with the corresponding effort of 5,72,899 trawling hours.

During 1979-'88 the average annual shrimp landing was 3,710.4 t with an effort expenditure of 3,42,020 trawling hours and during 1989-'98 it was 6,476.9 t with an effort input of 6,81,814 trawling hours. The MSY reported by Rao (1988) has been exceeded during 1978-'89 itself with much lower effort input than that of the F_{msy} given by Rao (1988). This may be attributed to the fact that the estimates of Rao (1988) pertains to a limited area around Kakinada during 1969-'78, whereas the landings during the latter years are from a wider area including those from Orissa and West Bengal. Though the overall production of penaeid shrimp increased, the catch rate by different types of trawl units exhibited a declining trend. This suggests that the present yield has crossed the MSY level and now entered into declining phase warranting an immediate introduction of regulatory measures for responsible exploitation of the resource.

Continued increase in the fishing pressure has resulted in a subtle change in the catch composition of different species. Studies by Muthu *et al.*, (1975), Rao (1988) and the present study reveal that over the last three decades a considerable reduction in the composition of major penaeid species and a subsequent increase in the composition of minor species. For example, *M. dobsoni* has declined substantially from 39% in 1967-'78 to 30.4% during 1993-'99 and the tiger shrimp *P. monodon* declined from 6% in 1967-'78 to 2.3% during 1993-'99. *M. affinis* which formed the bulk of the penaeid shrimp fishery (27.9%) during 1967-'70 has gradually declined to 8.1% during 1988 and further declined to 3% during 1993-'99. *M. brevicornis* also declined from 9.1% in 1967-'78 to 6.7% during 1993-'99 and *P. indicus* declined from 6.5% to 2.5%. However, some species have exhibited an increasing trend in the catch. *M. monoceros* has increased from 16.4% to 25.2%, *P. stylifera* from 3.1% to 6.3%, *P. hardwickii*

from 1.7% to 3.2% and *S. crassicornis* from 3.2% to 8.7%. Some species, which were recorded under other penaeids due to their meagre occurrence, have attained prominence due to increase in the landings. *M. stridulans, M. toloensis, P. semisulcatus, T. curvirostris* and *T. sedli* are the few species, which gained importance due to better contribution to the fishery. In general, over the years the contribution by penaeid shrimps to the shrimp fishery increased from 72.7% during 1967-'78 period (Rao,1988) to 79.3% during 1993-'99 and the contribution of non-penaeids declined from 27.3% to 20.7% . This is due to the increase in the penaeid production by the emergence of few species from the deep water. This may be owing to the expansion of the fishing ground by bigger vessels like Sorrah and Sona, which undertake voyage fishing for longer duration of time and cover wider fishing area. The continued increase in shrimp landings during the last three decades and the emergence of new fisheries of a few species like *S. crassicornis,* and *P. longipes* may appear to be encouraging. But the economy of the shrimp fishery continued to deteriorate in the latter years, as bulk of the catch was constituted by commercially less important species.

Most of the shrimps attain maturity at the age of 6-8 months and spawn throughout the year, with peak spawning activity varying from place to place and species to species (Pillai *et al.*, 1993). *P. indicus* is reported to breed during February-May and October-November in the southeast coast and February-March, May-June and November-December in northeast coast. Peak spawning activity of *P. monodon* along north east coast is during October-January and March-April. *P. merguiensis* breeds most actively during October-January on the north east coast (Pillai *et al.*,1993). Rao (1989) reported the spawning period of *M. monoceros* to be January-October with peak during January-August, along the Kakinada coast and the fecundity of this species to vary between 0.05-0.42 million whereas, Lalitha Devi (1988) observed this species to spawn throughout the year and the recruitment to be continuous. Many commercially important species like *P. indicus, P. monodon, P. semisulcatus* and *P. merguiensis* etc., have a very high fecundity ranging from 0.05 to 1.9 million (Pillai *et.al.*,1993).

The high fecundity, prolonged spawning season, more frequent spawning with short inter-spawning period and continuous recruitment clearly indicate that the shrimp fishery is not suffering due to recruitment over-fishing, but it is exposed to growth over-fishing. There are only two options to regulate the growth over-fishing i.e., either to reduce the effort or to increase the cod end mesh size of the trawls. The mesh size regulation is more complicated than the effort regulation owing to its involvement of higher expenditure on establishment etc., The other alternative available is to regulate the effort. Since the reduction in the number of units from the present strength is not possible due to various reasons like economic, social, political etc., at least introduction of new fishing units can be restricted and replacement of old obsolete units may be regulated strictly under scrutiny. Further, it is very sensible and highly practicable to introduce a closed fishing season, which will not only ease the fishing

pressure, but also serve as breathing period for the biological revival of the resources in the region.

Since the shrimp fishery is exposed to growth over-fishing, it is advisable to ban fishing during May-July, when most of the species spawn. The recruits will grow to attain the harvestable size when the fishing season starts anew after the closed season. The post-larvae of most of the penaeid shrimps enter backwaters of adjacent estuaries, as these areas happen to be their nursery grounds. Therefore, the ban on fishing should strictly be extended to the backwaters also to improve the recruitment into the fishery. The effect of the closed fishing season on the revival of the shrimp fishery may be studied in detail and based on the results, further regulatory measures may be drawn for the ensuing years.

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Table-1.

State-wise estimated penaeid and non-penaeid landings (in tonnes) on the East Coast of India during 1969-1993.

Period	1969-1978			1979-1988			1989-1993					
Maritime States	Penaeid Shrimp	N.penaeid Shrimp	Total catch	Penaeid Shrimp	N.penaeid Shrimp	Total catch	Penaeid Shrimp	N.penaeid Shrimp	Total catch	%	Coastline (km)	Yield / km (t)
West Bengal	2267	819	3086	500	2114	2614	1948	1726	3674	11	650	5
Orissa	409	13	422	2097	115	2212	2754	224	2978	6	480	3
Andhra Pradesh	6568	2032	8600	8413	2669	11082	10819	1569	12388	37	974	11
Tamil Nadu	7318	386	7704	13715	548	14262	18927	225	19152	45	973	13
Pondicherry	209	9	218	500	33	533	511	11	523	1	75	5
Anadman & Nicobar	46	0	46	68	1	68	0	0	0	0	2000	0
East Coast Total	16818	3259	20076	25293	5480	30771	34959	3755	38715			

Table-2.

District-wise catch composition (in tonnes) of shrimps in coastal districts of Andhra Pradesh during 1996.

SPECIES	DISTRICTS										
	Srikakulam	Vizianagaram	Visakhapatnam	East Godavary	West Godavary	Krishna	Guntur	Prakasam	Nellur	Total	Percentage
Penaeid Shrimps	79	53	2676	8613	61	254	550	705	2010	12193	9.2
Non-penaeid Shrimps	10	0	2	4249	0	0	0	118	2	4369	2.7
Total	89	53	2678	12862	61	254	550	823	2012	19382	
Perncentage		0.3	13.8	66.4	0.3	1.3	2.8	4.2	10.4		

Table-3.

Gear-wise average annual catch composition (in tonnes) of shrimps in Andhra Pradesh during 1993-94.

	GEARS								
SPECIES	**MTN**	**MGN**	**OBGN**	**OBHL**	**NMGN**	**NMBS**	**NMSS**	**NBSGN**	**TOTAL**
Penaeid Shrimps	13398	42	206	38	1239	275	78	747	16022
Non-penaeid Shrimps	1391	0	0	0	52	13	199	1	1656
Total	14789	42	206	38	1291	288	277	748	17678
Perncentage	83.7	0.2	1.2	0.2	7.3	1.6	1.6	4.2	

Table -4.
Estimated average annual catch (t), cpue (kg) and cph (kg) of shrimps landed by Pablo, Royya, Sorrah and Sona type trawlers at Kakinada during the three decades from 1969-98.

Type of Boat	Decade	Units	Hours	PS	CPUE	CPH	NPS	CPUE	CPH	Total Catch	CPUE	CPH	Total Fish Catch	CPUE	CPH
PABLO 9.14 M	1969-1978	6451	37750	314.9	48.8	8.3	0.0	0.0	0.0	314.9	48.8	8.3	1125.5	174.5	29.8
	1979-1988	4834	31844	254.3	52.6	8.0	76.7	15.9	2.4	331.1	68.5	10.4	1241.0	256.7	39.0
	1989–1998	1391	8455	60.0	43.1	7.1	13.4	9.6	1.6	73.4	52.7	8.7	226.7	163.0	26.8
ROYYA 9.57-10.0 M	1969-1978	13991	99040	1000.5	71.5	10.1	0.0	0.0	0.0	1000.5	71.5	10.1	4072.5	291.1	41.1
	1979-1988	36114	275563	2370.0	65.6	8.6	590.4	16.3	2.1	2960.4	82.0	10.7	12230.6	338.7	44.4
	1989-1998	21123	228887	1682.9	79.7	7.4	367.5	17.4	1.6	2050.5	97.1	9.0	7512.9	355.7	32.8
SORRAH 11.4 M	1969-1978	4395	32981	334.6	76.1	10.1	0.0	0.0	0.0	334.7	76.1	10.1	1438.6	327.3	43.6
	1979-1988	4124	34614	344.9	83.6	10.0	74.2	18.0	2.1	419.0	101.6	12.1	1841.2	446.5	53.2
	1989-1998	9762	150043	1140.3	116.8	7.6	287.8	29.5	1.9	1428.1	146.3	9.5	5360.8	549.2	35.7
SONA 13.14 M	1988-1998	14068	294429	2364.8	168.1	8.0	560.2	39.8	1.9	2925.1	207.9	9.9	10715.2	761.7	36.4

Table-5.

Estimated species composition of penaeid shrimp landing at Kakinada during 1993-'99.

Species	1993-'94	1994-'95	1995-'96	1996-'97	1997-'98	1998-'99	Average	Percentage
M. monoceros	1288	1433	1971	1373	1816	2613	1749	25.2
M. dobsoni	1334	2113	1816	2558	2125	2719	2111	30.4
M. affinis	189	253	249	199	173	202	211	3.0
M. brevicornis	365	672	393	353	387	606	463	6.7
M. lysianassa	61	136	50	38	80	56	70	1.0
P. indicus	180	159	194	154	178	187	175	2.5
P. monodon	74	533	118	93	72	66	159	2.3
P. semisulcatus	134	189	90	29	78	45	94	1.4
P. merguiensis	53	92	63	59	41	20	54	0.8
P. japonicus	39	56	33	24	29	17	33	0.5
P. stylifera	310	608	395	319	583	400	436	6.3
P. hardwickii	261	201	166	168	307	246	225	3.2
S. crassicornis	719	627	835	551	466	418	603	8.7
P. longipes	95	83	88	87	140	76	95	1.4
P. cornuta	134	92	53	36	87	39	74	1.1
Metapenaeopsis spp	191	193	272	177	40	54	154	2.2
Trachypenaeus spp	8	49	85	46	57	49	49	0.7
Other penaeids	160	217	103	94	393	146	185	2.7
TOTAL	**5595**	**7706**	**6974**	**6358**	**7052**	**7959**	**6941**	

Table-6.

Estimated species composition of Non- penaeid shrimp landing at Kakinad during 1993-'99

Species	1993-'94	1994-'95	1995-'96	1996-'97	1997-'98	1998-'99	Average	Percentage
A. indicus	296	450	370	198	424	1219	493	27
E. ensirostris	167	217	186	229	222	416	240	13
N. tenuipes	201	959	332	1380	1016	1209	850	47
P. longicauda	0	120	2	35	121	0	46	3
Other Non-Penaeids	151	202	67	109	441	164	189	10
Total	815	1948	957	1951	2224	3008	1818	