

SEAWEED RESOURCES OFF TAMIL NADU COAST : SECTOR II. ALANTHALI - MANAPAD AND VEMBAR - NALLATHANNI THIVU

P.V. Subba Rao, K. Rama Rao, T.K. Mal and K. Subbaramaiah
CSMCRI - Marine Algal Research Station, Mandapam - 623 518, Tamil Nadu
N. Kaliaperumal, S. Kalimuthu, K. Muniandi, J.R. Ramalingam & V.S.K. Chennubhotla *
Regional Centre of Central Marine Fisheries Research Institute
Marine Fisheries - 623 520, Tamil Nadu

Abstract

The Seaweed resources survey in the deepwater of Tamil Nadu coast was done in the area between Alanthali and Manapad and between Vembar and Nallathanni Thivu (lat. 8° 57' - 9° 4'N & 8° 27'N and long. 78° 35'E & 78° 6' - 78° - 14'E) during March - April 1988. During this survey, in all 76 species of marine algae were recorded of which 11 species belonged to Chlorophyta, 14 to Phaeophyta and 51 to Rhodophyta 3 species of sea grasses namely *Cymedoco rotunda*, *Halophila evalis* and *H. stipulaco* were also encountered. The estimates for the dominant species (in tons) were: *Codium tomentosum* 8090; *Halimeda macroloba* 3800; *Spatoglossum asperum* 9290; *Dictyota maximam* 750; *Halymenia venusta* 2530; *H. dilatata* 3550; *H. florosa* 3440; *Amphiroa anastromosans* 1130; *Agardhiella robusta* 980; *Solieria robusta* 2430; *Scinaia bongalica* 1250; *Gracilaria textorii* 630; *Hypnea musciformis* 980; *H. esperi* 580; of these, *Gracilaria* spp, and *Hypnea* spp could be exploited for the indigenous production of agar and carrageenan respectively by the seaweed based industries.

A comparison of the vegetation with the that recorded in the I sector — of Tuticorin and Tiruchendur and the III sector — Valinokkam - Kilakkarai and Manapad - Kanyakumari revealed the following features; The standing crop biomass wet in II sector recorded 42,100 tons with 26% productive area and biomass density of 95 tons/km² were found to be higher (I sector 9,100 tons; 19% 14 tons/km²; III sector 6,000 tons; 30 tons/km²).

In the species composition also, II sector recorded maximum number of species 76 (58 in I sector and 33 in III sector). In distribution the following 14 species were common to all the 3 sectors; *Halimeda macroloba*, *Dictyota maxima*, *D. dichotoma*, *Padina pavonica*, *Spatoglossum asperum*, *Scinaia bongalica*, *Halymenia florosa*, *H. venusta*, *Gracilaria textorii*, *Sarcodia indica*, *Solieria robusta*, *Hypnea musciformis*, *H. valentiae* and *Haloplogma, duperreyi*. and the following 15 species showed restricted distribution in the II sector only; *Enteromorpha compressa*, *Zonaria variegata*, *Sargassum plagiophyllum*, *Amphiroa anastromosans*, *Jania adhaerens*, *Halymenia dilatata*, *H. porphyroides*, *Halimonia* sp *Gracilaria millardetii*, *G. dura*, *Agardhiella rebusta*, *Champia compressa*, *C. parvula*, *Spyridia filamentosa* and *Chodria hypnoides*.

Introduction

The seaweeds are used for the production of polysaccharides such as agar, algin, carrageenan and they are harvested from intertidal regions along the southeast shores of India. The resource potential from intertidal regions was estimated (Anon 1978). To meet the demand of the raw material

* Present address: Research Centre of CMFRI, Minicoy - 682 5559; Union Territory of Lakshadweep.

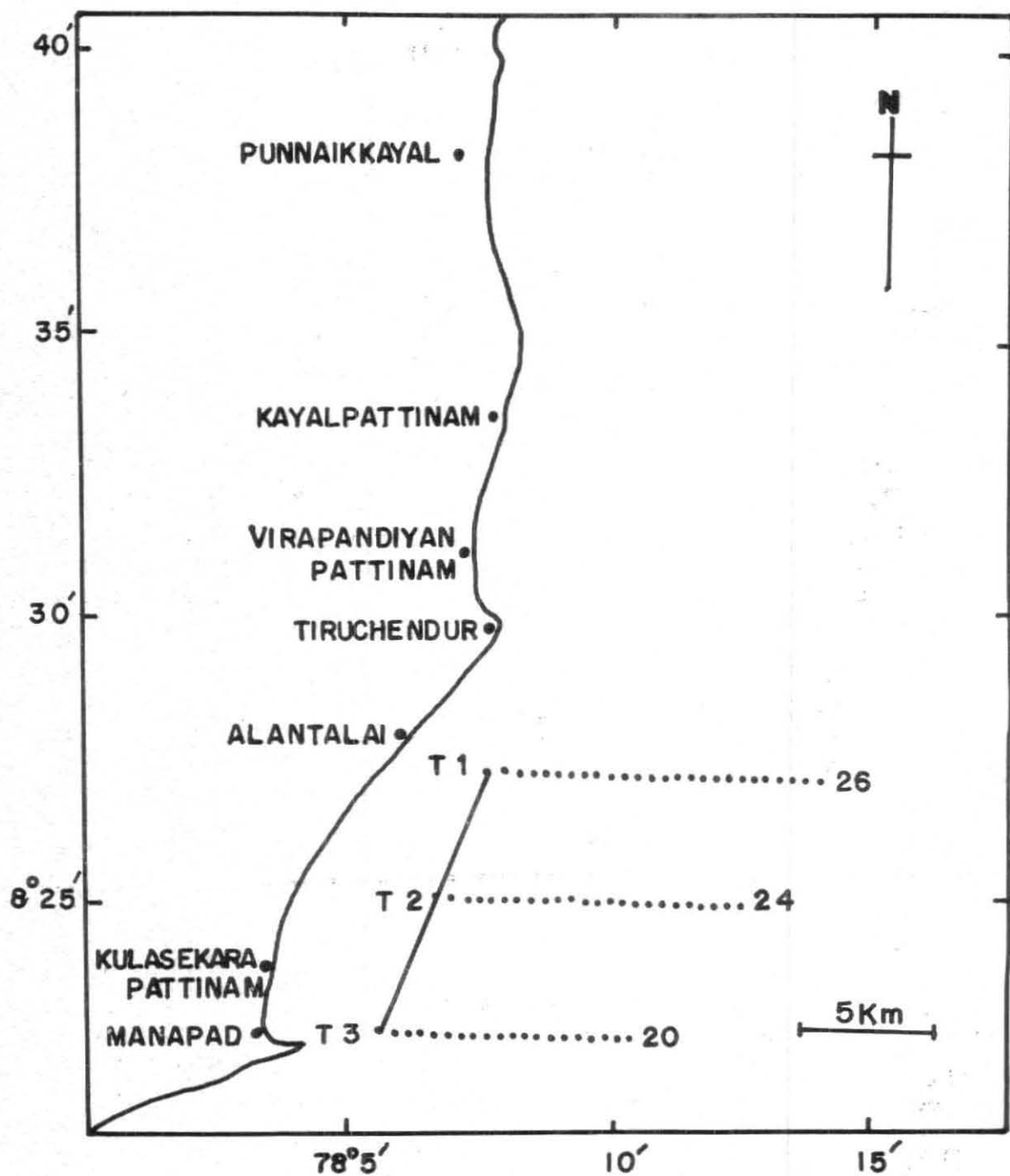


Fig. 1. Map showing the location of transects and stations surveyed in the southern zone from Alantalai to Manapad.

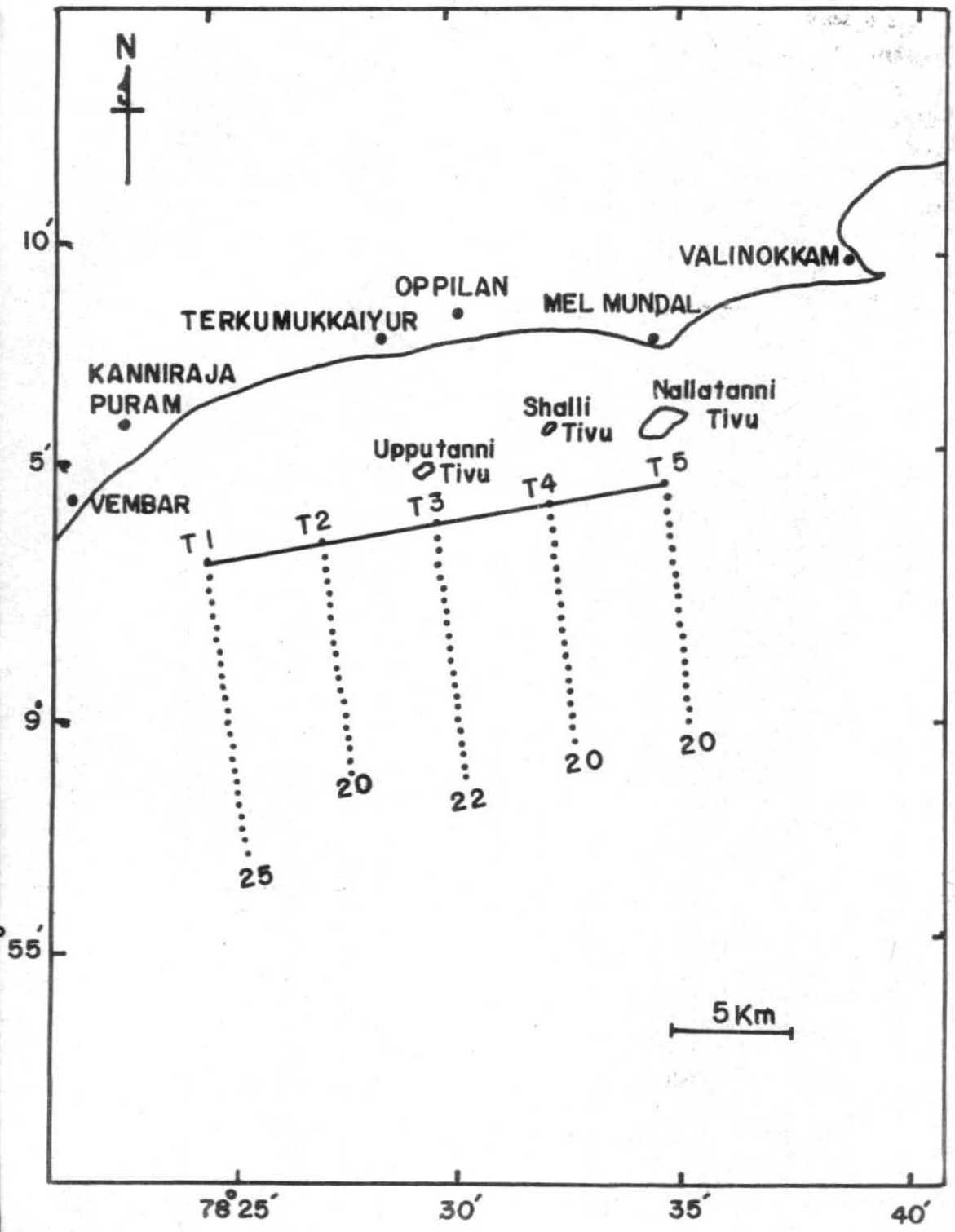


Fig. 2. Map showing the location of transects and stations surveyed in the northern zone from Vembar to Nallatanni Tivu.

for the growing industries, it has become necessary to explore the underwater beds. Earlier qualitative surveys of seaweeds representing deeper waters off Tuticorin were conducted (Varma 1960; Mahadevan and Nagappan Nayar, 1967). New under a collaborative project, CSMCRI & CMFRI have surveyed the deeper waters to locate the seaweeds and assess their quantities, from eastern shores of India i.e. from Kanyakumari to Rameswaram. For convenience the coast is divided into four sectors, viz sector I : Tuticorin - Tiruchedur, sector II: Alanthalai - Manad and Vembar - Nallathanni Thivu; Sector III; Valinokkam - Kilakkarai and Manapad - Kanyakumari and sector: IV Kilakkarai - Rameswaram. And the resource estimates of the first three sectors have already been published as reports, (Anon 1988; 1989; 1990). In this paper the resources estimated in the II sector; Alanthalai - Manapad and Vembar - Nallathanni Thivu are presented.

Methods

The survey in the area between Alanthalai and Manapad (lat. $8^{\circ} 57' - 9^{\circ} 4'N$ and long. $78^{\circ}35' E$) and between Vembar and Nallathanni Thivu (lat. $8^{\circ} 27'N$ and long. $78^{\circ} 6' - 78^{\circ} 14'E$) was done during March - April 1988. The area between Alanthalai and Manapad was divided into 3 transects whereas the area between Vembar and Nallathanni Thivu into 5 transects at 5 km intervals, horizontal to the shore (Fig 1 & 2). The seaweeds were collected by 'Scuba' diving from one square metre area along each transect at 500 m intervals. The number of sampling stations varied from 20 to 26 in the Alanthalai - Manapad region (Southern zone) with the depth ranging from 10.0 to 19.5m, while in the Vembar - Nallathanni Thivu (Northern zone) the same varied from 20 to 25 stations with the depth ranging from 6.0 to 20.0m. The seaweed samples were sorted out specieswise and the fresh weight of each species determined. They were later preserved as herbarium and liquid specimens.

Taking the area on all sides of the sampling stations into consideration the biomass for 2.5 sq. k.m. area was computed. The estimates of all the sampling stations was added to give the total standing crop in the area supporting the seaweed growth. In the same manner the specieswise resource estimates and the area covered by them were obtained. The estimates for the species were given only when the biomass measured 5g (wet)/m² and above.

Results

The substratum consisted of either sand, silt, rocks and rocks covered with mud or coral stones. The seaweeds generally occurred on the rocky/ coral substratum. In the Alanthalai - Manapad region, the total area surveyed was 175km². Of 70 stations sampled in the 3 transects only 22 stations supported vegetation. In all 22 general and 28 species of algae were recorded of which 3 genera and 4 species belong to Chlorophyta, 5 genera and 5 species to Phaeophyta and 14 genera and 19 species to Rhodophyta. The standing crop of 16 species (those of 5 g and above per m²) measured 128112.5 tons. (Table 1). Estimates for the following 6 species were above 500 tons (wet): *Spatoglossum asperum* 5140; *Halymenia venusta* 1690, *Solieria robusta* 1580, *Sciniaia bongalica* 1250; *Codium tomentosum* 1030; and *Dictyota maxima* 750. Only one species of sea grass *Halophila stipulacos* was recorded in the surveyed area.

In Vembar - Nallathanni Thivu region, the total area surveyed was 268 km². of the 107 sampling stations surveyed only 24 were found to support the seaweed growth. In all 20 genera and 27 species of algae were recorded of which 3 genera and 3 species belonged to Chlorophyta, 4 genera and 5 species to Phaeophyta, and 13 genera and 19 species to Rhodophyta. The total standing crop of 19

Table - 1 Standing crop of Seaweeds off Alanthalai - Manapad

S.No.	Seaweed	Transect number and wet weight (tons)			Total (tons)
		1	2	3	
	<i>Green Algae</i>				
1.	<i>Codium tomentosum</i>	1025.0	-	-	1025.0
	<i>Brown Algae</i>				
2.	<i>Ectocarpus irrogularis</i>	25.0	25.0	-	50.0
3.	<i>Dictyota maxima</i>	750.0	-	-	750.0
4.	<i>Padina pavonica</i>	75.0	-	-	750.0
5.	<i>Spatoglossum asperum</i>	3525.0	612.5	1000.0	5137.5
6.	<i>Sargassum tonorrimum</i>	250.0	-	-	250.0
	<i>Red Algae</i>				
7.	<i>Scinaia bengalica</i>	1150.0	100.00	-	1250.0
8.	<i>Chondrococcus hornomanii</i>	12.5	-	-	12.5
9.	<i>Halymenia florosa</i>	-	-	475.0	475.0
10.	<i>H. Prophyroides</i>	-	-	225.0	225.0
11.	<i>H. vonusta</i>	850.0	837.5	-	1687.5
12.	<i>Gracilaria millardetii</i>	-	-	75.0	75.0
13.	<i>Agardhiella rebusta</i>	-	125.0	-	125.0
14.	<i>Solieria robusta</i>	550.0	150.0	875.0	1575.0
15.	<i>Chondria hypnoides</i>	25.0	-	25.0	
16.	<i>Polysiphonia tuticorinensis</i>	-	75.0	-	75.0
	Total	8212.5	1950.0	2650.0	12812.5

species (those of 5 g and above per m²) was found to be 29337.5 tons (Table 2). Estimates for the following 12 species exceeded 500 tons (wet): *Codium tomentosum* 7060; *Spatoglossum asperum* 4150; *Halimeda maculosa* 3800; *Halymenia dilatata* 3550; *H. florosa* 3440; *H. venusta* 840; *Amphiroa anastromorans* 1130; *Agardhiella robusta* 980; *Hypnea musciformis* 980; *Solieria rebusta* 850; *Gracilaria taxtorii* 630 and *Hypnea osperi* 580. There species of sea grasses, viz *Cymodocea rotunda*, *Halophila ovalis* and *H. stipulacea* were encountered in the region.

Discussion

In this sector II, the seaweeds were inhibited on the coral and rocky substratum as observed in the I sector survey (tuticorin - Tiruchandur) (Anon 1989) and III sector survey (Valinokkam - Kilakkarai and Manapad - Kayakumari) (Anon 1990). The present survey has revealed the greater biomass of deepwater algal vegetation as compared to the already reported intertidal algal resources. In the intertidal survey 17 and 10 algal species in Alanthalai - Manapad and Vembar - Nallathanni Thivu respectively were recorded, whereas in the present deepwater survey the respective number of algal species extended to 28 and 27. Further deepwater algal vegetation is found to be distinct in species composition from the respective intertidal flora, except *Spatoglossum asperum* (Alanthalai - Manapad), *Sargassum plagiphyllum* and *Hypnea musciformis* (Vembar - Nallathanni Thivu) (Anon 1978).

The II sector recorded 42,100 tons (wet) standing crop with 26% productive area and a biomass density of 95 tons/km² (in Southern zone Alanthalai - Manapad, the standing crop 12,800 tons, with 31% productive area and the biomass density 73 tons/km² and in Northern zone Vembar - Nallathanni Thivu, the standing crop 29,300 tons, with 22% productive area the biomass density 109 tons/km²). In comparison I sector (Tuticorin - Tiruchandur) exhibited a standing crop of 9,100 tons with 19%

Table - 2 Standing crop of Seaweeds off Vember - Nallathanni Thivu

S.No.	Seaweeds	Transoct number and					Total (tons)
		wet weight (tons)					
		1	2	3	4	5	
<i>Green Algae</i>							
1.	<i>Codium tomentosum</i>	5100.0	1450.0	350.0	162.5	-	7062.5
2.	<i>Halimeda macroloba</i>	1512.5	300.0	562.5	1400.0	25.0	3800.0
<i>Brown Algae</i>							
3.	<i>Spatoglossum asperum</i>	750.0	2375.0	925.0	100.0	-	4150.0
4.	<i>Zonaria variegata</i>	-	-	-	12.5	-	12.5
<i>Red Algae</i>							
5.	<i>Amphiroa anastromosans</i>	-	125.0	175.0	825.0	-	1125.0
6.	<i>Cryptenamia coriacea</i>	-	-	125.0	-	-	125.0
7.	<i>Halymenia dilatata</i>	875.0	125.0	2275.0	225.0	50.0	3550.0
8.	<i>H. floresia</i>	2725.0	325.0	362.5	25.0	-	3437.5
9.	<i>H. perphyroides</i>	325.0	-	-	-	-	325.0
10.	<i>H. venusta</i>	837.5	-	-	-	-	837.5
11.	<i>Halymenia sp</i>	-	187.5	-	-	-	187.5
12.	<i>Gracilaria dura</i>	175.0	-	-	-	-	175.0
13.	<i>G. textorii</i>	-	-	625.0	-	-	625.0
14.	<i>Sarcodia indica</i>	-	-	175.0	-	-	175.0
15.	<i>Agardhiella robusta</i>	-	975.0	-	-	-	975.0
16.	<i>Silieria robusta</i>	850.0	-	-	-	-	850.0
17.	<i>Hypnea esperi</i>	-	-	575.0	-	-	575.0
18.	<i>H. musciformis</i>	875.0	-	100.0	-	-	975.0
19.	<i>Haleplegma duperreyi</i>	100.0	37.5	25.0	212.5	-	375.0
Total		14125.0	5900.0	6275.0	2962.5	75.0	29337.5

productive area and 14 tons/km² biomass density (in the Southern zone Tuticorin - Tiruchandur, the standing crop 7063 tons with 23% productive area and 21 tons/km² biomass density and in the Northern zone Tuticorin Kattapadu the standing crop 2037.5 tons with 16% productive area and 6.4 tons/km² biomass density) (Anon, 1989), while III sector (Valinokkam - Kilakkarai and Manapad - Kanyakumari) revealed a standing crop of 6,000 tons with 14% productive area and 30 ton/km² biomass density which was found in Northern zone (Valinokkam - Kilakkarai) only. The Southern zone (Manapad - Kanyakumari) was devoid of vegetation and hence this area sampled was not considered for calculating productive area and biomass density for the III sector exhibited higher biomass and biomass density together with productive area.

Of the total number of 76 algal species found in both regions, 26 species were common. In species composition also, II sector recorded maximum number of species 76, when compared to I sector (58) and III sector (33). 14 species were found commonly distributed in all the 3 sectors; *Halimeda macroloba*; *Dictyota maxima*, *D. dichotoma*, *Padina pavonica*, *Spatoglossum asperum*, *Scinaia bengalica*, *Halymenia florosa*, *H. venusta*, *Gracilaria textorii*, *Sarcodia indica*, *Solieria rebusta*, *Hypnea musciformis*, *H. valentiae* and *Halopegma duperreyi*. However 15 species showed restricted distribution, only in II sector; *Enteromorpha compressa*, *Zonaria variegata*, *Sargassum plagiophyllum*, *Amphiroa anastomosans*, *Halymenia* sp. *Gracilaria millardetii*, *G. dura*, *Agardhiella robusta*, *Champia compressa*, *C. parvula*, *Spiridia filamentosus* and *Chondria hypnoides*.

In the final analysis from the seaweed resources of the II sector *Gracilaria* spp. and *Hypnea* spp could be exploited for the indigenous production of agar and carrageenan respectively by the seaweed based industries.

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