IV. SEAWEEDS

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Seaweeds belong to a group of plants called Marine Algae. These can be divided into two main groups : (1) Attached plants, the larger fixed plants growing on the continental shelf (2) Miscroscopic floating forms called phytoplankton. There is another group which are the dead remains of the above groups called detritus.

Uses of Seaweeds : These can be divided into 5 groups (1) Chemicals (2) Food (3) Agar (4) Fish food (5) Plankton in relation to fisheries.

(1) *Chemicals :* Brown Seaweeds are used in the manufacture of bromine, iodine, sodium sulphate, potassium sulphate, formic acid, acetic acid, methylated spirits and acetone. The most important seaweed product prepared commercially today is alginic acid and its calcium and sodium salts and these are used in a great variety of goods. Alginates have a wide variety of uses as cosmetics, pharmaceuticals, thickening and stablising agents in the manufacture of processed foods. Beryllium alginate and calcium alginate are used for the manufacture of artificial silk.. Brown seaweed is also used as a source of mannitol and as a substitute in the manufacture of explosives.

(?) *Food :* Algae are used as food in most countries like Japan, China, Philippines and Hawaii. *Ulva* species, known as green laver or sea lettuce, is eaten as a salad in most countries. Other kinds of green algae, like *Caulerpa* and *Codium*, are used for preparing pickles. Brown seaweeds like *Laminaria* are used as food and for preparing a kind of tea in Japan. Many types of food are prepared from it.

The most important red seaweed used as food in Japan is *Porphyra* commonly called laver. It is a delicacy in Japan and about 500,000 people are engaged in culturing these seaweeds in bays. The other popular red seaweed is *Gracilaria* sp. and *Chondrus crispus.*

(3) *Agar :* This is manufactured from certain red seaweeds. In Ceylon the most suitable seaweeds are *Gracilaria confervoides* and *Gracilaria lichenoides.* Agar is a jelly like extract and is used in the preparation of delicacies like sweets, jellies, ice cream, and in canning fish to prevent the soft parts from being broken up. It is also used extensively in the preparation of media for growth of bacteria.

(4) *Fish Food :* The blue green algae play an important part in fish culture. The algae live on organic substances found in polluted waters. Their natural habitat is water foul with organic matter. One of the most important fish of the tropical Pacific is a large fish called milk fish (*Chanos chanos*) which is silvery in colour. These marine fish when kept in captivity in ponds feed on certain algae. The fry of milk fish collected from the sea are transferred into ponds containing a species of a blue green alga *Lyngbya*. This is filamentous, delicate, and slender, enclosed in a gelatinous sheath. They form the diet of this fish for three months. After three months they are transferred to ponds containing green algae, species of *Cladophora* and *Chaetomorpha*, which are much coarser than *Lyngbya*. Arter a further perid of two to three months they are transferred into ponds containing another ribbon like or tubular green alga, species of *Enteromorpha*, on which they feed until they are harvested.

(5) *Plankton :* Phytoplankton plays an important role in fisheries. A few examples are given below :—

Prediction of Mackerel fishery : The mackerel feed on copepods which in turn feed on phytoplankton. In England, for example, when there is plenty of sunshine in February, there is an abundance of phytoplankton in March and April thus producing food for copepods which in turn form the food of mackerel. Thus the quantity of mackerel is caught in abundance in May. If sunshine is poor in February very little phytoplankton is produced in March and April and the quantity of mackerel caught is small.

Red tide : The constituent organisms in the red tide vary with circumstances. Blue green algae, diatoms and dinoflagellates are significant factors causing red tide. Red tide is a menace to oyster culture. The dinoflagellates get entangled by viscous slime secreted from the gill of the oyster. These plankton choke up the gill causing difficulty for the oyster to breath. The damage can be rectified by removing the oysters from the area of the red tide or destroying the red tide by scattering copper sulphate in the water.

Departmental Work

(1) *General Survey :* In 1952 the Ministry of Fisheries and Industries became interested in the study of seaweeds. Accordingly I was instructed to carry out a survey of the seaweed beds and seaweed resources of the Ceylon coast. The above investigations were divided into three stages :—

(*a*) Systematic identification of all marine algae.

(*b*) Regional distribution of all marine algae.

(*c*) Sorting of varieties which are of commercial value.

For the purpose of this work the coast of Ceylon was divided into 8 sections :—

(1) Jaffna coast and lagoon.

(2) Jaffna islands and the surrounding seas.

(3) Palk bay between Punari and Vidateltivu.

(4) Region between Mannar and Kalpitiya.

(5) Puttalam lagoon.

(6) Region between Kalpitiya and Ambalangoda.

(7) Region between Ambalangoda and Hambantota.

(8) East Coast.

This work was confined to the littoral region from shore land to a distance of 50 feet. All the different types of algae were collected right round the coast of Ceylon. These were identified and along with their regional distribution were published in Bulletins Nos. 10 and 15.

(2) *Red seaweed survey :* During the survey it was observed that there were two commercially important red seaweeds called *Gracilaria confervoides* and *Gracilaria lichenoides*. These varieties ase commonly known as Ceylon moss. I carried out a survey of these varieties as there was a good

market for this commodity in Japan. The survey revealed that *Gracilaria lichenoides* was found in large quantities in Puttalam lagoon, Silavathurai and Mannar, while *Gracilaria confervoides* was found in abundance in Koddiyar Bay at Trincomalee. *Gracilaria confervoides* contained about 30–40% yield of agar, comparing favourably with Japan's grade I agar. *Gracilaria lichenoides* contained about 20–25% agar comparing favourably with Japan's grade II agar. The results of the survey were published in the Ceylon Trade Journal in 1954.

Samples were sent out by local traders to foreign companies. The result was very encouraging. By the end of 1961 a hitherto neglected industry was developed and *Gracilaria confervoides* was exported to Japan at prices ranging from 70 to 100 pounds sterling per metric ton C & F, bringing a subsidiary income to the poor fishermen of the area and some foreign exchange to Ceylon.

The export trade fell in 1963 due to unscruplous traders exporting bad quality seaweeds mixed with sand, shells, and other impurities. I feel that it is now time to set up a small plant for the manufacture of China moss (Agar) in Ceylon and that this should be done by the Corporation along with the ice plants. Ceylon will be able to produce enough China moss to meet the local demands and the rest could be exported.

(3) *Brown Seaweeds :* A survey of the brown seaweeds, *Sargassum*, was carried out from Ambalangoda to Hambantota. The survey showed that there were 4 species of *Sargassum* along this coast and a total of 130 tons of dried *Sagassum* could be harvested. Survey of *Sargassum* beds along the other coasts is being continued.

(4) *Phytoplankton Productivity :* One of the most important aspects of Fisheries is the determination of the primary productivity of waters around our coasts. This is now being carried out by me in the inshore waters and in Parakrama Samudra at Polonnaruwa.