SEAWEEDS AND THEIR IMPORTANCE

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INTRODUCTION

Seaweeds are abundant along the coastline of India where rocky or coral formations occur. This sort of substratum is found in the states of Tamil Nadu and Gujarat and in the vicinity of Mumbai, Ratnagiri, Goa, Karwar, Vizhinjam, Varkala, Visakhapatnam, Chilka lake, Pulicat lake and in the Lakshadweep and Andaman and Nicobar Islands. The seaweeds are classified into three important groups namely, green, brown and red. Seaweeds contain proteins, vitamins, minerals and trace elements and are also a rich source of iodine. As they are a cheap source of minerals and trace elements, products prepared from them can be utilized as supplement to the rations of cattle, poultry and other farm animals. From time immemorial seaweeds have been used as manure in the coastal areas. As the minerals and trace elements occur in water soluble form, they are readily absorbed by plants when applied as manure. Deficiency diseases are also controlled by the minerals and trace elements present in them. Seaweeds rich in iodine such as *Asparagopsis taxiformis* and *Sarconema* sp. can be used for controlling goitre disease caused by deficiency in iodine. Marine algae have all the essential aminoacids needed for the human diet. They also yield most important products such as agar-agar and algin.

NEED FOR SEAWEED CULTURE

The seaweed resources in our coastal waters are inadequate to meet the enormous demand for agar and algin production. There are several factories manufacturing agar-agar and algin in places like Madurai, Tiruchirapalli, Ahmedabad, Baroda and Hyderabad and as a result there is great demand for the raw material. Hence there is an urgent need to take up seaweed culture on commercial scale.

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CULTURE OF SEAWEEDS

Since 1972, the Central Marine Fishereis Research Institute (CMFRI) is engaged in the cultivation of several economically important seaweeds. The method of cultivation of *Gracilaria edulis*, a fast growing species with minimum seed material has been standardized. These culture experiments have been done by introducing the fragments of the seed material in the twists of the 12 mm thick coir ropes which are fabricated in the form of 5 x 2 meter size nets and these coir nets are tied to wooden poles fixed in the coastal waters. The plants reach harvestable size after a period of 60 days. The yield from a coir net is approximately 30 kg in the coastal waters of peninsular India while the experiments conducted in Minicoy lagoon (Lakshadweep) using long line coir ropes with coral blocks as anchors gave 31 fold increase in 71 days.

The difference between coir net method and coir rope method is that the net gives a very good support to the growing plants and it also lasts for three harvests while the latter is not so durable as it is at the mercy of the waves, tides and wind. However, the long line rope culture method is suitable for bays and protected areas as it brings down the operational cost. Expenses for fabrication of the nets and the cost of poles for fixing the nets can be saved.

USES OF AGAR-AGAR AND ALGIN

Agar agar and algin serve as stabilizers, emulsifiers, thickeners, and gelling agents. Agar agar is often used where firm gel is needed and algin for soft and viscous products.

In the ice cream indusry, both agar and algin are used as stabilizing agents. The seaweed colloids are used in the canning industry as coating materials, in the preparation of dental impression materials and agricultural sprays.

Agar is used in smoking tobacco and cakes as moisture retaining agent, in confectionary industry, in drawing tungsten wire as a lubricant, in hectograph duplicators and in photofilm and plates. It is also widely used as microbiological culture medium, therapeutic agent and as a coating material for capsules.

Algin is used for sizing textiles and paper, thickening textile paints and for boiler water treatment. This is the most useful colloidal carbohydrate in cosmetic industry. It is also used in the preparation of tablets and pills as granulating and binding agents, in rubber industry as a creaming agent to separate the rubber, in the manufacture of lignite briquettes, in liquor clarification, in varnishes, paints, adhesives, leather polishing materials etc. Sodium alginate and other salts are used in the manufacture of seaweed rayon. Alginic acid and its salts are used as blood anticoagulants also.

TRANSFER OF TECHNOLOGY

The method of cultivation of *Gracilaria edulis* on coir rope nets was demonstrated to

the fish farmers of Mandapam and nearby coastal villagers by the CMFRI. This technology was transferred to them under the Lab-to-Land programme of the Institute. They were also given training in the post-harvest technology. The CMFRI also conducts short term training course every year on seaweed culture and utilization under its Trainer's Training Centre to the interested parties.

PROSPECTS

There is vast scope for starting large scale culture of seaweeds (*Gracilaria edulis* and others) in India, based on the know-how developed by CMFRI. Exotic species such as *Eucheuma* could be introduced and propagated in Indian waters so that it will also help in augmenting seaweed production. The coastal areas of Palk Bay and Gulf of Mannar near Mandapam, lagoons in Gulf of Mannar Islands, and the bays and creeks along the east and west coasts are potential areas for seaweed culture. Commercial scale cultivation of seaweeds could be undertaken in these areas by availing the financial assistance from banks and other funding agencies connected with rural development programmes. Seaweed culture besides augmenting the supply of raw materials, will provide vast employment opportunities to the coastal people.

ECONOMICS

The economics of culture of *Gracilaria edulis* by rope net culture method in an area of 1 ha. are given below. About 700 rope nets can be put up in 1 ha with an investment of Rs.1,04,600/-. Four harvests can be made during a year. A total of 21 tonnes (dry weight) of *G.edulis* could be harvested in the four harvests which will fetch Rs.1,26,000/- yeilding a net profit of Rs.21,400/-.

Economics of *Gracilaria edulis* culture in 1 ha. :

Recurring expenditure for 4 Crops

1.	Cost of seed material of *G.edulis* for 7000 kg. @Rs.4/- kg.	Rs.28,000/-
2.	Cost of coir nets of (700 nos) 5x2m size including fabrication charges (700xRs.50 = 35,000)	Rs.35,000/-
3.	Cost of casuarina poles of 1.5m height 1260 nos. @ Rs.10/-per pole	Rs.12,600/-
4.	Wages for labourers @ Rs.25/- per day for 3 persons including watch and ward duty (360 days Rs.75/-)	Rs.27,000/-
5.	Miscellaneous expenditure	Rs.2,000/-
		Rs.1,04,600/-

Income

Production rate of 3 kg/m2 for one ha/700 nets/harvest	21 tonnes
yield in 4 harvests (in fresh weight in a year)	84 tonnes
In terms of dy weight (75% moisture)	21 tonnes
Present market rate of dry *G.edulis*	Rs.6,000/t
Expected income	Rs.1,26,000
Expenditure for 4 harvests	Rs.1,04,600
Net profit for 4 crops	Rs.21,400