

# Mariculture

March 1, 2019

## Manifest Pedagogy

As India is the second most populous country, it suffers from hunger and hidden hunger. Mariculture and edible seaweeds act as an alternative source of energy. Mariculture is an interdisciplinary topic which can be asked in Environmental Geography, Economics and Energy Resources. This can be a probable question in both prelims and mains.

## In news

Research in the area of edible seaweeds in India

## Placing it in the syllabus

Issues of food security, Science and Technology- developments and their applications and effects in everyday life.

## Static dimensions

- What is Mariculture?
- Impact of Mariculture
- Advantages

## Current dimensions

- Edible seaweed as an alternative food source

## Content

### What is Mariculture?

Mariculture is a specialized branch of aquaculture involving the cultivation of marine organisms for food and other

products in the open ocean, an enclosed section of the ocean, or in tanks, ponds or raceways which are filled with seawater. An example of the latter is the farming of marine fish, including finfish and shellfish like prawns, or oysters and seaweed in saltwater ponds.

**Non-food products produced by mariculture include** fish meal, nutrient agar, jewelry (e.g. cultured pearls), and cosmetics.

## **Seaweed as an alternative food source**

### **Need**

About 37% of the area of the entire world is agricultural land, a third of which (about 11%) is used for crops. And as the population of the world rises to 9.7 billion people in 30 years, the land available for crops will reduce. Thus, there is an immediate need to try and improve the efficiency of food production. Experts predict that agricultural yield must increase by 50% between now and 2050. How to do this is the question facing agricultural scientists across the world.

It is in this context that we need to open our minds and expand our ideas about our food habits. The most efficient use of photosynthesis is actually not by land plants but by micro and macroalgae, such as seaweeds. These are the champions, contributing to about 50% of all photosynthesis in the world. And many of them, notably those with dark green, red and brown colour, are edible.

They are low-calorie and nutrient-dense food items and **eaten by people in most parts of Southeast Asia – Philippines, Malaysia, Vietnam, Indonesia, China, Korea and Japan, and also in some in the coastal Atlantic region.**

### **Applicability to India**

#### **Background**

About 844 seaweed species are reported from India, a country

with a coast line of 7,500 km. Peninsular India from Gujarat all way to Odisha and West Bengal has a coastline of 5,200 km, and Andaman and Nicobar together have a coastline of 2,500 km. Thus, while we have 63% of our land area for crop agriculture, we should not forget this vast coastal area, much of which breeds seaweeds.

Research in the area of edible seaweeds in India has been going on for over 40 years. The Central Salt and Marine Chemicals Research Institute (CSMCRI) at Bhavnagar, Gujarat has done pioneering work in the area.

### **Advantages of seaweeds**

1. Seaweeds are rich sources of vitamins A and C, and minerals such as Ca, Mg, Zn, Se and Fe.
2. They also have a high level of vegetable proteins and omega 3 and 6 fatty acids.
3. Best of all, they are vegetarian, indeed vegan, and do not have any fishy smell, thus good and acceptable.
4. Further, it does not require pesticides, fertilizers and water for irrigation, which is an added advantage.

### **Impact of mariculture**

Mariculture has rapidly expanded over the last two decades due to new technology, improvements in formulated feeds, greater biological understanding of farmed species, increased water quality within closed farm systems, greater demand for seafood products, site expansion and government interest.

As a consequence, mariculture has been subject to some controversy regarding its social and environmental impacts. Commonly identified environmental impacts from marine farms are:

1. Wastes from cage cultures.
2. Farm escapees and invasives.
3. Genetic pollution and disease and parasite transfer.

#### 4. Habitat modification.

As with most farming practices, the degree of environmental impact depends on the size of the farm, the cultured species, stock density, type of feed, hydrography of the site, and husbandry methods.

#### **Sustainability of Mariculture**

Mariculture development must be sustained by basic and applied research and development in major fields such as nutrition, genetics, system management, product handling, and socioeconomics. One approach is closed systems that have no direct interaction with the local environment. However, investment and operational cost are currently significantly higher than open cages, limiting them to their current role as hatcheries.

#### **Benefits of Mariculture**

- Sustainable mariculture promises economic and environmental benefits.
- Economies of scale imply that ranching can produce fish at lower cost than industrial fishing, leading to better human diets and the gradual elimination of unsustainable fisheries.
- Maricultured fish are also perceived to be of higher quality than fish raised in ponds or tanks, and offer more diverse choice of species.
- Consistent supply and quality control has enabled integration in food market channels.