Seaweed farming

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Seaweed farming is the practice of cultivating and harvesting seaweed. In its simplest form, it consists of the management of naturally found batches. In its most advanced form, it consists of fully controlling the life cycle of the algae. The main food species grown by aquaculture in Japan, China and Korea include *Gelidium*, *Pterocladia*,[1] *Porphyra*,[2] and *Laminaria*.[3] Seaweed farming has frequently been developed as an alternative to improve economic conditions and to reduce fishing pressure and over exploited fisheries. Seaweeds have been harvested throughout the world as a food source as well as an export commodity for production of agar and carrageenan products.[4]

A seaweed farmer in Nusa Lembongan (Indonesia) gathers edible seaweed that has grown on a rope.

Contents

History

Cultivation of *gim* (laver) in Korea is reported in the books from 15th century, such as *Revised and Augmented Survey of the Geography of Korea* and *Geography of Gyeongsang Province*.[5][6]

Seaweed farming began in Japan as early as 1670 in Tokyo Bay.[2] In autumn of each year, farmers would throw bamboo branches into shallow, muddy water, where the spores of the seaweed would collect. A few weeks later these branches would be moved to a river estuary. The nutrients from the river would help the seaweed to grow.[2]

In the 1940s, the Japanese improved this method by placing nets of synthetic material tied to bamboo poles. This effectively doubled the production.[2] A cheaper variant of this method is called the *hibi* method — simple ropes stretched between bamboo poles.

In the early 1970s there was a recognized demand for seaweed and seaweed products, outstripping supply, and cultivation was viewed as the best means to increase productions.[7]

Culture methods

The earliest seaweed farming guides in the Philippines recommended cultivation of *Laminaria* seaweed and reef flats at approximately one metre's depth at low tide. They also recommended cutting off sea grasses and removing sea urchins prior to farm construction. Seedlings are then tied to monofilament lines and strung

between mangrove stakes pounded into the substrate. This off-bottom method is still one of the major methods used today.[8]

There are new long-line cultivation methods that can be used in deeper water approximately 7 metres in depth. They use floating cultivation lines anchored to the bottom and are the primary methods used in the villages of North Sulawesi, Indonesia.[9][10]

Cultivation of seaweed in Asia is a relatively low-technology business with a high labour requirement. There have been many attempts in various countries to introduce high technology to cultivate detached plants growth in tanks on land in order to reduce labour, but they have yet to attain commercial viability.[8]

Environmental and ecological impacts

Several environmental problems can result from seaweed farming. Sometimes seaweed farmers cut down mangroves to use as stakes for their ropes. This, however, negatively affects the farming since it reduces the water quality and mangrove biodiversity due to depletion. Farmers may also sometimes remove eelgrass from their farming areas. This, however, is also discouraged, as it adversely affects water quality.[11]

Seaweed farming helps to preserve coral reefs,[12] by increasing diversity where the algae and seaweed have been introduced and it also provides added niche for local species of fish and invertebrates. Farming may be beneficial by increasing the production of herbivorous fishes and shellfish in the area.[4] Pollnac & et al 1997b reported an increase in Siginid population after the start of extensive farming of eucheuma seaweed in villages in North Sulawesi, Indonesia.[10]

Seaweed culture can also be used to capture, absorb, and eventually incorporate excessive nutrients into living tissue. "Nutrient bioextraction" is the preferred term for bioremediation involving cultured plants and animals. Nutrient bioextraction (also called bioharvesting) is the practice of farming and harvesting shellfish and seaweed for the purpose of removing nitrogen and other nutrients from natural water bodies.[13] (See main article Nutrient pollution.)

Seaweed farming can be an actor in biological carbon sequestration.

Societal impact

The practice of seaweed farming has long since spread beyond Japan. In 1997 it was estimated that 40,000 people in the Philippines made their living through seaweed farming.[12] Cultivation is also common in all of southeast Asia, Canada, Great Britain, Spain, and the United States.[1]

Harvesting seaweed inNorth Cape (Canada)

Socioeconomic aspects

In Japan alone annual production value of nori amounts to US$2 billion and is one of the world's most valuable crops produced by aquaculture. The high demand in seaweed production provides plentiful opportunities and work for the local community. In a study conducted by the Philippines it showed that plots of approximately one hectare can have a net income from eucheuma farming that was 5 to 6 times that of the minimum average wage of an agriculture worker. In the same study they also saw an increase in seaweed exports from 675 metric tons (MT) in 1967 to 13,191 MT in 1980, which doubled to 28,000 MT by 1988.[14]

See also

- Algaculture
- Aquaculture of giant kelp
- Edible seaweed
- Seaweed cultivator

References

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3. Borgese 1980, p. 116.
4. Ask 1999, p. 52.
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8. Crawford 2002, p. 2.
9. Pollnac & et al 1997a, p. 67.
10. Pollnac & et al 1997b, p. 79.
11. Zertruche-Gonzalez 1997, p. 53.
12. Zertruche-Gonzalez 1997, p. 54.
13. NOAA. "Nutrient Bioextraction Overview" (http://longislandsoundstudy.net/issues-actions/water-quality/nutrient-bioextraction-overview/?doing_wp_cron=1369944259.2313320636749267578125). Long Island Sound Study.
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