



PEGASUS

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The technical document "PEGASUS" i.e. **Phycomorph European Guidelines for a Sustainable Aquaculture of Seaweeds**, highlights the current state of European seaweed production and pinpoints challenges for the development and proposes recommendations for short-term and long-term improvements at different levels of the chain.

- **Phycomorph** is a network of international academic laboratories each addressing one or several issues related to **macroalgal development**. The dynamics of the network is based on regular meetings and student exchanges in order to share both recent progress and experience in technical skills preparing guidelines for **sustainable seaweed aquaculture in Europe**.

The main aim of PHYCOMORPH is to unify a scattered European research landscape to enable a step-change in the basic knowledge of macroalgal reproduction and development.

- **Macroalgae (seaweeds)** are multicellular organisms living mainly in marine or freshwater (a few live almost permanently out of water).
 - **Seaweed** is plant-like organisms, playing a key ecological role in coastal ecosystems. It is a promising **bioresource** for the future and the demand for high-value seaweed-derived compounds (cosmetics, food) is growing across the world.
 - Like plants, they **use light to fix atmospheric carbon dissolved in water**. Macroalgae are amongst the **most powerful carbon-fixing organisms** on earth. Their size ranges from a few millimetres up to 50 metres.

Importance of aquaculture of Seaweeds

- **Food security:** By 2050, the edible bioresource biomass will have to satisfy the 9 billion people predicted to live on the planet.
 - Seaweed aquaculture can help to address global challenges related to nutrition, health and sustainable circular bio-economy.
 - Domestication of the oceans is widely regarded as a possible solution to increase

food and could be one of the next most important developments in human history.

- **Environment protection:** It will support food web, coastal protection of erosion, bioremediation by removal of possible pollutants like nitrogen or phosphate and CO₂ sequestration.
- **Pharmaceutical and medical applications:**
 - Antibacterial and antifungal activity of various macroalgae has been demonstrated.
 - It contains some promising compounds in the field of curing cancer. It shows a potent cytotoxic activity (inhibition of cell growth and multiplication) against human cancer cell lines.
 - It could be potentially useful as therapeutic agents against Adult T-cell leukaemia (ATL).
 - It can be used as an anti-oxidant and anti-inflammatory agent.
- **Renewable energy source:** Algal biofuels dispose of quite some benefits compared to fuels of terrestrial origin, such as a higher energy content; a fast growth and the fact that they complement terrestrial biofuels instead of competing with it.
- **Cosmetics products:** Because of the lipids they contain which can be used to produce oils, these are an excellent choice for the preparation of cosmetic products.
- **Job creation:** The algal industry is able to create a wide variety of jobs ranging from research to engineering, from constructing to farming and from marketing to financial services.

Seaweed production in India

According to a report from the **Central Marine Fisheries Research Institute (CMFRI)**, only 30 million tonnes of seaweeds, valuing €8 billion, are being harvested every year.

- In India, seaweeds grow abundantly along the Tamil Nadu and Gujarat coasts and around Lakshadweep and the Andaman and Nicobar islands.
- Of the nearly 700 species of marine algae found in both inter-tidal and deepwater regions of the Indian coast, about 60 species are commercially important.

Aquaculture is breeding, raising, and harvesting fish, shellfish, and aquatic plants. Basically, it's farming in water. It is an environmentally responsible source of food and commercial products, helps to create healthier habitats, and is used to rebuild stocks of threatened or endangered species.

Central Marine Fisheries Research Institute (CMFRI) was established by Government of India on February 3, 1947, under the Ministry of Agriculture and Farmers Welfare.

- In 1967, it joined the Indian Council of Agricultural Research (ICAR) and emerged as a leading tropical marine fisheries research institute in the world.
- The Headquarters of the ICAR-CMFRI is located in Kochi, Kerala.