Seaweed cultivation to harness the productivity of poorly drained saline lands

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SALINITY

- Getting worse over the last few decades.
- Lands salinized and waterlogged by both irrigation salinity and dryland salinity: Don't support traditional crops.
- Saline groundwater tables close enough to the surface: Destroy crops and pasture.
- Excavating saltwater evaporation basins filled by pumping groundwater to lower the water table below the root zone of traditional crops: Highly expensive.
- or closed industrial pollutants.

SEAWEED

- Large, multicellular algae.
- Seaweed crops: Potentially suitable crop for saline basins.
- Seaweed production: Make productive, profitable, and sustainable use of salt degraded land that is currently unproductive due to high saline water tables.
- Seaweed farming is more accessible than those required for the husbandry of fish or shellfish in saltwater ponds, and even the infrastructure required is minimal.
- Production could enable farmers to take advantage of saline groundwater resources to produce export crops worth more per hectare than the current suite of grain crops.
- Require less than twenty elements for their growth and development (Lobban& Harrison, 1994).
- Saline groundwater contains enough concentration of the minerals necessary for seaweed growth.
- Make currently degraded lands productive again using saline groundwater as a resource
- Enables carbon sequestration, breeding grounds for fish and shellfish, pollution abatement, and animal feed and fertilizers.
- Effective in mitigating eutrophication and remove excess nitrogen from the polluted water.

Fig 1. Seaweed cultivation ©FAO website

BENEFITS

- Rich in protein, iodine, and other minerals.
- Eating source for malnourished children.
- Eaten raw, cooked, or processed, and their products (e.g., agars, carrageenans, and alginates).
- Seaweed production for biomass could produce green electricity from methane gas.
- Seaweed from saline drainage water evaporation basins could remove about 200 kg of salt with each ton of seaweed grown.
- Cows fed certain seaweed species belch 58 percent less methane.

OTHER BENEFITS

- Essential ingredients in many cosmetic and pharmaceutical products.
- Seaweed harvests could mitigate the costs of engineering investments and costs for salinity restoration programs.
- Development of processing plants near the source of raw materials can provide opportunities for value-adding, off-farm employment, and support industries.

FUTURE PROSPECTS FOR SCALING UP THE PRACTICE

Seaweed cultivation has agronomic potential to grow in inland saline groundwater, and future research and development are required to understand the major practices required for its cultivation.

Although India has a coastline of more than 8,000 km and harbors about 844 species of seaweeds, their commercial exploitation is still in a nascent stage. It could increase and diversify the range of species cropped by farmers and increase the economic sustainability of farms through the use of currently non-productive land.

Multidisciplinary research is required, including hydro-geology, agronomy, water chemistry, and soil-water interaction, extension, engineering, and business skills to develop technologies, agronomy, and models for profitable cropping of seaweed in saline ground waters. Seaweed physiology, photosynthesis, and diagnostic information on seaweed nutrition need to be studied in the laboratory. Results of seaweed growth trials under laboratory conditions would inform field trials. There is a need to focus on closely managed field trials at salt-degraded farm sites involving farmers at the earliest stages of technology development to establish reliable agronomic protocols for crop and water management.

Fig 2. Employment generation from seaweed cultivation. 2016, ©algaeworldnews

GLOBAL SYMPOSIUM ON
SALT-AFFECTED SOILS
20 - 22 October, 2021