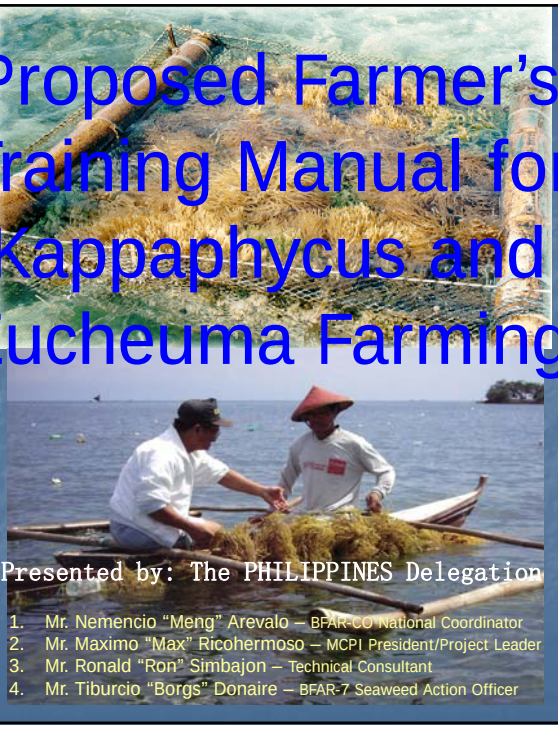
Proposed Farmer's Training Manual for Kappaphycus and Eucheuma Farming



Presented by: The PHILIPPINES Delegation

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INTRODUCTION

Seaweed farming in the Philippines started in the late 1960's. Various experiments were done in seaweed growing reefs of Sulu. The culture techniques was then proven and disseminated to the seaweed farmers in the early seventies.

Photo 1. Transfer of cuttings to Sitangkai, Tawi-Tawi

Photo 2. Researcher monitoring seaweed growth

Photo 3. Different varieties of seaweeds are prepared for test planting

Today, the Philippines is the world's biggest producer of farmed *Kappaphycus* and *Eucheuma* seaweeds supplying about 60% of the world raw material requirements for carrageenan production.

Seaweed is the number 1 aquaculture commodity in terms of production. In 2006, the Philippines produced about 1.5 million metric tons equivalent to 70% of total aquaculture production.

Major seaweed producing areas include Sulu, Tawi-Tawi, Zamboanga, Palawan and Bohol. Other producing areas are Batangas, Masbate, Surigao, Negros, Cebu, Lanao del Sur, Samar and more areas are developed for farming.

Major producing areas, Sulu, Tawi-Tawi , Bohol and Palawan
Other producing areas

There are three commercially farmed seaweed species and they grow all throughout the year especially in Tawi-Tawi

•*Kappaphycus alvarezii* (previously known as *Eucheuma alvarezii, Eucheuma cottonii)* = cottonii in commerce

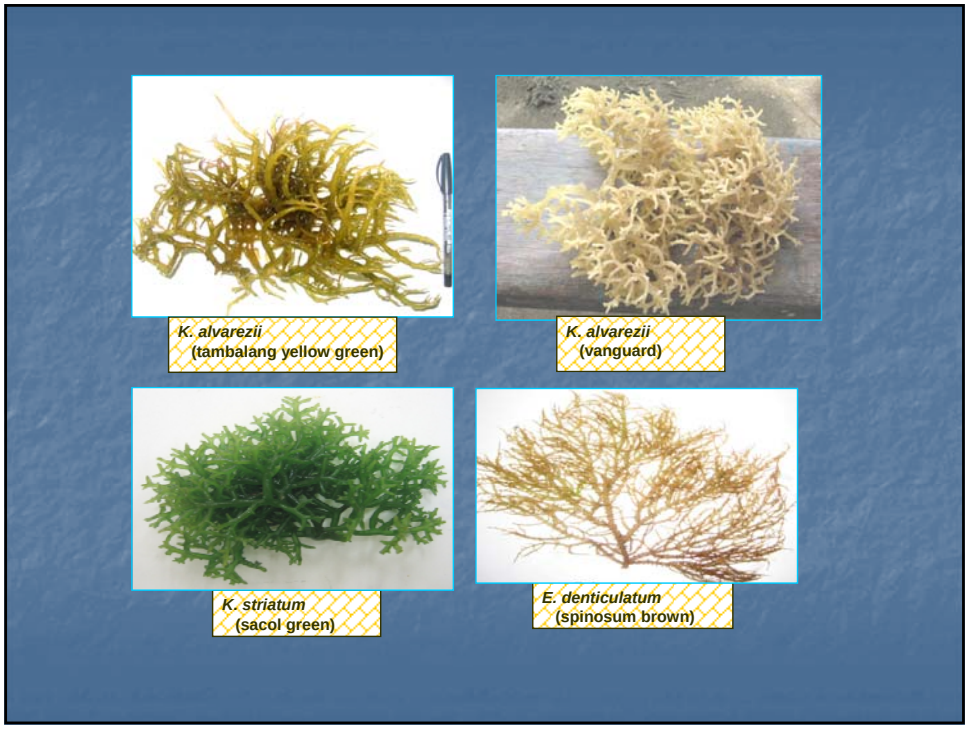
•*Kappaphycus striatum* = cottonii in commerce

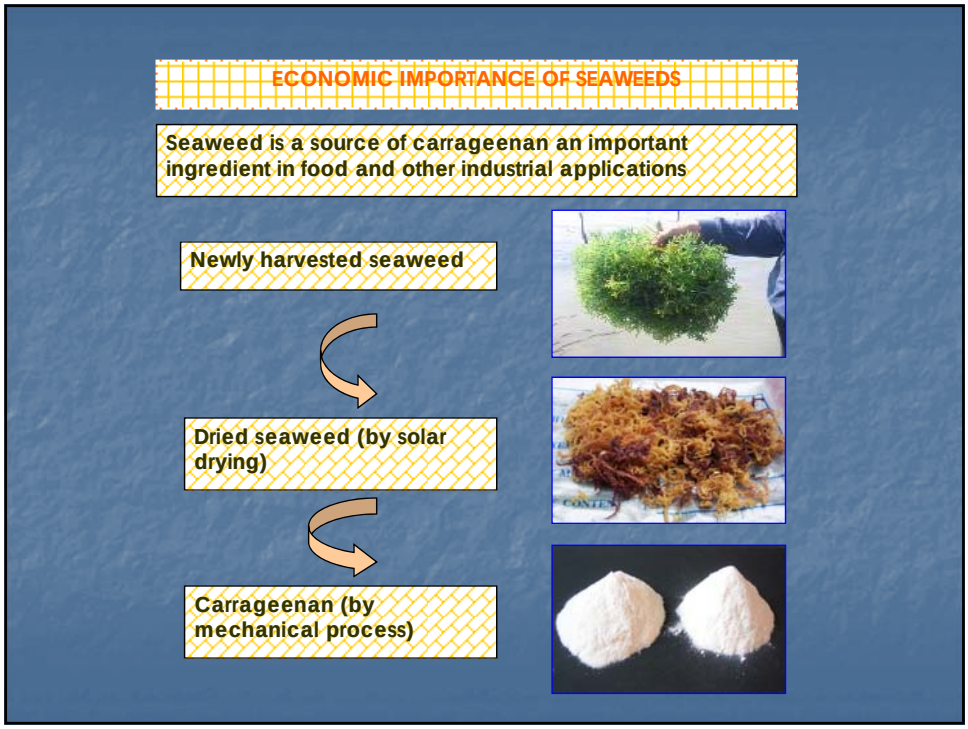
•*Eucheuma denticulatum* (previously known as *Eucheuma spinosum* = spinosum in commerce

Other commonly farmed varieties of *Kappaphycus* and Eucheuma in the Philippines

K. alvarezii (tambalang green)

K. alvarezii (tambalang brown)


K. alvarezii
(tambalang yellow green)
K. alvarezii
(vanguard)
K. striatum
(sacol green)
E. denticulatum
(spinosum brown)

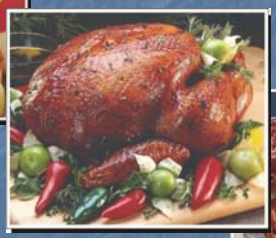

ECONOMIC IMPORTANCE OF SEAWEEDS
Seaweed is a source of carrageenan an important ingredient in food and other industrial applications
Newly harvested seaweed
Dried seaweed (by solar drying)
Carrageenan (by mechanical process)

USES OF CARRAGEENAN

Gelling agent for jellies

Stabilizer for ice cream and toothpaste

Thickener for catsup and sauces



Binder for patties and meat

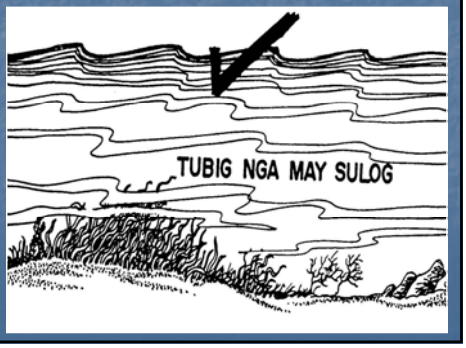
Beer clarifier

STARTING A SEAWEED FARM

SITE SELECTIONS: Seaweeds grow in tropical marine environment, however, there are important considerations ideal for a successful seaweed farming

- Accessibility to farming inputs and markets, transport facilities, security and safety and available areas for expansion;

- With good water movement.
  = Not very slow to cause silting
  =Not very strong to break the plants and damage the farm structures;

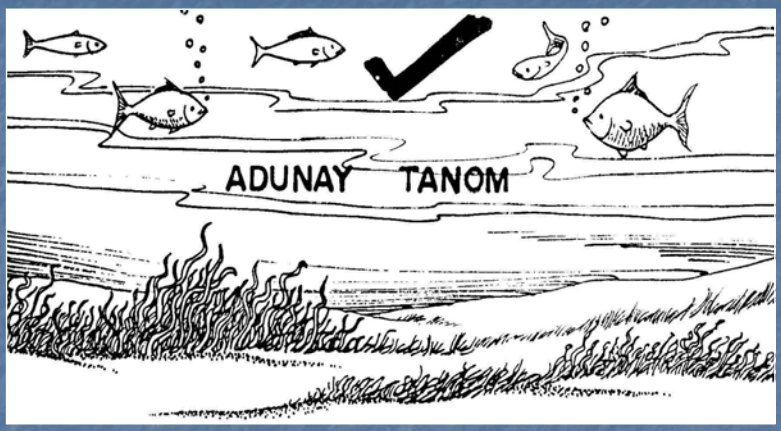


- Away from sources of fresh water like river mouth.

- Protected from strong waves

- Water is clean and away from sources of pollutants

•Natural growth of seagrasses and other seaweeds are found and abundant

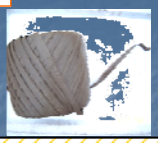


Once a site has been selected, get a permit from the Local Government Unit which has jurisdiction over Municipal waters where the farm is to be established.

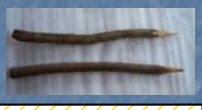
FARMING MATERIALS REQUIREMENTS

It is important to prepare these materials before planting.

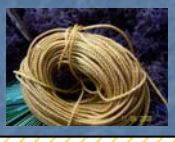
a. mallet



b. plastic straw (hard type)



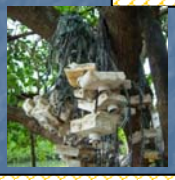
c. wooden stake



d. PE Rope # 18

e. Stainless knife

f. Plastic straw (soft type)



g. Recycled styrophore (floating device)

h. banca

FARMING METHODS

There are three farming methods in Cottonii and Spinosum:

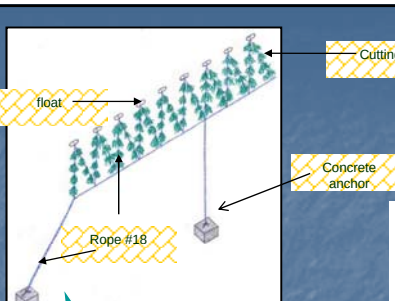
1. Floating Method
2. Fixed Off Bottom Method
3. Broadcast Method

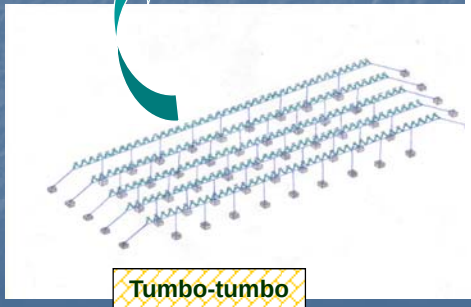
Floating Method is suitable in shallow (not less than 0.75 m) to deeper areas with moderate water current.

Floating Monoline

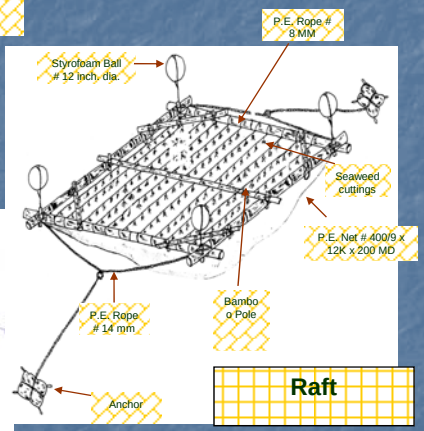
Innovations in floating method:

- Monoline/longline
- Raft
- "Tumbo tumbo"/"Spider web"



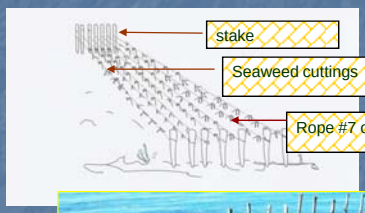


Tumbo-tumbo



Raft

Fixed Off-Bottom is best used in shallow areas (not less than 0.75 m) during low tides with moderate to strong water current

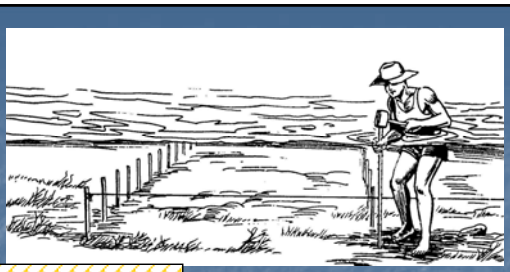


Broadcast method is used in shallow areas with moderate to strong water current, sandy to carraline bottom and mostly used in Spinosum farming

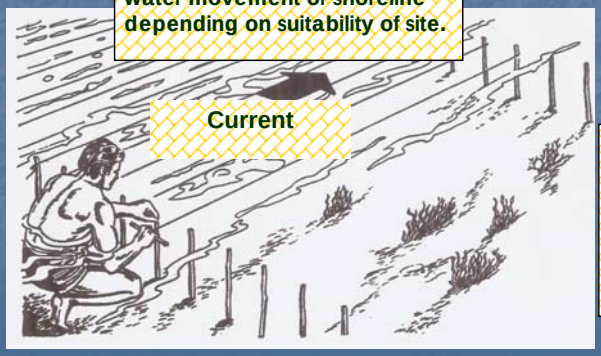
PREPARATIONS AND SETTING UP OF FARMS

Measure and mark the area.
Clean the site and remove rocks and big stones. Remove and transfer sea urchins and sea stars outside the farm.

Lay-out the farm, install stakes and anchors.



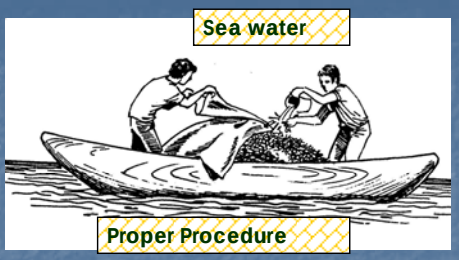
Monolines maybe parallel, perpendicular or diagonal to water movement or shoreline depending on suitability of site.



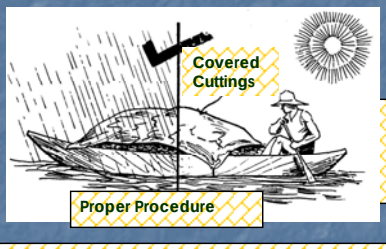
Parallel orientation has many advantages: less breakage of plants and lines, minimal uprooting of stakes and less entangling of floating debris

PREPARATION OF CUTTINGS

Cuttings should be taken from healthy and fast growing variety in the area preferably from the young portion of the plant.



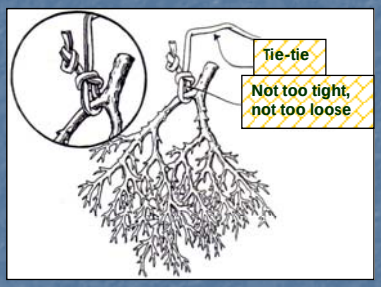
Cuttings should stay fresh, sprinkled with or submerged with seawater most of the time.



Protect if from sunlight, rain, temperature and humidity changes.

If cuttlings are taken from other areas, water should be drained first before transport. Placed them inside styroboxes, rattan baskets or sacks.

Preparation of cuttings can be done on the shore or in land. Always work under the shade.



Tie each cutting using soft twine "tie-tie".

CARE AND MAINTENANCE

Seaweeds need a Tender Loving Care, regular visit is necessary to check the possible problems before they worsen.

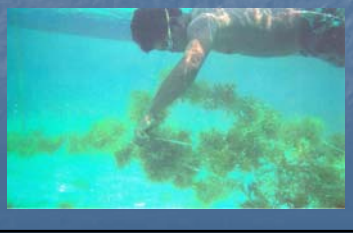
Remove other weeds. Mud flakes and sediments that cling to the plants and lines.

Drive away fish grazers, removed sea urchins and others.

Tighten and fix sagging and broken monolines.

Pick-up broken and drifted plants.

Replace broken or lost plants.



Remove old and rotten stakes and repair uprooted stakes and anchors.

HARVESTING

Seaweeds are fast growing and they are ready for harvest in 45 to 60 days.

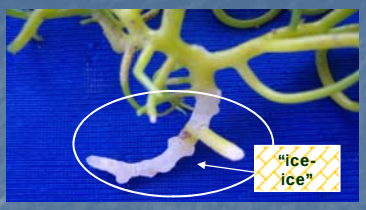
For floating and fixed off bottom farming, harvest the seaweeds by removing the entire monolines together with the plants from the stakes or from the main support lines.

This procedure makes it easy and convenient to select good planting materials for the succeeding cropping.

In the broadcast method, harvest the seaweeds by pruning the plants and leaving some parts of the seaweeds to re-grow.

MANAGEMENT OF DISEASES AND OTHER CALAMITIES

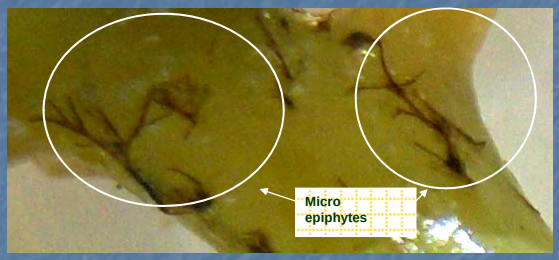
"Ice-ice" disease is a major problem in seaweed farming. Affected plant parts become whitish, soft and eventually disintegrates.

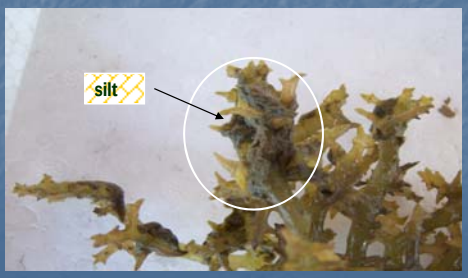


This is a result of sudden change in environmental conditions such as salinity and temperature and light intensity.

If "ice-ice" is observed, totally harvest your crops to avoid losses and replace them with new healthy plants.

Other problems include: epiphytes infestations; pitting, tip darkening and silting.
Solution: Clean the plants daily and or harvest to avoid further losses





POST HARVEST HANDLING AND PROCESSING

Seaweeds and its extracts are mainly intended for food, pharmaceutical and personal care applications, hygienic practices should be observed at all times.

Never dry the seaweeds directly on the ground to avoid any contaminations.

Do not allow stray animals like dogs, cats, and chicken in the drying area.

Cover the seaweeds with plastic sheets during night time and when it rains.

While drying, remove the impurities like tie-ties, stones, corals, shells and other foreign matters.

Recommended Drying Procedures

c. Seaweeds being dried in elevated drying platform

b. Hanging method of solar drying in the seaweed farm

a. Seaweeds being dried hanging on bamboo poles

As soon as the seaweeds are dried, pack them in sacks and store in clean dry place.

Dried seaweed is now ready to sell immediately or accumulate them in storage while awaiting for better price (but not too long to avoid spoilage).

Initial Investment Cost (Floating Method)

Materials/description	Quantity	Unit Cost	Cost PHP
Concrete blocks 30Kg each for anchor	20 pcs	75	1,500
Nylon rope #18 (for Main support)	3 rolls	1800	5,400
Nylon rope #9 (for longline)	10	700	7,000
Plastic twine (soft type for tie-tie)	10 rolls	100	1,000
Floats (plastic bottles, styropor scraps)	20 kilos	25	1,000
Seedling baskets/containers	3 pcs	100	300
Seedlings	1600 kg	15	24,000
Diving goggles	2 pcs	150	300
Motorized banca/boat	1 unit		35,000
TOTAL			75,500

Initial Investment Cost (Fixed off-bottom method)

Materials/description	Quantity	Unit Price	Cost PHP
Stakes, 5cm in dia., 75 cm long	1800	3	5400
Plastic twine (hard type) for longline	10 rolls	100	1000
Plastic twine (soft type) for tie-tie	10 rolls	100	1000
Iron bars	4 pcs	200	800
Bull Hammer	4 pcs	200	800
Seedling container/baskets	3 pcs	100	300
Seedlings	2,400	15	36000
Diving goggles	KG	150	300
Motorized banca	2 pcs		35000
TOTAL	I unit		80600

Comparative Labor Cost of Floating & Fixed Off-Bottom monolines Methods

Particulars	Cost PHP Floating	Cost PHP FixedOff-Bottom
Installation of anchors, Main support lines and stakes 4 people x 3 days x 150/day	1800	1350
Tying of seedlings to lines @ P6/12meter	2400	3600
Line	1350	2250
Planting and installation of floats	2250	1200
Harvesting and Drying 3 people x 5 days x 150/day	120	180
Packing/Sacking @ 10/ sack (60 KG)	7920	8580
TOTAL		

Other maintenance expenses for floating and fixed off bottom method includes gas is approximately P2,250 per cropping.
Annual Cost and Returns Analysis for floating and fixed off bottom methods of farming at P80/Kg farmgate price.

Item	Floating Method	Fixed off-bottom
Sales of Harvest	**321,600**	**482,400**
Initial Investment Cost	75500	80,600
Labor Cost	39,600	42,900
Maintenance Cost	11,250	11,250
Depreciation	20,650	18,750
Total Annual Cost	**147,000**	**153,500**
Annual Net Profit	**174,600**	**328,900**

PROPOSED TWO (2) TECHNICIANS/FARMERS LIVE-IN TRAINING
For Bohol; Cebu and Palawan

Budgetary Requirements:

- Food and Lodging Accomodation (P1,500/pax/30/3 days) - P135,000.00
- Resource Speakers:
  - * Core Group Incentives - - - P12,000.00
  - * Airfare from Manila-Cebu-Manila - - P30,000.00
  - * Incentives for Speakers - - - P10,000.00
- Training Kit at P1,000.00/pax x 30 pax- - - P30,000.00
- Transportation Cost (fuel, lubricants & TEV of pax) - P75,000.00
- Supplies and Materials (ink; reproduction cost and for hands-on) P50,000.00

Sub-Total Cost - P330,000.00

- Contingency (10% of the Sub-Total Cost) - - P33,000.00

TOTAL - - P363,000.00

Multiplied by two sets of trainings - X 2

Grand Total Cost in Pesos - P726,000.00

15,500US$


THANKYOUVERYMUCH
FOR
LISTENING!!!


MABUHAY!!!