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FOREWORD

This manual was formed as actual farmers' manual for the cultivation of Eucheuma in Cot and Bacolod, by the author with the Green Produce, a private company engaged in seaweed farming. This manual was also used in training contract small-scale seaweed farmers as part of the extension training and service conducted by the Bicol University.

ASEAN SPECIMEN CLINIC Regional Seaweed Production Project
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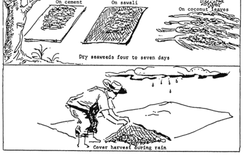

Figure 20. Harvesting and drying

4. Turn the seaweeds at regular intervals under the sun for three days and at the same time removing foreign materials. During summer months, seaweeds can be dried for only 1–½ days.
5. Always cover the harvest to protect from the rain.
6. Separate dried harvest according to the day it was harvested.
7. Seaweeds are considered dry when there are no moist and particles of sand on the surface. They are crispy and have a rubbery touch.
8. Remove salt particles from the dried seaweeds by screening them with meshed screens.
9. Pack, clean dried seaweeds free of salt particles in large sacks and lace them up.
10. Sell the seaweeds and keep a record of all its weight.

5. MAINTENANCE OF THE FARM

Assurance for good farm production largely depends upon farm management, procedures and practices coupled with the farmer's own initiative and creativity (Juanich, G. 1980).

Some ways to maintain a Eucheuma farm:

1. Remove sea urchins, starfishes, rocks, dead corals and other obstacles found inside the farm everyday.
2. A boat (with or without engine) would be required depending upon the distance of theresidence to the farm site.
3. Replace missing plants.
4. Never allow the plant to grow more than 5 kgs for it will be destroyed by the water current.
5. Harvest completely all unhealthy and loose plants.
6. Tighten any loose nets and repair any broken lines and destroyed stakes.
7. Always keep the record of the farm such as weekly test plant record, daily harvest record (wet and dry), record of receipts and expenses, etc.
8. When a farm is a hectare or more, it is advisable to install nets in the lower position of the farm to collect seaweeds washed out by the tidal current. The mesh size of net to be used should not be more than 4 inches made of No. 100 nylon line (Figure 21).

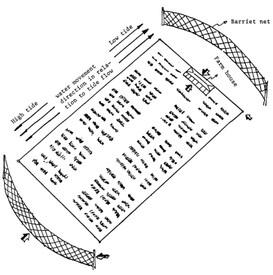

Figure 21. A typical developed one-hectare Eucheuma farm

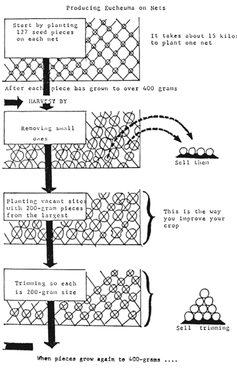

Figure 22. Management of a Eucheuma farm (Using mangrove stakes and net method)

6. SUMMATIVE EVALUATION

1. Prepare a design/program proposal to conduct test plant experiment.
2. Construct test plots using either of the two known methods of test planting.
3. Construct one set of floating bamboo method of seaweeds culture using the monoline.

EXPERIMENTAL COMPONENT EUCHEUMA SEAWEED FARMING

Assumption - For one hectare Eucheuma farm

	Activities	Time Allotment	Persons Involved
I.	Survey/selection of suitable site taking into consideration the following:		
	1. Water qualities/properties (current, temperature, salinity, depth, etc.).	2 days	2 persons
	2. Farm bottom, presence of vegetation, etc.	1 day	
	3. Test planting (with observation).	45 days	
II.	Preparation of farm site and other culture materials:		
	1. Securing permit from the BFAR office and survey of the proposed site by BFAR technicians, preparing/processing of other pertinent papers for acquisition.	15 days	1 person
	2. Cutting of eel grasses, removing of rocks, stones, starfishes, sea urchins, etc.	7 days	2 persons
	3. Preparation/purchasing of farm house materials.	15 days	1 person
	4. Construction of farm house.	10 days	5 persons
	5. Preparation of baskets or seed bin for holding seed stock and other culture materials.	2 days	1 person
III.	Construction of Eucheuma farm		
	A. Floating bamboo method		
	1. Tying of nets to bamboo and stretching thereon.	40 man-hours*	5 persons
	2. Cutting of 1 meter piece of bamboo and tying them to each corner of the net.		
	3. Adding additional net to previously constructed one.		
	B. Mangrove stakes and net method		
	1. Installation of stake bipods and tripods.	40 man-hours*	5 persons
	2. of nets to the bipods/tripods and stretching them.		
	C. Bottom monoline method		
	1. Driving wooden posts/stakes to farm bottom.	40 man-hours*	3 persons
	2. Tying monolines to both ends of the posts parallel to each other.		
IV.	Management of Eucheuma farm		
	A. Seed selection and preparation		
	1. Selection of healthy seedlings.	21 man-hours*	2 persons
	2. Preparing/cutting of seedlings.	42 man-hours**	1 person
	B. Tying of seedlings	42 man-hours**	1 person
	C. Planting of tied seedlings.	28 man-hours*	2 persons
	D. Harvesting	42 man-hours*	2 persons
	1. Preparing all necessary harvesting materials.		
	2. Preparing the drying area.		
	3. Pruning the branch of harvestable size Eucheuma or cutting the tie in-between plant and nylon line.		
	4. Scooping the harvested plants and collecting them in a banca.		
	E. Drying	3 days	2 persons
	1. Spreading of harvested seaweeds in drying site.		
	2. Turning seaweeds at regular intervals at same time removing foreign materials.		
	3. Separating harvest according to the day it was harvested.		
	4. Removing salt particles of dried seaweeds by screening with meshed screen.		
	5. Packing clean and dried seaweeds.		
V.	Maintenance of Eucheuma farm	Everyday	2 persons
	1. Removing sea urchins, starfishes, rocks, dead corals and other obstacles found inside the farm		
	2. Replacing missing plants.		
	3. Harvesting all unhealthy and loose plants.		
	4. Tightening all loose nets and repairing broken lines of destroyed stakes.		
	5. Keeping farm record about test plants, harvest record (wet and dry weights), record or receipts, other expenses. etc.		
	6. Installing nets in a leeward position of the farm to collect seaweeds washed out by tide current.	8 man-hours	2 persons

* The activities are done during low tide for four working hours only.
** Activities done during high tide for six working hours.

7. BIBLIOGRAPHY

Alegaen, V. Dag.aaral.ng.Ilang.Damong.Dagat na.Nakukunan.ng.Agar.gara.sa.Pangkomersyal.na.Gamit.

Alvarez, V.B. 1977 Site Selection Specification for Seaweeds (Eucheuma) Farming. A paper presented at the National Seaweeds Symposium, Manila, January 17–19, 1977. 5p.

Barreca, R.T. 1977 The Agronomy of Eucheuma. (Unpublished manuscript). 7pp.

Dawes, C.J. 1974 On the Mariculture of Florida Seaweed, Eucheuma,Isiforme. State University System of Florida Sea Grant Program. Rep. pp. 5–10.

Dawes, C.S., J. W. LaClaire and R.E. Moon. 1976 Culture Studies on Eucheuma,Nudum,L.,Agardh, A Carrageenan Producing Red Alga from Florida. Aquaculture, Vol. 7; pp. 1–9.

Doty, M.S. 1973 Eucheuma farming for carrageenans. Reprint from Sea Grant Advisory Report. UNIHI.

Doty, M.S. Physical factors in the production of tropical bentic marine alga. Fertility of the Sea, Vol. 1, pp. 25.

Doty, M.S., 1973 et al. Seaweeds farms: A new approach for U.S. industry. Reprints from Marine Technology Society. Proc. pp. 701–708.

Fisheries, Bureau of. 1972 Public information section, Intramuros, Manila. Illustrated Instructions for Private Eucheuma Farmers. p. 24.

Juanich, G.L. 1980 The culture of Eucheuma by bottom monoline method. (Unpublished handout). p. 20.

Lapointe, BeE., W.D. Cavergne, J.C. Goloman and J.M. Ryther. 1976 The mass outdoor culture of macroscopic marine algae, Aquaculture, Vol. 8, pp. 9–21.

Reyes, C. Preliminary report on Philippine Eucheuma seaweeds market. BFAR, Report to DNR Secretary.

Trono G.C. Jr. 1974 Eucheuma farming in the Philippines. U.P. National Science and Research Center, Quezon City.

Trono, G.C. Jr. 1977 Guide to Philippine flora and fauna seaweeds. Vol. 1. pp. 5–8.

Villongco, J.G. 1974 The feasibility of establishing a 30-hectare Eucheuma farm in the Palawan area. (Masteral thesis). Asian Institute of Management.

PUBLICATIONS AND DOCUMENTS OF THE ASEAN/UNDP/FAO REGIONAL SMALL-SCALE COASTAL FISHERIES DEVELOPMENT PROJECT

Working Papers

ASEAN/SF/86/WP/1 Rabanal. H. R. Seafarming as alternative to small-scale fishing in ASEAN Region. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 55p.

ASEAN/SF/86/WP/2 Soeyanto, T. The status of Bali Strait fisheries with special reference to Muncar, Kedonganan and Jimbaran coastal villages. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 36p.

ASEAN/SF/86/WP/3 Boongerd, S. and S. Chitrapong. Small-Scale Fishing for Squids and Related Species in Thailand. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 44p.

Workshop Reports/Other General Reports

ASEAN/SF/86/GEN/1 Report of National Consultative Meeting on Aquaculture Engineering held at Tigbauan Research Station, SEAFDEC Aquaculture Department, 2–5 October 1985. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 186p.

ASEAN/SF/86/GEN/2 Zabala, P. T. (Comp.) Preliminary annotated bibliography on small-scale fisheries in the ASEAN Region. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 41p.

ASEAN Fisheries Manuals

ASEAN/SF/86/Manual 1 Suprayitno, H. Manual of running water fish culture. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 1986. 34p.

Periodic Progress Reports

ASEAN/SF/86/PR-1 Soesanto, V. Project progress report of the ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 5 October 1985–5 April 1986. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project. 9p.

ASEAN/SF/86/PR-2 Soesanto, V. Project progress report of the ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project, 6 April-6 October 1986. Manila, ASEAN/UNDP/FAO Regional Small-Scale Coastal Fisheries Development Project. 11p.

Technical Reports Contributed to Symposia/Meetings, etc.

ASEAN/SF/85/Tech. 1 Rabanal, H. R. and V. Soesanto. The world fishery and culture of *Macrobrachium* and related prawn species. Contributed to the National Conference on Prawn Technology, sponsored by the Philippine Fishfarmer's Technical Assistance Foundation, Inc., Manila, Philippines, 27–28 November 1985. 16p.

ASEAN/SF/86/Tech. 2 Rabanal, H.R. and V. Soesanto. Commercial species of shrimps and prawns, their sources and export markets. Contributed to the Seminar on Quality Control in the Production, Processing and Marketing of Frozen Shrimps for Export, sponsored by Food Research Department, Food Terminal Incorporated, Taguig, Metro Manila, Philippines, 29–31 July 1986. 64p.

ASEAN/SF/86/Tech. 3 Rabanal, H.R. Status and prospects of shrimp farming in the Philippines. Contributed to the Monthly Seminar Series on Timely and Related Fisheries Issues sponsored by the Philippine Council for Agriculture and Resources Research and Development, (PCARRD), Los Baños, Laguna, Philippines, 5 November 1986. 24p.