

Updated and expanded version - 2013

SEAWEED QUALITY MANUAL ***SOLOMON ISLANDS***

A PRACTICAL GUIDE FOR:

- ***SEAWEED FARMERS,***
- ***BUYING AGENTS,***
- ***FISHERIES OFFICERS and***
- ***EXPORTERS***

by Gideon Tiroba

“Good-quality seaweed can fetch better prices”



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The commercialisation of seaweed production in the Solomon Islands was originally funded by the CoSPSI project funded by the European Union. Since late 2012, seaweed farming activities have been further developed and expanded through funding allocated by the New Zealand Aid Programme (NZAP), managed by the Mekem Strong Solomon Islands Fisheries (MSSIF) Programme in partnership with the Solomon Islands' Ministry of Fisheries and Marine Resources (MFMR). The main aim of both of these projects has been to improve the socioeconomic wellbeing of isolated rural communities by increasing diversification of the cash economy and the involvement of women in the primary productive sector.

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Preface

This manual is designed for farmers, buying agents, exporters and fisheries officers who play an important role in achieving the required quality of seaweed for export.

The purpose of the manual is to educate farmers to understand the importance of good-quality seaweed, the role they play and the benefits they can achieve.

The manual also provides guidance for buying agents, exporters and fisheries officers in the roles they perform to improve and maintain the required quality of seaweed.

Acknowledgements

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The additional charts and drawings (p. 18–25) were authored by Mahuri Robertson with input from Sylvester Diake Jnr and Stephen Lindsay. They were added to this manual at the request of farmers, who were looking for further information for the practical development and management of their farming operations.

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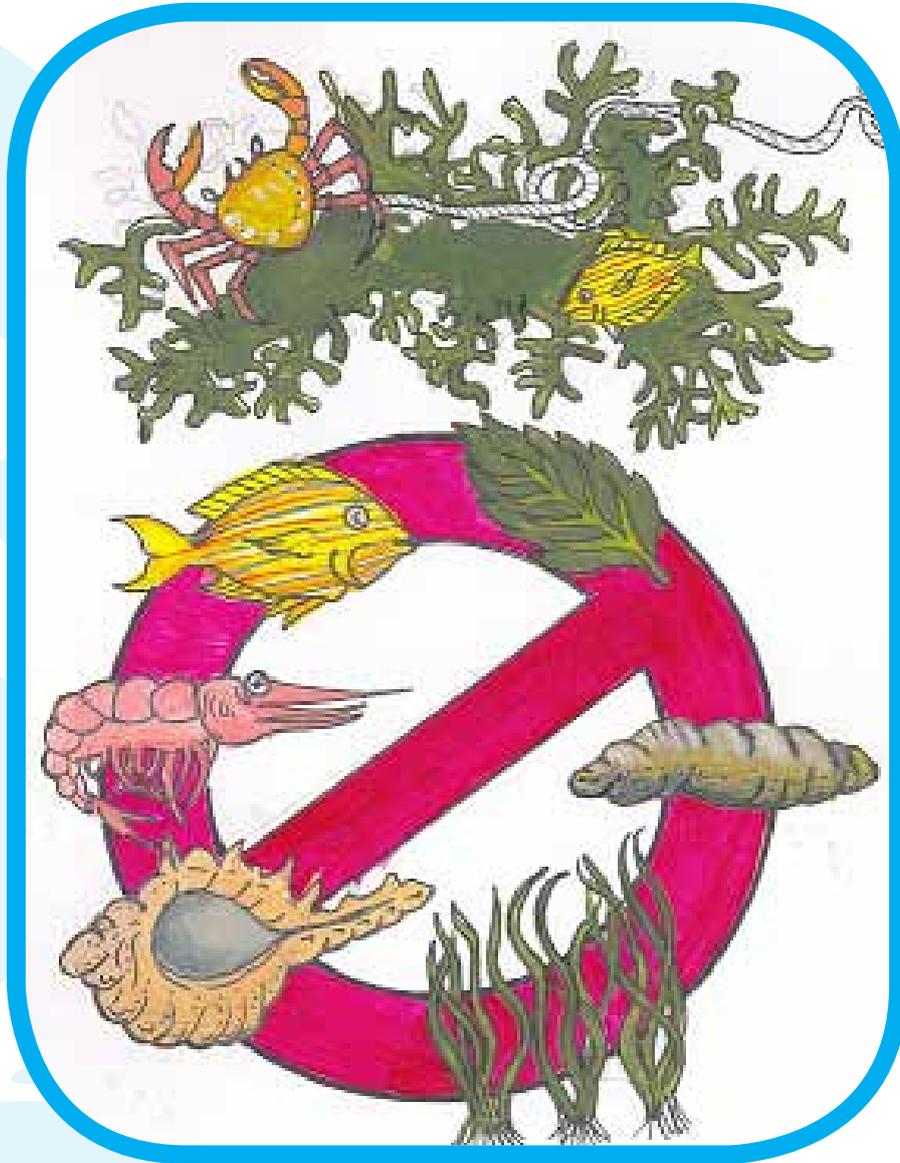
1. What is seaweed quality?



Seaweed of acceptable quality should not contain more than:

- 35% water (H_2O) moisture content
- 28% salt (KCl) – potassium chloride
- 34% salt free dried matter
- Usually purple, green and white with some salt crystals are signs of good quality

2. What affects the quality of seaweed?



Impurities such as sand, raffia, fish, shells and crabs are not acceptable by overseas buyers or processors. These can damage processing equipment and could also affect the price paid for the seaweed.

3. Drying seaweed

The following section shows the drying process and illustrates the requirements that a farmer must undertake when drying seaweed.

These are important areas which contribute to the quality of seaweed.

Remember: always strive for the best quality!



3.1 Spread your seaweed!



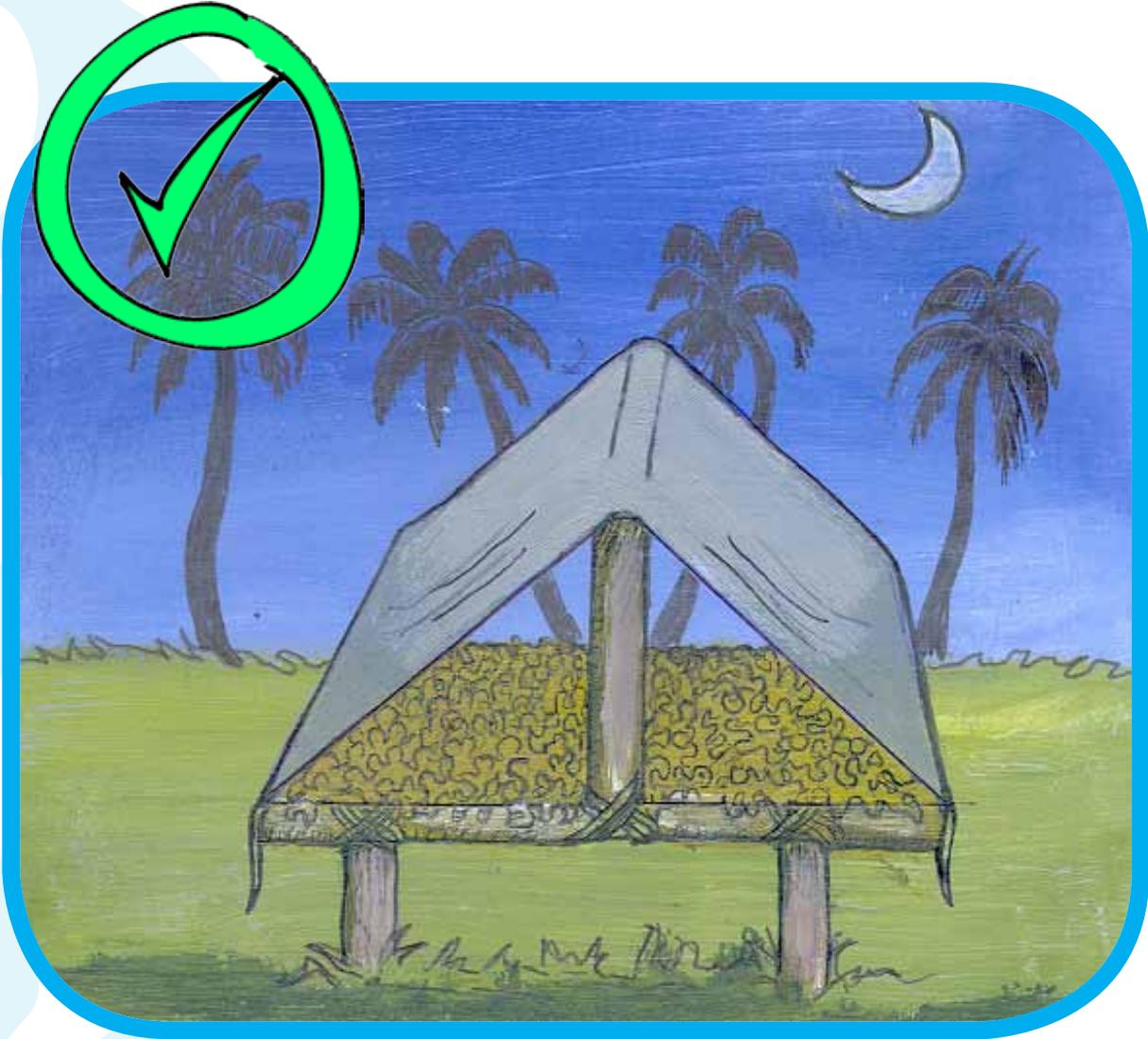
During the drying process, spread harvested seaweed evenly and thinly so that it can be easily turned. The more you turn it, the quicker it will dry if weather conditions are good.

3.2 Don't heap your seaweed!



During the drying process, seaweed that is heaped will rot and lower the quality. It is also difficult to dry and will take a long time.

3.3 *At night?*



Raised covers during night time protect seaweed from condensation. They also allow air movement over the seaweed, which helps in speeding up the drying process.

3.4 *During rainy days?*



Rain/fresh water is the big enemy of seaweed. Rain on seaweed lowers the quality and reduces the weight. Don't forget to install a raised plastic cover on drying seaweed.

3.5 *No cover?*



Uncovered seaweed during rain will lower the quality and reduce the weight.

Remember: seaweed will dissolve in fresh water (rain).

3.6 *Direct cover?*



Direct cover on seaweed will cause condensation, which bleaches the seaweed. It will also cause the seaweed to heat up and cook. This seriously lowers the quality of the seaweed.

4. Growing seaweed



- Fresh water slows growth of seaweed and even kills seaweed.
- Plant seaweed away from rivers, streams and areas near the beach where you can see fresh water coming out of the ground.
- Choose areas where there is good current or water movement. These bring food to the plants and help them grow healthy and fast.
- Healthy plants are the start of good-quality seaweed.

5. Role of farmers

1. Plant seaweed in good protected areas.
2. During harvest, ensure that impurities are not present among the seaweed (fish, crabs, tie-tie, shells).
3. During the drying process, spread seaweed thinly on drying tables.
4. Use raised covers during rain or at night to protect the seaweed.
5. Try to grow several plots so that you will have a harvest every week.
6. Short cuts or lack of care at any stage (planting, growing, harvesting, drying and cleaning) can reduce the quality and reduce the price.
7. Never play “games” (adding water and rocks to gain weight).



6. Role of buying agent

1. Always attend to incoming seaweed and check to ensure that it is properly dried.
2. Reject wet seaweed.
3. Reject seaweed that contains impurities – fish, shells, crabs, sand, etc.
4. Advise farmers about the importance of seaweed quality control measures.
5. Good-quality seaweed can result in better prices being paid by the processors.
6. Good quality: dry seaweed (not damp), clean seaweed (no sand, crabs, shells, etc.), colour (purple, green, white – not just white), not too much salt.



7. Role of exporter

1. Ensure that incoming seaweed from the Island is well dried.
2. Ensure seaweed does not get wet during transportation.
3. Send small random samples from consignment to overseas buyers.
4. Results of samples must be provided to Fisheries Department.
5. Bale and pack seaweed before export.
6. Provide weight of exported seaweed to the Department of Fisheries.



8. Role of fisheries officer



1. Visit farmers and carry out training.
2. Monitor production and quality.
3. Advise on meteorological conditions.
4. Share new techniques.

9. Quality determines price

Meet required standard
as prescribed by overseas buyer
(gel strength test above 1,000 mg/cm³)

High content of carrageenan
4 kg dry seaweed = 1 kg carrageenan
(seaweed – flour powder)

Remember:
Good-quality can fetch good prices.

10. Seaweed problems, impacts and possible solutions

Problem	Description	Characteristics/impacts	Possible solutions
Epiphytes	Very small hair-like brownish algae that grow on plant tips and stems.	<ul style="list-style-type: none"> • Rapid growth which will cover the plant in a few weeks. • Competes with seaweed for space, light and nutrients. • Reduces seaweed growth. • Reduces farm production. • May kill the plant eventually. 	<ul style="list-style-type: none"> • Choose clean area for farm site selection. • Plant seaweed farm in areas with suitable current. • Plant seaweed upwind and up current. • Daily maintenance and farm cleaning. • Harvest and dispose of infected plants immediately. • Do not move infected plants to new areas.
Nimrona (green algae)	Green mat of algae can accumulate in ponds or bays of slow water movement.	<ul style="list-style-type: none"> • Can accumulate in large areas and high densities. • Reduces seaweed growth. • Reduces farm production. • May kill the plant eventually. 	<ul style="list-style-type: none"> • Choose clean area for farm site selection. • Plant seaweed farm in areas with suitable current. • Regular farm maintenance (weekly). • Harvest and dispose of infected plants immediately. • Do not move infected plants to new areas. • Can cause problems at drying time as algae stays wet for a long time.
Large fish grazing – puffer fish	Feed mainly on large parts of stem and shoots. Exposed areas covered with silt.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. 	<ul style="list-style-type: none"> • Catch and remove the grazing fish. • Put 3-mm lines closer together to increase plant density, reducing effects of fish grazing. • Relocate farm to deeper water (flotation method). • Move to another site or area free of grazing. • Use fishing nets and coconut fronds to keep fish away from the farm.
Urchin and small fish grazing – rabbit fish	Seasonal feeding of small fish and urchins. They feed on the outside layer of the plant including tips.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. • Plants become white and dead in a few days (often confused with ice-ice). 	<ul style="list-style-type: none"> • Catch and remove the grazing fish and sea urchins near farm. • Relocate farm to deeper water (flotation method). • Move to another site or area free of grazing (e.g. very shallow water).

Turtle grazing	Seasonal Grazing by turtles. Can be a large impact on the seaweed farm.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. • Loss of seaweed normally short lived. 	<ul style="list-style-type: none"> • Catch turtles (whenever possible) and relocate. • Move seaweed to shallow water. • Move seaweed regularly. • Put barrier around farm (fishing net, coconut fronds).
Heavy rainfall	Continuous down pours of heavy rain may cause a drop in water salinity. Freshwater is lighter density than salt water and therefore, if undisturbed, always sits on top of sea water.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. 	<ul style="list-style-type: none"> • Choose suitable marine area for farm site selection (away from freshwater streams, runoffs, etc.). • Plant seaweed farm in areas with suitable current. • Use off-bottom method and keep seaweed lines in deeper water to avoid flotation.
Aerial exposure	The seaweed plants are exposed to direct sunlight for longer periods of time at low tide.	<ul style="list-style-type: none"> • Tips of plants start withering followed by the stem. Tips turn white & fall off. • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. 	<ul style="list-style-type: none"> • Choose suitable area for farm site selection. • Put seaweed in deeper water where it does not dry out.
Silt	Very fine grained mud and sand particles that settle and cover seaweed.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Increases plant mortality. 	<ul style="list-style-type: none"> • Daily maintenance: shake the lines to get rid of settled silt. • Relocate farm to deeper water (flotation method). • Move farm to new area of better water movement.
Ice-ice	When the seaweed plants respond to poor growing conditions the seaweed turns white with red blotches. Affects main and small stems.	<ul style="list-style-type: none"> • Reduces seaweed growth. • Reduces farm production. • Ice-Ice causes seaweed to detach and drift away. • Increases plant mortality. 	<ul style="list-style-type: none"> • Relocate farm to a new clean area. • Plant seaweed farm in areas with suitable current. • Cut off white pieces, take ashore and dispose. • Retie good pieces at good areas.

11. Training aids for seaweed farmers

TOOLS & EQUIPMENT:



Bush Knife

Use a bush knife and/or a bow saw to cut sticks for your posts.



Bow Saw

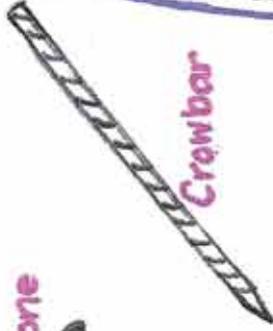


Mallet Hammer

Use the crowbar to make a deep hole in the sand before putting the post in.
Use a mallet hammer or a heavy stone to hit the post in further to make it strong and tight.



Stone



Crowbar



Small Knife

Use a small knife to cut your plants when starting. Use it also to cut your loop twine and ropes.



6mm Rope

Use 6mm ropes if you are planting on long lines - over 20mtrs.



4mm Rope

Use 4mm ropes if you are planting on lines under 20mtrs long.



2mm Twine

For making the loops to attach the seaweed to the seaweed rope.



Black Plastic

For covering the seaweed & protecting from rain.



Netting

To put on drying tables to dry the seaweed on.

MEASURING out your FARM:

STEP 1

Select the area you are going to farm and put in the first post **1**. This is post **1**.

STEP 2

Put a loop at each end of a long rope - stretch the rope tightly from post **1** and put in the 2nd post. This is post **2**.

STEP 3

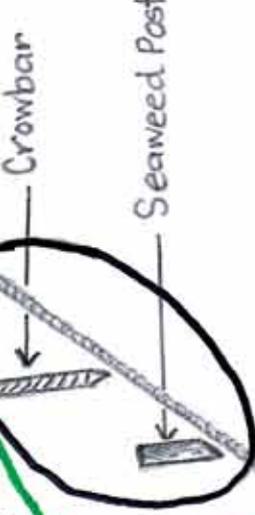
Put in the seaweed line posts - 30cm apart - follow rope. Use crowbar & hammer/stone to make posts strong. Do NOT touch the rope with the crowbar or posts. Posts are on outside of rope.

STEP 4

Measure, using your seaweed rope, from post **1** to get the width of your farm. This is post **3**. Put this post in at about a handspan from the end of the seaweed rope loop. This makes the rope tight.

STEP 5

Remove the rope between posts **1** and **2** and transfer to posts **3** and **4**. Again, use a seaweed rope to measure from post **2** across to the next post. This is post **4**.



STEP 6

Put in the posts for this line as for step 3. Both lines to have same number of posts.

- * Make sure that all posts are very strong.
- * All seaweed ropes should fit any posts anywhere on your farm.

STEP 5

Remove the rope between posts **1** and **2** and transfer to posts **3** and **4**. Again, use a seaweed rope to measure from post **2** across to the next post. This is post **4**.

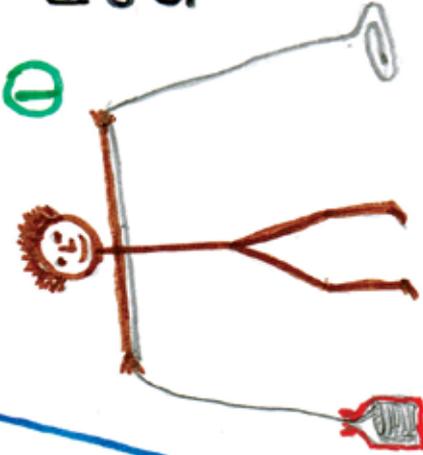
MEASURING YOUR ROPES:



4 mm + 6 mm
Ropes.

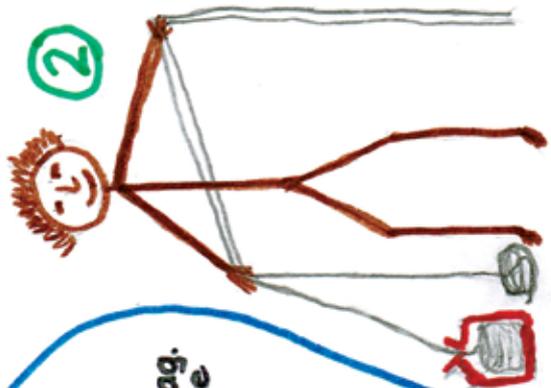


Put the roll of rope into a bucket, carton or plastic bag. Remove all the straps from the roll of rope. Pull out the rope from the middle of the roll - NOT from the outside - as shown. From the outside will cause the rope to tangle.



①

Both outstretched hands can be 1 fathom. Measure one rope at 4-7 fathoms using this method. One fathom is about 2mtrs.

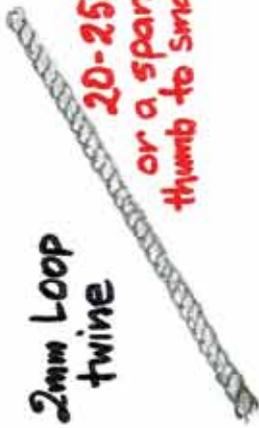


②

Use the rope that was measured (as above) to measure all your ropes. All your ropes will then be the same length.

LOOPS

2mm Loop twine



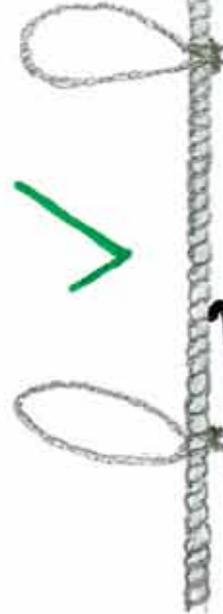
20-25cm or a span from thumb to small finger

Split 2mm twine to make 3 loops



Loop.

Do not make these too big.



20-25cm between loops or a span from thumb to small finger.

4mm or 6mm Rope

Pull the seaweed line through the loop.



Use this method for big plants.

6mm or 4mm rope.

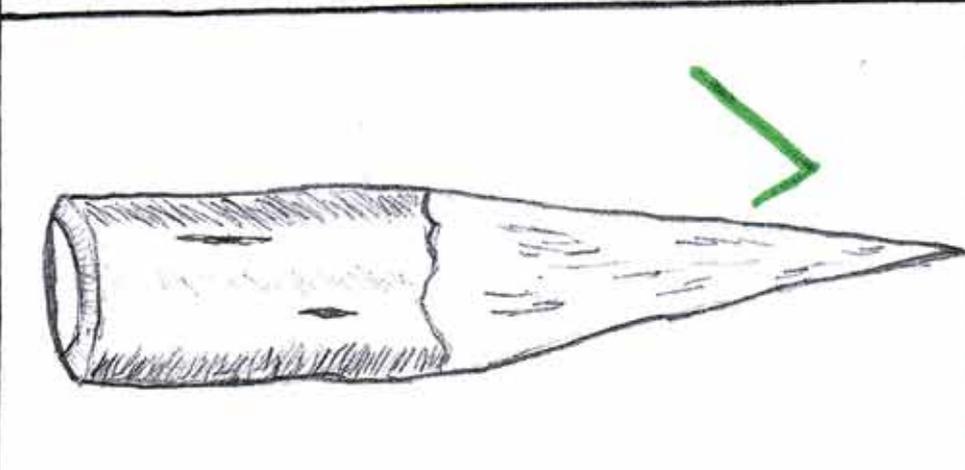


Use this method for small plants

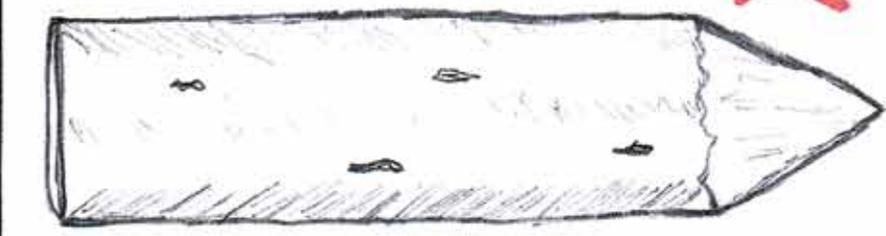


The plants will hang down from the rope.

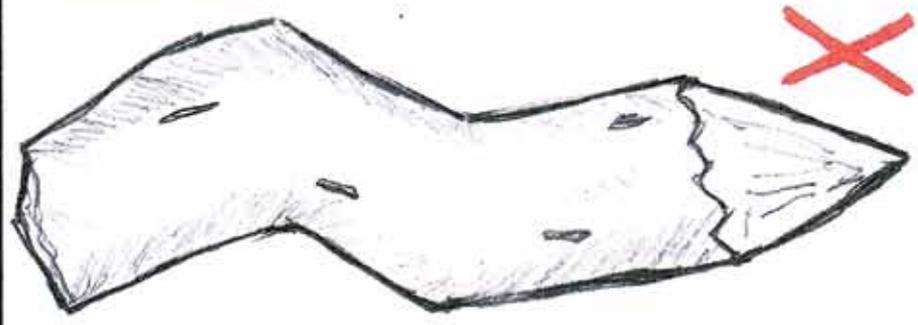
POSTS:



Cut posts up to 1m long. Sharp posts are easier to put in. Taper the tops to reduce splitting.



Blunt posts do not go into the sand easily.

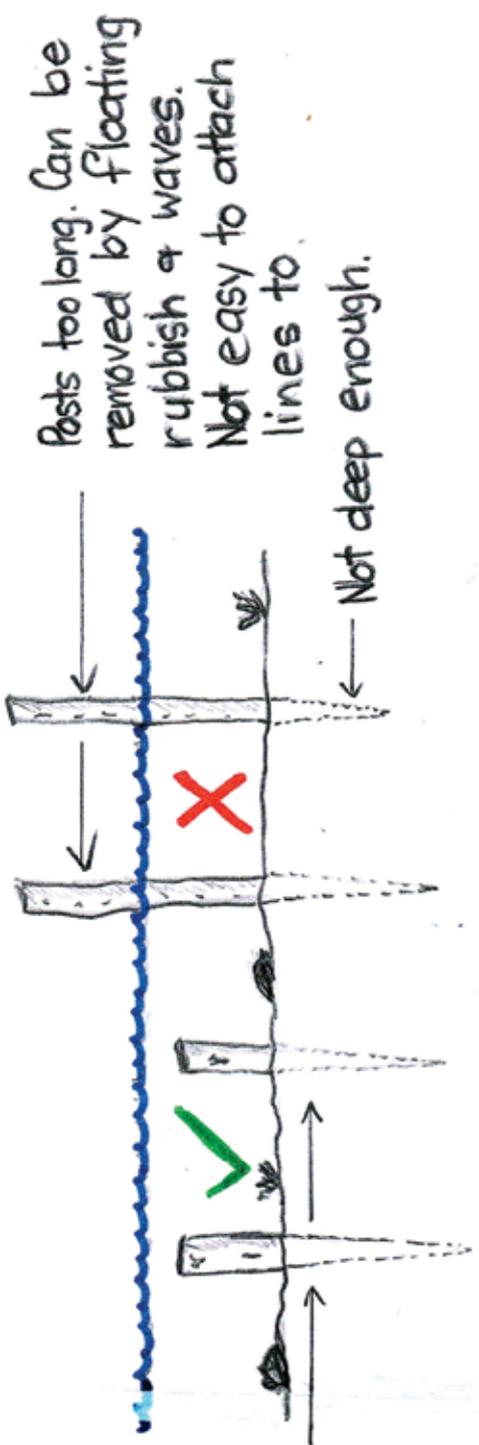
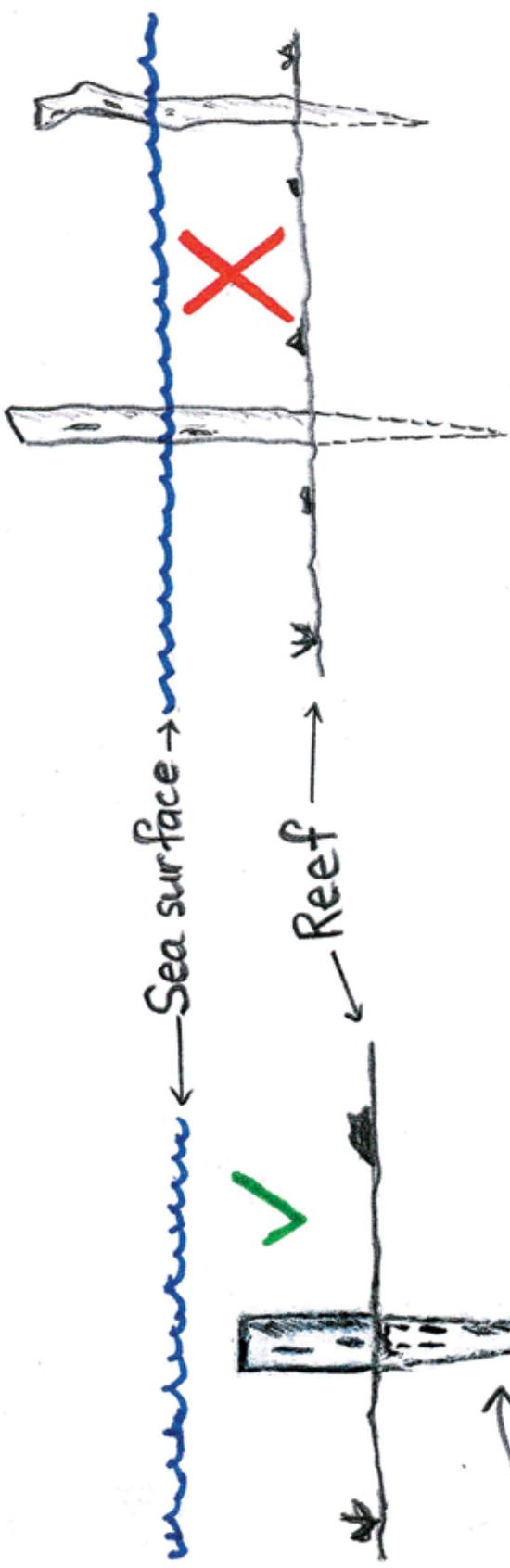


Crooked & blunt posts are not easy to put in.



Too thin. Top not flat - will split easily.

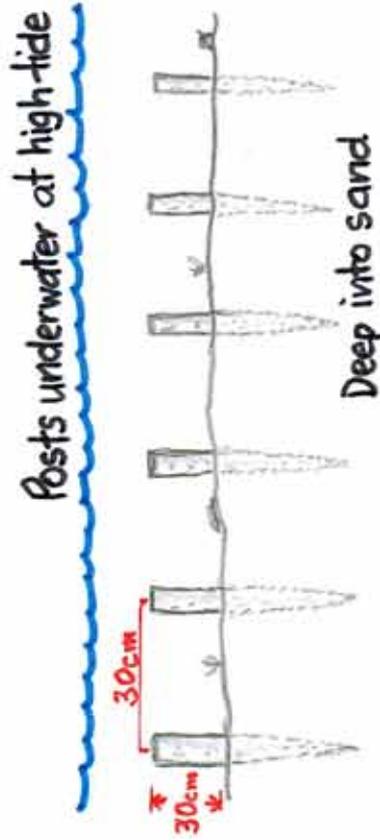
PUTTING in the POSTS: - good + bad posts.



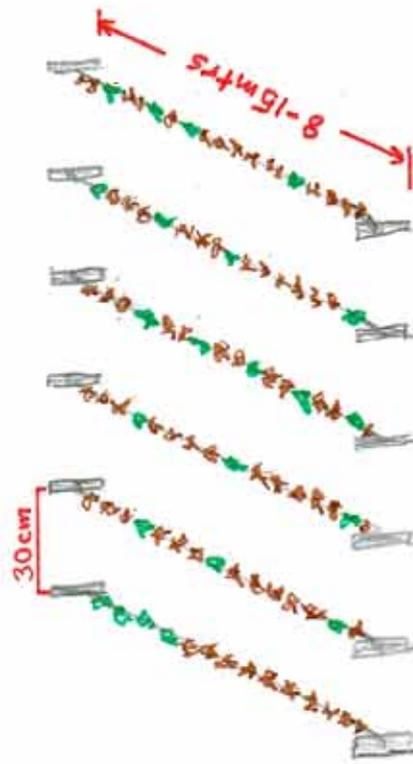
Posts will remain strong as they are deep in the sand. Waves and floating rubbish are not able to remove these posts.

Posts too long. Can be removed by floating rubbish & waves. Not easy to attach lines to. Not deep enough.

OFF BOTTOM - post to post

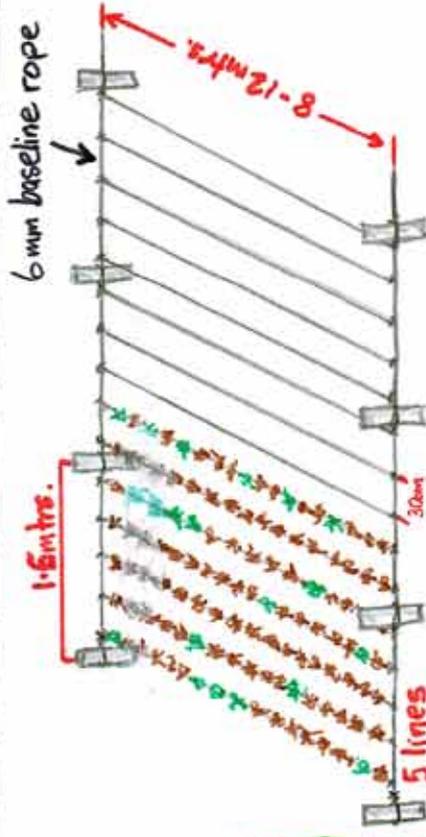
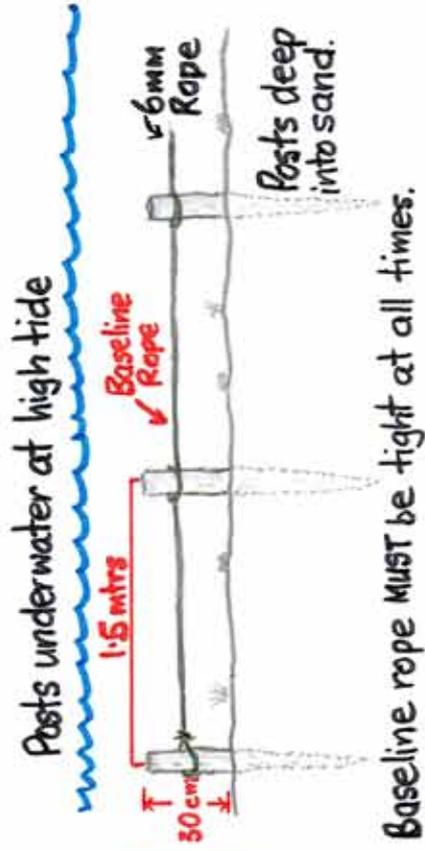


Deep into sand



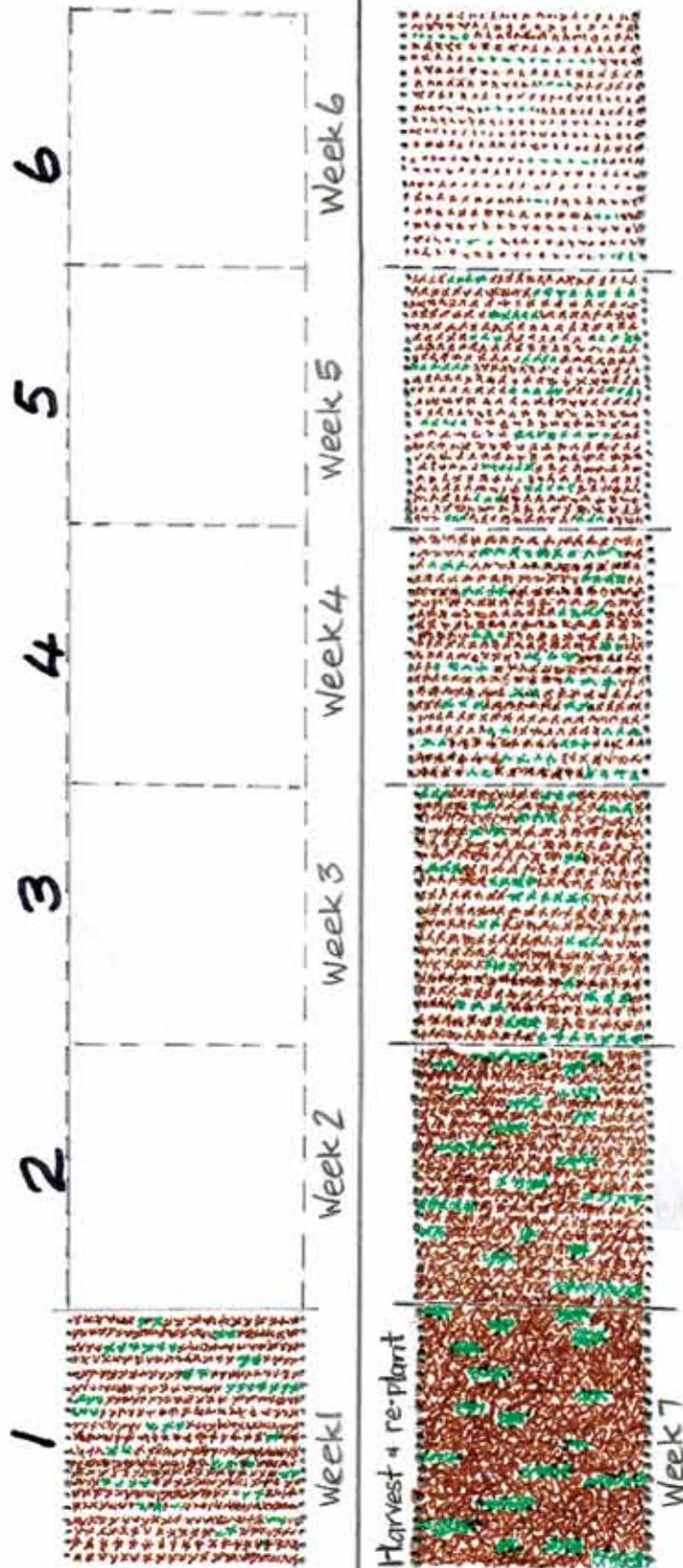
Keep lines tight.
Keep lines off the sand.

OFF BOTTOM - baseline



15 lines = 8 posts (post-to-post = 30 posts)
Keep baseline very tight.
Keep seaweed lines tight and off the sand.

FARM ROTATION



- 1) Plant six plots over 6 weeks.
- 2) Each plot to be the same size with the same number of lines.
- 3) Only plant what you can handle comfortably.
- 4) Harvest and replant plot 1 after 6 weeks from planting.
- 5) Harvest and replant one plot each week.
- 6) Receive an income every week.

NOTES



A series of horizontal lines for writing, spanning the width of the page. The lines are evenly spaced and extend from the right edge of the page towards the left, where they meet the decorative graphic.

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