

PRECISION KELP FARMING

By Dr. Alexander Ebbing



“If we are to thrive for the next thousand years, we must increase Earth’s carrying capacity. The ocean is not our limit, it’s our leverage.”

From Tradition to Precision: The Path to Scalable Kelp Farming



Jan stands on the deck of his boat, a fraying rope in one hand, his calendar in the other. He squints at the kelp lines still dangling below, hoping last year's survivors have started producing sorus (classic Jan).

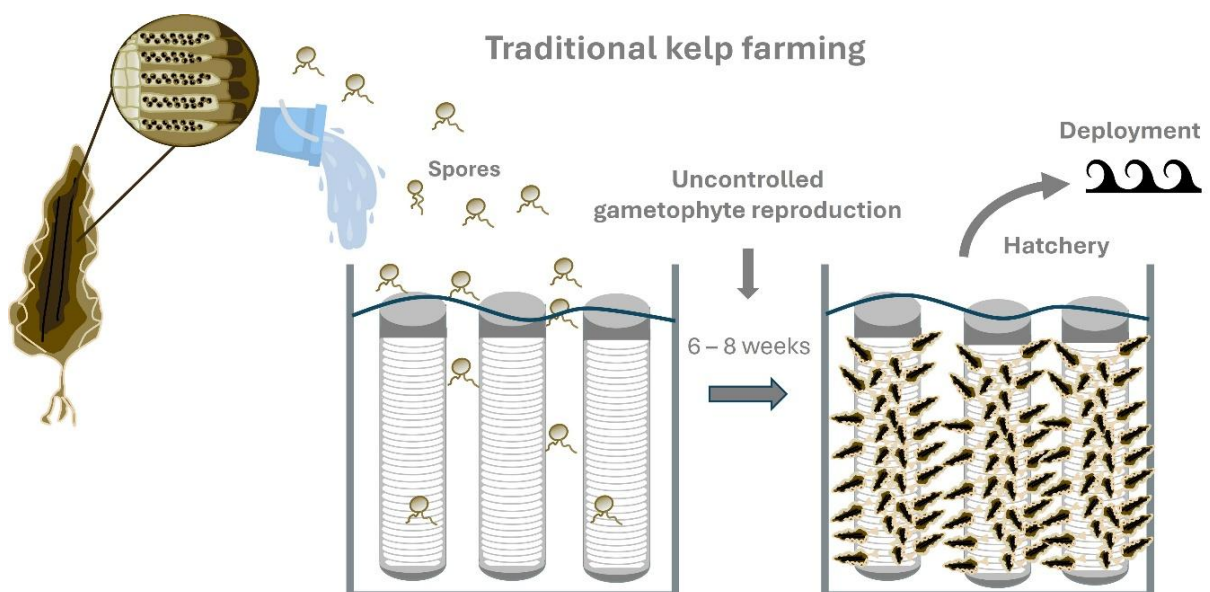
““It should be time,” he mutters.

But it's not. Not yet. The sori—those precious patches of mature reproductive tissue—are late this year. Or are they just patchy? Or will they not come this year due to the incredible hot summer? No.....Maybe last summer's heatwaves stressed the kelp too much! Maybe grazers got to them first. Or maybe nature's just feeling cryptic this year....

So Jan waits. Then after 4 harrowing weeks he finally finds enough mature sorus tissue scraps—scrapes it off the wild sporophytes, triggers sporulation, hustles it into the hatchery, and inoculates his Twine cultivation ropes. From there, he nurtures them in tightly controlled tanks for 4 to 6 weeks, until the young sporophytes are ready for deployment. Fingers crossed that no infection accidentally is introduced in the basins, making Jan's work, all that work, for nothing.... And with a bit of luck we can outplant!

Now we just have to hope the weather window aligns with the schedule we set—over six weeks ago..... Uhm, here we go.....Fingers crossed...Again.....

This is what traditional kelp farming might look like for a farmer named Jan.



It works—but only if nature cooperates. And it's riddled with dependencies: on wild kelp or surviving holdovers, on available sorus tissue, on the seasonal timing, on a clean hatchery process, on a cooperating weather window. All eating up the predictability a kelp farmer craves for. All adding stress at the start of an already stressful planting season.

What Traditional Farming Gets You

- You need **mature sori** to start your cycle.
- These sori **aren't always available, predictable, or cooperative**.
- You collect spores, inoculate ropes, and nurture them in a hatchery. A process that is very **prone to infections** (e.g. green algae, diatoms, or fungi) if you do not exactly know what you are doing.
- After 4–6 weeks of babysitting, sometimes even 6 – 8 weeks of babysitting, you hope to have enough visible baby kelps on your twines to deploy. After all, **patchy lines quickly become a risk for further infection**.
- You have no control or insights on the reproduction of kelp gametophytes. After all, you attach the spores or young gametophytes on the twine substrates and therefore let nature have its groove on 😊, without your direct supervision.

Let's be clear: for many traditional kelp farmers, the process isn't as chaotic as described above. The cultivation method actually works more often than not. After all, in Asia huge kelp industries thrive using this traditional approach. However, for many new kelp farmers I worked with, primarily outside of Asia, this method seemed simply... unreliable, stressful, too season-dependent, and above all, **imprecise**. The lack of control over the farm became especially apparent with farmers that had put their brave shoes on and decided to increase their farm size over the summer period.

It is this lack of control that was experienced by these kelp farmers that leads me to believe that the Traditional Kelp Farming method just does **not seem to be made for scale**. The traditional kelp cultivation method is like using a surplus shotgun, where you scatter a gazillion billion seeds over your twine with the aim of having a good harvest—when in reality, scaling more often than not, requires sniper-like precision.

In kelp farming terms, sniping could look like this in a couple of years:

Two gametophytes getting their groove on ---> one kelp that is outplanted --> one kelp that is successfully harvested. No surpluses of anything.

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