

Techniques for Land Regeneration[©]

Errol Wiles

Australian Forest Growers Association, Kruckow Road, BABINDA QLD 4861

I plant trees! Please be assured that I am not 28 years old and have had a hard life; I really am every bit of the 63 years that I look. Why then do I plant trees?

Elementary arithmetic will tell you that my planting trees for dollar profit is no less than eight different kinds of stupid in one. There has to be something else. There are other profits, and being at peace with the Beneficent God is one of them. I am in the blessed position of having a suitable piece of land in these glorious wet tropics and of not being dependent on it for my income. This circumstance carries with it a bounden obligation: that is to do what is right and do it well. So plant trees. Which trees?

In the scrub on my place and in the National Park, which is on three sides of my property, there are probably upwards of 600 species of trees. Dare I suggest that becoming familiar with the vices and virtues of all those would involve a lifetime of work and study? Obviously I don't have a lifetime. It became necessary to determine, aside from obligation, just what I wanted to achieve in as few categories as possible. In reaching that determination I have made no fewer than 783 mistakes and I probably have capacity for that number again.

What that indicates is that there is a paucity of definitive information in readily accessible form to lay persons. And, from my experience, we have to be reasonably site specific in recommending what to plant.

From all this you can see that I really needed to determine for myself what to do. The result is about eight different planting regimes. I wanted some cabinet woods, some more utilitarian species, some feel-good species, and some habitat species. For cabinet woods I wanted cedars, maples, silky oaks, walnuts; for utility I wanted eucalypts, quandongs, and acacias; for feel-good I wanted the like of macaranga; and for habitat I wanted quandongs, leichhardts, and euodias. What a fool! The tip-moth borer fixed up the cedars, some violent winds took care of the maples and eucalypts, and other bugs ruined all of the acacias.

Now when all else fails, read the instructions. So that was next in the plan. I spent all spare time wandering my scrub and the National Park to find what was growing, where it was growing and how it was growing, i.e., dominance, understorey, companions.

I can explain those eight different planting regimes by telling you I have Russell River frontage, creek banks (mostly vertical), flood paths, springs and seeps, hill country, self-regenerating scrub, and natural scrub. I knew nothing of most efficacious spacings. While there is some species crossover, each of those physical conditions has fairly specific species requirements. What excels on well-drained slopes will not necessarily prosper on flood paths. Even in examining riverbanks we can see that there may be four or five strata from low water level to flood bank level, each with different populations. I suggest that most landcare groups, despite excellent commitment and enthusiasm, tend to execute riverbank plantings in a willy-nilly manner.

The wet tropics lowlands have some acute dangers that can severely punish the careless or the unwary. One is prodigious rainfall. Last year our Russell River

drained 11.8 m of rain from its source mountains and 7.3 m from my lowland area. One irreverent sod reckons I am the only bloke practicing hydroponic forestry. Our short rivers are sometimes violent and certainly cause erosion from both bare and forested banks. It is a mistake to forbid harvesting of trees on riverbanks. I have seen a large tree of such mass that the river's sodden wet season bank could not support it. The tree slumped vertically into the river taking a great ball of soil with it and exposing the bank to the flood. Within minutes the next 100 m downstream lost 2 to 3 m of frontage. Sometimes discretion favours the selective harvesting of riverbanks. The damage may not even start if trees with deep and spreading root systems inhabit vulnerable parts. Good examples of this type of tree are: *Ficus racemosa*, *Nauclea orientalis*, and *Tristaniopsis exiliflora*.

On one of my sloping paddocks there was a nasty gully erosion problem when I bought the place. My heavy rainfall required that stopping the erosion was a priority job, so I had contour banks built. Subsequent plantings were all done on contour lines following the banks — problem over. Well, not really. We know that erosion will persist whenever there is gravity. However, erosion on that sloping paddock has dramatically reduced, and I think there are clear lessons for anyone who wants to see them.

In searching for appropriate species to plant I searched my local bush and other comparable areas in the region. Now, while I have abandoned the idea of dollar profit for me, reasonable profit in a reasonable time is necessary if we are to attract the number of planters this country needs. It therefore sought species from other areas with similar conditions, including Papua New Guinea, Africa, Indonesia, and the like. That is, my indigenous areas are around 15° north and south of the equator. If Australian acacias and eucalypts can thrive elsewhere in the world because their indigenous pests and diseases are absent, it seems reasonable to me that exotic species may thrive here and help us overcome the 1.8 billion dollar annual deficit in forest products. We now find ourselves importing eucalypt planting material from Brazil!

You breeders and propagators did similar things to South and Central American plants, i.e., improving and re-exporting with tropical legumes like puro, stilo, siratro, callipo, etc, so fair enough. I am sure you can imagine all the cries of dismay from some authorities and perhaps even from some of you, at my seeking exotic timber species. "They may become weeds!"

Well the Australian natives I tried failed miserably: Huon pine, mountain ash, karri, and jarrah. Perhaps being Australian is unimportant; perhaps friendly soil and climatic conditions are more important. Everything that you eat and wear is exotic — except macadamias. Did we worry that asparagus may become feral? In fact, will someone please tell me how to induce *Khaya senegalensis* to become a weed? At \$3000 m³ retail, I think I could stand having my place overrun with African mahogany. That is not to say that great caution should be abandoned. There have been terrible things released into our environment, mostly from home gardens and aquariums, and we want to minimise these risks. I cannot imagine eliminating the possibility of risk.

From all this rambling I have put together some rules that I try to impose on myself — often unsuccessfully. They are:

- Keep your matches in your pocket, rainforest trees hate fire.
- Know your land — your base rock formations, your rainfall, your slopes, your temperature variations.

- Study the local native forest, discover what prospers naturally.
- Know the growth pattern of your selected species — deep roots, shallow roots, crown size, etc.
- Know something of the desirability of various species from a marketing and value point of view.
- Ignore current fashions. Fashions in wood usage are as variable as those for women's shoes.
- What critters will make use of your trees and should you provide food trees or shelter trees.
- Try for multiple use species. For example: *Nauclea orientalis*, Leichhardt pine or cheesewood. Forestry lists this tree as durability 4 (not very durable) but a saw miller friend has used it as treads on his external stairway. It is a lovely golden timber. The tree has a prodigious and deep root system, provides excellent shade, has an edible fruit suitable for cassowaries and other fructivores, and epiphytes proliferate in its umbra.
- Always try for the right tree, right place, right purpose, right time.

Now, what do we planters, wherever we are, want from you the propagators? We want ace quality. Seed gatherers must be encouraged to seek out prime specimens for their genetic material. Seed falling from a *Cardwellia sublimis* will not necessarily grow into a prime silky oak. We want plants from well-formed provenances. We want planting material that is not old in the pot. You will remember I said cyclones belted my eucalypts around very savagely. Many had heads blown out or were snapped off 3, 4, or 6 m from the ground. I examined those that were blown out of the ground or were broken off at or near ground level. In most cases root development was poor and there was abundant evidence of ring rooting. From this, I believe the plants were too old.

How do we get eucalypts that are much smaller, i.e., younger, and I think 15 cm tall, maximum, with root development such that the ball does not disintegrate on extraction from the pot. I think it would be a matter of not too much difficulty to manufacture pots from material like coir. The material could be stiffened with a biodegradable glue containing fungicide and slow release fertiliser. In this way, healthy, vigorous, young seedlings would be planted pot and all.

Quality site preparation and meticulous weed control should ensure maximum survival and trouble-free growth. When a local revegetation programme took off in 1993 with far more enthusiasm than planning, I suspect some nurseries took advantage of the occasion to unload old stock.

Let me finish with a little bit about values. Let me imagine I have 100 ha that I have planted at a rate of 600 stems ha⁻¹ with a tropical rainforest cabinet wood species. These I manage carefully and bring 150 stems ha⁻¹ to maturity. I will use a transportable mill and harvest one stem per day. By that I mean stump recovered and cleaned, butt log milled, fork slabbed, branches cut up for turners, and site replanted. I will be flat out doing one stem per day, five per week, 250 per year. That's 60 years to do one circuit of the 100 ha. Time to start again. I have quotes of \$1000 m⁻³ green off the saw. If I recover no more than 1 m³ per stem (only the butt log) it would be a poor result. But that means the 100 ha could yield in full swing \$1000 per day forever. As you see, I am quite mad. Thank you for your listening patience.