

To whom it may concern,

I write my response from the middle of a rainforest in Bahia, Brasil. I am here directing a documentary on Successional Agroforestry; a practice dedicated to accelerated forest-regeneration. I have met and will continue to interview people who in the space of 8-20 years turn a barren, deforested wasteland, due to agriculture and cattle grazing, to abundant, thriving ecosystems. In order to ensure the longevity of Victoria's forests, it is critical to explore different models for how to restore forest land impacted by mining or logging practices in a cost-effective manner which best simulates natural forest recovery and provides for human livelihoods.

I'm requesting that a joint environmental and industry committee is established, governed by the Regional Forest Agreement (RFA), to progress the establishment of Successional Agroforestry and other progressive practices for forest regeneration and sustainable logging in Victoria. In addition, with oversight from this committee, funding pathways are created to support viable projects utilising these methods throughout RFA protected areas.

What is Successional agroforestry?

Successional agroforestry relies on two core understandings when planting. Stratification and succession.

Stratification:

Planting in layers of low strata plant species that require 20-40% sunlight, to medium strata species that require 40-60% sunlight and emergent strata species that require 60-100% sunlight.

Succession:

Some species are fast to grow and die out, returning nutrients to the soil (lettuce, legumes etc). And some take a long time to grow and flourish (fruit trees and other pioneer species).

Stratification refers to how plants organize themselves in space. And succession is their process of growth throughout time. Understanding different plants stratification and succession allows human intervention to have maximum impact on regeneration, and to receive benefits from the process (food, wood, tourism etc)¹.

¹ Sanchez PA. 1995. Science in agroforestry. *Agroforestry Systems* 30:5-55.

Techniques for managing an agroforest.

Pruning:

This is one of the main techniques for accelerating forest regeneration. Pruning, also known as chop and drop, allows the ecosystem to stay in an active growth state. A metaphor to understand this is an old forest with little human interaction is like a nursing home, the energy is slow and everything takes a long time to happen. But once you chop and drop, the ecosystem then enters an active growth state and becomes more like a kindergarten, full of energy and destined to grow rapidly².

Ground cover:

For regenerative agriculture, there can be no soil exposed. When the earth is bare, it is susceptible to erosion by natural agents, such as rain and sun. The gradual action of rainfall on the surface of exposed soil displaces minerals and nutrients by leaching and leads to compaction of the soil, reducing the fertility and rate of infiltration of the water in that place³.

Diversity in Planting:

Simply put, the more diversity in a system the better the exchange of nutrients between plants, resulting in faster growth, less disease, richer soil and healthier food. Each plant takes certain nutrients from the soil and gives back different nutrients⁴.

Nature is cooperative:

The biggest shift in our approach to working with nature is to change our mindset from competitive to cooperative. Individually we may see plants and animals competing but the wider our perspective becomes, we can actually start to see how it is far more cooperative than competitive.

For example:

A lion will hunt and kill an antelope from a herd. But something that is harder to notice is that the lion kills the antelope that is the weakest, slowest and most lame. Ensuring the best reproduction of the pack.

A tree that has ants eating it away. We would normally think the ants are destroying the tree. But actually what they are doing is eating away a disease that is in the tree, or destroying the tree so more sunlight can come into the lower plants (this may be needed to rejuvenate the soil for example).

Benefits of Successional Agroforestry:

The benefits of Successional Agroforestry are wide-ranging and long-lasting. These include:

² Lawrence T. Szott, Erick C.M. Fernandes, Pedro A. Sanchez, Soil-plant interactions in agroforestry systems, *Forest Ecology and Management*, Volume 45, Issues 1–4, 1991, Pages 127-152

³ Carmen García-Fernández, Miguel A. Casado, Forest recovery in managed agroforestry systems: The case of benzoin and rattan gardens in Indonesia, *Forest Ecology and Management*, Volume 214, Issues 1–3, 2005, Pages 158-169,

⁴ ieira, D. L., Holl, K. D. and Peneireiro, F. M. (2009), Agro-Successional Restoration as a Strategy to Facilitate Tropical Forest Recovery. *Restoration Ecology*, 17: 451-459. doi:[10.1111/j.1526-100X.2009.00570.x](https://doi.org/10.1111/j.1526-100X.2009.00570.x)

- Reestablishment of the natural water cycle⁵.
- Improved biodiversity⁶.
- Massive acceleration to the regeneration process⁷.
- Unparalleled improvement to soil⁸.
- Rapid acceleration without herbicides and pesticides⁹.
- Economically viable as these forests can create food for supplying local communities with healthy, organic food. Also, logging can continue. Not in its large-scale form as it is now but planting trees like eucalyptus is essential for successional agroforestry. These trees can be harvested when fully grown. Our research has demonstrated that flora and fauna in a Successional Agroforest grow substantially faster than in a monoculture plantation as there is wider access to nutrients and water from the diversity of plants¹⁰.
- Large amounts of Carbon sequestration due to the diversity and density.

Case Studies of Successional Agroforestry Systems:

Bahia, Brazil: Fazenda Olhos d'Agua

Over the last 30 years, Successional Agroforestry has played an important role in regenerating soils and improving productive ecosystems of degraded agricultural and forest landscapes in Brazil. In 1994, a team of researchers partnered with the owner of a 500ha farm in the Gandu District of southeastern Bahia. The farm was converted from degraded pasture and secondary forest, with remnant fragments of a primary forest, to a cultivated agroforest. After a 10 year period, the regeneration of the site had been achieved, enabling wildlife diversity, preservation of endangered wildlife and the provision of a wide variety of food, as well as sufficient supply of construction timber and rewood¹¹. It was demonstrated that the ability to regenerate the land was enhanced greatly through the application of the Successional Agroforestry method¹².

Isla de Ometepe, Nicaragua- Project Bona Fide

Project Bona Fide is a research and demonstration farm in Nicaragua that aims to inspire local partners and people from all over the world to undertake their education through hands-on learning experiences with permaculture design, agroforestry, and community collaboration.

⁵ Gregory, P.J. *Agroforest Syst* (1996) 34: 51

⁶ Norris, K. Agriculture and biodiversity conservation: Opportunity knocks. *Conserv. Lett.* **2008**, 1, 2–11.

⁷ Verchot, L.V.; Noordwijk, M.V.; Kandji, S.; Tomich, T.; Ong, C.; Albrecht, A.; Mackensen, J.; Bantilan, C.; Anupama, K.V.; Palm, C. Climate change: Linking adaptation and mitigation through agroforestry. *Mitig. Adapt. Strateg. Glob. Change* **2007**, 12, 901–918

⁸ Jacobson, M.; Kar, S. Extent of Agroforestry Extension Programs in the United States. *J. Ext.* **2013**, 51, Article 4.

⁹ Wilson, M.H.; Lovell, S.T. Agroforestry—The Next Step in Sustainable and Resilient Agriculture. *Sustainability* **2016**, 8, 574.

¹⁰ Foley, J.A. Can We Feed the World and Sustain the Planet? *Sci. Am.* **2011**, 305, 60–65.

¹¹ Young, Katherine. (2017). Mimicking Nature: A Review of Successional Agroforestry Systems as an Analogue to Natural Regeneration of Secondary Forest Stands. 10.1007/978-3-319-69371-2_8.

¹² Vieira, D. L., Holl, K. D. and Peneireiro, F. M. (2009), Agro-Successional Restoration as a Strategy to Facilitate Tropical Forest Recovery. *Restoration Ecology*, 17: 451-459. doi:[10.1111/j.1526-100X.2009.00570.x](https://doi.org/10.1111/j.1526-100X.2009.00570.x)

In 2001, [REDACTED], a student from Project Bona Fide, purchased a 10.5ha property on the south-eastern side of Volcán Maderas on the twin-peaked volcanic island Isla de Ometepe. The site had been abandoned by local farmers, who had cleared the land of timber, and over utilised the land until it could no longer support agriculture. It was then heavily grazed with cattle until compacted and eroded, and no longer provided adequate nutrition for the cows. [REDACTED] applied strict Successional Agroforestry practices including:

- the promotion of nutrient cycling (particularly nitrogen) through the introduction of leguminous groundcovers, and multifunctional shrubs and trees.
- Building rapid biomass through the selection of short-lived perennials (such as bananas or pigeon pea) and fast-growing woody species (ideal for rewood), that can be used to “chop and drop” branches and leaves for rapid in situ mulching around valuable fruit, nut, or hardwood trees planted on contour.
- The nitrogen producing shrubs or trees (such as *Gliricidia sepium*) provide wind protection and shade, nitrogen, and provide rewood and stakes through coppice and pollarding.
- The short-lived perennials also provide shade and windbreaks, and bananas have the added benefit of maintaining moisture in soil, providing moisture-rich organic material for mulch, and provide edible fruits.

Empirical evidence demonstrates that from 2001–2016, [REDACTED] has achieved an increase in biomass (critical for carbon sequestration), improved soil fertility and soil moisture retention, mitigation of erosion and flooding, wildlife corridor connectivity, the creation of wildlife habitat in a previously severely disturbed agricultural landscape, and food sovereignty¹³.



Figure 1: images captured at the same location after initial planting (left) and 7 years later (right)¹⁴

Summary:

¹³ Young, Katherine. (2017). *Mimicking Nature: A Review of Successional Agroforestry Systems as an Analogue to Natural Regeneration of Secondary Forest Stands*. 10.1007/978-3-319-69371-2_8.

¹⁴ Young, Katherine. (2017). *Mimicking Nature: A Review of Successional Agroforestry Systems as an Analogue to Natural Regeneration of Secondary Forest Stands*. 10.1007/978-3-319-69371-2_8.

'The RFAs seek to balance competing economic, social and environmental demands on forests.'¹⁵

As previously mentioned, the way forward is not through balancing competitive needs. But meeting each need cooperatively. The solutions have to be long term and context-driven, otherwise, we will continue to put bandaid after bandaid on until there are no more bandaids or the problem is too big. Successional agroforestry can meet the needs of the economy, of society, and of the environment.

The best process is long term. And we need to first focus on the environment by regenerating, then society by integrating and then the economy through profiting off ecology. Long term solutions require a short term sacrifice but create a cycle of perpetuating long term benefits on a variety of levels.

This public consultation process is about Regional Forest Agreements. For the benefit of future generations the only agreements we should have in place are ones where the effects are benefiting society, ecology and economics. If the agreement does not benefit these three layers than it should not be implemented. You may think it too difficult to find solutions that have benefits to all three, but I have given you one that does (and is proven to work in Brazil, and the work being done with this agroforestry technique in Australia is on its way to having huge impacts on all three levels).

If this solution interests you please feel free to get in contact and I can put you in contact with experts in this area who would know how to implement this technique and amplify benefits. [REDACTED]

I'd be delighted to be provided with the opportunity to discuss this in person when I return.

Yours sincerely
[REDACTED]

[REDACTED]

¹⁵ <http://www.agriculture.gov.au/forestry/policies/rfa>