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Using trees to build a better world

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Asia Pacific Resources International Holdings Ltd.'s mature *Acacia crassicaarpa* trees surround a recently harvested plot at one of the company's plantations located in their pulp and paper manufacturing facilities in Kerinci, some 40 miles east of the central Sumatran city of Pekanbaru, in Indonesia. Photographer: Jonathan Drake/Bloomberg News BLOOMBERG NEWS

I worked in Hawaii for five years for a man who owned plantation forests. Inevitably, I ran into people who complained when it was time to harvest these forests. They simply didn't distinguish between tree farming and clear-cutting of old growth forests. To them, cutting down trees was bad. Period.

I thought of this last week when I watched Michael Moore's new documentary [Planet of the Humans](#). The film has some environmentalists agitated because they charge that there is a lot of misinformation in the film.

As an aside, I agree that there are a lot of things wrong with the film, but the fact that Gasland's writer and director Josh Fox is trying to get the film banned because — in his [own words](#) — it is “riddled with falsehoods and misinformation”, is textbook irony. As fellow Forbes contributor Michael Shellenberger [correctly notes](#), Gasland itself is riddled with falsehoods and misinformation.

But I digress. Planet of the Humans is extremely critical of using biomass like trees to produce power. They treat the idea of burning trees for power as an environmental abomination.

Certainly, the burning of trees can be bad, but one can't treat that as a universal truth. You wouldn't make a blanket statement that all drugs are bad, just because some people abuse drugs.

Trees can cycle subsoil nutrients up into the topsoil. If you plant trees on marginal land, grow them, harvest them, and then replant them — you can actually improve the soil quality of that marginal land over time. So I flatly reject the blanket characterization that cutting down trees — even if they are going to be used to produce power — is always bad.

I grew up on a small farm in Oklahoma. Wood was our primary source of heat. More wood grew on our farm than we ever harvested, so it's ridiculous to suggest that wood can't provide sustainable energy. There are plenty of cases where wood is harvested in an unsustainable way, but that doesn't mean it must be that way.

In a [recent interview](#) with University of Washington Professor Indroneil Ganguly, we discussed the important environmental role of trees. In addition to the interview with Professor Ganguly, I also interviewed Ford Seeman, founder and president of [Forest Founders](#). The mission of Forest Founders is to plant trees to “help revitalize land and provide sustainable living conditions for people.”

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RR: Can you explain the relationship trees have with the carbon cycle? Does a mature forest continue to sequester carbon, or is most of that done during the growth phase?

Ford: Trees are the workhorse that help sequester carbon, but they aren't the only one. Every organism that depends on photosynthesis to survive and create the building blocks they need for life are an integral part of this carbon sequestration web. There are two ways to look at carbon sequestering functionality. Trees are a part of the habitat that is created through this process. The other side is fuel for complex food chains.

Studies have shown that the oceans may sequester more carbon than our trees. Every food chain starts with autotrophs, plant-based fuel sources, which feed into the base of the heterotrophic side of the chain, herbivores and carnivores. Every complex food web starts with organisms on plant-based diets.

Trees in particular have a large role to play in our environment by creating the majority of the oxygen almost all life on this planet needs to survive. Mature trees capture less carbon but convert more carbon dioxide into oxygen. Growing trees sequester carbon and turn it into the building blocks they need to create woody mass to grow. Most trees growth will be limited by environmental factors that will trigger them to stop growing when certain resource thresholds are surpassed, be that space, nutrients, root density or environmental conditions.

When trees die some of the carbon is released through processes of decay but a majority is converted into soil and broken down by bugs and fungi. Before these organisms evolved trees would die and start to pile up. Since there weren't organisms to help them break down, they would be covered over and through millions of years of geologic events be turned into the coal we now dig up and burn. Using coal as a fuel source is taking carbon sinks millions of years old and reintroducing it into our atmosphere. It is no wonder that our natural well-balanced carbon sinks can no longer keep up. Our oceans are absorbing more and more carbon to the point they are reaching saturation. This is a process called ocean acidification that is starting to tip to a point where life in our oceans must adapt or die out.

New growth forests will sequester carbon faster than old growth forests, but many new growth forests are created for industrial purposes. Even though these trees are destined to be a part of our economic system and cut down, as long as they aren't turned into firewood or stove pellets, we still see a beneficial effect in their commoditization. Wood turned into pulp for paper for example still retains carbon. It is how these products are disposed of that will tell whether their life cycle is a net benefit or negative to the carbon cycle.

RR: What happens when an old growth forest is deforested? How does this damage the ability of the environment to sequester carbon?

Ford: Many old growth forests have already come close to maxing out their ability to sequester further carbon. The reason cutting down old growth forests is so detrimental is due to the enormous amounts of carbon already sequestered in their ecosystem. These old growth forests aren't just woody masses of carbon, they represent entire complex ecosystems that include bacteria, insects and animals that have found a healthy thriving balance for these systems to exist.

One of the reasons the burning of the rainforest in Brazil and the Congo is such a travesty is because these ecosystems over millennia of growth have created their own microclimates that are extremely beneficial and integral to their survival. If the forests lose enough landmass and aren't able to self-regulate and dictate the climate in their regions they might not be able to survive the harsh conditions they would be exposed to. The delta between the Tigris and Euphrates rivers was once known as the fertile crescent. Now they are largely deserts. This is due to the inability for them to control their microclimates.

As an environment hits a tipping point and can no longer help regulate its own climate, conditions become harsher. This creates a negative feedback loop, which in turn creates a more hostile environment. Over many years some species adapt to the harsher conditions, we might see new species evolve or older fringe species get a larger foothold. This is how entire environments change over time.

When capitalism drives us to unsustainably use our natural resources, we become the cause of instability within these ecosystems. With rapid deforestation or urbanization, we interrupt the ability of these old growth forests to regulate themselves. This sets a dangerous precedent and forces us to be the stewards of the environment when they were once self-regulating.

RR: How much global potential is there for using trees to remove atmospheric carbon dioxide?

Ford: Studies have shown that one trillion trees planted can help negate the carbon emissions of the past decade. Planting trees all over the world will be a huge help to correct the wrongs of our industrial past. We have the ability to correct the carbon crisis we have brought upon ourselves, but the issue is not as easy as planting trees. We need new regulations put in place. We cannot continue to operate on a business as usual basis.

As Einstein is credited with saying, "We can't solve problems by using the same kind of thinking we used when we created them." We need to end urban sprawl. We need to see what works and replicate it. We need to create new old growth forest opportunities instead of shuffling around our resources and acting as if planting a tree is good enough on its own. We need to consider that maybe we have taken too much land from the planet for ourselves to allow the world to thrive and flourish to the best of its natural abilities.

Planting trees for carbon sequestration will work, but only if we cut down on new sources of industrial carbon pollution. We are already at a tipping point that will only continue to get worse if we can't get a handle on our carbon output.

We are in the midst of a technological revolution that has been exponentially increasing for the last century. The majority of it has been fueled through carbon-based energy sources. In order to cut back on our carbon pollution, we need to embrace renewable energy, wind, solar, geothermal and nuclear energy sources. It will be nearly impossible to extricate ourselves from the modern conveniences the oil industry has heralded us into, such as single use plastics and propane gas for our summer cookouts, but we must move away from them as a primary source of our collective energy needs.

RR: In a managed forest, trees are planted, they grow, and they are harvested. Some of that carbon will be sequestered for a long period of time when it is used in wood products. Are there specific assumptions about the length of time forest products will sequester carbon before it is returned to the atmosphere? And how about the tree roots? How long will they continue to sequester carbon before they ultimately decompose?

Ford: Managed forests help lower our carbon pollution problems in two main ways. Through carefully harvested forestry practices we don't have a need to destroy our old established forest growth, and we also create an opportunity for these trees to continually be in a

growth phase while keeping some of the used trees carbon intact in products and sequestered for all intents and purposes. Wood used in construction is effectively sequestered unless an outlier event exists, such as a fire.

The questions worth asking when determining the carbon pollution from a tree-based product is manner of disposal and use of product. Many trees are pelletized and used as fuel marketed as “renewable.” This is both technically true but also misleading at the same time. The term renewable is tricky because it implies sustainable while being defined as something that can recapture the carbon output, which is technically true, but only on a long-term horizon.

Tree roots are a little trickier. Some species of trees have the ability to regenerate as long as the root system is still intact. Other trees will have their roots decompose over time and add the majority of their carbon into the environment in the form of nutrient rich dirt that can be used by other organisms or trees.

RR: What is the relative carbon sequestration potential above ground and below ground for trees?

Ford: All trees have a life cycle, it is less a question of potential and more a question of purpose. If a tree is logged then the purpose of logging could create two very different outcomes. If the wood is used for industrial purposes it could act as a carbon sink for many years as the bones of a structure. If it is logged to be pelletized then it will very quickly be returned to the atmosphere. Roots in either case will remain in the natural environment and decompose over time.

Most species of trees have about a 1 to 5 correlation of below ground to above ground ratio. The trunk of a tree is where the majority of woody growth happens and the prized possession for most industrial purposes.

RR: What should we be doing today to push this idea forward?

Ford: What we need to do to help trees become a part of the solution is to create more uses for them and other plants as an alternative to fossil-based fuels and other petroleum products. We need to create legislation that creates a healthier market for sustainable and renewable energy to be generated to power our industrial activities. We need to protect our natural environment rather than look at land as a commodity to profit from.

We need to take drastic measures in these drastic times. While we inadvertently introduce predator populations and decimate millions of trees a year, we don't consider introducing nonnative species that could be beneficial to our industrialization of our forests.

Trees are an incredible commodity that are worthy of our admiration, appreciation and protection. Globalization has created a harsh environment for them. We burn unique environments for industrial purposes, think palm oil and land for beef in the amazon. We bring over invasive species that decimate local populations, think ash trees with the emerald ash borer. We commoditize trees for our gain, think dragon's blood trees and palo santo trees. We need new strategies to allow trees to be a part of the answer.

There is an incredible species of tree native to Japan called the empress tree that should be a part of an answer when it comes to the proliferation of tree-based solutions. The empress tree grows quicker, sequesters more carbon and has a highly sought-after wood that is versatile. They are also hard to grow, negating the impact of it spreading out of control as an invasive species. It will also grow out of its root system after the trunk is harvested.

We plant trees that are native without thinking about the negative impact of passing up on better solutions. Planting native trees is what we have become accustomed to due to regulations created when we weren't facing such dire consequences. It is time to change our way of thinking when coming up with the creative solutions that will help us overcome our carbon crisis.

Source: <https://www.forbes.com/sites/rpapier/2020/04/26/using-trees-to-build-a-better-world/#2a30a7da8b84>