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Should bamboos and palms be included in CDM forestry projects?

by

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Abstract

The CDM Executive board has left the decision to include bamboo and palms within forestry crops to the individual countries. Bamboo covers about 37 million hectares which is just about 1% of forests worldwide but it is one forest species that is overwhelmingly important to people with as much as two third of bamboo forests being privately owned in sharp contrast to the other forests and more than 85% of which are state owned. Under intensive small scale private diffused management, bamboo proves itself very valuable to the man. Many species of bamboo have significantly higher carbon sequestration potential when measured over a rotation period. Bamboo biomass production may be 7 to 30 % higher compared to other woody species and it is not uncommon to have aboveground productivity of bamboos in the range of 20 to 40 tonnes per hectare per year. INBAR has reported that average biomass of mature Bambusa bambos plantation at 6 years age (149 tonnes carbon per hectare) is higher than in average teak plantation of 40 years age (126 tonnes carbon per hectare) and that subtropical Moso bamboo, Phyllostachys pubescences, can sequester upto 43 tonnes of carbon per hectare over its 5 year harvesting cycle which is twice that for teak under similar conditions. The proliferating bamboo roots enhance belowground biomass and the soil porosity and, consequently, aeration, percolation, humidity and soil biodiversity leading to faster accretion to the belowground biomass and soil organic carbon, and resulting climate change mitigation advantage. Palms are also excellent species for agroforestry with having high food and carbon values. Both bamboo and palms have significant potential of making CDM projects and enhance food security in

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contrast to other forestry crops that tend to reduce food security. Palms like Palmyrah and date palms sequesters carbon dioxide on lands that produce almost no other woody vegetation thus providing the most suitable tree species for CDM A/R projects for arid zones. Coconut palms sequesters carbon dioxide on coastal saline lands exposed to high coastal winds that often permit few other woody vegetation along many tropical coastal lands thus providing one of the most suitable tree species for CDM A/R projects for these lands. Also due to high degree of homogeneity in their cultivated populations the assessment of biomass in bamboos and palms is relatively easy and low cost compared to other tropical tree species. Thus CDM projects based on these species lower the transaction costs and will give high returns.

Key words: Bamboo, Palms, CDM, forest definition

Scientific classifications can sometimes lead to tricky situations. Bamboos are as much carbon as trees and some of them grow really quick sequestering carbon dioxide faster than the trees. So one would expect bamboos to be plants of choice for climate change mitigation. But because they are taxonomically classified as grasses, not trees, the climate bureaucracy had a lot of reservation in permitting its use in CDM projects. And even when they did ultimately relent about a year back it was with reluctance, giving only 'in principle' approval allowing bamboos, and palms, in afforestation and reforestation projects and actually leaving it to the individual countries to make the choice.²

Bamboo covers about 37 million hectares which is just about 1% of forests worldwide. This may make it appear that it is not so important as a forest crop. But it is one forest species that is overwhelmingly important to people. Globally more than 85% of forests are state owned, and more than 95% in Asia and Africa, but of bamboo forests as much as two third is owned privately. Under intensive small scale private diffused management bamboo proves itself very valuable to the man, providing him all that he wants, from food to fuel to house, storage and furniture.

Bamboos possess some very special characteristics that make them markedly different from trees. One of these is that in most bamboo species the culms stop adding to their biomass volume after the first year subsequent to which they only harden and become drier before they die and decay in 8 to 10 years. The root stock keeps growing throwing fresh culms every year and a good part of the previous year culms can be harvested thus giving a steady supply of biomass to the owner of the land that can be put to all kinds of uses. Without this kind of management and harvesting the bamboo clumps become crowded and tend to degrade over a period of time. Intensive human interference of the proper kind thus makes bamboo crop sustainable over a long period which is something that is only rarely achievable in tree crops. It is this steady income that makes bamboo the preferred choice of small land owners everywhere where bamboos grow.

Even as it provides culms year after year its roots keep proliferating thus enhancing belowground biomass and the soil porosity and, consequently, aeration, percolation, humidity and soil biodiversity. This is the reason of faster accretion to the belowground biomass and soil organic carbon in bamboo forests and consequential climate change mitigation advantage.

²The CDM Executive board further vide its decision taken in its 53rd meeting (para 38) stated the following:

The Board further clarified the guidance provided in paragraph 33 of the report of its thirty-ninth meeting by stating that:(a) Until a DNA provides clarification that the definition of forest as reported by them to the Board includes palms (trees) and/or bamboos it shall be deemed that the definition does not include palms (trees) and bamboos;(b) Any clarifications from the DNA regarding the inclusion of palm (trees) and/or bamboos shall not retroactively affect the A/R project activities for which a Letter of Approval was issued.

Bamboos are some of the most productive and fastest growing species on the planet. Many species of bamboo put on biomass at rates which are far higher than for most tree species including important timber species like teak and have significantly higher carbon sequestration potential when measured over a rotation period. Even when above ground bamboo culms are harvested the below ground biomass keeps on growing with a spread of bamboo roots.

According to the International Network of Bamboo and Rattan (INBAR), bamboo biomass and carbon production may be 7 to 30 % higher compared to other woody species. It is not uncommon to have aboveground productivity of bamboos in the range of 20 to 40 tonnes per hectare per year. INBAR has reported that average biomass of mature *Bambusa bambos* plantation at 6 years age (149 tonnes carbon per hectare) is higher than in average teak plantation of 40 years age (126 tonnes carbon per hectare) and that subtropical *Moso bamboo Phyllostachys pubescens*, sequesters 43 tonnes of carbon per hectare over its 5 year harvesting cycle which is twice that for teak under similar conditions.

Unlike other grasses bamboos are C3 plants which is a reference to the photosynthesis pathway in which the carbon dioxide is initially bound in molecules of phosphoglyceric acid containing three carbon atoms as against C-4 plants in which the photosynthesis initially binds the CO₂ in molecules of oxaloacetic acid with four C atoms. Since C3 plants are more responsive to CO₂ concentration in the atmosphere the effect of CO₂ enrichment would be felt more in bamboos than in other grasses resulting in higher Net Primary Productivity and greater carbon sequestration for bamboos similar to the trees. It is worth mentioning here that only about 10% of plants follow C4 pathway, the rest being C3.

Palms

Though there are hundreds of species of palms four major species of palms of concern are the coconut palms (*Cocos nucifera*) in the higher rainfall coastal and non-coastal lands tropical parts of Asia, oil palm (*Elaeis oleifera* and *E. guineensis*) trees of the equatorial region in Indonesia and Malaysia, the Palmyrah (*Borassus flabellifer*) trees that dot the drier tracts of tropical South Asia, and the date palm (*Phoenix dactylifera*) of the Middle East. All these species have multiple uses including high value food. Coconut and oil palm are reasonably fast growing while Palmyrah and date palm are very slow growing species. Coconut palm grows well in the coastal saline soils and the date palm and Palmyrah trees on lands where little else can grow on account of poor soils, low rainfall and extreme heat. And these species are grown extensively by small as well as large farmers alike.

Like bamboos, Coconut, oil palm, date palms and Palmyra palms are excellent species for agroforestry. On account of their widespread multiple uses, knowledge about their cultivation and management is common and easily accessible to even the smallest cultivator and finding a market for their products is usually not difficult.

Also, just like bamboos the palms also have certain food value and some palms like coconut and date palm have very high food value. If included in CDM, these would make the palm and bamboo based CDM projects as some of the few carbon projects that actually directly enhance food security of the country in sharp contrast to other CDM A/R projects that can rarely claim to have no adverse impact on food security.

If it is advantageous then why so few countries have opted for this inclusion?

As of now only 3 countries namely Philippines, Laos and Cambodia have communicated their intentions to the CDM Executive Board. Philippines has decided to include both bamboo and palm, Cambodia has agreed only for bamboo whereas Laos has informed that it want neither to be included as forest trees. A question arises that if palms and bamboos are indeed such strong candidates for inclusion then why these species have not been added by almost all other countries except Philippines and Cambodia. A possible reasons for this is that there have been so few forestry project, and even fewer apparent possibilities for future, that no country is really paying any attention to whether bamboo and palms should be added to the forest trees or not. This is so even though, internally in most countries, many species of palms and bamboos grow within their forest areas and are readily accepted as forest trees. But once the need arises, which would happen when the CDM forestry projects become more viable, and easy of approval, than now, then I have no doubt that these countries would take the necessary action to include bamboo and palms as forest trees.

A reason often expressed is the fear that if these are taken as forest trees, the lands which are under bamboo and palms, and have cover densities beyond the forest threshold, would become ineligible for taking up CDM A/R projects. On the face of it, it appears to be a sound reason. But when explored in depth, it would be clear that this can actually make no material difference to land selection for CDM A/R projects. To understand this assertion, let us take a hypothetical land which has 50% crown cover of bamboo growth on the cutoff dates. If bamboo is considered a forest tree, then it is obviously an ineligible land for CDM A/R project. However, if bamboo is not a forest tree then it would not be considered a forested area on the cut off date and, therefore, would be legally available for the CDM project.

But legal availability would not mean that this area would be taken up by any prudent investor of CDM project because the carbon contained in the pre-existing bamboo (even though not a forest tree), and its subsequent growth over the crediting period, would be considered baseline carbon on the project land meaning thereby that it would have to be deducted from the carbon sequestered under the project scenario for earning carbon credits which would drastically reduce the carbon credits earned and hence the viability of the project. Thus any land with pre-existing good growth of bamboos or palms, whether these are considered forest trees or not, would not be a preferred site for taking up a CDM plantation.

There is also the fear that if oil palms are included as forest trees for the purpose of CDM then the rainforests would vanish as oil palm plantations, already economically very attractive, would become extremely lucrative and lead to the total destruction of the few remaining patches of rainforests. But normal vigilance would ensure this does not happen because the biodiversity conservation requirements of CDM projects are very stringent and activities that destroy the native biodiversity can never pass muster to earn carbon credits.

In brief, therefore, bamboos and palms deserve to be considered as forest trees for the following reasons:

- These have always been recognized as integral parts of forests in most countries including India and China. In India this recognition has also been accorded national legal validity under the Indian Forest Act.
- Bamboos sequester significantly higher amount of carbon than the most productive of tree species and is often used in long life products that can keep the carbon away from atmosphere for a long time.
- Both bamboo and palms have significant food value and have thus the potential of making CDM projects enhance food security in contrast to other forestry crops that tend to reduce food security
- Palms like Palmyrah and date palms sequesters carbon dioxide on lands that produce almost no other woody vegetation thus providing the most suitable tree species for CDM A/R projects for arid zones
- Coconut palms sequesters carbon dioxide on coastal saline lands exposed to high coastal winds that often permit few other woody vegetation along many tropical coastal lands thus providing one of the most suitable tree species for CDM A/R projects for these lands
- It would open up opportunities for CDM projects for small scale farmers and for the first time the CDM projects can be “Rural Lifestyle projects” in which the plantations provide many necessities of rural life of the plantation owners besides providing carbon services to the globe
- Also due to high degree of homogeneity in their cultivated populations the assessment of biomass in bamboos and palms is relatively easy and low cost compared to other tropical tree species. This reduces transaction costs in carbon projects based on these species.

Also when, and if, REDD comes into existence the countries that decide to consider bamboos and palms as forests would be at an advantage because then all the lands under bamboo and palms would also be considered as forests and become part of the REDD.

The only thing one would have to guard against is to ensure that the CDM biodiversity provisions are enforced strictly so that there is not even a stray chance of oil palm plantations coming over forested lands anywhere.

Reference and further readings:-

INBAR, <http://www.inbar.int/show.asp?NewsID=373>

Indian Forest Act, 1927 available at <http://envfor.nic.in/legis/forest/forest4.html>