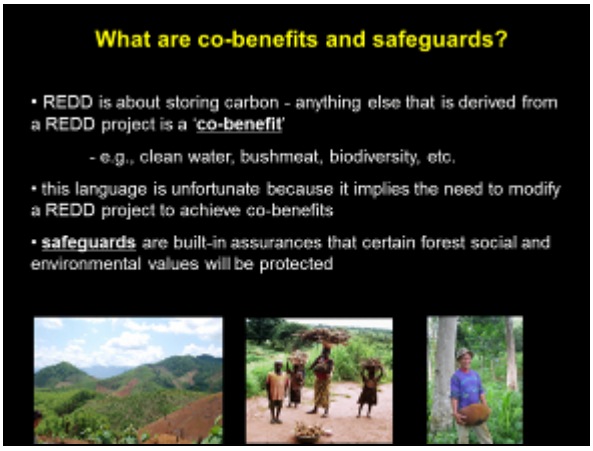
Challenges for REDD+: Co-benefits and Biodiversity Safeguards

Ian Thompson (Canadian Forest Service/International Union of Forest Research Organizations, IUFRO[1])

My name is Ian Thompson, and I work with the Canadian Forest Service, but I spent a lot of time on various expert panels with the FAO, with the CBD[2], with IPCC and so on. My main interest is in the way in which environmental change affects biodiversity, and so I was asked to come here to discuss biodiversity and REDD. Thank you very much to FFPRI, to the FFPRI REDD Institute, and for Matsumoto-san for extending me the invitation to make this presentation to you today.

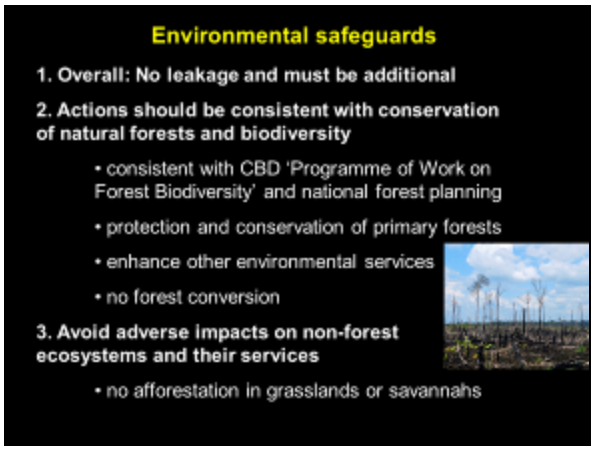




I am going to talk about 'Challenges for REDD+,' and this idea that biodiversity is somehow a co-benefit to a REDD project. REDD is about storing carbon, but anything else that is derived from a REDD project is called a co-benefit, so clean water, bushmeat, biodiversity, and so on, but I find this language is kind of unfortunate, because it separates the trees from the ecosystem, and I think if we are going to do these projects properly, we need to start thinking about ecosystems as a whole functioning unit. Ecosystems are more than all of the species that function within that system and if you start to take species out of the system, it does not function as well. Safeguards are built-in assurances, in the certain project forests, that social and environmental values are going to be protected in these projects.

[1]International Union of Forest Research Organizations（国際森林研究機関連合）：http://www.iufro.org/

[2]Center for Biological Diversity: http://www.cbd.int

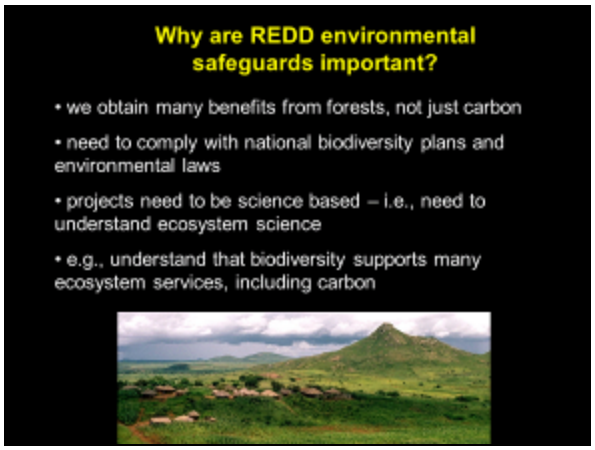

There was a recent convention on biological diversity decision taken in Hyderabad, Decision XI/19[3], that talked about REDD safeguards. The secretary was asked to start compiling information on biodiversity safeguards and to work with the IUFRO Global Expert Panel, which Dr. Kimiko Okabe, who is also here, and I, were members. We produced a publication that looks at understanding the relationships between biodiversity, carbon, and forests, and also with respect to local people on how they use the forest. I would encourage you to go to IUFRO website and download this publication to understand these concepts a little better (http://www.iufro.org/publications/series/world-series/#c20155). The rest of the Decision talked about building synergy between biodiversity action plans and climate action plans and then there was also some guidance to parties, so some of the things you might do with respect to trying to protect biodiversity such as: involving stakeholders, the multiple benefits that can flow from forests, the application of the ecosystem, principles, and so on. All of that is in the appendix to the Decision.



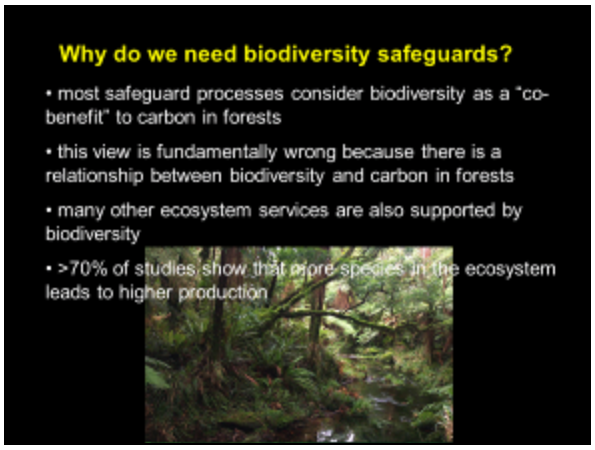

Environmental safeguards are like the concept of leakage with respect to REDD projects because you do

[3]Assessment of new substances that deplete the ozone layer: http://ozone.unep.org/Publications/MP_Handbook/Section_2_Decisions/Article_2/decs-new_substances/Decision_XI-19.shtml

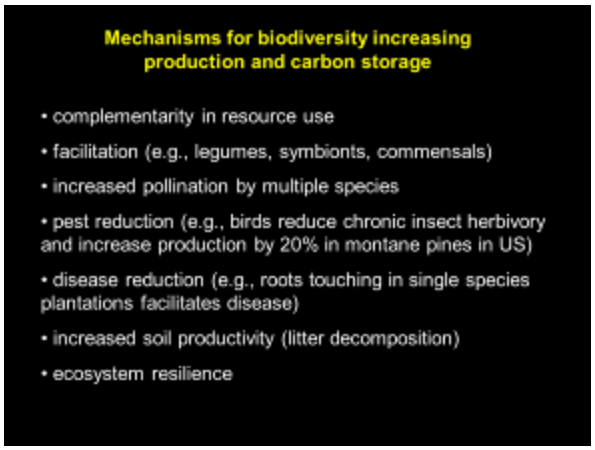
not want to see leakage in biodiversity either. If you do something in one place, you do not want to see something lost someplace else, so that is this idea of additionality or trying to increase the total biodiversity and the total forest within the country. Actions should be consistent with conservation of natural forests and biodiversity, consistent with 'Program of Work on Forest Biodiversity,' which is basically a guideline to doing sustainable forest management, to work towards the protection and conservation of primary forests and to enhance other environmental services and also no forest conversion. These are some of the priorities that are suggested in the CBD Decision. But, also to avoid adverse impacts on non-forest ecosystems, so we do not want to see afforestation in grasslands, for example, because then you are losing grassland biodiversity and replacing it with some form of forest biodiversity, which is contrary to the concept of conserving biodiversity.




Why are these REDD environmental safeguards important? We obtain many benefits from forests not just carbon, and we need to comply with national biodiversity action plans as well as national environmental laws, and projects should be science based. We need to apply the best science that we have to understand ecosystems as functioning units and not just use a reductionist approach of looking at trees and looking at biodiversity as somehow separate objectives on the land. Saving biodiversity or maintaining biodiversity and functioning systems is not about saving the great apes and saving the tigers and so on, although that is part of it, but rather, it is trying to understand that the ecosystems in forests are functioning ecosystems. We need to understand that biodiversity supports many of the ecosystem services including the carbon that is sequestered and stored within that system.




Why do we need biodiversity safeguards? Partly because that concept that biodiversity has value and is linked directly to carbon has not yet flowed through to people who manage the forests in many places. Most safeguard processes as I say consider biodiversity as some kind of a co-benefit, when in fact, it is actually what you are trying to restore. That is, use biodiversity to increase carbon within the system. There are many other ecosystem services that are also supported by biodiversity but in terms of forest productivity, the vast majority of studies, more than 70% of the studies that we have reviewed, showed that the more species that there are in the system, the more carbon that is sequestered, and stored by that ecosystem.




There are a lot of mechanisms for this relationship between biodiversity and ecosystem services. All of the species that function within systems have roles within that system. They do different things, so complementarity of resource-use is one of these mechanisms. For example, some trees like light, so they form the canopy while other species can live below the canopy, so in that way they use different aspects of the resources in order to increase the total productivity within the ecosystem.

Another mechanistic concept is facilitation, where certain species may aid the way in which other species perform their functions. For example, legumes put nitrogen into the soil and nitrogen is used by plants to

increase their productivity. Another mechanism is increased pollination by multiple species, it is best to have many species performing pollination within the system because some pollinators are tied to particular plants and so if you start to lose some pollinators, you begin to lose the capacity from some species to continue to grow and produce within that ecosystem.

Many birds perform pest reduction services within systems. There were wonderful paper from the western United States where they fenced off or covered trees so that birds could not get at

them and then looked at the herbivory rates of insects and production by trees that were protected and unprotected. They found that where birds were absent, there was a 20% decrease in the productivity of the trees, simply because the pest reduction service was not being performed.

Disease reduction is another mechanism affected by biodiversity. In Canada, we started to do some of these early plantations where we only planted one or two species. What we find now, 40 years later, is that where the roots are touching, because there is no other tree species in between, you end up with disease spread throughout the whole stand, and so you get very high mortality which would not be the case if we had many other species in the system and so separation between trees of the same species. So the way in which these things function are very subtle sometimes.

You have increased soil productivity as a result of litter decomposition. There is a vast soil fauna that performs this role underneath the canopy that takes the nutrients that fall from the leaves, dead wood, and so on, and puts them back into the system. Finally, ecosystem resilience is particularly supported by biodiversity. Resilience is this idea that the system can withstand certain amounts of change and still maintain its functioning over time and space. Resilience is highly dependent on the amount of biodiversity within the ecosystem.

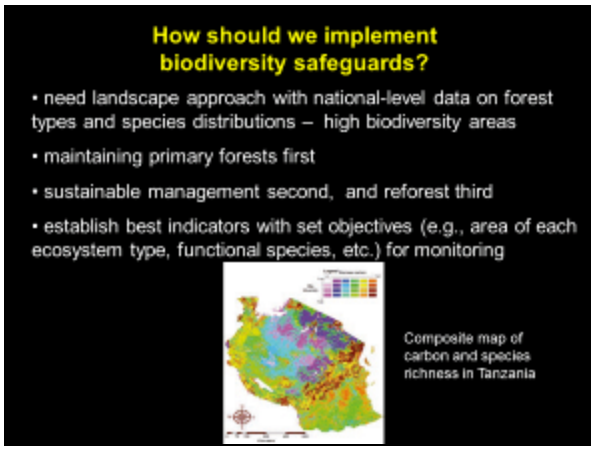
**Biodiversity is key to many ecosystem services**

| Ecosystem service | Strength of linkage to biodiversity | Quality of evidence |
|---|---|---|
| Pollination | High | High |
| Decomposition | High | High |
| Carbon sequestration | High | High |
| Carbon storage | Mixed | High |
| Erosion control | Low | High |
| Pest control | High | High |
| Seed dispersal | High to none (wind) | High |
| Water quality | Low | Poor |
| Water quantity | Medium to high | Poor |


Biodiversity is a key to a large number of ecosystem services, some of which we value directly and some of which we do not particularly value, but they occur within the system regardless. Pollination, for example. What I am trying to show here is that there is a suite of services and the strength of the linkage of each service to biodiversity. This is based on the evidence from scientific studies that looked at specifically

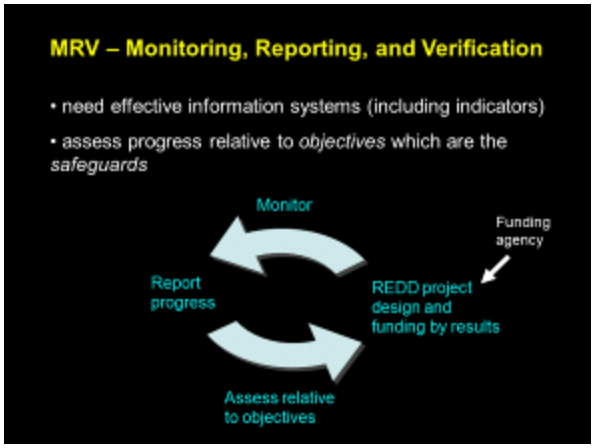
these ecosystem services and whether or not it is related to biodiversity within the system. Not all ecosystem services are directly related to biodiversity. For example, water quality and water quantity may not be particularly related to biodiversity, although they may be, we think the evidence of those services is particularly poor at this point in time. Erosion control is a good example of an ecosystem service that is not particularly related to biodiversity. You can plant almost any species of tree and maintain soil from slumping down into a valley. But, all these many other services like carbon sequestration, carbon storage, pest control, seed dispersal, which is the way in which the system propagates, and so on are very directly related to biodiversity.

Put all of that together and we can grow trees and store carbon or we can foster and maintain forest ecosystems and have multiple ecosystem services, clean water, produce oxygen, produce food, and so on and store even more carbon. We need to stop thinking about trees as trees and start thinking about forest as ecosystems and biodiversity within those systems that supports the carbon sequestration.




How do we implement these biodiversity safeguards? We need to think about this carefully because there may be tradeoffs across the landscape, but regardless, what we need is a landscape level approach with national-level data on forest types and species distributions. This map is a map of Tanzania for example, which overlays high carbon areas with high biodiversity areas produced by UNEP/WCMC. Often, these are one and the same. It does not mean the biodiversity is any less valuable where it is less abundant, it just means that the more productive areas tend to support more biodiversity and so this is one way of prorating how we do REDD projects within a country. If we had to make a choice, the best win-win situation is to maintain primary forests. These are the forests that have the most carbon in them already, so if we stop deforesting them you gain the most for the money you are going to put in for bioth carbon and biodiversity. Secondly, we would do sustainable management of forests, and sustainable management of forest does not mean producing the same amount of timber over and over and over again through time. What sustainable means is maintaining all of the species that function within that system, so it means

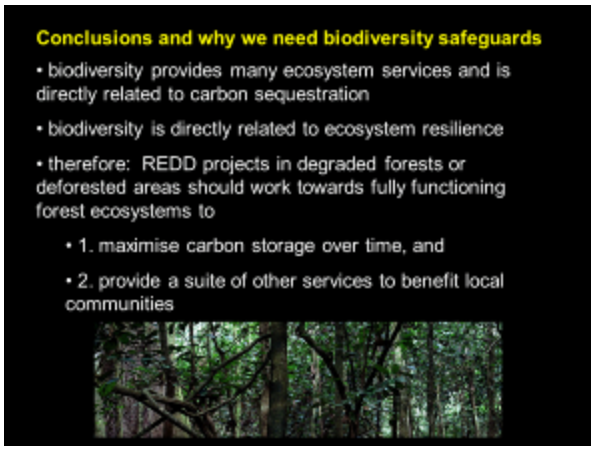
maintaining the ecosystem in time and space.

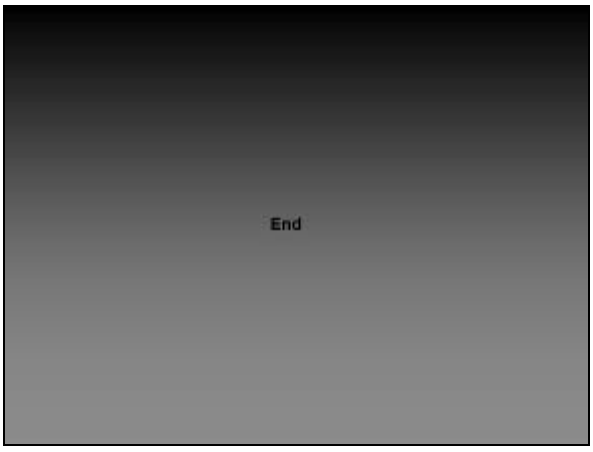




A third area to consider is reforestation. Recreating ecosystems on areas where the forest have since been degraded can be done over time and numerous examples exist. In order to measure our progress particularly with respect to reforesting and sustainable forest management then we need to establish best indicators, set objectives for those indicators, and then monitor them over time to see how we are doing. This is MRV, but from a biodiversity perspective. We need to be talking about a hypothesis of what we expect would happen from a REDD project, so what are the outcomes that you would expect or want to achieve for biodiversity, and monitor those outcomes, and then change your REDD project as you move along. This is the basis of an adaptive approach.

The value of safeguards is that they enable a results-based incremental funding scheme, but also they protect local cultures and national interests. They promote sustainable development and they promote a science-based policy to forest recovery and consideration of much more than just carbon within the system.




In conclusion then why we need biodiversity safeguards, is because biodiversity provides many ecosystem

services and is directly related to carbon sequestration within the system. Biodiversity is also directly related to ecosystem resilience, this maintaining of the system through time and space and the capacity of that system to absorb environmental change and still function properly. REDD Projects on degraded forests or deforested areas should work towards fully functioning forest systems, not just planting trees and if we do that, then we can maximize carbon storage over time and provide a suite of other environmental benefits to local communities. We need to understand that carbon is actually a co-benefit of maintaining biodiversity, not the other way around.