New Outputs from SEnSOR: Gaining Co-benefits for Biodiversity and Carbon Storage within Plantations

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Overall aim: to test the impact of RSPO certification on social and environmental sustainability

We do this by:
• establishing baselines
• testing the effectiveness of the application of RSPO’s P&Cs
• identifying scope and methods for improvement

We received our first significant tranche of funding this September from the RSPO

• conducting new analysis of available data to answer key questions --biodiversity, soil, water and GHGs, and social issues.
• fieldwork to test a new forest quality assessment
• establishing the experimental network and looking for match funding to expand the project in year 2 two and beyond
Findings from our latest study
One of the key areas of policy development within the RSPO is how to incorporate criteria for conserving high carbon stock (HCS) land.

The HCS approach and HCS study are attempting to define High Carbon Stock and how to identify it.

The RSPO stipulates that Growers should conserve areas of High Carbon stock. But a process for achieving this is not yet in place.

There is already a process in place for setting aside important biodiversity areas - the HCV process.

So if there is an overlap between HCS and HCV areas, policy for these two ecosystem services could be streamlined.
At a global scale carbon storage and biodiversity are highly correlated- i.e. where there is lots of carbon, there is lots of biodiversity (e.g. Strassburg et al. 2010)

But we do not know whether this is true at finer scales across land cover types in a high carbon-high biodiversity region.
Compares Above Ground Carbon (AGC) and Biodiversity across a gradient of land-uses

**Aim**
To synthesize current scientific information to help oil palm policy makers make land-use decisions which jointly meet biodiversity and carbon conservation agendas

**Method**
To establish the baseline to test whether RSPO is having an impact on biodiversity and carbon conservation

**Focus region**
Malaysia and Indonesia
- >80% of global production
- Good level of data for a range of land uses

**Biodiversity**
The number of species is important for understanding how healthy a habitat is. In this study, "biodiversity" refers to the number of species per unit area and this is the unit of comparison across land-uses.

A wide variety of species creates resilience. The number of species is important for understanding how healthy a habitat is.

We don’t quantify the effects on any “special” group of species, e.g. iconic or endangered species— but I will talk about these.
This study focuses on *Above Ground Carbon* because there is good data available for this metric and in general it is a good proxy for the total carbon stock of a land-use.

The exception to this is for peat land, where vast amounts of carbon are stored in the soil.
Landuses examined

- Primary forest
- Logged forest
- Fragmented forest
- Oil palm
- Rubber and acacia
- Grassland and scrub
We converted all values for biodiversity and carbon to a percentage of what is found in lowland primary forest in mineral soil.

**Biodiversity data:** over 40 published studies

**Carbon data:** from the exhaustive set of published carbon information collected by Zeigler et al. (2012)

**Reference point: primary forest**

We converted all values for biodiversity and carbon to a percentage of what is found in lowland primary forest in mineral soil.
AGC in logged forest has the potential to recover over time.

Soil carbon in peat makes the carbon value of peat forest many times higher than other land-uses.
Primary peat forest has lower biodiversity, but its soil organic carbon makes it extremely important for carbon.
Although some primary forest specialists are missing, total biodiversity actually slightly higher. Carbon is almost half-but has the potential to recover.
Less than half of primary forest biodiversity and around 20% of primary forest carbon.
Rubber and acacia seem to be slightly better for carbon and biodiversity than oil palm.

Grass and scrubland are much worse for both C and biodiversity.
So what does this mean?

There is high agreement in the responses of biodiversity (number of species) and Above Ground Carbon (AGC) to different land-uses in Malaysia and Indonesia, meaning land use decisions to benefit one are highly likely to also have benefits for the other.

So the RSPO’s HCV approach is a great place to start - likely to already be impacting on conserving Carbon even if these areas weren’t specifically designed for this purpose.
RSPO’s policy of avoiding all primary forest means the top places for carbon and biodiversity are off limits to conversion by RSPO members.
About the same number of species as in primary forest - even if the forest is quite badly degraded.

Although about 25-30% of primary forest specialists are lost (if HCV assessments only look for specific species they may not be identifying areas of high overall biodiversity).

BUT - logged forest is also vital - even if it is quite degraded.

Carbon can be halved by logging - BUT has the potential to recover over time.
Biodiversity per ha in fragmented forest is much lower than continuous forest. Fragments less than a few tens of ha tend not to support many more species than oil palm.

Forest needs to be in the region of \(10,000-100,000\) ha to support similar numbers of species per ha as continuous forest.

Areas identified as HCVs when continuous and then subsequently fragmented could lose biodiversity over time.

Small fragments might help dispersal of species, but there is very little data available on this.

But forest fragments are not the same!

Not much carbon data for fragments yet, but degrading edge effects are likely to have a similar effect on carbon in fragments.

(Lucey et al. in prep)
What is the average size of HCVS?

Can we connect them better?

Could off-site offsetting have better biodiversity and carbon benefits?

Can we make them bigger?

Can we boost biodiversity and carbon by management such as enrichment planting?
• Funding to match the contribution from RSPO in year two and beyond
• Developing a network of fieldsites

Talk to Glen Reynolds or myself if you are interested to find out how to be involved
The co-authors and reviewers:

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