

‘Natural Capital’ – A better term than ‘Natural Resources?’

- Third Country Training Programme TCTP2017
- Title of course: Integrated Biodiversity and Ecosystem Conservation Training Course
- This seminar aims to provide an intellectual framework for the monetary evaluation of natural resources, hopefully leading to more sustainable management
- Why Natural Capital and not Natural Resources?
- *Note: This is Power Point is designed for you to take back with you and study later*

'Rio + 20'

was the original source of this seminar content



- The United Nations Conference on Sustainable Development - or Rio+20 - took place in Rio de Janeiro, Brazil on **20-22 June 2012**. It resulted in a focused [political outcome document](#) which contains clear and practical measures for implementing sustainable development. <https://sustainabledevelopment.un.org/rio20.html>
- The Conference also adopted ground-breaking guidelines on [green economy policies](#). It triggered development of a set of [Sustainable Development Goals \(SDGs\)](#)
- It also galvanized the attention of thousands of representatives of the UN system and major groups. It resulted in over 700 [voluntary commitments](#) and witnessed the formation of new [partnerships](#) to advance sustainable development.

The Gabarone Declaration

- [Gabarone Declaration for Sustainability in Africa](#)
- An African-led initiative for sustainable development (**May 2012**)
- “To ensure that the contributions of **natural capital** to sustainable economic growth, maintenance and improvement of social capital and human well-being are **quantified** and integrated into development and business practice.”
- This Declaration actually *preceded* the Rio+20 conference. All credit to these African nations
- With thanks to participants from Botswana, Peggy Kedikilwe Tsalano & Babitseng Thamani Meshack, for alerting me to this on Thursday
- 1st use of the **Natural Capital** concept in a major policy statement?

Natural Capital? – New way of thinking about use of natural resources

....think...moving towards **sustainability** from **unsustainability**

.....thinkmoving towards **renewability** from **non-renewability**

.....thinka fundamental fact of life on earth is that:

at some point a balance will be reached between human needs for resources to sustain life for 7 to n (maybe n=10?) billion people and the ability of the planet to provide these.

....at some point,
without a shift to
sustainability in using
natural resources, the
human population of
the planet will be
reduced ('Nature Bites
Back')



Humanity

Nature

– a traumatic procedure at the human experience level – but *normal operating procedure* by Nature when the carrying capacity of a species exceeds resource limits. Think of budgerigars in Australia's wet & dry climate cycle

Most people's way of thinking when they hear the phrase 'Natural Resources' is to think of taking away something for human use. Could be non-living resources like coal, oil, or living resources like timber, fish

Or to take for granted clean air and water

There is too little consideration for **non-living resources** - of managing the stock for the long term; e.g Britain's discovery of oil in the North Sea (between Britain & continental Europe) the 1970's. The oil was exploited as fast as it could be pumped out. Big loss of future income as a result

Important point

- Non-living resources are by definition **unsustainable**, they cannot reproduce themselves
- If used wisely or if the reserves are enormous, they can benefit a country for centuries (or more)
- Some oil and gas executives say that the amount of natural gas in the earth's crust is so enormous that in effect it will never all be used. This is partly due to the increasing cost of extracting it
- But as new technologies are developed (e.g. shale gas extraction) surprisingly large reservoirs can be tapped
- Technofixes have a future, but a limited one. Not to be relied upon

In the case of **living resources**, many are managed sustainably, (farming)(aquaculture) by breeding (young animals or plant seeds)(sustainable harvesting)

However there is a very big problem with many living resources being harvested **unsustainably** e.g. most marine fish stocks



- This **degrades biodiversity** and challenges the very existence of some **ecosystems. Coral reefs** around Sabah are so extensively damaged by high temperatures, fish-bombing and trawling that it is a problem to find healthy ones except in protected areas

Pristine coral reef off Semporna, East Coast of Sabah,
Malaysian Borneo



Unsustainable Use of Resources

I am sure you know of many examples from your own countries. You may want teaching tools to get the message across to government & civil society that **unsustainable harvesting** leads to **permanent loss of biodiversity & ecosystems**, meaning less ability to provide humanity with resources for its well-being – and ultimately its existence. It is an **existential** problem

- Here is a tool for teaching whoever it is you need to persuade about conservation and wise use of natural resources (of particular value with policy-making economists)
- First, switch to talking about ‘Natural Capital’
- Define it as: The **value** in USD, rand, baht or ringgit of natural resources– be it iron ore, timber, water, sunshine (sunshine nowadays can be priced by the value of electricity it can produce via solar panels)

Once you use the value approach you can compare **natural capital** with **financial capital** & **human capital** in value

- **Financial capital** – cash; stocks; property (houses, land), valuable artefacts (jewellery, paintings), mechanical artefacts (cars, airplanes)
- **Human capital** – education, experience; specialist knowledge (Dubai now trying to recruit all kinds of specialists (master chefs, master printers, expert code writers, university professors) to work there)
- **Natural Capital** - What the planet has in the way of natural resources
- Non renewable Natural Capital needs to be ‘spun-out’, ‘husbanded’, i.e. some kept in reserve
- Renewable Natural Capital needs to be harvested **sustainably**

Keyword Definitions

- Natural Capital

- Natural resources that are managed to provide goods & services for societies.
- NatCap includes fossil fuels & minerals
- But, except on a geological timescale (100' of millions of years) stocks of fossil fuels & minerals are finite (no replacement)

- **Natural Income** e.g. like interest in money from a bank savings account
 - The portion of natural capital (resources) that is produced as interest, i.e. the sustainable income produced by renewable natural capital
 - Even if all of this interest is consumed, the capital is not reduced. e.g in sustainable fishing for tuna, the population after the harvest would be the same size (or bigger if lightly harvested) than before

Natural Capital Total Economic Value

← Use Value → Non – use value



Direct

Use Value:

- Consumptive
- Non-consumptive

Indirect use
value

Optional Value

- Option
- Bequest

Existence
Value

A terminology swamp – alternative terms

- Natural Value – that part of Natural Capital which can currently be quantified in USD value
- Economic Value – the *market price* of the goods and services a resource produces. Has to be responsibly calculated – no arm waving
- Ecological Value – Resources with no formal market price: soil erosion control, nitrogen fixation and photosynthesis are all essential for human existence but have no direct monetary value, although some estimates have been made

... back to diagram... **Natural Capital**
Total Economic Value

← **Use Value** → **Non – use value**



Direct

Use Value:

- Consumptive
- Non-consumptive

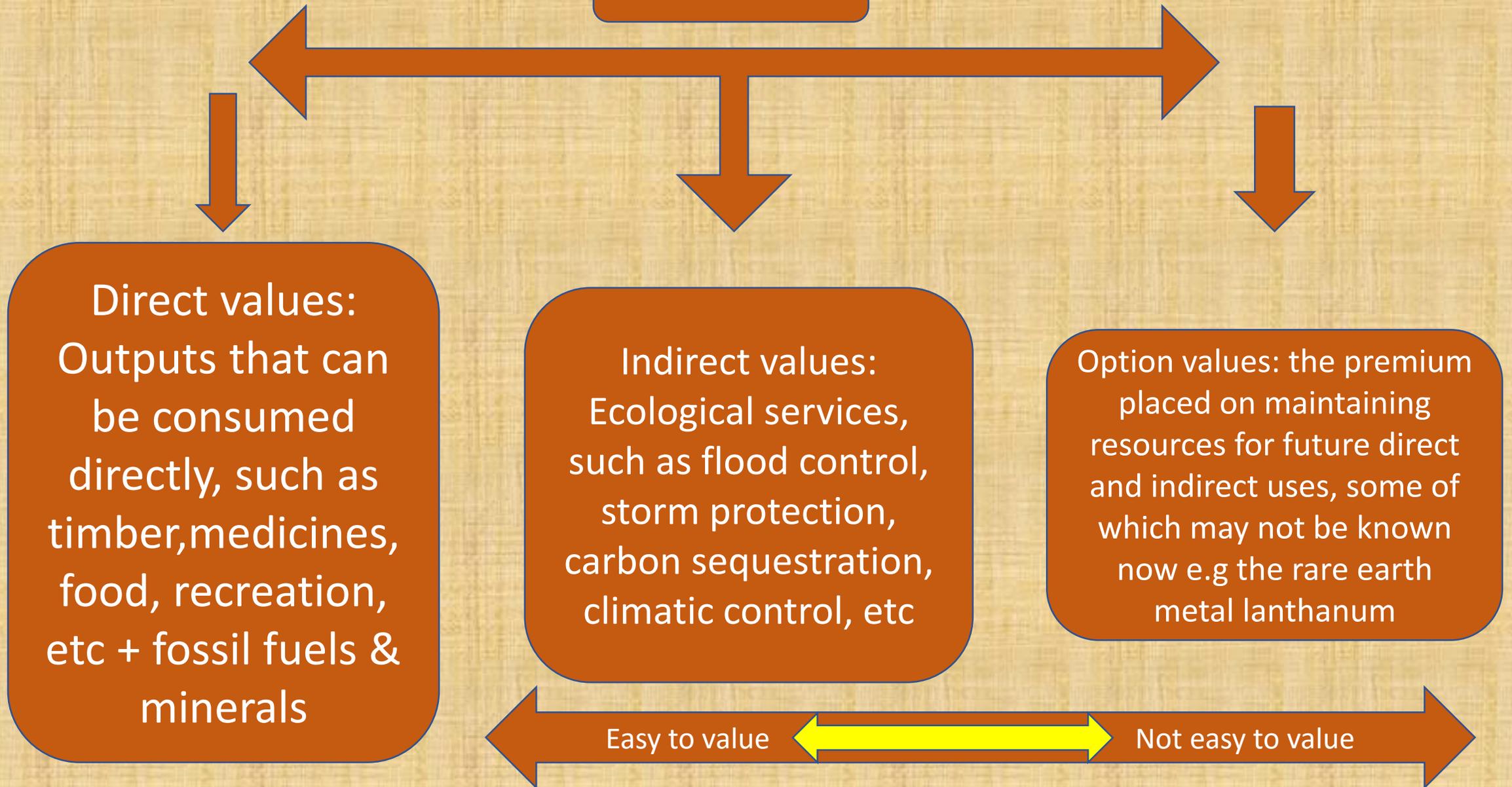
**Indirect use
value**

Optional Value

- Option
- Bequest

**Existence
Value**

Use



Non-use values, also known as 'existence values'



Existence values: the intrinsic ('built-in') value of resources, e.g. cultural, aesthetic, adventure "Because its there".
Mt Kinabalu is a tourist goldmine, but it is far, far more than that e.g. genetic diversity storehouse, spiritual icon, aesthetic (beauty), adventure playground

Non-use Values continued... Option value (bequest) could also be included here in part:



Supposing you have a house looking down on a beautiful peaceful forested valley. You decide to keep it for your children: It has a 'Use' bequest value because your kids could chop down the forest and live off the proceeds



It also has a non-use existence value because in chopping down the forest the aesthetic value of the valley may be lessened – particularly if the little horrors build a factory in full view 😞 e.g. hill towns in central Italy with factories below

Tips on assessing natural capital (1)

- **Direct use values** are natural goods and services that are directly used by humans – most often by people visiting or residing in the ecosystem
- **Consumptive use values** include harvesting food products, timber for fuel or housing, medicinal products and hunting animals for food and clothing, copper mining in the case of Mt K
- **Non-consumptive use values** include recreational and cultural activities that do not require harvesting or ‘mining’ of products. Golf course in the case of Mt Kinabalu
- **Indirect use values** are derived from ecosystem services that provide benefits outside the ecosystem itself (e.g. natural water filtration, which may benefit people downstream)

Tips on assessing natural capital (2)

- **Optional values** are derived from the potential future use of ecosystem goods and services not currently used – either by yourself (option value) or for future generations (bequest value)(keeping some resource for your children's benefit) e.g. a forest
- **Non-use values** include intrinsic and aesthetic values. You like it – and want to keep it for ever – just because it exists. Hence these also called existence values. These values have no market price
- There are many **attempts to value nature** so that its importance to humanity can be objectively assessed.
- What, for example, is the cost to a sovereign country of the loss of its biodiversity? What is the value of the countries Natural Capital compared with its Financial and Human Capital
- However, in most cases these valuations of Natural Capital are not precise.
- For example Mt Kinabalu in Sabah has a phenomenally high level of biodiversity and loads of endemic species. It has pristine forest, spectacular waterfalls, challenging climbing to 4,000m, strong spiritual value and is the pride of all Malaysia. But the only truly objective value that can be placed on this is tourist dollars (note: 'endemic' means occurs nowhere else on the planet)

ARKive
www.arkive.org



© The Natural History Museum, London

Troides andromache, the endemic Kinabalu Birdwing butterfly
Wingspan 17cm (6 inches). What cost if goes extinct?

Trade offs between consumption and biodiversity loss

- On Mt Kinabalu building the golf course on the Mesilau Plateau at 1800m resulted in the loss of a large area of pristine montane forest, with consequent great loss of biodiversity (including the birdwing - but OK elsewhere on the mountain)
- On Mt Kinabalu the copper mine created wealth in USD (most of which went overseas) but resulted in forest loss and toxic dust from dried out waste lagoons near the villages below when mining finished



Calculating values

- Direct and indirect values can be quantified, more or less
- Option values and non-use values are nearly impossible to quantify, but should not be ignored.
- For example, even an economist would have to accept that although the spiritual/aesthetic/inspirational/ 're-charging of batteries'/adventure value of some places or ecosystems may be impossible to quantify, they are highly valued by individual humans or groups. Therefore their value should definitely not be ignored.
- Waterfalls the world over are sought out for visiting. Mt Fuji, Mt Kinabalu, Mt Kilimanjaro; Uluru. All have spiritual, ethical, philosophical values.

All these places make tourist dollars, but would be revered without those

- Also national pride – Okavango Delta (Africa's last Eden)



..... And Sri Lanka's Sri Pada or Paada ('Sacred Footprint' of Buddha)

Great religious significance to many cultures, even Christianity.
I still have this stamp in my childhood stamp collection



Some Key Points (I believe in repetition!)

- *Resources* are everything that is useful to mankind. Non-renewable resources (oil, coal) generate wealth but can be used only once in a human lifetime
- *Natural Capital* and *Natural Resources* are often substituted for each other
- However *Natural Resources* suggests that resources are there to be used,
- Whereas *Natural Capital* suggests something to be managed to produce an income or a return on the investment. ***Sustainable.*** People can live off the interest
- They include air, water, soil, people, education, fossil fuels, ecosystems and so on

Valuing Biodiversity – a Malaysian example

- Biodiversity is difficult to value, but there is no doubt Malaysia values it. MYR2.6m has recently been granted to *Bring back Malaysia's National Heritage from Overseas*
- ('National Heritage' is anything a nation values – human artefact or natural capital)
- In this case it is to bring back digital images of type specimens of plants & animals from the museums of the ex colonial occupiers – in Malaysia's case this is the UK.

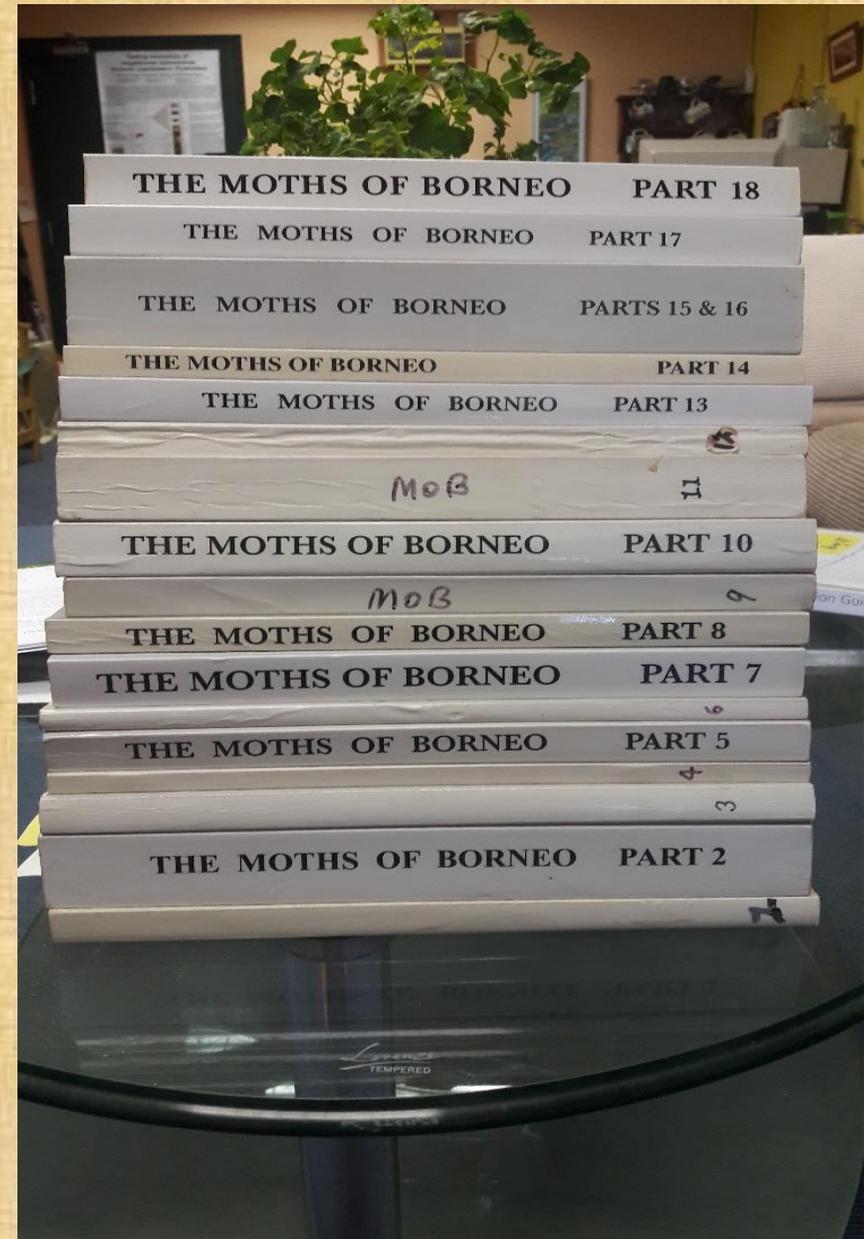
Repatriation by *digital means* of part of Malaysia's biodiversity: The 'Repat' Grant

- Type specimens of species are the key to knowing how much animal & plant diversity Malaysia has
- These days no need to bring back the type specimens themselves, can **repatriate** 3D digital images & DNA bar codes, then create a Malaysian Natural History Museum in Kuala Lumpur to provide a place to study them and educate the public about this valuable part of Malaysia's Natural Capital
- The funding is for (among others): image capture of the type specimens in London & export to M'sia
- Training of a new generation of Malaysian taxonomists and employing them to study and analyse
- Training of museum curators, rangers and tour guides to educate the public about the value of biodiversity as a national asset as part of its Natural Capital.
- [Hasanah Foundation - driving for sustainability & awareness](#)
- Apply pressure get a similar foundation started in your own country!

Moths of Borneo

(macros - larger moths)

- 18 Parts, 4,000+ pages, 4,000 + species written up and imaged
- Many new species
- Completed in 2011, since when many more species have been found.
- 30 years in preparation
- Privately sponsored throughout, but in part publicly now



Pyraloid Moths of Borneo (PoB)

- This research programme benefiting from a grant (from July 2017) to complete the work on PoB with the publication of 3 printed volumes of moth images and a website.
- Auditing of pyraloid moth biodiversity shows 2,300+ Malaysian Borneo (Sabah & Sarawak). Megadiverse hotspot on world scale
- New development in taxonomy developed for PoB is *hybrid publication*
- Printed volumes of high quality images + a QR code for each species image
- QR codes link to a massive website, each species entry has 11 tabs ('pages')
- Images imported from London' Natural History Museum are a key feature

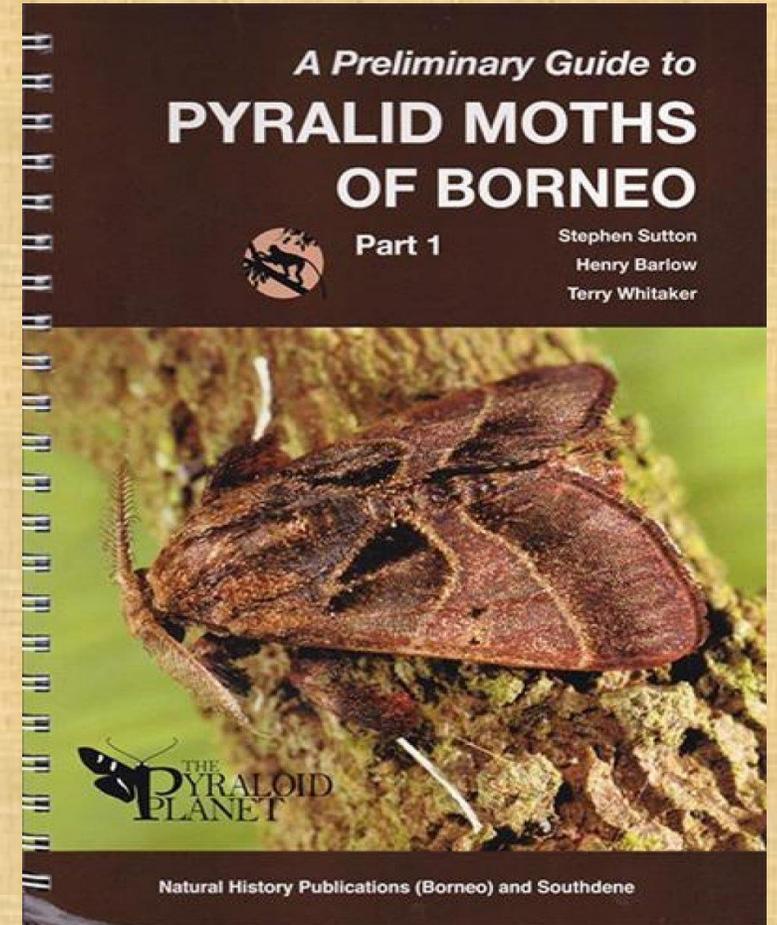
Pyraloid Moths of Borneo (continued)

- SE Asia reference collection of set specimens collected in Sabah in Borneensis Museum here in ITBC.
- Will bring in researchers from S & E Asia to study the collection. Appreciation of its value will re-inforce conservation pressure for the habitat from which most species come from – rain forest
- Will also be linked to website by QR codes (but at present no signal at UMS! 😞) <http://stephensutton.info>
- Appbooks. They are small digital books (c. 24 pages) with extracts from the website or instructional material about e.g. studying moths or the importance of rainforest to conserve their diversity

2,300 species, 40% new 3 Volumes.
Started 2003 [Pyriloid Moths of Borneo Website](#)



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Significance of the 'Repat' grant

- The size and wide distribution of the grant, including to an overseas institution (the Natural History Museum in London) indicates a welcome drive for study leading to wise management of Natural Capital in Malaysia.
- Shows deepening maturity in environmental policy as the country approaches year 2020
- This is the year M'sia aims to become a Developed Nation.

Sources

<https://www.amazon.com/Environmental-Systems-Societies-Diploma-Revision/dp/147189973X>

Environmental Systems and Societies IB Diploma Study Revision Guide: Second edition. Andrew Davis & Garrett Nagle.

This is an excellent condensed summary guide from which this seminar is derived. 174 pages

<https://www.amazon.com/ENVIRONMENTAL-SYSTEMS-SOCIETIES-International-Baccalaureate/dp/1447990420/>

ENVIRONMENTAL SYSTEMS AND SOCIETIES (ESS) STUDENT EDITION TEXT PLUS ETEXT 2ND EDITION (Pearson International Baccalaureate Diploma: International Editions) 2nd Student edition Edition. Andrew Davis & Garrett Nagle.

The full book of which the Revision Guide above is a summary

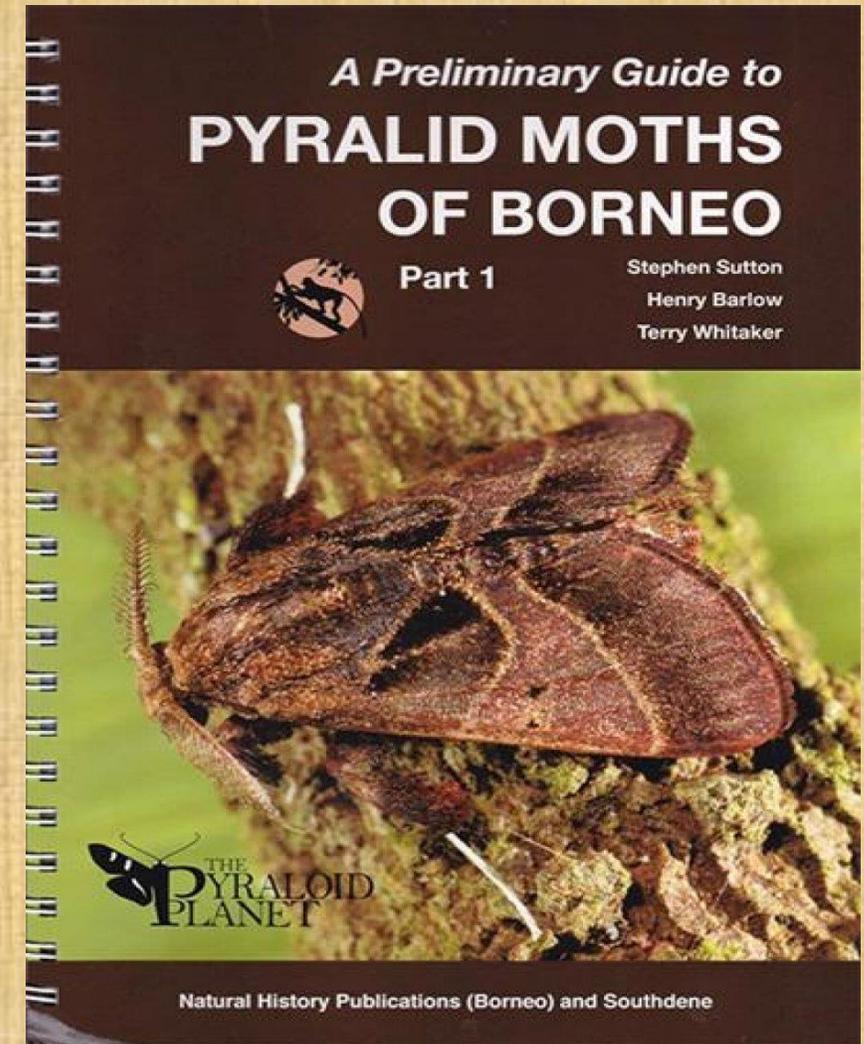
[Source of Borneo/Sulawesi insect biodiversity papers](#)

Stephen Sutton's website with news of insect biodiversity studies in Borneo and his publications

Sources cont.

[Pyriloid Moths of Borneo Identification Website](#)

An example of the ongoing auditing of Sabah's mega-biodiversity. It is an example of *hybrid publishing*. The website is associated with a series of 3 volumes of images (1 published, 2 to come). Each image is of a different species and is linked by a QR code *directly* to the write-up for that species on the website. There is no need to log-in to the site. The connection is immediate if there is good broadband. The books consist *only* of images and their QR codes. On the site each species has 11 tabs ('pages'). Printing is expensive, website content, once set up, is almost without cost. This project is privately & publicly sponsored. Borneo's biodiversity is increasingly well documented due to ongoing auditing in Sabah & Sarawak and active publishing of nature guides e.g. [Books on Borneo Biodiversity](#)



Finish! And thanks for listening!

