Biomass for Energy and Sustainability: Identification of Responsible Cultivation Areas (RCA)

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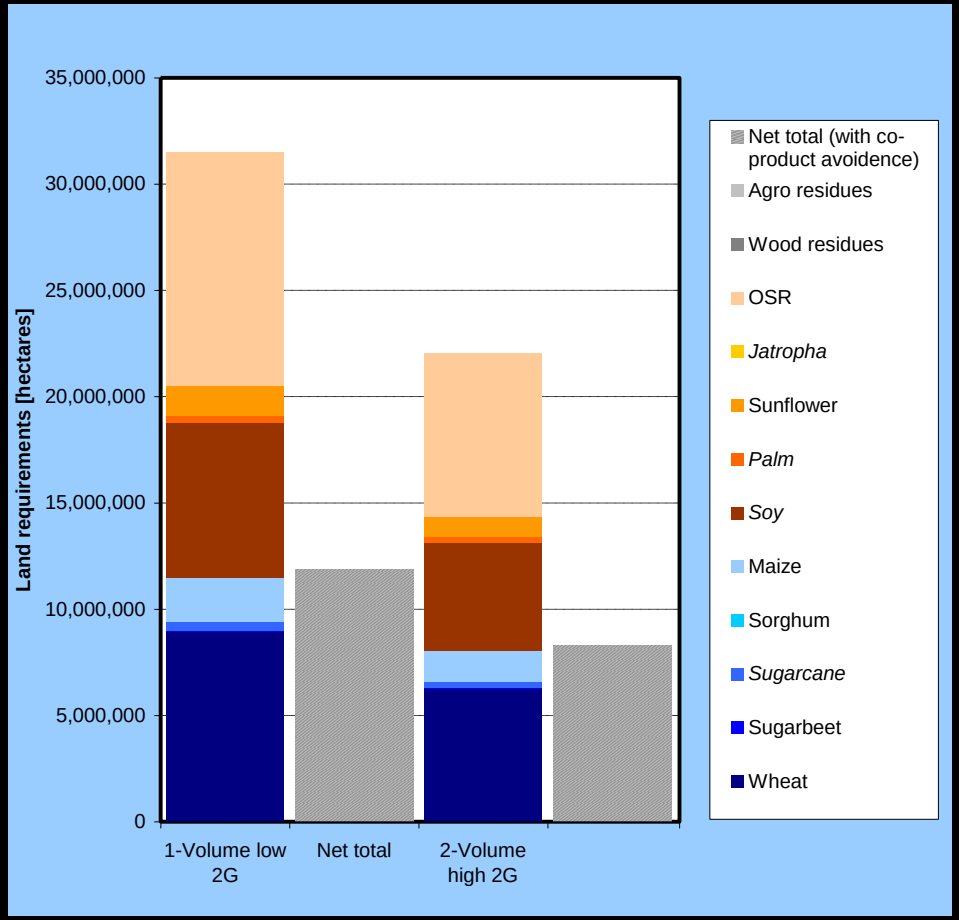
Background

- Bio-energy production (non traditional uses) has seen a sharp growth in recent years.
- Key drivers include reduction of greenhouse gas emission, energy security, and rural development.
- In all future energy scenarios with high contributions from renewable energy, bio-energy plays an important role.

Case: 10% target of EU and land requirements

- **EU RES target includes 10% transport fuel target**
- **10% equals 35 Mio toe**
- **Land requirement: 8 – 31 Mha**
  - **Role of residues**
  - **Role of co-products**
- **Land requirements causing:**
  - **Direct impact**
  - **Indirect Impact**



Source: Ecofys (2008) – contribution to Gallagher review

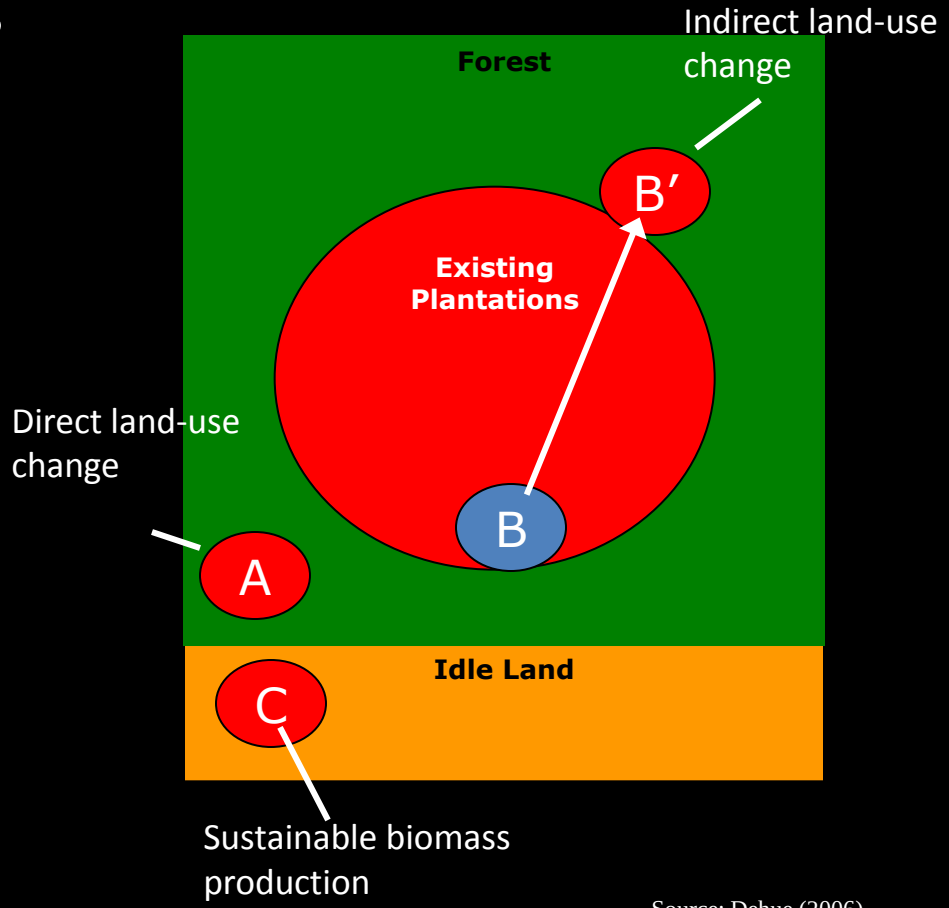
Objectives

- How biofuels can be produced without (or with a minimum risk of) indirect impacts.
- To develop and field-test a practical definition and methodology for Responsible Cultivation Areas, where energy crops can be produced responsibly without causing ILUC;

Indirect LUC – understanding the issue

Consequences of wrong LUC:

- Change in carbon stocks
- Biodiversity
- Land-right issues



Source: Dehue (2006)

Identifying areas for expansion of oil palm (bio-energy) based on sustainability criteria of:

- Roundtable on sustainable palm oil (RSPO)
  - GHG-methodology in the discussion
- Roundtable on Sustainable Biofuels (RSB)
  - GHG-methodology includes emissions from ILUC in the discussion

- US Renewable fuel standard
  - GHG-methodology includes emissions from ILUC: *significant*

- California Low Carbon Fuel Standard
  - GHG-methodology includes emissions from ILUC: *significant*

- EU Renewable Energy Directive & Fuel Quality Directive
  - Review of indirect effects by EC in 2010
  - EC may propose
    - measures to minimize negative impacts
    - Inclusion of emissions from ILUC in GHG-methodology

-> strong interest for companies to demonstrate production with minimum risk of ILUC

Preventing Indirect Impacts at the project level

Indirect Impacts

- Production on **land not currently in use**
- Production **with efficiency and productivity increases or integration models**
- Production from **residues.**
- Production from feedstock with potentially small land use requirements per unit output, including ***aquatic biomass***.

“Degraded land” use for future palm oil (bio-energy) expansion?

The utilization of degraded land is an alternative for developing plantations in agriculture or forestry area’s?

(Daily, 1995; Casson, 2000; Syahrinudin, 2005; Fargione, 2008; Fairhurst, 2009)

Estimations of ‘degraded land’ in Indonesia vary significantly (Source: Wicke et al 2007):

- 74 Mha - Indonesian Ministry of Forestry
- 31 Mha - FAO
- 18 Mha - WWF
- 12 Mha - Casson

RCA Principles

- Principles considered:

P1: HCV; High Conservation Values are maintained or increased

P2: Carbon; Carbon stocks are not significantly reduced

P3: Land rights Formal and customary land rights

P4: Displacement ; No unwanted displacement effects

P5: Suitable for Plantation development

High Conservation Value (HCV) concept

- HCV is used as a planning tool to minimize negative ecological and social effects from natural forest conversion. The concept of HCV has originally been developed in the context of forest certification by the FSC and is today used by many NGOs, other sustainability certification standards such as RSPO, biofuel initiatives such RSB and Governmental legislation such as the UK's RTFO.

- (e.g. the standard for certified sustainable oil palm developed by the multi-stakeholder Roundtable on Sustainable Palm Oil (RSPO) requires that development of new plantations post 2005 must avoid the conversion of areas needed to maintain or enhance HCVs p resent).

High Conservation Value

HCV 1 Areas with Important Levels of Biodiversity *

- HCV 1.1 Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas
- HCV 1.2 Critically Endangered Species
- HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species
- HCV 1.4 Areas that Contain Habitat of Temporary Use by Species or Congregations of Species

HCV 2 Natural Landscapes & Dynamics *

- HCV 2.1 Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics
- HCV 2.2 Areas that Contain Two or More Contiguous Ecosystems
- HCV 2.3 Areas that Contain Representative Populations of Most Naturally Occurring Species

HCV 3 Rare or Endangered Ecosystems *

HCV 4 Environmental Services

- HCV 4.1 Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream communities
- HCV 4.2 Areas Important for the Prevention of Erosion and Sedimentation
- HCV 4.3 Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire

HCV 5 Natural Areas Critical for Meeting the Basic Needs of Local People

HCV 6 Areas Critical for Maintaining the Cultural Identity of Local Communities

Provide spatially explicit guidance on sustainable development and investments Case of Kutai Barat – East Kalimantan

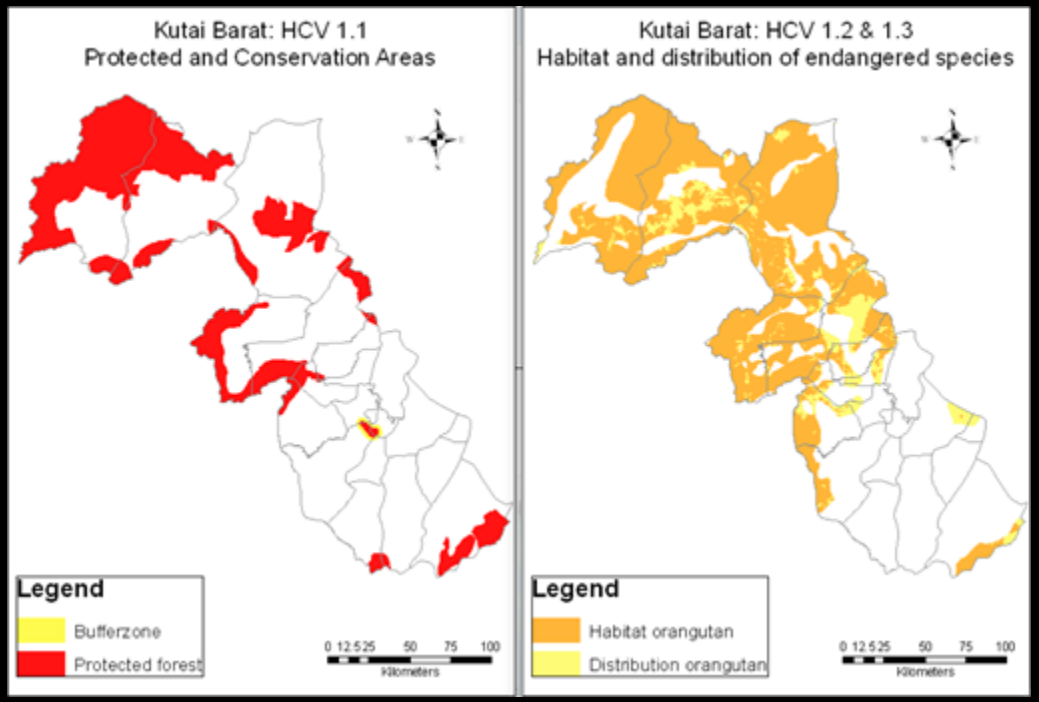
1. **Identify and map High Conservation values in Kutai Barat**
2. **Map distribution of carbon stocks**
3. **Combine the separate HCV's and carbon' layers' in one map**
4. **Integrate into an interactive tool that can be made publicly available**

Analysis & Results

HCV 1: Protected areas, and biodiversity

HCV 1	Low value	Medium value	High value	Unsuitable
HCV 1.1	No overlap with IUCN areas or conservation and protected areas areas and buffer zones.	Bufferzones: minimum 500m. max 100km x 200km (forest block): buffer 2km	IUCN V-VII,	IUCN I-IV, protected forest, Ramsar and national conservation area
HCV 1.2, 1.3, 1.4	No overlap with distribution or habitats of protected and endangered species	Overlap with distribution of protected and endangered species. (Ex: Singleton, 2004)	Overlap with habitat of protected and endangered species. (Ex: Singleton 2004, overlay LC, or EBA)	Breeding grounds and nesting places, grazing/browsing for endangered species and temporal habitats for migratory species (HCV 1.3 & 1.4)

HCV 1 based on proposed RTRWK (left), and HCV 1.2, 1.3 and based on distribution orangutan, and land cover (right).

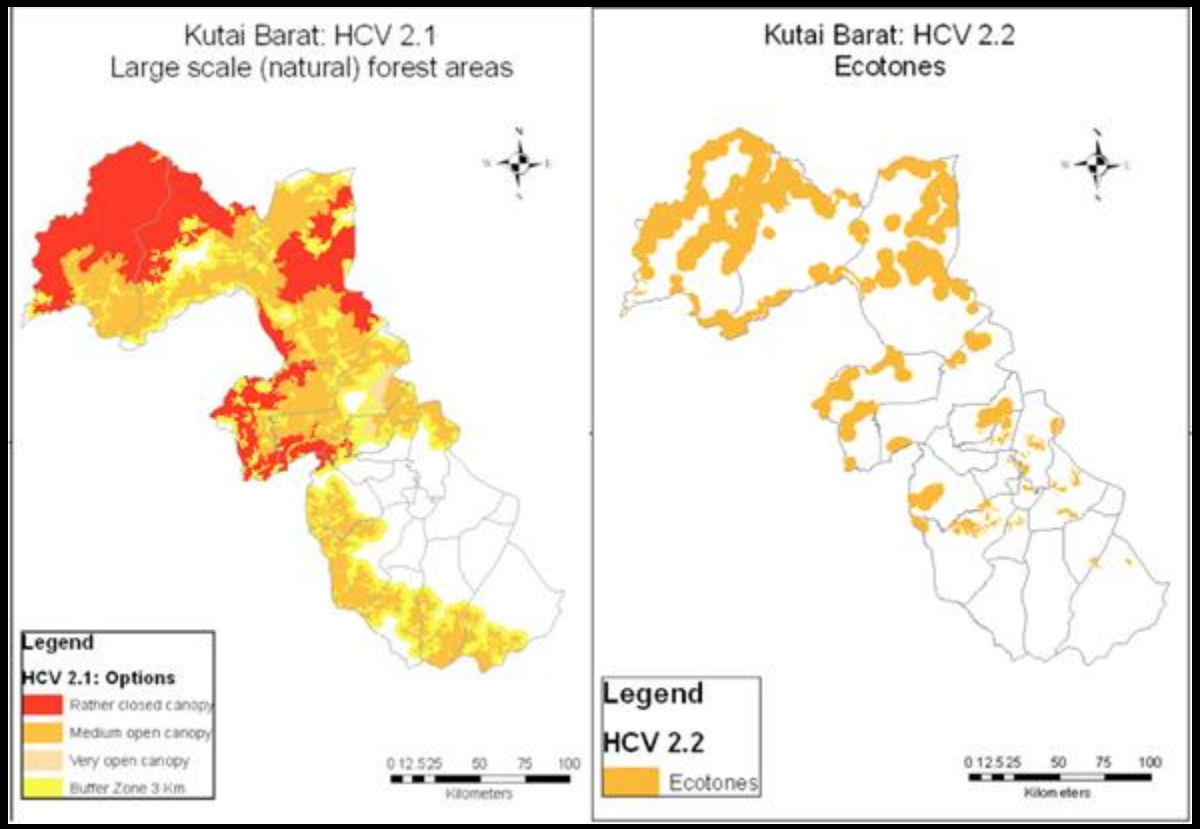


Analysis & Results

HCV 2: Natural landscapes

HCV 2	Low value	Medium value	High value
HCV 2.1	No overlap large scale forest and important ecotone regions.	Large scale forest areas. Forest area >20000 ha (incl very open canopy forest) plus buffer 3 km (HCV 2.1 ID)	Intact Natural Landscape. An: Forest area >20000 ha very forest) (HCV 2.1 INT)
HCV 2.2	No overlap important ecotone regions		2 or more ecotone regions

HCV 2; HCV 2.1 (left), and HCV 2.2 (right).

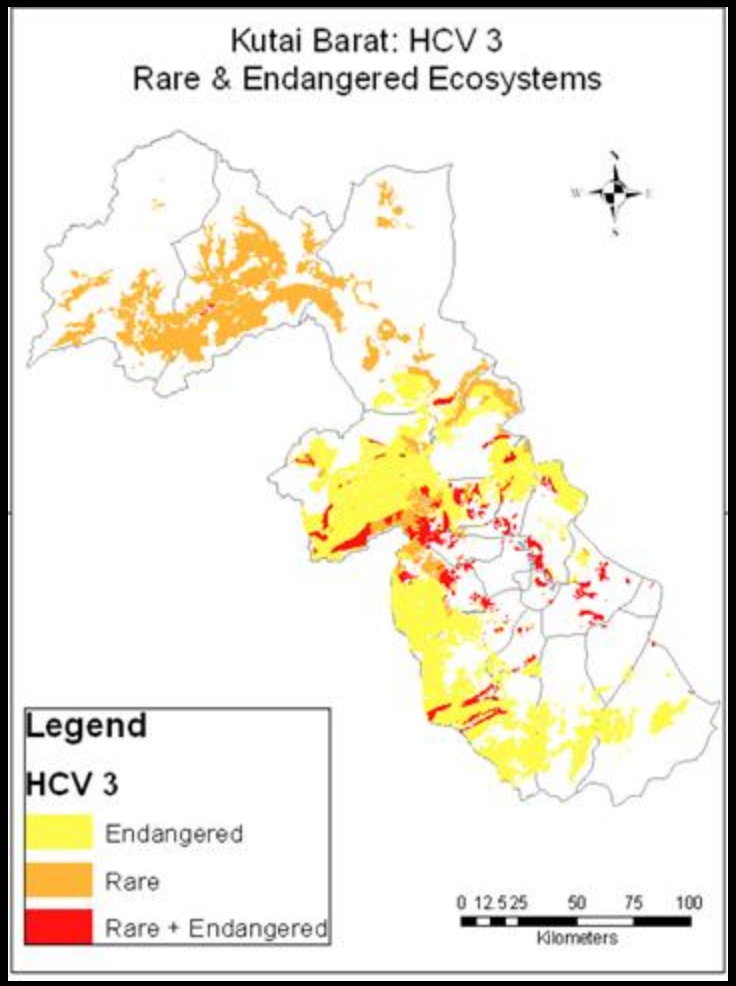


Analysis & Results

HCV 3: Rare & Endangered ecosystems

HCV 3	Medium value	High value
HCV 3	Endangered ecosystem 50% lost from the past total or 75% in the future.	Rare ecosystems, remain <= 5% from the total, Karst class nr 1, peat, fresh water swamp, mangrove, hutan kerangas, cloud rainforest: peat, mangrove, cloud rainforest

HCV 3 in orange for Kutai Barat, based on Deameter (2010), corrected based on landcover data from BioTrop (2011)

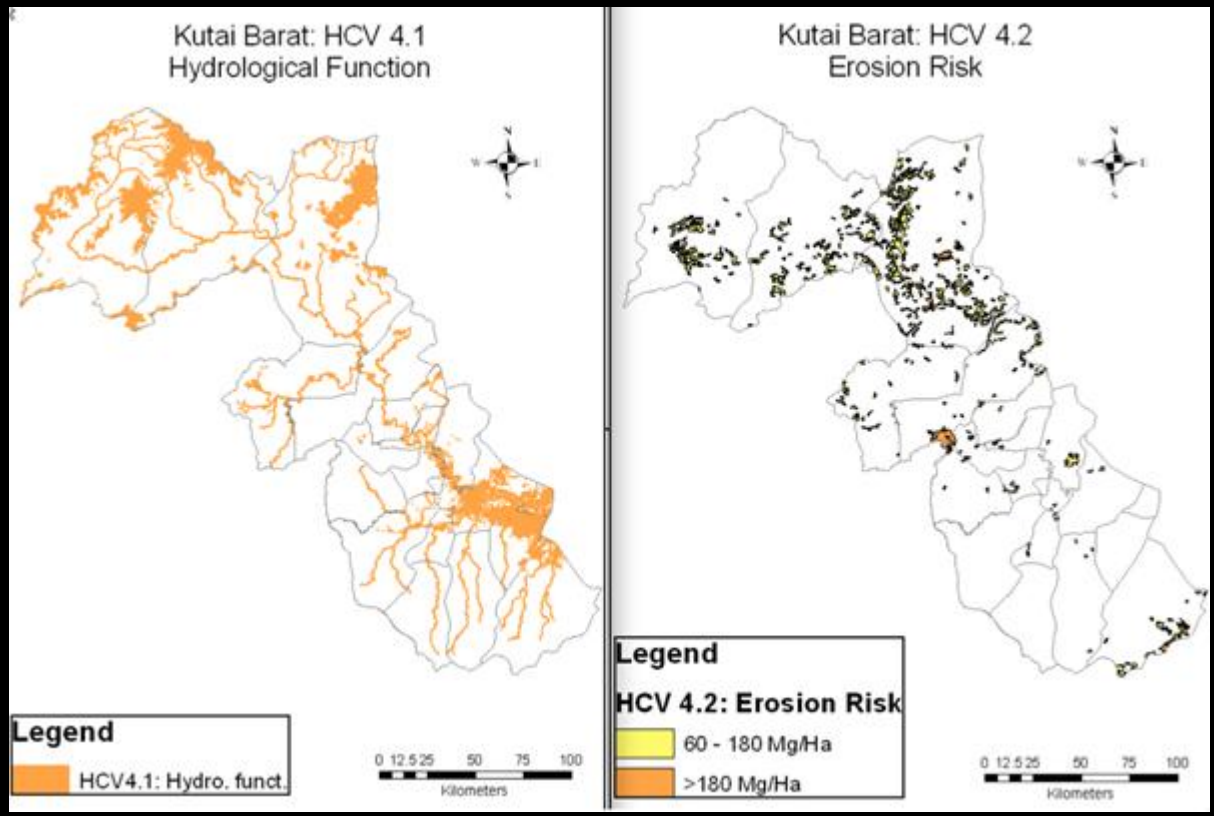


Analysis & Results

HCV 4: Ecosystem services

HCV 4	Low value	Medium value	High value
HCV 4.1		.	Watersource (spring), riperian zone and bufferzone 500m. Including ecosystems: Mangrove, peat, wet land and karst forest.
HCV 4.2	< 15 ton/ha/year	15 - 179 ton/ha/year	> 180 ton/ha/year

HCV 4: From left to right; HCV 4.1, and HCV 4.2 (Source: WWF Indonesia, 2011)



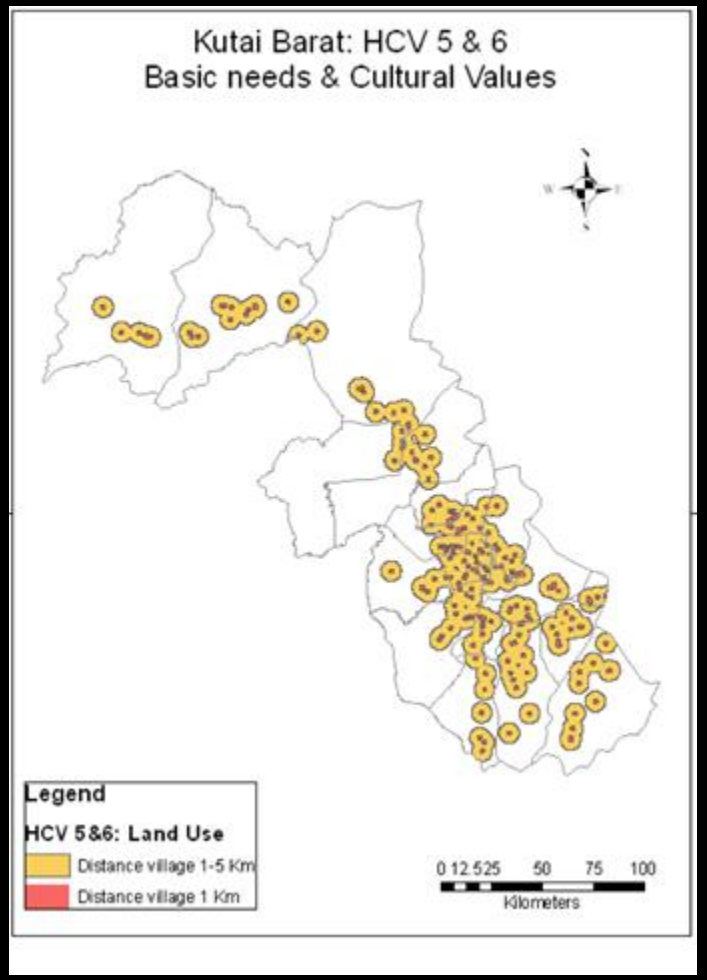
Analysis & Results

HCV 5&6: Social and cultural values

HCV 5&6	High value	High value (unsuitable)
HCV 5&6	Areas providing >25% for subsistence, or cultural sites. (Proxy: settlements buffer 1-5 km)	Areas providing >50% for subsistence, or cultural sites. (Proxy: settlements buffer <1 km)

Social and cultural values are difficult to map on a 'district level'

Proposal: Distance from village centre as a proxy for HCV 5 & 6

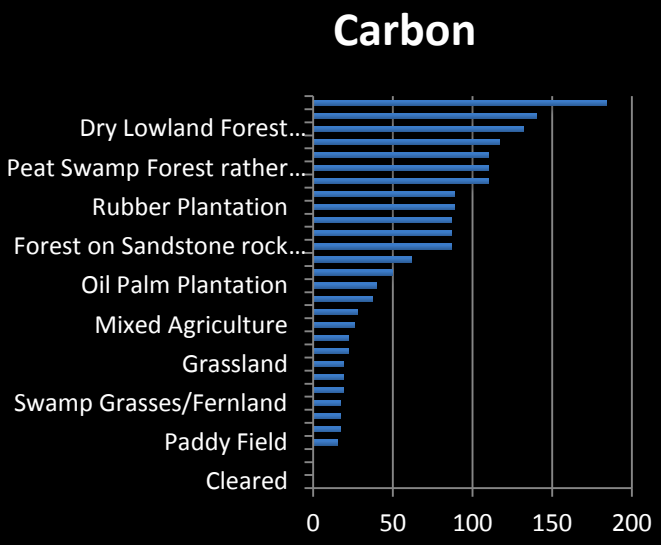


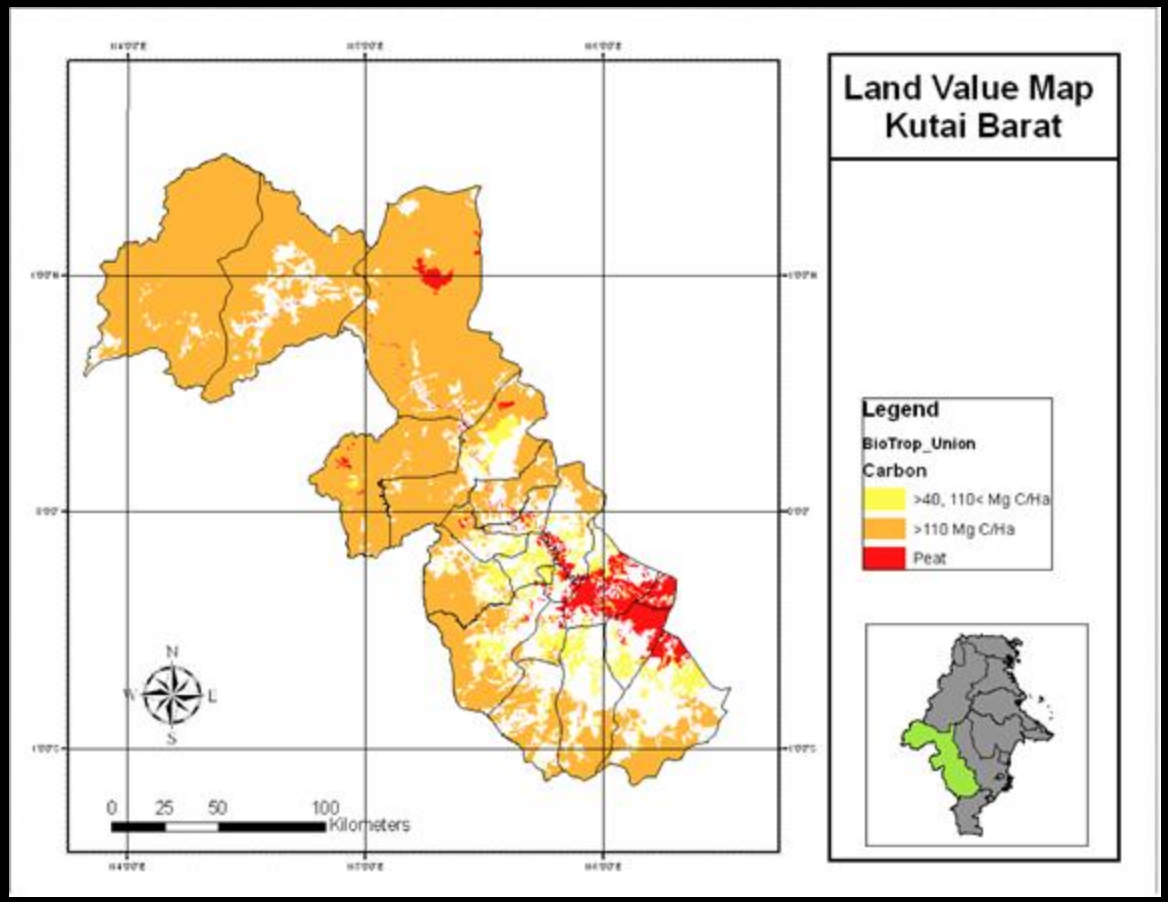
Analysis & Results

Carbon stocks

Carbon	Low value	Medium value	High value	High value (unsuitable)
Carbon Stock	0-40 Mg C/Ha	>40, 110< Mg C/Ha	> 110 Mg C/Ha	Peat areas

Carbon distribution, with areas containing peat in red (unsuitable).

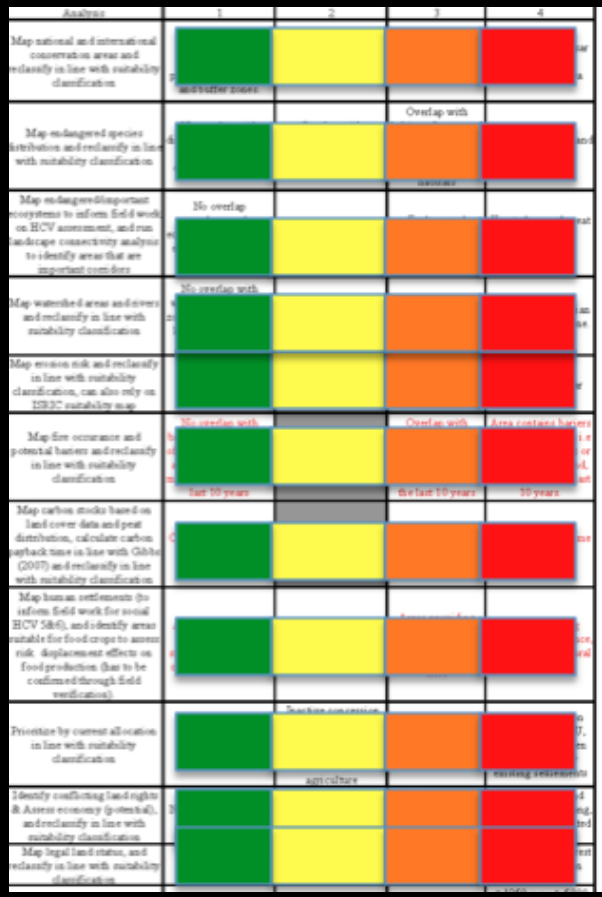


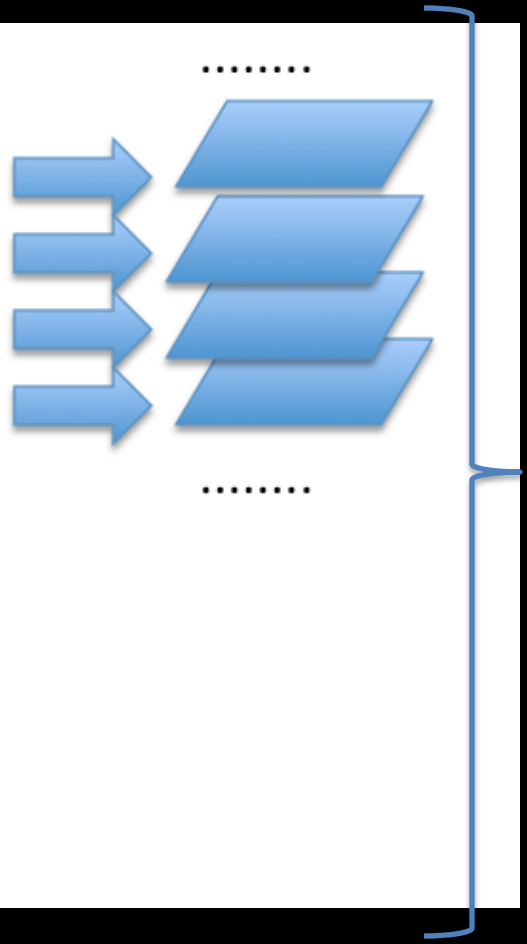


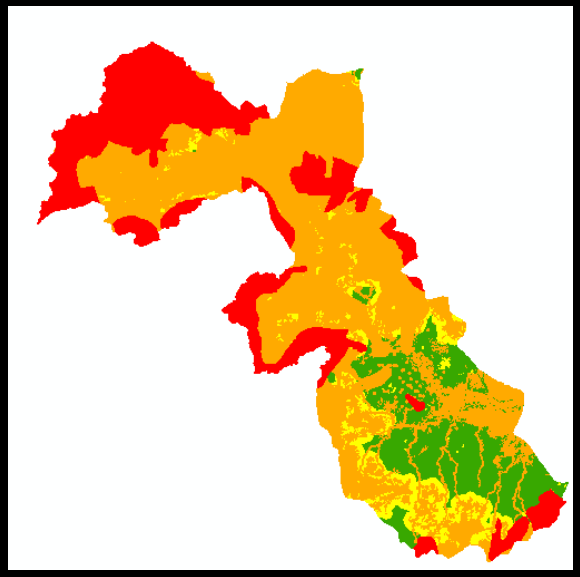
Analysis & Results

Conservation Value Map

Combine the separate layer in one map

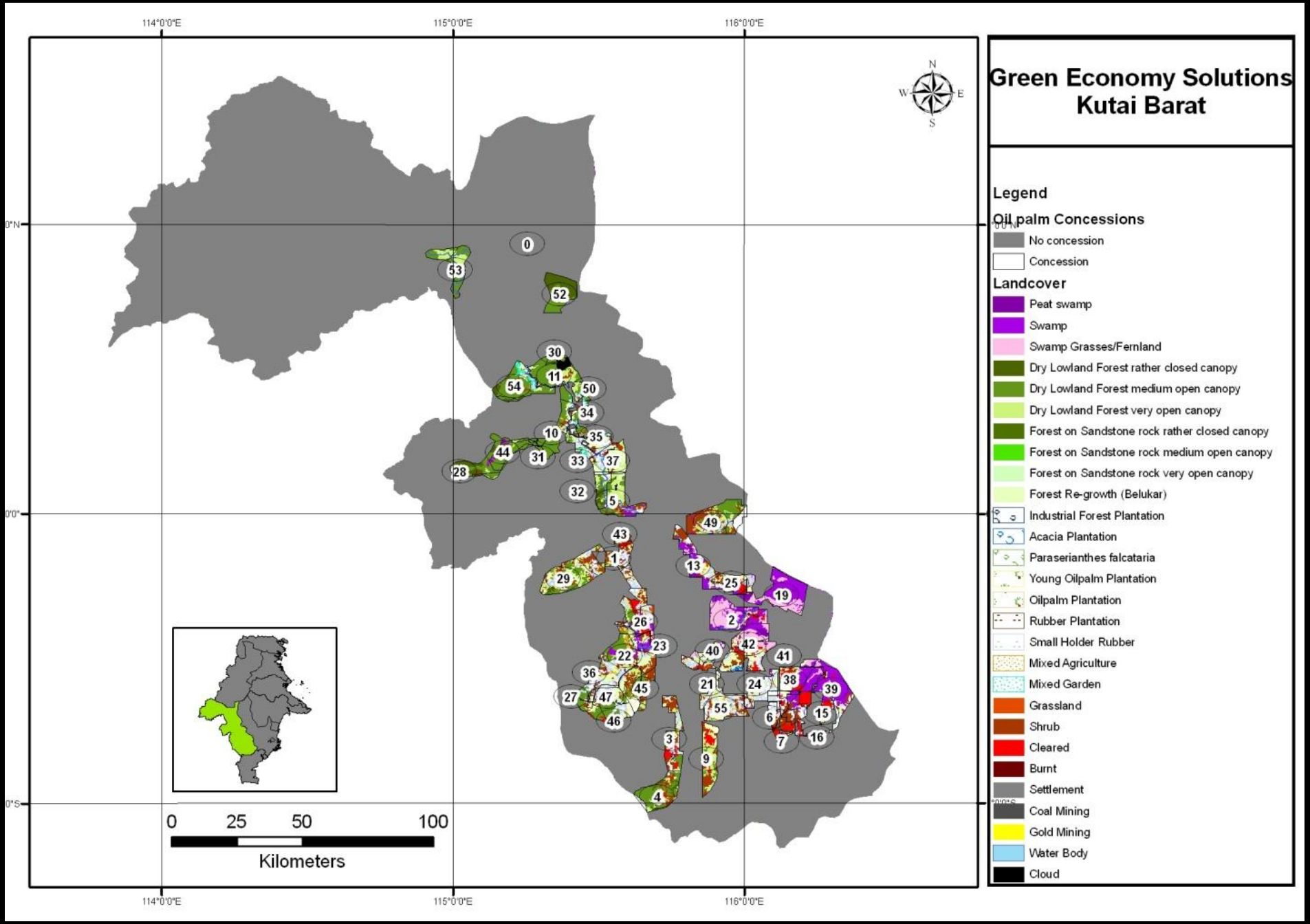






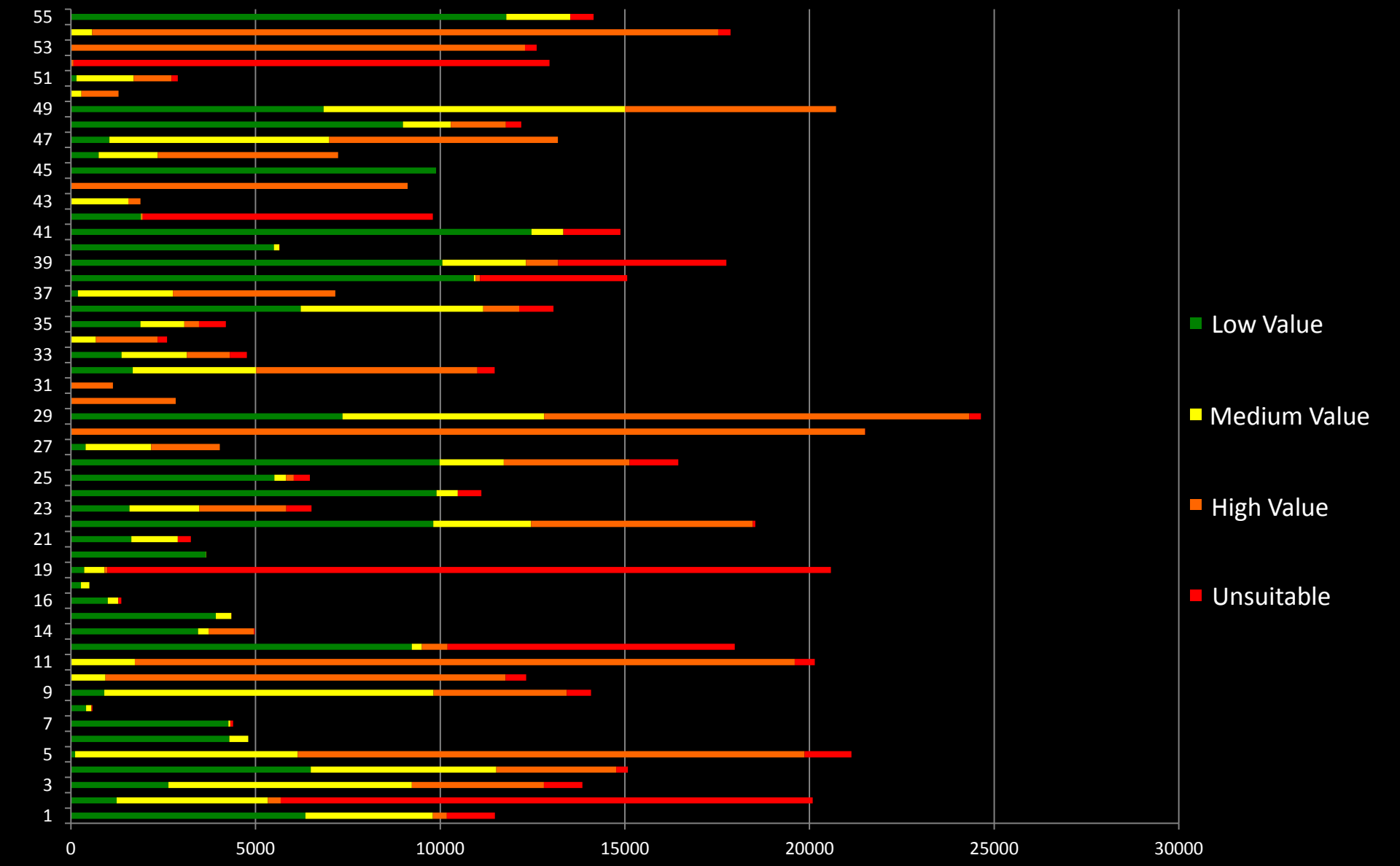
Classes	Area_ha
Low Risk	589,329
Medium Risk	310,150
High Risk	1,536,097
Not Suitable	858,112

Oil palm concessions Kutai Barat 2009



Analysis & Results

Values in OP concessions



Challenges

- Not all degraded lands will be available
- Some of them may not be suitable for oil palm production
- Degradation is often caused by the presence of people
- Degraded lands can still contain HCV
- Degraded lands may have already been allocated for other purposes

Thank you

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