Some Basic Facts About Peat

U Myint Aung

Forest Resource Environment Development and Conservation Association (FREDA)

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Naypyidaw, Myanmar

Some Basic Facts About Peat

1. Introduction: What is Peatland?
2. Where Peat Can be Found?
3. Importance of Peatland
4. Current Situation of Peatland
5. Some Impacts of Peatland Degradation
6. Conservation and Management
7. Peatland Assessment in Myanmar
8. Next- steps for Myanmar Peatlands

1. Introduction: What is Peat?

- Peat is soil which is composed of **65% or more organic matter** (mostly semi-decomposed plant matter: trees, sedges, grasses, mosses)

- Normally **black in color and spongy** (Peat can contain 90% water)
  - By Comparison mineral soils are made up of inorganic matter (e.g. sand, silt, clay)

(b) What is Peatland?

- The Soil contains at least 65% organic matter Depth – at least 50 cm
- Area at least 1.0 ha

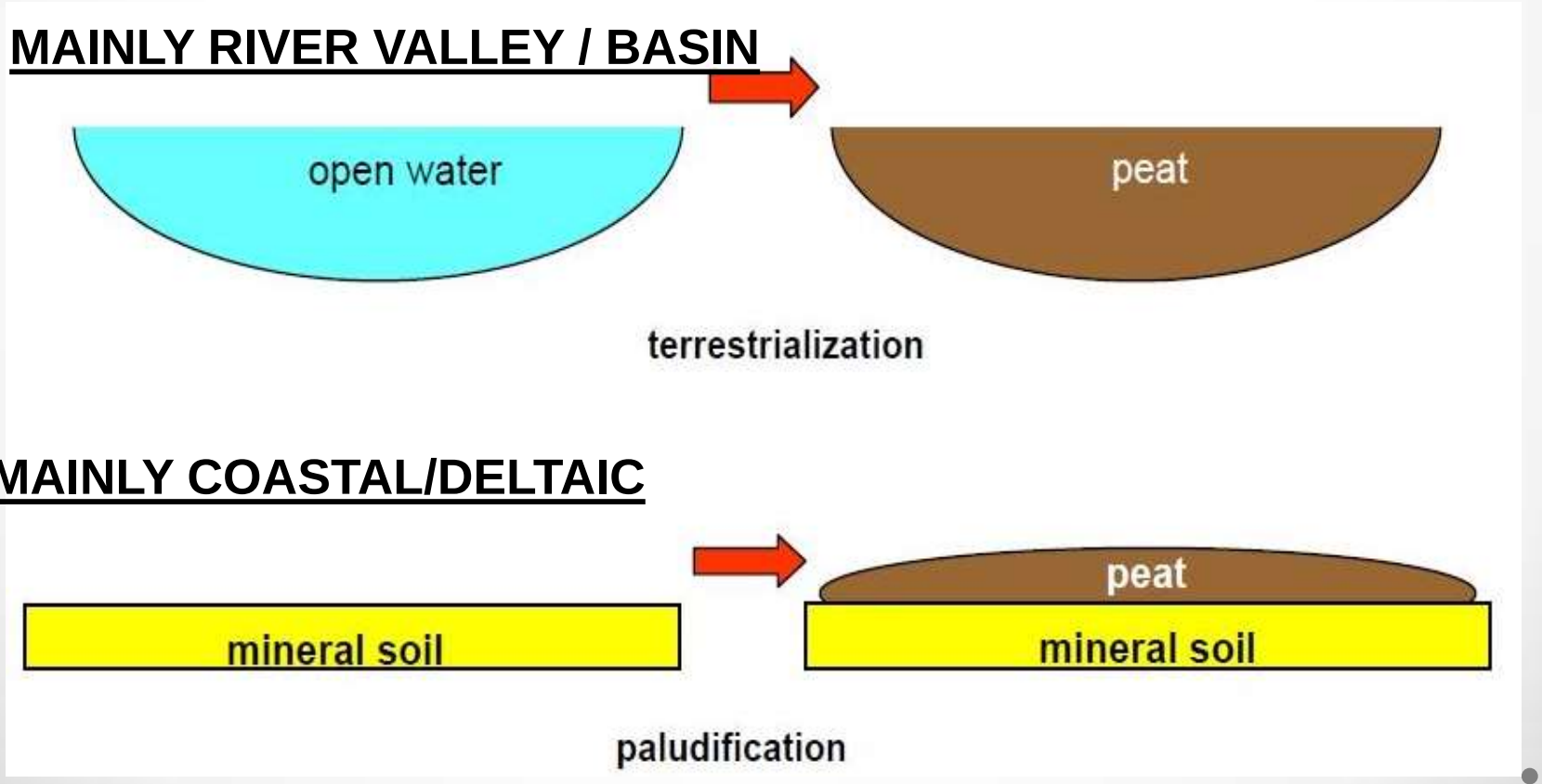
(c) Peat Formation

TOPOGRAPHICAL SETTINGS FOR PEAT FORMATION

TOPOGRAPHICAL SETTINGS FOR PEAT FORMATION

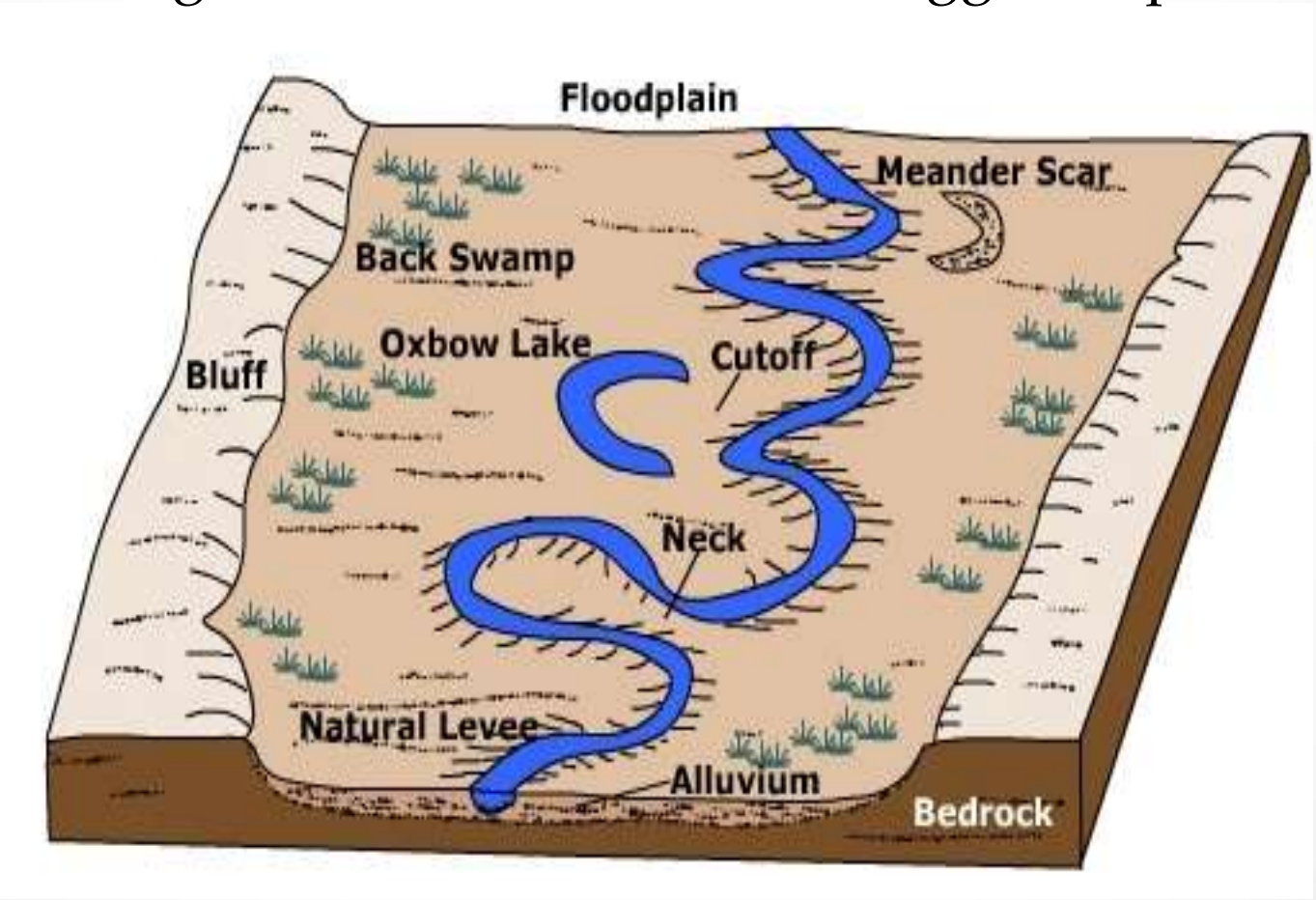
Two kinds of formation:

1. Terrestrialization: peat develops in open water.
2. Paludification: peat accumulates directly over a paludifying mineral soil



Conditions for PEAT DEVELOPMENT Suitable in Floodplains

e.g. infilling ox-bow lakes and waterlogged depressions



CONDITIONS FOR PEAT DEVELOPMENT

- Areas which are **waterlogged** for most of the year
- Where there is **high production of organic matter**
- Where **water flow is low** so that organic matter can accumulate

Waterlogged soils are low in, or devoid of oxygen, so that decomposition of the organic matter is reduced: Partially decomposed organic matter accumulates as **PEAT**

From what material was peat formed.

- Urapeepatanapong & Pitayakajornwute (1996)

Southern Thailand
Narathiwat: closure of lagoonal systems, peat initially formed from grasses, then trees.

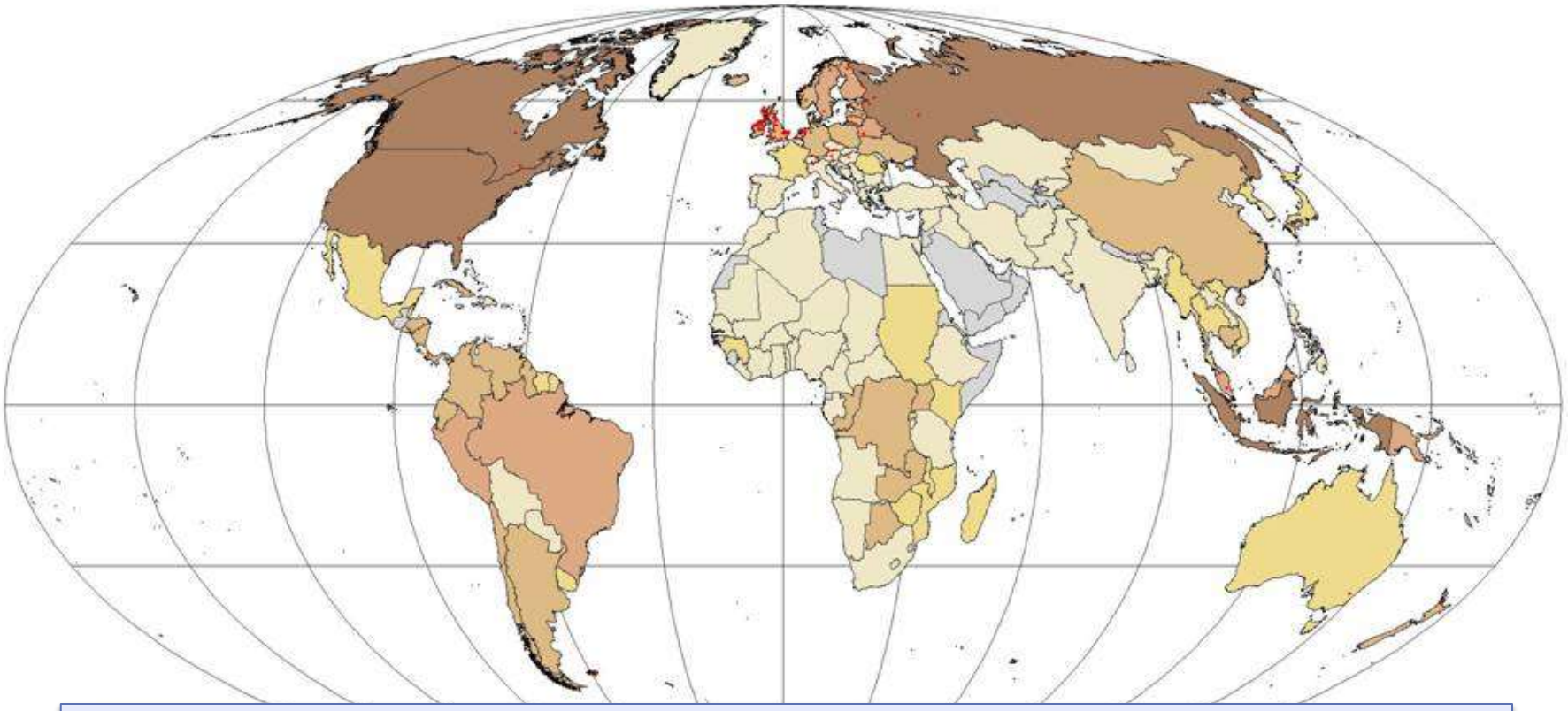
- Supiandi & Furukawa (1986)

Coastal areas of Jambi province, Sumatra
Peat formed initially from herbaceous vegetation, especially ferns

More recent peat formed from trees.

2. Where can peat be found?

Peatlands are everywhere…



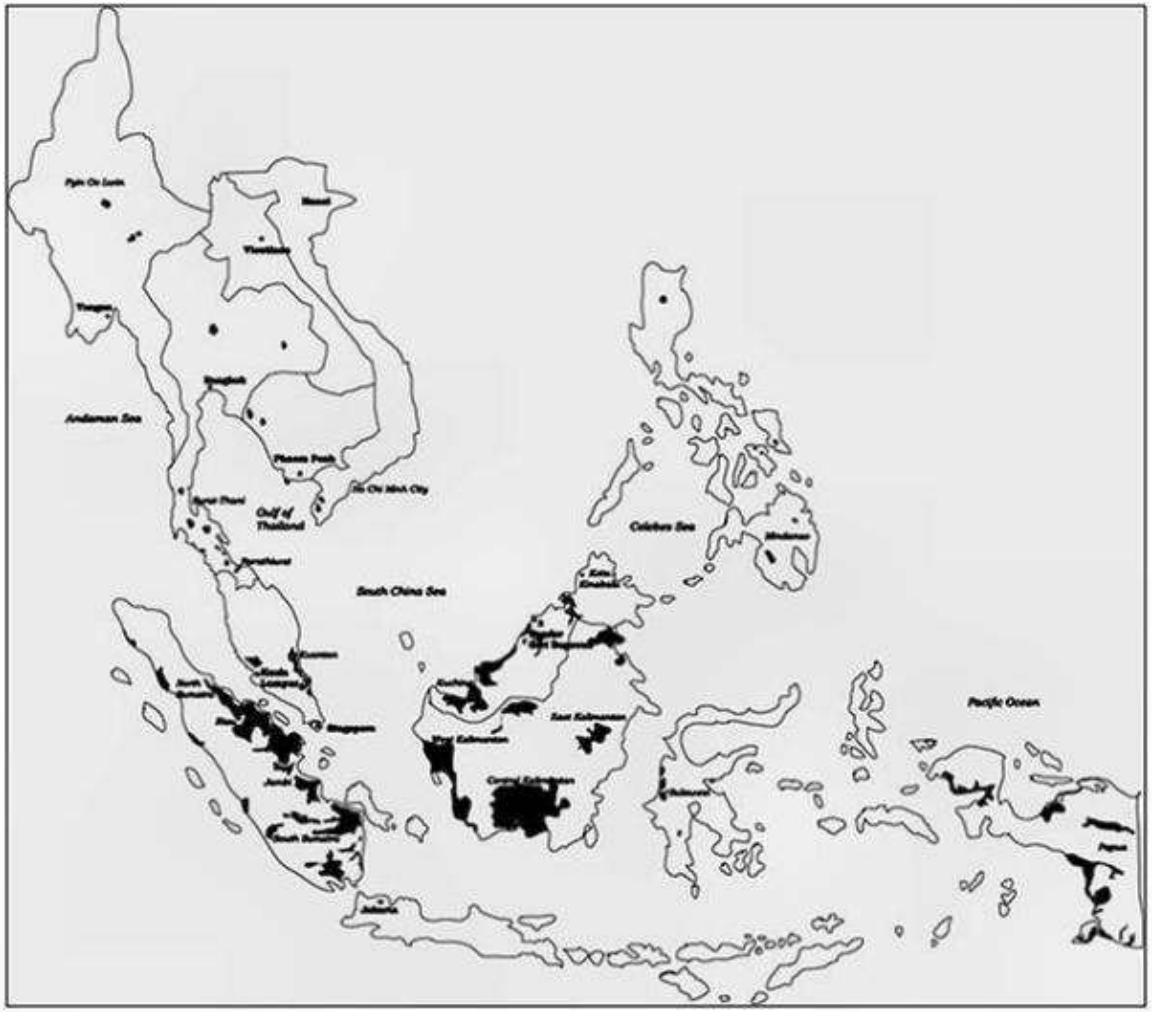
- World wide: 400 million ha
- 3% of global land area; 40% of all wetlands
- Present in all climate zones, in 126 countries
- Southeast Asia has 6% of global peatlands (c WI)

Dominant (non)forested peat lands

Tropical Peatlands.

REGION	AREA RANGE (Million has)
Central America	2.28 - 2.60
South America	4.04
Africa	2.00
The Pacific	0.019
Asia (Mainland)	1.100 - 3.100
Asia (Southeast)	20.21 - 33.21
TOTAL	30.63 - 45.96

Distribution of Peatlands in Southeast Asia



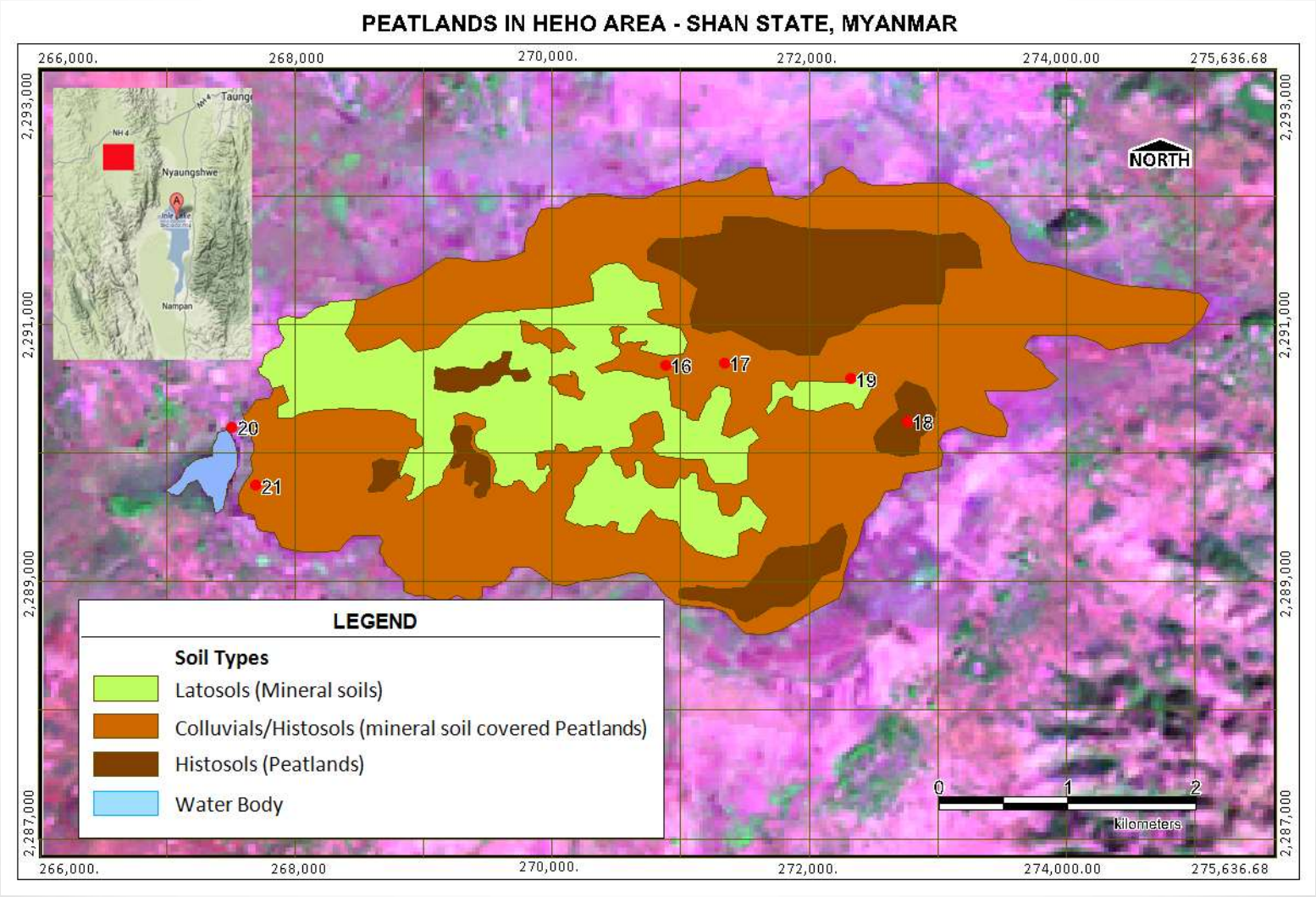
In Southeast Asia

COUNTRY	ESTIMATE OF TOTAL PEATLAND AREA (ha)
Indonesia	20,695,000
Malaysia	2,588,900
Myanmar	122,800
Brunei Darussalem	90,900
Philippines	64,500
Thailand	63,800
Vietnam	53,300
Lao PDR	19,100
Cambodia	4,580
Singapore	50

Potential Areas of Peatland in Myanmar

Peatland Found in Myanmar

(i) Heho Valley, Kalaw Township, S. Shan States



Some Finding of Heho Valley Peatland

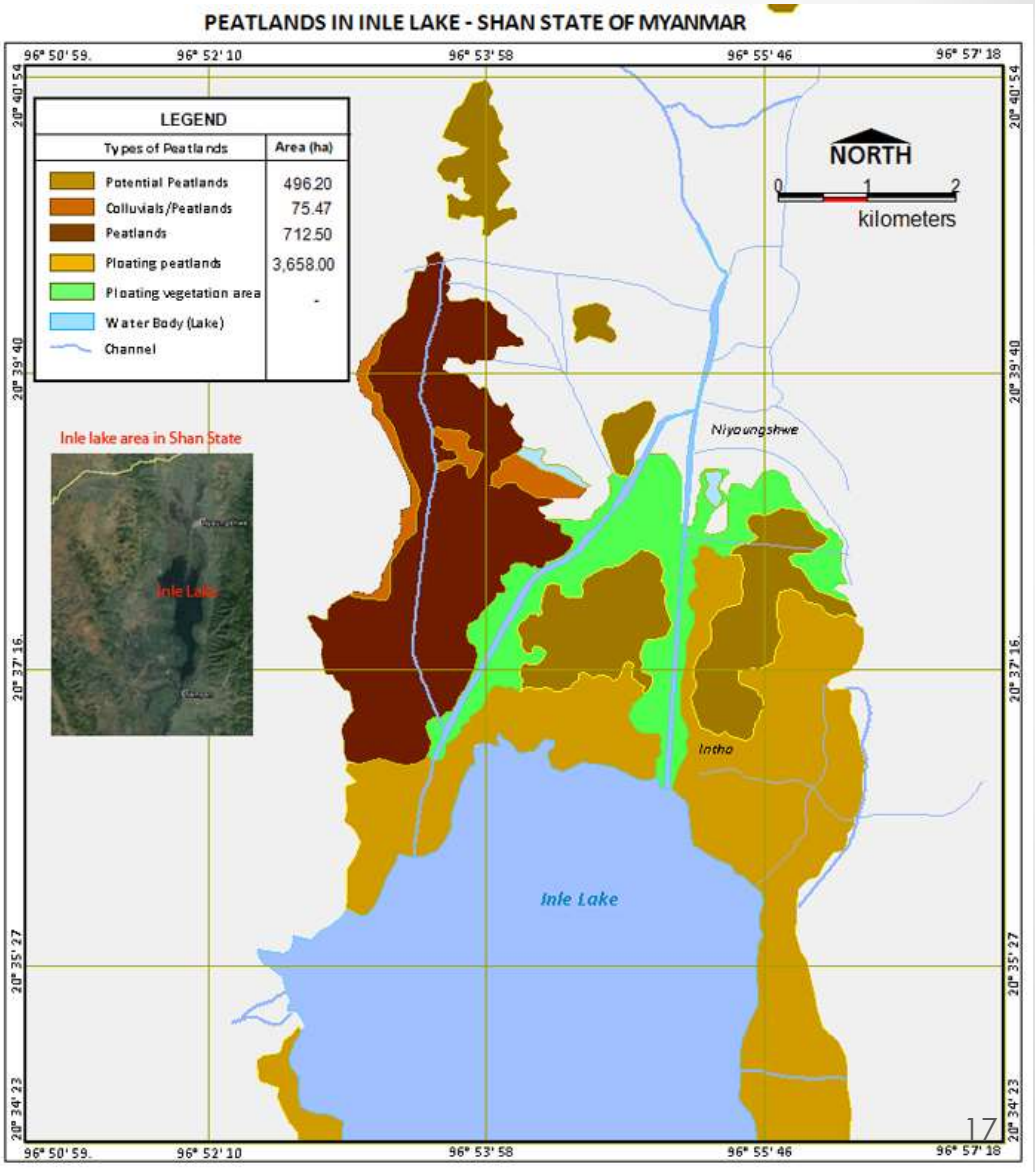
Area

Colluvials/Histosols	965 ha
Histosols	224 ha
Peat type:	buried peat land
Maturity:	Hemic (medium maturity)

	Range	Average
Peat thickness (cm)	15-295	71
Moisture %	30-88	68
Bulk Density (g/cm3)	0.11-0.37	0.25
Carbon volume (t/m3)	0.01-0.12	0.04
Total Carbon stock (t ha-1)		
< 200 cm	60-817	264
> 200 cm	217-476	287
Total Carbon stock (ton/area)	**338,548 (1189 ha)**	

(ii) Taungpoegyi Peat Dome, Nyaung Shwe Township S.Shan States

Area:	71250 has
Peat type:	(Ongoing)
Current use:	Water Source for Agriculture



3. Importance of Peatlands

(a)Huge Carbon store

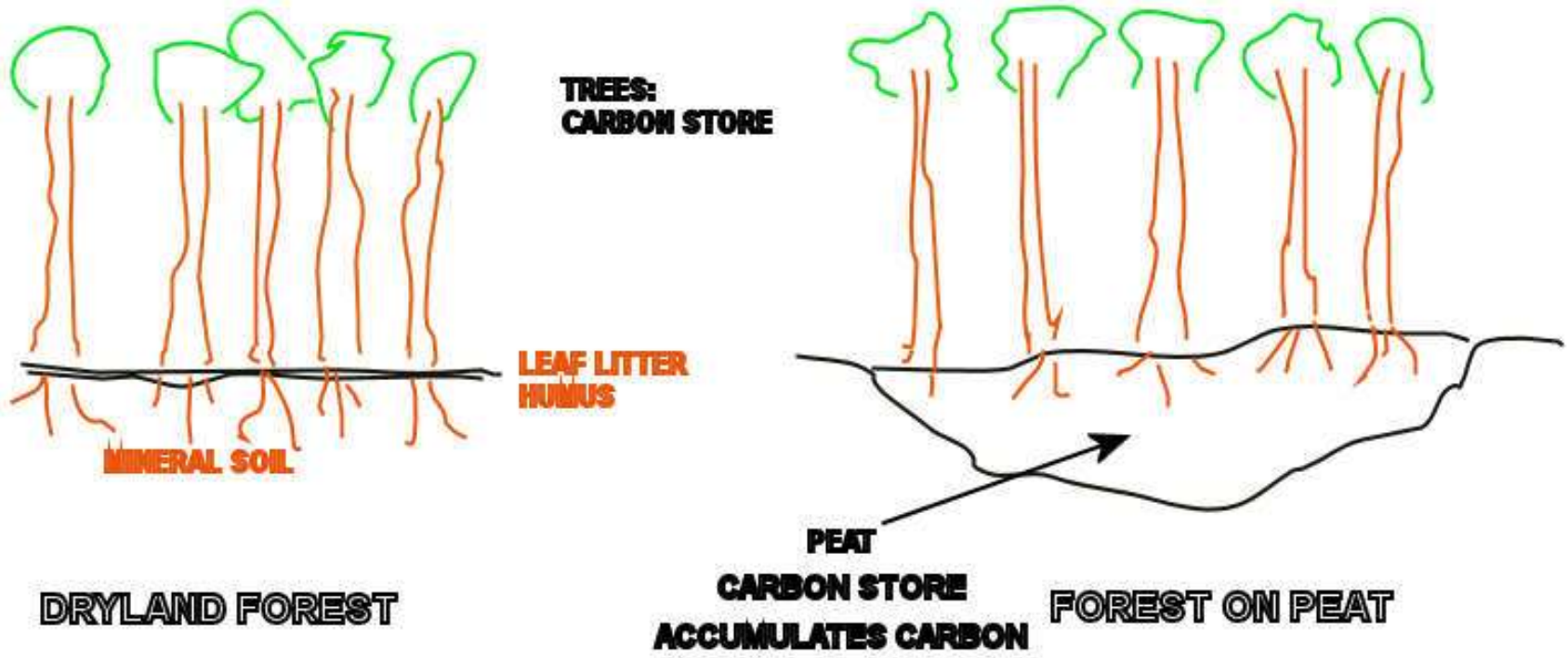
(b)Water services

(c)High Biodiversity value

(d)Others – support for local community

(a) Huge Carbon store

(i) Peatlands in their natural state are mostly a carbon store and a carbon sink; they accumulate carbon



(ii) Carbon & Peatland: Some figures

- Globally peatlands store 2000 Giga ton (Gt) CO_2
- Equivalent to 30% of terrestrial carbon
  - 75% of all carbon in the atmosphere
  - 90% of all carbon stored global plant biomass
  - twice the carbon stored in forests

- Peatlands are the **most efficient carbon** store of all terrestrial ecosystems.

  Peatlands **contain more carbon per ha than other ecosystems** on mineral soil:

  - in the (sub)polar zone, 3.5 times,

  - in the boreal zone 7 times,

  - in the tropical zone, 10 times

(b) Water Services

Intact peatlands may be as much as 95% water – can be thought of as aquatic rather than terrestrial systems

Extensive peatlands: **huge water storage** reservoirs

Due to a normally high water table, peatlands have a limited capacity to absorb more water.

BUT valuable for:

- Flood reduction, increase sedimentation.
- Releasing water slowly in dry periods → maintain base flows in rivers running through them → preventing salt water intrusion

(c) High Biodiversity Value

(i) Peatlands Protect Important Biodiversity

(ii) Biodiversity Value - FLORA

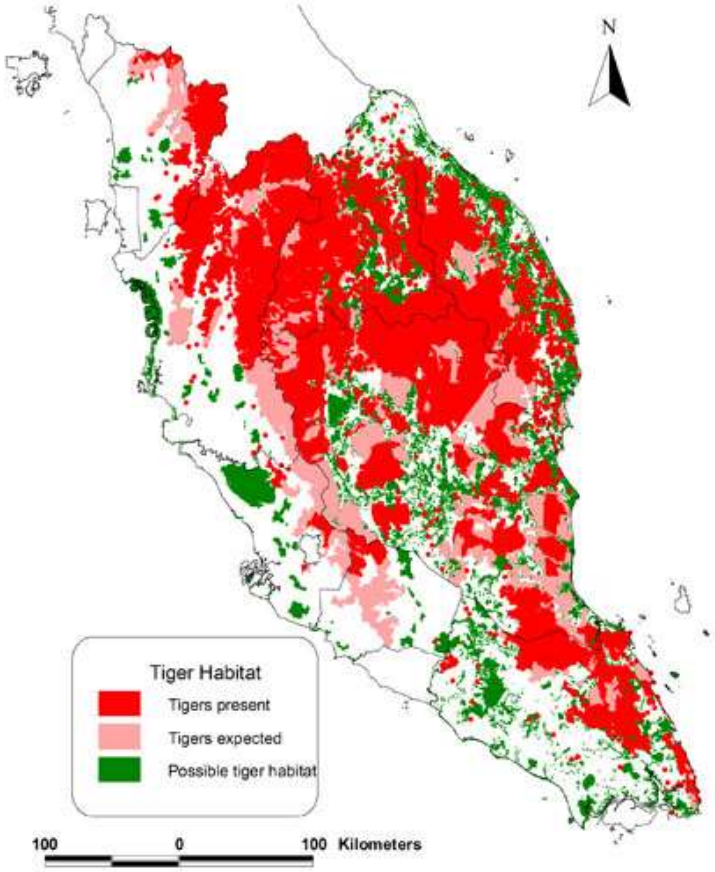
Western Malaysia: Borneo is centre of species richness
For PSF tree flora: Borneo > 380 species; Peninsular Malaysia > 170 species (from Page)

(iii) Faunal Diversity

Threatened species: TIGER

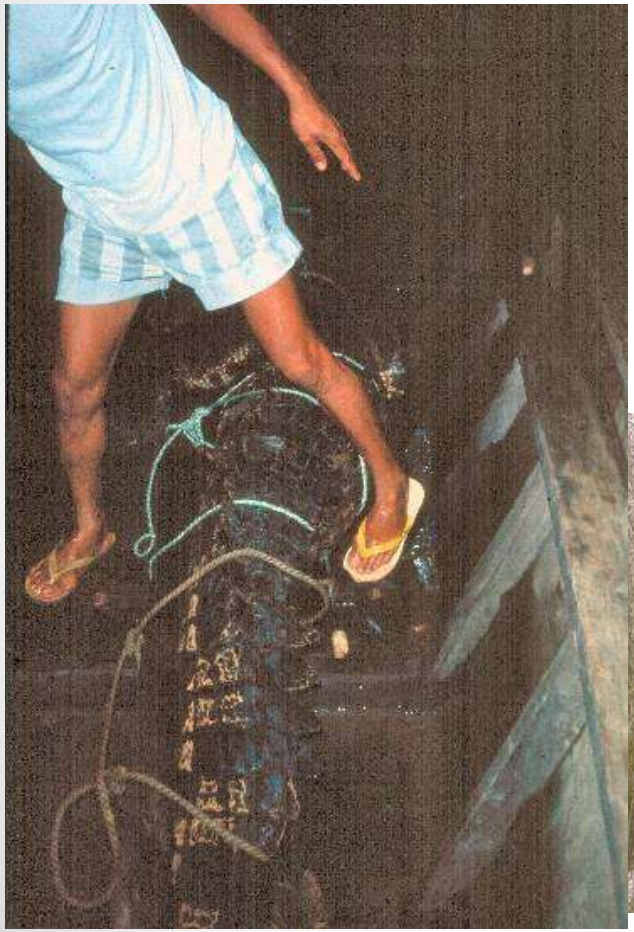
Tigers are habitat generalists, meaning that they can live in a variety of habitat types; from **peat swamp** to small woodlands inside plantations to lower montane forest.

FROM: Department of Wildlife and National Parks Peninsular Malaysia, 2005



Forest map source: Forestry Department (2002) and Agriculture Department (1997)

(iv) Faunal Diversity



Crocodilian species:

Crocodylus porosus (estuarine crocodile),
Crocodylus mindorenesis *(in Philippines)*,
Tomistoma schlegelii (False Gharial)

(v) Faunal Diversity

Lesser Adjutant Stork

Birds

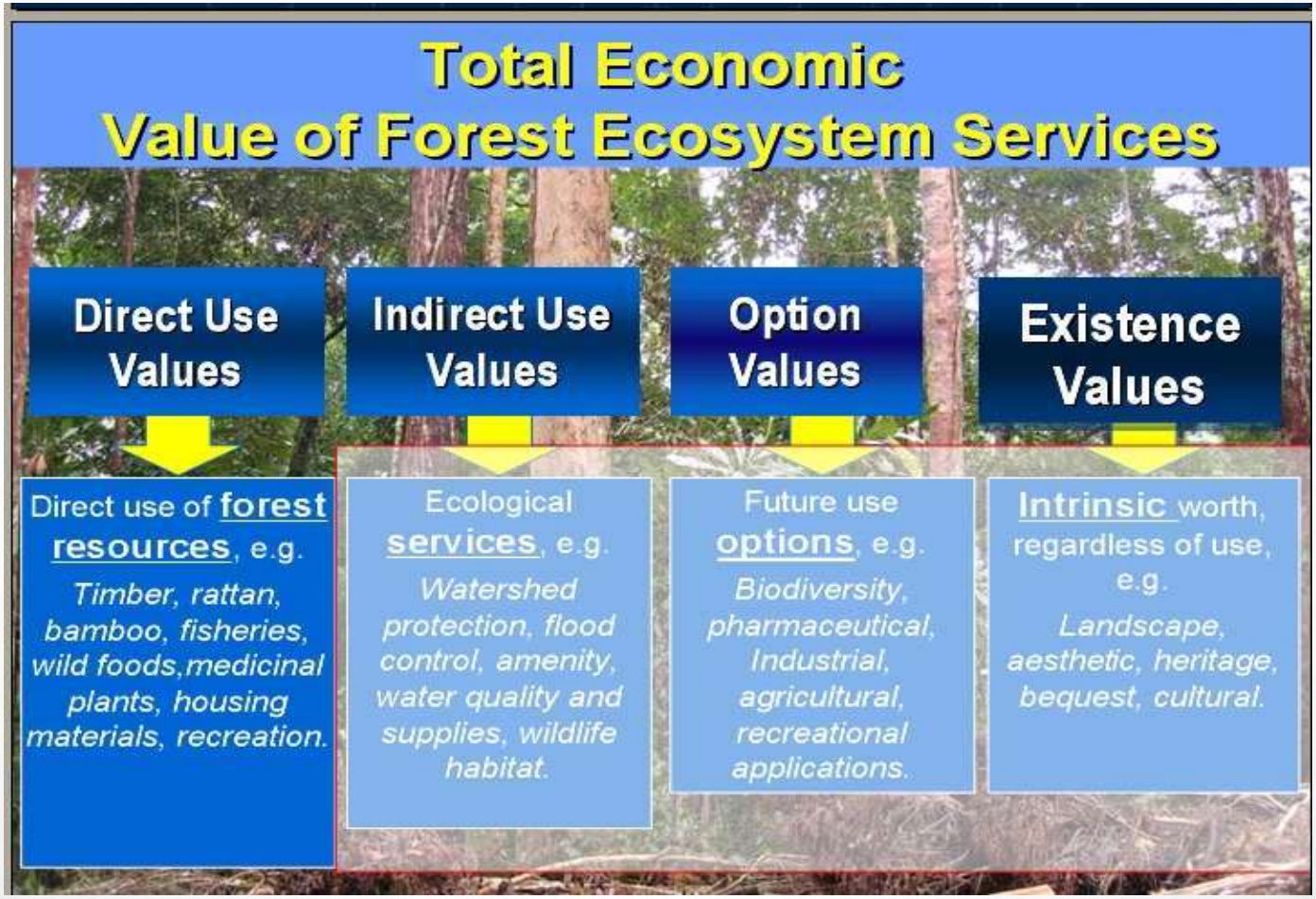
© *James Eaton / Birdtour Asia*

Storm's Stork

Crestless fireback pheasant

(d) Others

(i) Support For Local Community



(ii) Service

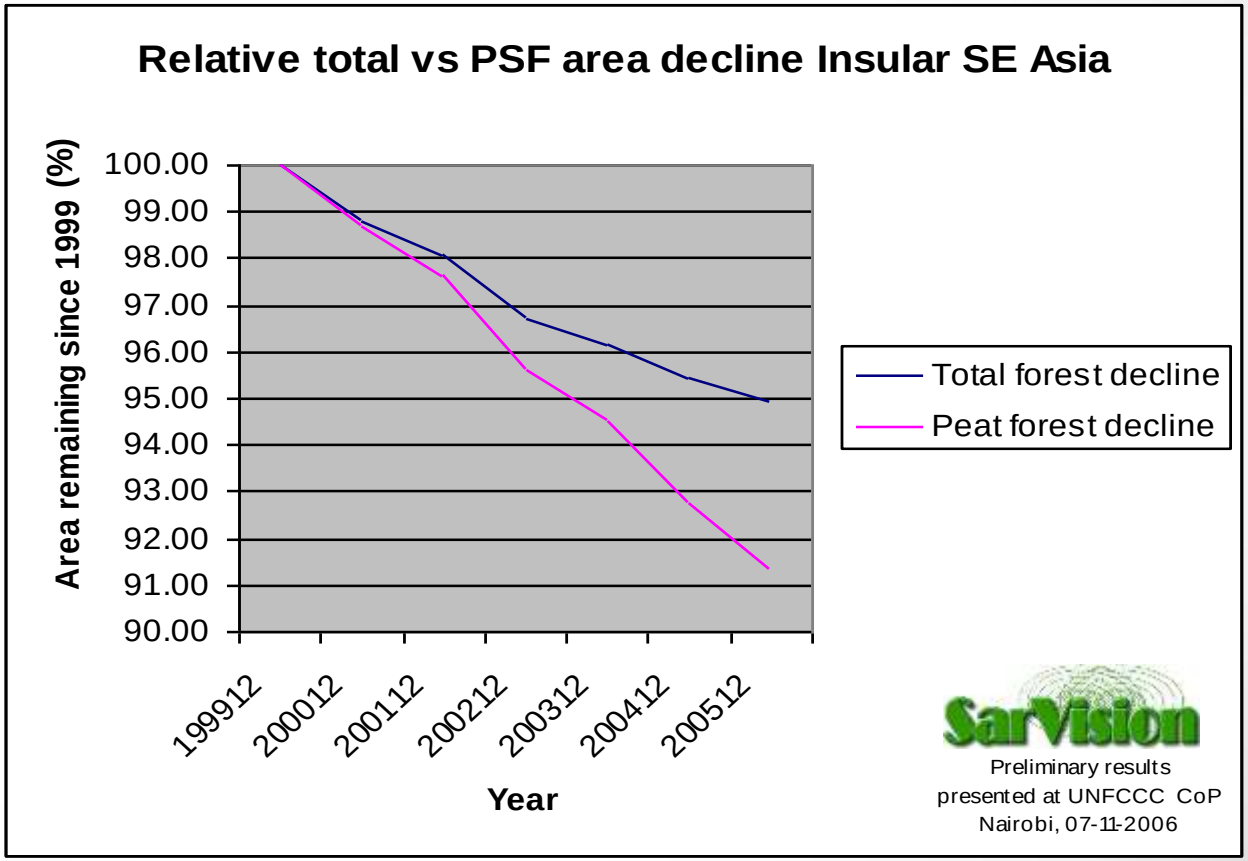
- Fisheries
- Collection of non-timber forest products (NTFP)
- Hunting
- Logging / Forestry plantations
- Agriculture
- Aquaculture

- ***Subsistence (livelihoods for local communities)***
- ***Commercial***

4. Current Situation of Peatlands

(a)Peatland Degradation

- 1.5% per year since 2000, twice the rate for other forest types
- Of the 27.1 million hectares (MHa) of peatlands in Southeast Asia, 12.9 MHa has been deforested and mostly drained by 2006 (48%)



(b) Causes of Degradation

(i) Drainage

(ii) Landuse Change

Especially peat swamp forest, a big controversy

Terengganu, Peninsular Malaysia

(iii) Forest Fire

- **COMPLETELY ACCIDENTAL:**
  e.g. throwing cigarette butts etc.
- **DELIBERATE / ACCIDENTAL:**
  Burning a small area, but fire gets out of control
- **DELIBERATE:**
  Arson
- **INDIRECT:**
  e.g. Short circuiting of pylon lines, broken glass focusing sun's rays etc.

(iv) Logging and Agriculture

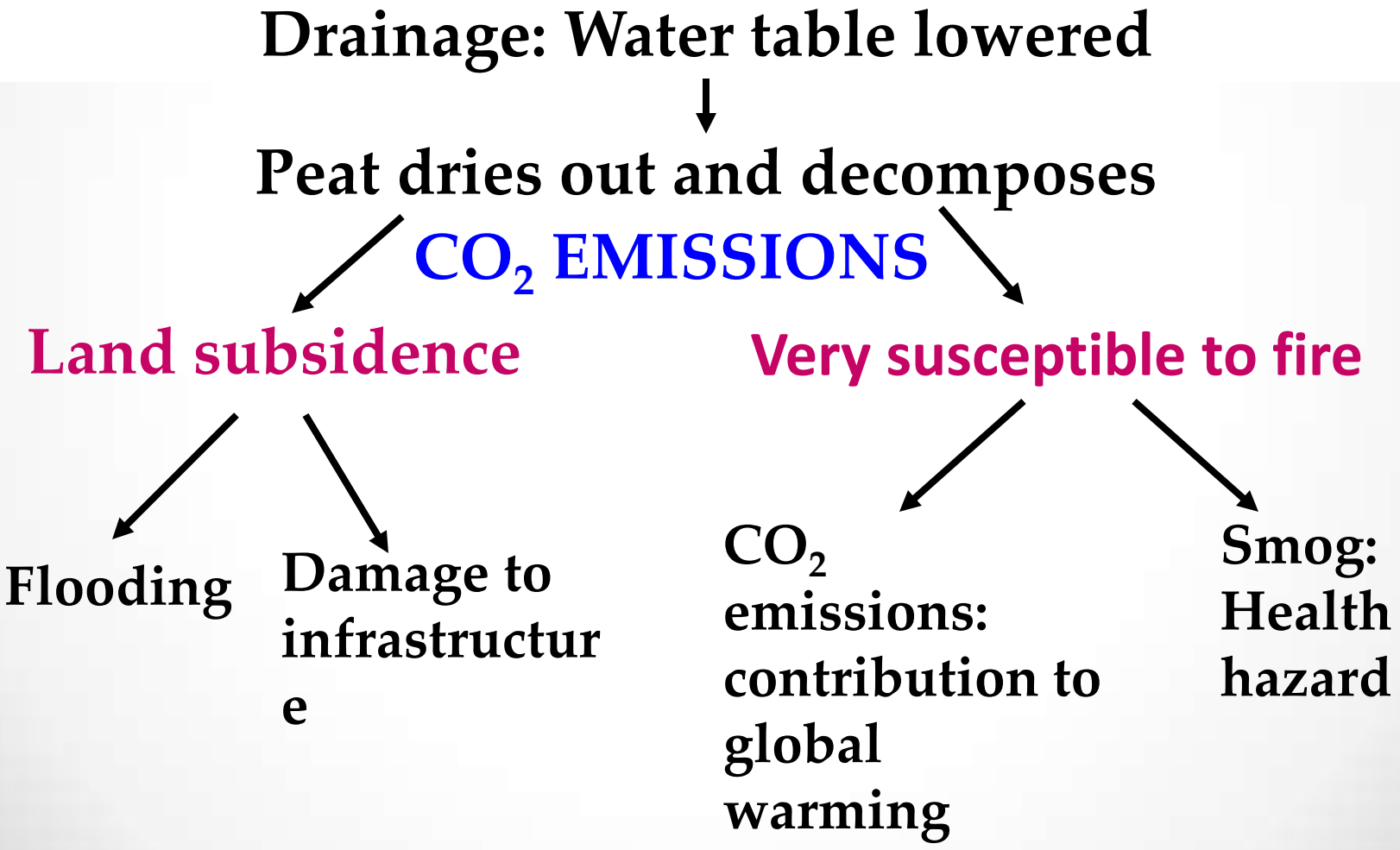
5. Some Impacts of Peatland Degradation

THREATS

The major threat to peatlands is **drainage** (for agriculture, logging etc)

Drainage leads to very damaging “knock-on” effects

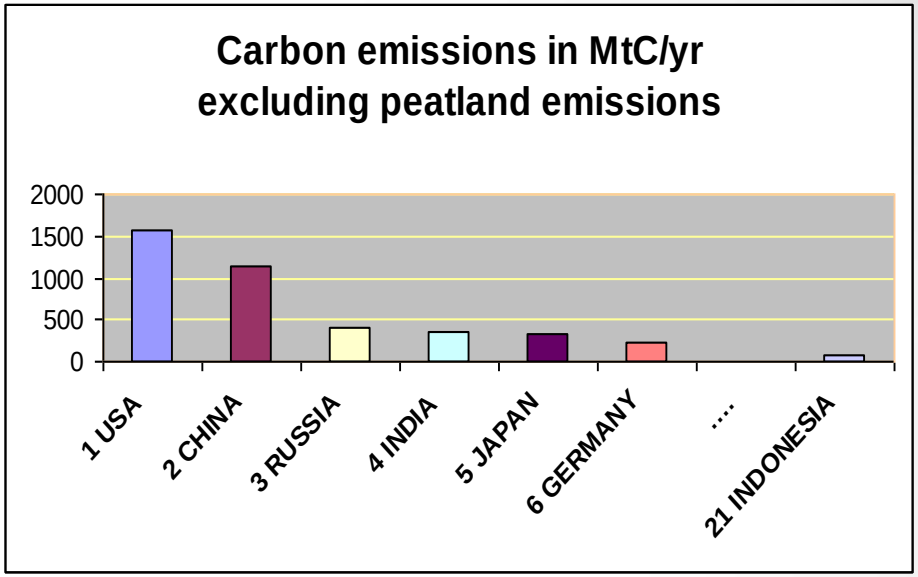
CONSEQUENCES OF DISTURBANCE

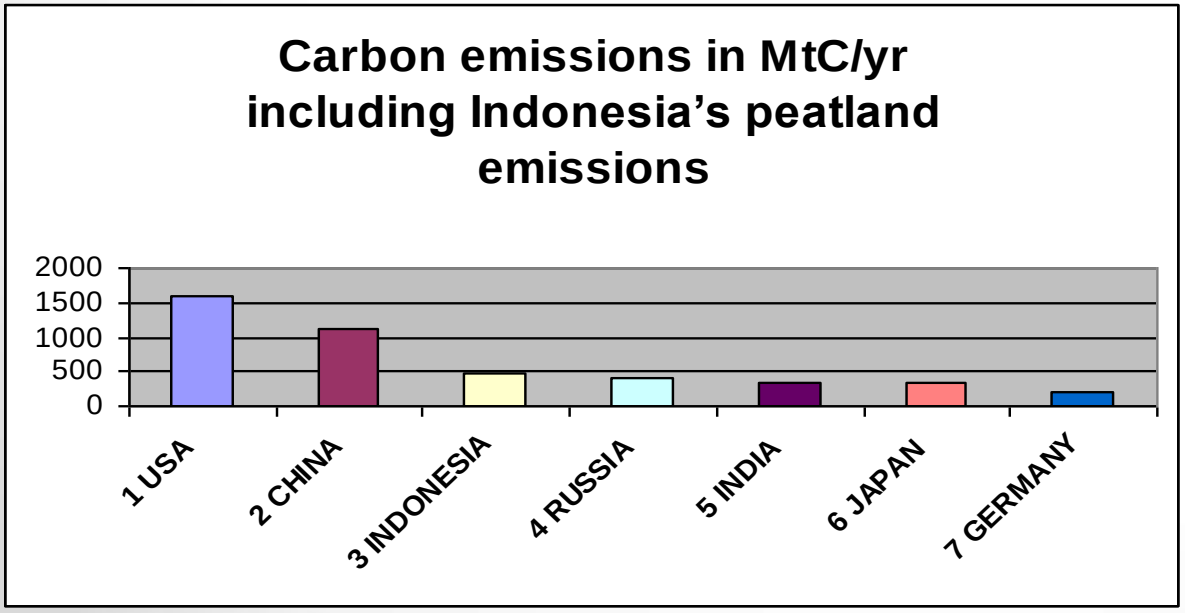


Basic points:
fires start in drained and degraded areas, very, very rarely in undisturbed peat swamp forest

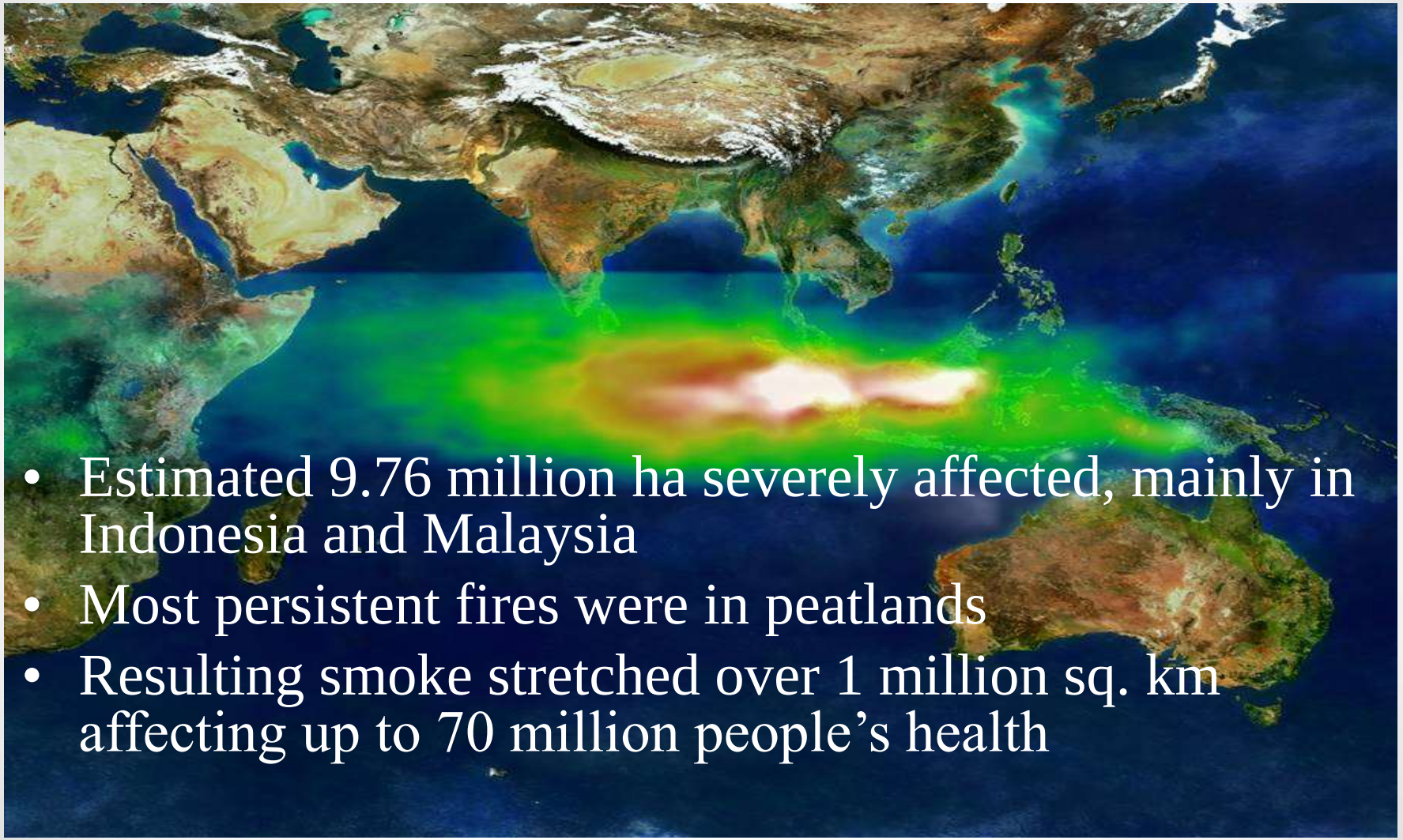
Carbon Emission

In 1997/1998, Indonesia was the third highest emitter of CO_2 globally





The Indonesian Peat Forest Fires of 1997/98 *(Cont'd)*



- Estimated 9.76 million ha severely affected, mainly in Indonesia and Malaysia
- Most persistent fires were in peatlands
- Resulting smoke stretched over 1 million sq. km affecting up to 70 million people's health

The Indonesian Peat Forest Fires of 1997/98 *(Cont'd)*

Economic impacts of fire and haze

- The total economic losses for the 1997/98 fire episode were estimated to be **US$ 10.3 billion**
  - Indonesia: total losses in forestry, health, tourism and others estimated to be US$ 9.3 billion (BAPPENAS 1998)
  - Other countries (Malaysia and Singapore): total losses in forestry, health, tourism and others estimated to be US$ 1 billion

HAZE (PEAT SMOKE)

Consequences of fire and haze in Southeast Asia

Regional effect: Effect of health and economy

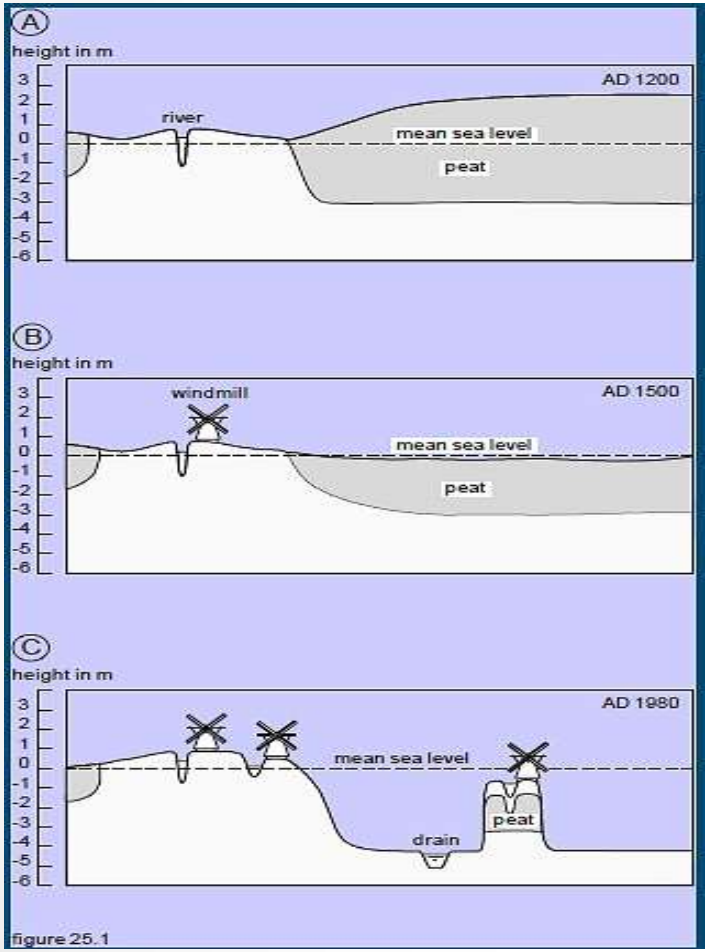
Global: CO_2 emissions and global warming

- **Peat fires cause health Problems**
- **30% of all young children in peatlands in Indonesia have respiratory diseases and growth inhibition**

Fires of 1997/8:

- **Hundred thousands of hospitalizations and outpatient treatments**
- **Millions of working & school days lost**

Peat Subsidence in the Netherlands: 1200 – 1980



- Much of the country is below sea level due to loss of peat through drainage

- Pumping needed to prevent flooding

6. Conservation and Management

6.1 Guiding Principles

- **Remaining intact peat swamp forest should be conserved as far as possible (inclusion in protected areas system)**

- **Degraded areas should be rehabilitated**

- **Degraded areas can then be used for:**
  - **Sustainable agriculture**
  - **Sustainable forestry**
  - **Biodiversity conservation**
  - **Nature-based tourism**

6.2 Peatland Management

(a) Rehabilitation

What to do with degraded peatland areas?

- **First step is to restore high water table to prevent further decomposition, prevent subsidence, prevent fires and CO_2 emissions**

- **Second step: re-vegetation**

6.2 Peatland Management (cont)

(b) Two stages:

- Hydrological restoration
- Re-vegetation

Source: Wetlands International - Indonesia (Central Kalimantan Peatlands Project)

(c) First Question:
Is Rehabilitation/Restoration Possible?

- What was there before?
- Have the physical and chemical properties changed?
- How long and how badly has the land been degraded?

Depends on degree of degradation

Types of re-vegetation:
- Natural Succession
- Enrichment Planting
- Reforestation (Mound Planting)

(d) Degradation Classes for Peatland

	VEGETATION TYPE	DESCRIPTION	HYDROLOGICAL CONDITIONS	RESTORATION POTENTIAL
1	**Pandanus & sedge dominated lake type**	Low diversity, only *Pandanus helicopus* and *Thoracostachyum bancanum* can proliferate	Flooding is year-round and deep (to > 2 m)	None
2	Grass-dominated seasonal lake type	Low diversity, natural regeneration poor	Maximum flooding is moderately deep (1 – 1.5 m). Likely to be subject to annual fires	None
3a	Sedge-dominated early regeneration type	Moderately low diversity, sedges (e.g. *Scleria* spp.) and ferns dominate; Due to long inundation, natural regeneration is quite poor	Maximum flooding is moderately deep (1 – 1.5 m). Period of inundation in the wet season is of relatively long duration	Little
3b	Fern-dominated early regeneration type	Moderately high diversity with high fern cover. As the period of inundation is relatively short, pioneer tree species can establish	Maximum flooding is moderately deep (1 – 1.5 m), but period of inundation relatively short	Possible
4	Fern-dominated tree establishment type	Diversity high. Pioneer tree species (e.g. *Macaranga* spp., *Alstonia* spp.) can establish and show good growth	Maximum flooding is low (1.0 m). Period of inundation in the wet season is relatively short	Possible
5	Tree-dominated early forest type	Diversity high. Pioneer tree species can grow well, fern cover reduced. Improved micro-climate close to peat surface reduces risk of fire	Maximum flooding is low (< 1.0 m). Period of inundation in the wet season is short	High: No direct re-planting necessary
6	**Tree dominated well-developed forest type**	Pioneer tree species form a closed canopy. Climax tree species able to establish. Fern cover low. Micro-climate under closed canopy appreciably reduces risk of fire	Maximum flooding is low (< 1.0 m). Period of inundation in the wet season is very short	High: No direct re-planting necessary

6.3 Fire prevention and control

COMMUNITY BASED FIRE CONTROL

- Provision of equipment and training
- Support for sustainable livelihood activities
- Development of local regulations

6.4 Incentives

(a) Incentive based Conservation

- REDD+
- Zero burning initiative
- Re-Emission, storing Carbon and inverting in low-carbon sustainable development

6.4 Incentives

(b) Buying Living Tree System

- In Central Kalimantan
- For the number of living trees maintained
- Communities are rewarded
- Helps to protect Peatland Forest
- Promotes Sustainable Peatland management

6.5 Protection & Sustainable Use

(a) Protection

- National Policy & Law
- Awareness & education
- Conservation

6.5 Protection & Sustainable Use

(b) Sustainable Use

- Community Livelihood
- Nature tourism & Management
- Sustainable Agriculture
- Sustainable Forestry

7. Peatland Assessment in Myanmar

a. Level of Assessment

Level 1: Catchment

Level 2 Peatland Area/Unit

Level 3: Specific Site Surveyed

b. Specific Site Survey

(i) Heho Valley

(ii) Taungpoegyi

8. Next Steps for Myanmar Peatland Management

(a) Management Processes have begun

- **2002:** ASEAN Agreement on Transboundary Haze Pollution (AATHP) was signed by all ASEAN Member State (AMS) 10 June in Kuala Lumpur, Malaysia. The Agreement entered into force on 25 November 2003

- **2003:** AMS agreed to **ASEAN Peatland Management Initiative (APMI)**

- **2004:** AMS endorsed the APMI

- **2005:** AMS initiated the assessment of peatlands and the preparation of National Action Plan for Peatlands (NAP) in their respective countries

- **2006:** AMS endorsed **ASEAN Peatland Management Strategy (APMS)**

- **2011:** Myanmar Peatland Programme Started

(b) Current Situation

(i) TOT Training: 1, Participants: 24

(ii) Regional Workshops/Meeting: 6, Participants: 119

(iii)Potential Area: 110

(iv)Sites Visited: 25

(v)To be visited: 85

(vi)Peatland Assessment: 2 (Heho & Taungpoegyi)

(vii)Case Study: 2 (Heho & Taungpoegyi)

(C)Phase I Program : 2014 Plan

No	Activity	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1	**Technical Workshop on Sustainable Peatland Management in Naypyitaw**												
2	**Replicated training and Peat Assessment in remaining areas**												
2.1	Shan State												
2.2	Sagaing Region												
2.3	Kayin State/Kachin State												
2.4	Thnintharyi Region												
3	**Pilot testing - for best management practices of peatland**												
3.1	Planning												
3.2	Inle area												
3.3	Mandalay Region												
4	**Awareness and Education campaigns**												
4.1	Shan State												
4.2	Sagaing Region												
4.3	Kayin State/Kachin State												
4.4	Thnintharyi Region												
5	**Monitoring and reporting and Auditing**												
6	Coordination and facilitation												
7	Stakeholder consultation												
	Grand Total												

The activities will be a cooperation of the Ministry of Environmental Conservation and Forestry (MOECAF), the Forestry Department (FD), : Environmental Conservation Department (ECD), Ministry of Agriculture and Irrigation (MAI), and Forest Resource Environment Development and Conservation Association (FREDA).

(d)Phase II Program: 2015 to 2020

No.	Project activities	2015	2016	2017	2018	2019	2020
1	**Peat Assessment**						
1.1	To find out the location	10 places					
1.2	To measure the area in extent		10 places	10 places			
1.3	To study peat volume				10 places	10 places	
2	**Pilot Research/ Case Studies**						
2.1	Peatland eco-system	3 places					
2.2	Peatland biodiversity	3 places					
2.3	Peatland livelihood		3 places	3 places			
2.4	Peatland carbon storage		2 places	2 places			
2.5	Peatland conservation				1 places	1 places	
3	**Establishment of Demonstration Plots for Best Management Practice**		2 Nos	2 Nos.	2 Nos.	2 Nos.	
4	**Training Workshop/ Seminar/ Educational talk for preparation NAP**						
4.1	For departmental staff	10 places	10 places				
4.2	For local community			10 places	10 places		
4.3	For stakeholders				2 places	2 places	
5	**Preparation of NAP**						
5.1	Preparation of first draft of NAP						
5.2	Consultation with key stallholders						
5.3	Submission of final NAP						
5.4	Submission of final NAP						

Thank You

U Myint Aung

Forest Resource Environment and Development Association (FREDA)

fredamyanmar@gmail.com