


CIMTROP IN PICTURES
**On Conserving and Restoring Tropical Peatland
in Central Kalimantan, Indonesia**

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I. INTRODUCTION

11. Histories and Why ?

- The damage peatland started when the Government exploited the forest through Forest Companies without benefit for local community and converting to agriculture.
- To prevent threat to exist peatland, since 1992 Dr. Jack Rieley (Nottingham Univ.), Dr Bambang Setiadi (BPPT-Jakarta) and Suwido Limin (Palangka Raya Univ.) established a research group (KPSFRP) and Natural Laboratory of Peat Swamp Forest (NLPFSF) Kereng Bangkirai Palangka Raya-Central Kalimantan, Indonesia.
- Understanding of the negative impact of the MRP with more than 4000 km of canals, since 1997 CIMTROP and International Scientists conducted and established a site for research at Kalamangpan (block C of the ex MRP).

12. Facts

- Tropical peatland is important for the environment and is vital for the sustainable livelihoods of local people
- Tropical peatland is one of the world's largest carbon stores

13. Problems

- The **Mega Rice Project** is the greatest example of peatland mismanagement
- Peatland development and fires have made Indonesia the **number three CO₂ emitter** after USA and China with direct and indirect effects on all countries

**Natural Laboratory of Peatswamp Forest (NLPFSF)
Kereng Bangkirai-Sabangau**

In 1993, the Local Government of Central Kalimantan and the University of Palangka Raya established collaborative research with BPPT and the University of Nottingham UK on ecology and natural resource functions of tropical peat swamps forest. Two targets will be achieve are the NLPFSF established and International Peat Symposium will be conduct in 1995.

With respect to the importance of this centre, the Provincial Government of Central Kalimantan has designated a peat swamp forest area of 500 Km² as a "Natural Laboratory for Peat Swamp Forest" for research and studies. The establishment of this Natural Laboratory is very important for many reasons, from studying biodiversity to promoting peat swamp forest sustainability. This is the best facility that CIMTROP can offer.

The research activities were primarily concentrated within the catchments of the Sabangau River. Therefore, it was very important to establish a permanent area that is considered representative and relatively undisturbed as a centre for international research and educational purposes.

Finally, the legal status of the Natural Laboratory of Peat Swamp Forest (NLPSF) was obtained and formally approved in 1998 by Governor Decree of Central Kalimantan, Number: 072/463/I/Bapp. Dated: 17th July 1998 and Region Regulation (PERDA) No. 08/2003.

The Sabangau catchment's covers an area of 500,000 ha and of this about 50,000 ha has been designated as the Natural Laboratory of Peat Swamp Forest. The long-term objectives of the NLPSF are:

- a) To provide an international scale natural museum for ecological components of peat swamp forest in order to preserve peatland naturalness and biodiversity including swamp biota for scientific interests;
- b) To provide an international scale site in conducting research so that the area can be established as a source of science and technology on peat and peat swamp forest into the future;
- c) To promote science and technology on peat and peat swamp forest with the involvement of numerous international scientists so that information exchange, knowledge and experience or technology transfer can be intensified through field research activities and scientific meetings.

14. Research project collaboration

a. KPSFRP (1993-1997)

"Ecology and Economic Value of Tropical Peatland"
(Nottingham Univ., Leicester Univ., CIMTROP & BPPT Jakarta)

b. DARTROP (1998-2001)

"Biodiversity of peat swamp forest in Central Kalimantan"
(Nottingham Univ., Leicester Univ. & CIMTROP-UNPAR)

c. EUTROP (1998-2002)

"Natural Resources Functions, Biodiversity and Sustainable Development of Tropical Peatland"
(BPPT, UNSRI, UGM, CIMTROP-UNPAR, Nottingham Univ., Leicester Univ. & Univ. Sains Malaysia)

d. STRAPEAT (2001-2004)

"Implementing Sustainable Management of Peatlands in Borneo"
(BPPT, UNSRI, UGM, CIMTROP-UNPAR, Nottingham Univ., Leicester Univ., Wageningen Univ., Helsinki Univ., Munich Univ., MARDI, Univ. Malaysia Sarawak & Univ. Sains Malaysia)

e. KEYTROP (2003-2006)

"Securing of Tropical Peat Carbon"
(University of Helsinki-FINLAND, UGM Yogyakarta & CIMTROP-UNPAR)

f. RESTORPEAT (2004-2007)

"Restoration of Tropical Peatland to Promote Sustainable Use of Renewable Natural Resources"
(BPPT, UNSRI, UGM, CIMTROP-UNPAR, Nottingham Univ., Leicester Univ., Wageningen Univ., Helsinki Univ., Munich Univ., MARDI, Univ. Malaysia Sarawak, Univ. Sains Malaysia, Can Tho Univ.-Vietnam & VAPU Oy-FINLAND)

g. JPTROP (1997-2006)

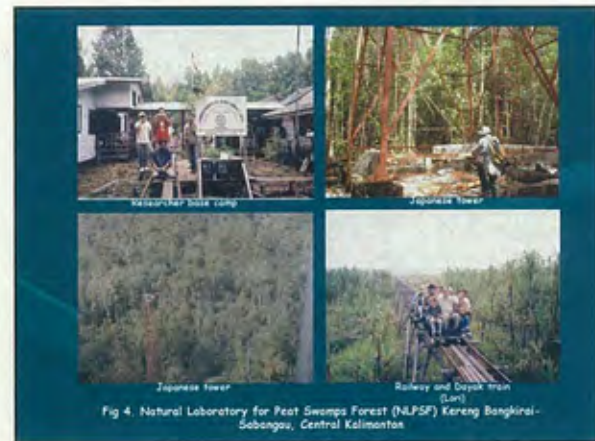
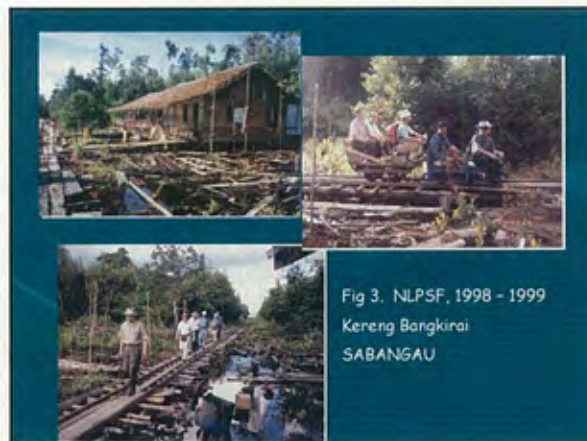
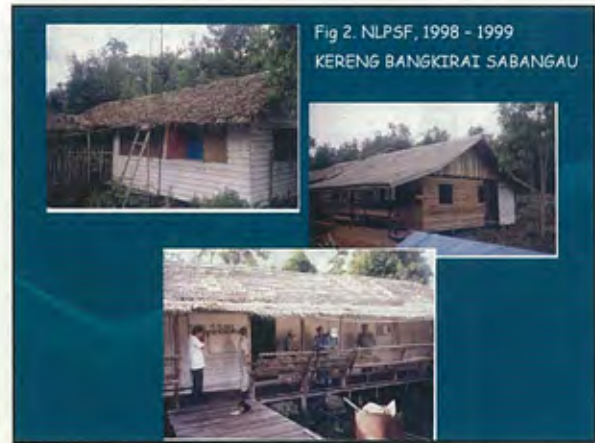
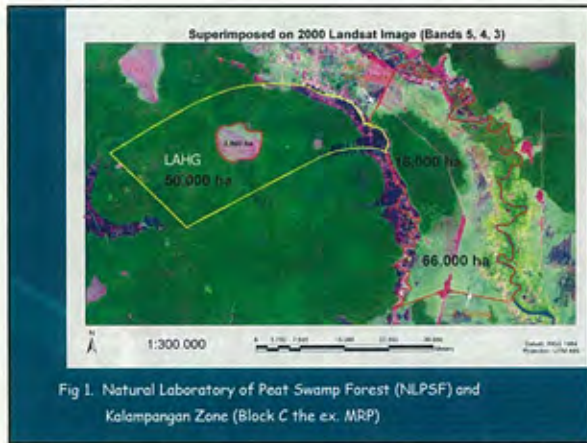
"Land Management and Biodiversity in South East Asia"
(JSPS-Hokkaido Univ., IPB Bogor, LIPI, & CIMTROP-UNPAR)

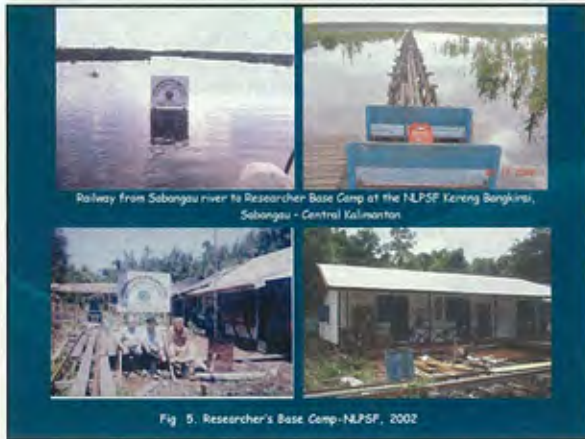
h. ASIA LINK/PEAT WISE (2003 - 2006)

"New Educational Tools for Sustainable Management of Peatland in the Humid Tropics"
(Wageningen Univ., Leicester Univ., CIMTROP-UNPAR & UNIMAS)

i. BUYING LIVING TREE SYSTEM (2008-2011)

"Feasible Reforestation Program for Environments Maintenance and Community Welfare" (Supported by Siemerpui Foundation-Finland)





II. CONSERVING AND RESTORING PEATLAND

21. Strategy

211. Primary Peat Swamp Forest

- (1) Determine the area to establish the Natural Laboratory of Peat Swamp Forest (NLPSF) with wide 50,000 ha at Sabangau catchments (Fig 1).
- (2) Establish and continue collaborative research with International Institutes (Fig 2).
- (3) Establish a Patrol Unit Team (first in 1999, and secondly support by Fred Bagley/US Fish Wide Life Service on 2003 to present).
- (4) Conducting environmental education.

212. Peatland Damage in Block C ex MRP (Kalampangan Zone)

1. Establish site research and facilities
2. Establish Fire Fighting Team (TSA Kalteng)
3. Damming of large channels for restoring the hydrological status

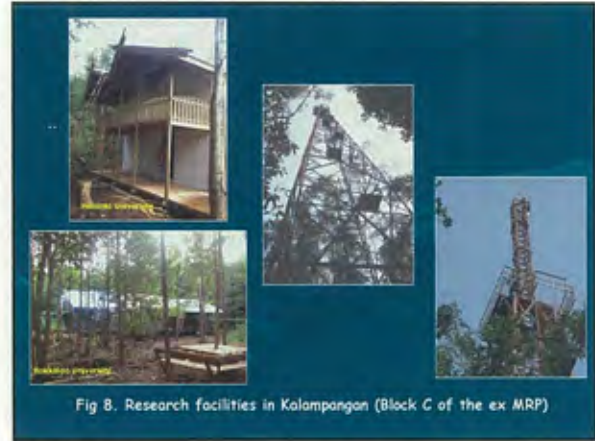
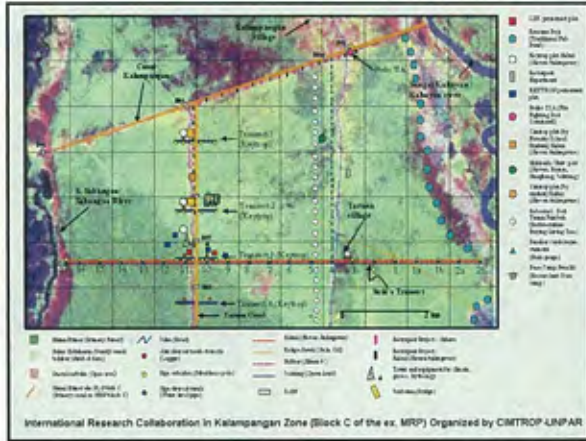




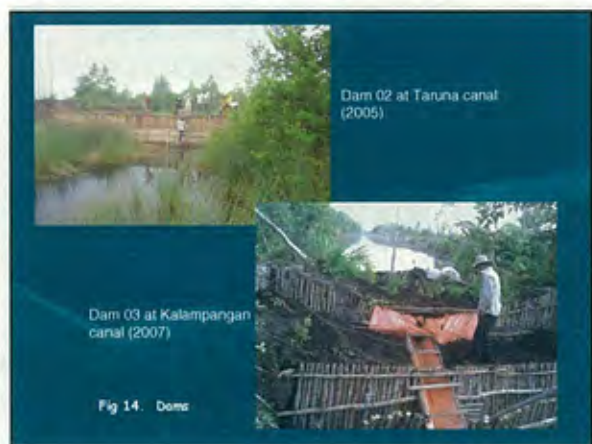
Fig 11. Tower (50 m) at Kalampangan Zone (CIMTROP-Hokkaido Univ. Collaboration)



Fig 12. Researcher Base Camp near Kalampangan Tower



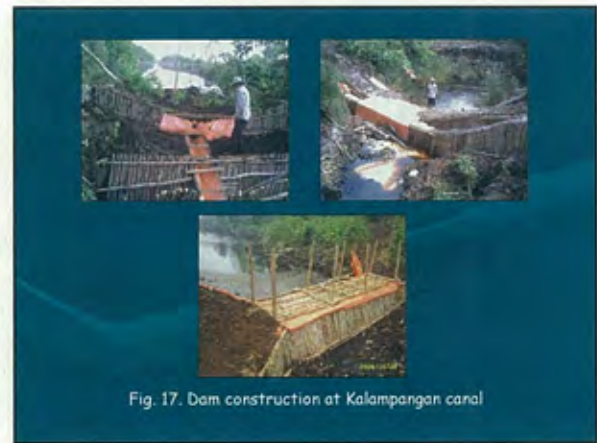
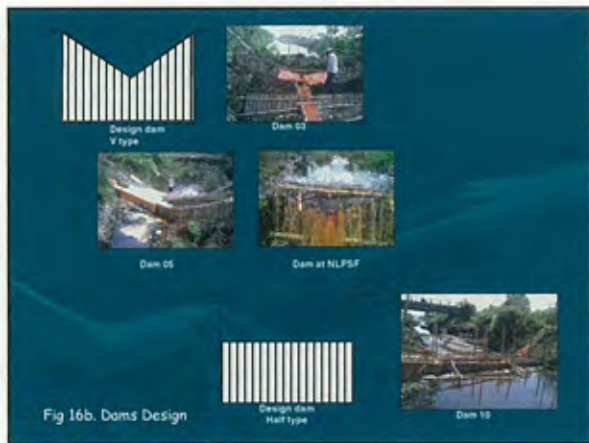
Fig 13. Dams at Kalampangan canal-Block C of the ex MRP (2005)



Dam 02 at Taruna canal (2005)

Dam 03 at Kalampangan canal (2007)

Fig 14. Dams



22. Threats to the NLPSF Kereng Bangkirai-Sabangau

To protect the NLPSF from illegal logging, CIMTROP established a Patrol Unit Team with the support of US Fish & Wildlife Service and this has now been merged with the TSA.

- (1) Illegal logging after PT Setia Alam stopped operating and building of illegal canal inside the NLPSF for carrying timber.
 - 11. The PUTSK and Dutch students work together and they found more than 20 canals in the NLPSF which connecting to Sabangau river (Fig 18)
 - 12. The PUTSK-CIMTROP has found about 80 % of illegal loggers are newcomers (Fig 19).
- (2) Wild fires

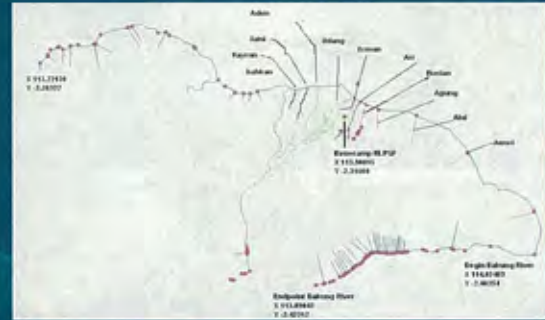


Fig. 18. Illegal canals at the NLPSF Kereng Bangkirai-Sabangau (Source : Ronald Krutzenga dan Simon Chevalking, WUR, 2005)



The PUTSK found log in the forest



The PUTSK destroying simple hut in the forest

Fig 19. The PUTSK activities in the field

23. Effort to conserve the NLPSF and restore the ex MRP

- (1) Damming of canal as one of priority needs to restore hydrological status



Fig 20. The PUTSK and Local Community establishing dams at the NLPSF

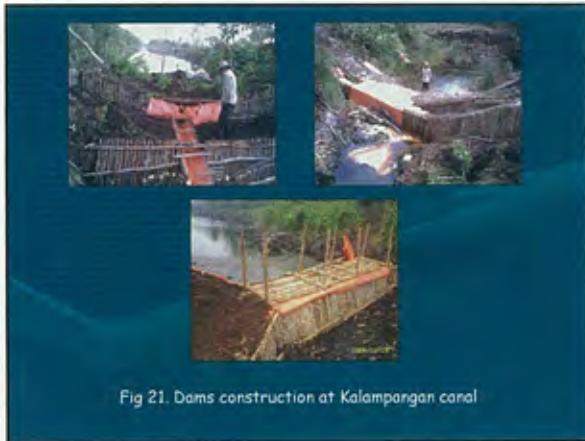


Fig 21. Dams construction at Kalamangan canal

24. Effect of dam on water table

241. Blocking canal can raise the water table (Table 1 and Fig 8)

Table 1. Maximum difference of water table before and after dam construction

Year	Transect 1 Water table (m) & point no.	Transect 2 Water table (m) & point no.	Transect 3 Water table (m) & point no.
2004 vs 2005			
September	0.84 (10)	0.87 (13)	1.08 (14)*
October	1.51 (13)	1.34 (13)	1.45 (13)
November	1.04 (13)	0.86 (12)	1.12 (13)
2005 vs 2006			
June	0.59 (12)	0.83 (12)	0.41 (21)
July	0.34 (7)	0.27 (12,13)	0.29 (19)
August	0.12 (18)	0.38 (11)	0.09 (21)

* Water table (September 2004): 188 cm

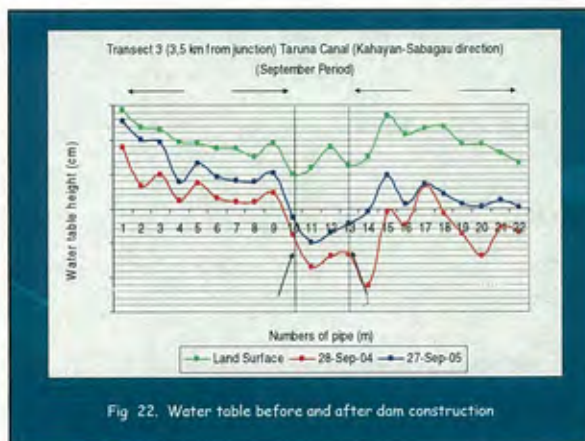


Fig 22. Water table before and after dam construction

242. Native species growing well at the Kalamangan canal (Fig 9)



Fig 23. Parun (*Lepironia articulata*) and Tumih (*Combretocarpus rotundatus*)

25. Fire Management

251. Prevention and suppression program by TSA KALTENG (Fig 10.)



Fig 24. TSA KALTENG Activities (drilling deep well) on fires 2006

Fig 25. TSA KALTENG and Patrol Unit Team action in upstream Sabangau river the NLPSF (September 2006)



252. TSA KALTENG and PUTSK suppressing fire which will threat a hundred thousand hectares of peatland (Fig 11)



Fig 26. Suppressing fire in NLPSF (29 Oct to 1 Nov 2006)

26. Peat layer loss by fire

Typical peat depth lost by fire events:

Kalampangan 2002

- Deep peat : loss 0 - 42.3 cm (Average 22.04 ± 12.09 cm)

Kalampangan 2006

- Deep peat : loss 18 - 60 cm (average: 34.7 ± 14.51 cm)
- Deep peat : loss 16 - 43 cm (average: 31.7 ± 11.11 cm)

Tumbang Nusa 2006

- Deep peat : loss 16 - 55 cm (average: 34.1 ± 13.35 cm)

NLPSF-Sabangau 2006

- Shallow peat : loss 15 - 24 cm (average: 19.7 ± 3.20 cm)

III. Restoration of Peatland damage by Planting native species (experiment of Buying Living Tree system/BLTS)

Native species growing well until 2 years are : Kahui (*Shorea balangeran*) 100% and height 270,45 cm, Galam (*Melaleuca leucadendron*) 90,3% and height 238,16 cm and Jelutung (*Dyera lowii*) 87,5% and height 55,50 cm

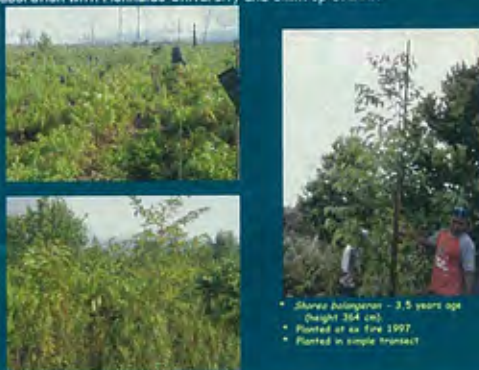


Fig 27. BLTS experiment : Planting and two years after planting

Fig 28. Buying Living Tree System Experiment at Taruna Jaya village



Fig 29. Planting trial of native species *Shorea balangeran* in Pulang Pisau border Collaboration with Hokkaido University and Cimtrop UNPAR



- *Shorea balangeran* - 3,5 years age (height 364 cm)
- Planted at ex fire 1997
- Planted in simple transect

IV. Constraints :

41. In Central Kalimantan fires always occur every year in dry season since part of peat swamp forest opened for the MRP (big fire : 1997, 2002, 2006)
42. Fires occur by human attitude and indicated by the human access routes (road, river, channel, lake, and temporary activity in the forest) are the starting points of the hotspots.
43. Communities still enter and use the canals for transportation and have destroyed several dams and facilities.
44. The Government team to prevent illegal activities and fire always too late and not efficient.
45. Number of PUTSK and TSA members are few compare to the large area. Compensation for local community to do high risk job is also lowest.

V. DISCUSSION

51. Damming system of channels in peat dome areas is necessary, at least to promote self restoration. Without dams the water flows faster through the channels and peat domes become dry faster.
52. In the conserving and restoring process of damaged peatland, fire management is one of the keys to the success of peat sustainability, because fire is still a major threat on the peatland areas, while the recovery of hydrological status and reforestation will take a long time.
53. Restoration and conservation of peatland cannot be achieved by physical activities alone, but must be integrate with a real program to increase human awareness of and responsibility to the environment.
54. Empowerment of community through the reforestation program could be achieved by applying the Buying Living Tree System and TSA Concept.

CONCLUSION

- **Rehabilitate the Ex-Mega Rice Project** by blocking channels to restore hydrological integrity
- **Promote reforestation** by conserving remaining peat swamp forest and planting new trees
- **Prevent fires** by appropriate education and control measures

- **Involve local people** by empowering them to be custodians of the peatland from which they will receive benefits
- **Investigate new financial mechanisms** to prevent deforestation and protect the peat carbon store, e.g. Bio-rights and carbon payments



CIMTROP the University of Palangka Raya View and Support on Research for

FULL CARBON BUDGETING OF CENTRAL KALIMANTAN SWAMP FOREST

INTRODUCTION

The research topic is relevant to the climate changes which was indicated by many kind of disasters.

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    graph TD
      A[Human activity & human behaviour] --> B[Environments Damage]
      B --> C[Climate Changes]
  
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for living with level :
 # Very rich or having in abundance
 # Rich and enough
 # Poor

CIMTROP UNPAR CONTRIBUTE BY EXPERIENCE SINCE 1993 :

1. Peat amount :
 11. Peat thickness and elevation
 - Along the transect and plot as we need.
 - Elevation more difficult and need Bench Mark.
 - Airborne measurement is enough.
 12. Peat decomposition by litter bag
 13. Bulk density
2. The above-ground timber :
 21. Diameter at breast height of tree
3. Forest type
4. Social forestry We have Buying Living Tree System (BLTS)

if

