Do we need a road map for tropical peat?

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Summary

There are conflicts and arguments of the potential benefits of tropical peat but we still lack information and knowledge about it. We need an iterative planning tool as the basis for mobilisation and allocation of financial partnerships and synergy building. The tool is a road map to guide and answer the most difficult and latest academic questions. For example: is tropical peat more useful for agriculture or should it be preserved as swamp land that can preserve carbon, oxygen and water? Why, in certain countries is there a high risk of tropical peat burning while in others it is never seriously damaged? How should we deal with and handle intelligently tropical peat burning incidents and their unpleasant consequences and impacts on other countries? How should we deal with the difference in opinions between Government and NGOs? What are the appropriate international solutions to decrease the detrimental effects of tropical peat, especially on global warming? We need a road map which contains certain rules to guide us, even the world as tropical peat owner. It's a very important issue that IPS needs to be involved in, formulating the road map, since nowadays tropical peat is not only owned by certain countries but is also the responsibility of the whole world. A road map for tropical peat benefits has to be made internationally in years to come, starting from this Tullamore Peat Congress. The road map should become a protocol of tropical peat potential benefit, for all of us throughout the world. It would be a great foundation for knowledge and technology of tropical peat tropical benefit in certain aspects of life, prosperity, and nation gains in the world.

Key index words: tropical peat, peatland development, fire, water management, road map

Introduction

Tropical peat in Indonesia has been dynamically discussed and great and deliberate thought has been applied as to how to benefit from it or leave it 'as it is'. Over the last five decades, there has been a process of learning, which started from knowing nothing – being curious and wanting to know – knowledge began in some areas – we carefully knew – we just knew – (again) being curious and wanting to know.

It all started in a serene area where peat grows, absorbing carbon and releasing oxygen, when suddenly it was awakened by roaring tractor work on the tropical peat and the cracking sound of breaking trees. To clear the debris it was set on fire so that eventually tropical peat released millions of tons of carbon into the air. Ever since, tropical peat has become a world star for its contribution to global warming.

During the first and second of the five decades of peat development in Indonesia, few people understood thoroughly about peat or seriously wanted to study its potential. Most of us see tropical peat as a problem, not a potential resource. Most academics are fearful of its very low pH. The first generation of transmigrants left Java for Kalimantan and Sumatra during this time.

In the third decade, the focus on exploring the peat's potential started when attempts were made to deal with turbid water and low fertility of agricultural land. University agronomists started to learn and discuss more about these problems, selecting many peat topics as subjects for their postgraduate theses. The results have shown success in controlling water discharge and increasing land fertility while, in others, there was failure.

During the fourth decade, intensive tropical peat utilization has benefitted many farmers on low incomes. Unfortunately, in this same period, the largest peatland development project in the world, The Mega Rice Project (MRP) commenced, driven by the necessity of the Government of Indonesia to deal with the major food deficiency problem (rice) caused by the loss of approximately one million hectares of productive rice lost in Java to industrial, commercial and urban development since the 1980s. This vast development project caused great damage to the environment and increased poverty of local people (Muhammad and Rieley, 1992). Rieley (1999) compared key natural resource attributes of natural peat swamp forest and the area developed for the Mega Rice Project (Table 1).

By the fifth period, tropical peat had become the world *prima donna* for donating huge amounts of carbon to the world, especially when the peat was burning. At the same time, universities produced hundreds of tropical peat experts with doctorates and masters' degrees who turned the situation into a complicated matter when all of their thoughts and theses were taken into account.

Table 1. Comparison of natural resource functions of peat swamp forest with peatland degraded during inception of the Mega Rice Project in Central Kalimantan (based on Rieley, 1999)

NATURAL PEAT SWAMP FOREST	*MEGA RICE PROJECT AREA*
High biodiversity rain forest	Low biodiversity degraded landscape
Orang utan habitat	Orang utan killed or captured
Hydrology intact	Hydrology disrupted
Climate moderator	Climate extremes frequent
Chemical filter	Purification ability lost
Major carbon store	Major carbon losses
Fire resistant	Fire prone
Access difficult	Access facilitated
Good resources for local people	Only stealing trees
Sustainable	Unsustainable
Few illegal activities	Illegal activities promoted

As the decades passed, tropical peat has contributed more and more problems for us and these are likely to continue for many more decades. These include: (1) water system for tropical peat areas – how is it possible to manage water in an almost flat area and at the same time maintain tropical peat as a water reservoir? (2) the carbon inside the dome – how to regulate it and at the same time conserve it as a major global carbon store; (3) biodiversity – how to maintain this and prevent it from being destroyed by burning and illegal logging; (4) poverty and livelihoods – how to reduce the former and increase the quality of the latter without affecting the peatland environment adversely (wise use!)?

Donal Clarke's thesis

Donal Clarke, in his keynote lecture to the International Seminar and Workshop on Tropical Peatland in Yogyakarta (Clarke, 2008) proposed five important theses of Tropical Peat Potential Benefits: (a) Is the project important for human life? (b) If yes, is the tropical peatland to be used abundant or will the project affect the whole of tropical peatland? (c) If it will, how badly? (d) Can the damage be contained or reversed? (e) What is the objective of the project and is it project achievable?

Of course, Donal Clarke's thesis doesn't finish only with yes or no answers. Donald asks about the relationship between man and peat, the potential benefit perspective of tropical peat. He talks about ecosystem and man as subsystems. A correlation of the two subsystems is shown in Figure 1.

Priority considerations for tropical peatland

In the future, tropical peatlands need much more attention:

Tropical peat dome

Tropical peat domes should be given serious attention (Penguang Manggil (n.d.) They form some of the largest contiguous peat-covered landscapes in the world and are the habitats of unique flora and fauna. The peat dome, and therefore the flora and fauna, react strongly and in as yet uncertain ways to changes in hydrology. As soon as water is allowed to drain away from the peat dome at a rate in excess of the natural rate, the peat from which the water flows starts to dry out. This has a negative effect on the flora and fauna and the numerous ecological functions of the peat dome.

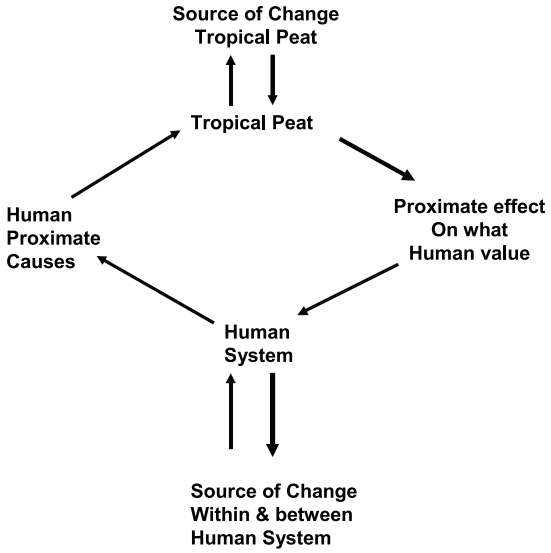

Figure 1. Interaction between human and tropical peat subsystems. (from Anonim (1992; Figure 2-2))

The carbon stored in the peat dome is potentially at risk from drainage and fire. In order to maintain this carbon store the peat dome must be protected as a water reservoir by maintaining the water table as high as possible. This will reduce the CO_2 emission rate during the rainy season, and minimise CO_2 release during the dry season. Tropical peat swamp forest and the carbon contained in the peat dome should be considered as a valuable asset (Fig. 2).

Water in tropical peat

Tropical peat is a water reservoir that is a major water resource to downstream areas. In many regions tropical peatland plays a significant role in supporting rural livelihoods as a source of timber, food, medicines and other products. It is also a source of water for drinking and irrigation. The following are some of the points that must be noted.

Water level control

The water table should be maintained at less than 100 cm below the peat surface to ensure that adequate water is available for particular purposes. Water level control is also necessary to minimize peat oxidation (decomposition) and subsidence and to control water discharge. It is essential to monitor water levels and subsidence rates. On tropical peatland developed for agriculture, including plantations, it is important to achieve high growth rates and yields while at the same time mitigating adverse environmental impacts.

Strategies for carbon management

There are several requirements for carbon management in tropical peatland. Tropical peat changes based on the peat dome, carbon and water are shown in Fig. 3.

Carbon conservation

Options include afforestation, reforestation and restoration of degraded peatland. Improved silvicultural techniques need to be developed and applied together with appropriate agroforestry practices on agricultural peatland.

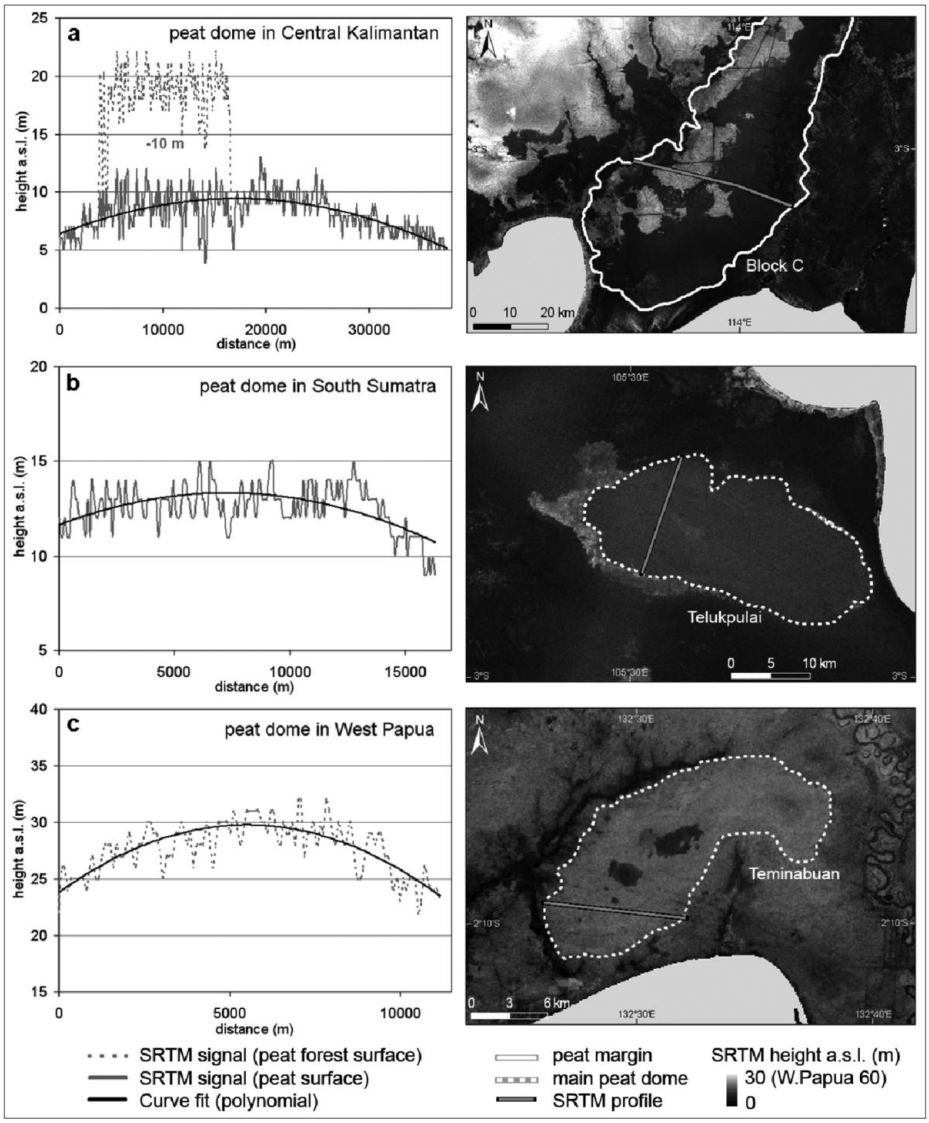

Figure 2. SRTM elevation profiles of peat domes typical for the Indonesian provinces of Central Kalimantan (a) South Sumatra, (b) and West Papua (c). The SRTM data clearly shows the characteristic dome-shaped surface of ombrogenous peat (SRTM©USGS). (Setiadi (2007).

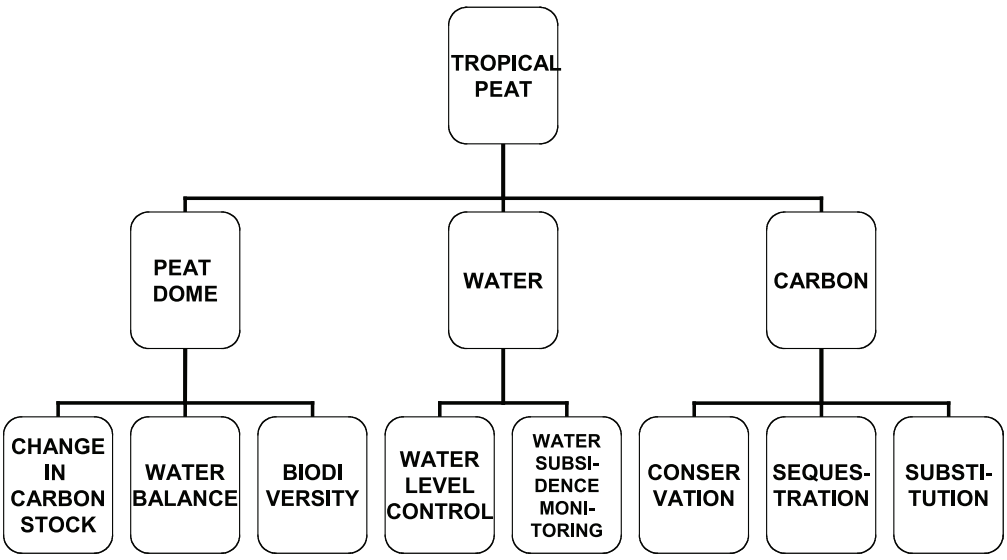

Figure 3. Changes that take place in tropical peatland

Carbon sequestration
It is essential to conserve biomass and carbon in existing forests, both above and below ground. There is a need for improved harvesting practices and better wood processing efficiency, fire protection and more effective control of burning.

Carbon substitution
Increased conversion of forest biomass into durable wood products for use in place of energy-intensive materials should be investigated. There should also be increased use of biofuels (e.g. introduction of bioenergy plantations), enhanced utilization of harvesting waste (e.g. sawdust) for biofuel (Jauhiainen, 2004).

A road map for tropical peat

There are conflicts and arguments about the potential benefits of tropical peatlands and peat. In fact, we still lack information and knowledge of tropical peat. We need an iterative planning tool as the basis for mobilization and allocation of financial partnerships and synergy building. The tool is a road map to guide and answer the difficult, latest academic questions. For example, is tropical peatland more useful for agriculture or should it remain as swamp that can preserve water and carbon? Why in certain countries does tropical peat have a high risk of burning while in others, it does not experience serious damage? How should we deal with and handle intelligently the serious problem of tropical peat and forest fires and their dangerous and unpleasant impact upon other countries? How should we deal with the difference in opinions between Government and NGO's, especially in Southeast Asia? What are the appropriate international solutions to reduce the detrimental effects of tropical peatland upon the environment, especially with respect to global warming?

We cannot answer all of these questions with a 'hit and run' system. We need a road map, which contains certain milestones to guide us, including the whole world, as the custodians of tropical peatland. This is a very important issue and IPS should be involved in formulating the road map since nowadays tropical peatland is not owned only by certain countries but also the global community. A road map for tropical peat has to be developed internationally in the years to come, starting from this Tullamore Peat Congress.

Before deciding on a systematic formula, a working group of international experts and managers of tropical peatland and peat should be established to address the key issues raised and agreed at this IPS congress and to develop guidelines for the road map. The road map would become a protocol of tropical peat potential benefit, for all of us and the world. It would be a great foundation for knowledge and technology of tropical peat tropical benefit in certain aspects of life, prosperity, and benefit to mankind.

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