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DEVELOPMENT CONTEXT OF COASTAL RIAU PEATLAND, SUMATRA, INDONESIA

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SUMMARY

Riau Province is 40% peatland. In the last 20 years much of it has been cleared for Riau's land-based economy. The clearing sequence is often initiated by uncontrolled activities like illegal logging and slash and burn subsistence farming. Development to formal agriculture plantations follows some time later. To halt this sequence in the interests of global climate will be difficult in the current social context where rural poverty is being alleviated through agriculture. Alternative models of development need to be introduced.

KEY WORDS: Peat swamp forest, climate change, carbon emissions, deforestation, livelihoods

INTRODUCTION

At the time of Indonesia's economic awakening of the late 1960s, the Sumatra province of Riau was sparsely populated, forest clad and lacking infrastructure. Immigration and clearing of 5 M ha of original forest have since built an agricultural economy. It needs to diversify now that stocks of land to clear are diminishing. World opinion against clearing forest has recently shifted focus from biodiversity loss, including most notably the Sumatran tiger and elephant, to carbon emissions from peatland. This paper gives the economic setting in which rapid deforestation has occurred, first to mineral soils and now to peatland. While conserving intact swamp forest is important for biodiversity, not a lot of it exists. It is the large area of non-intact peatland that has most potential to mitigate climate change. This paper looks at the social context for making progress.

METHODS

A time series of satellite image coverage of Riau peatland has been sub-sampled with high resolution digital aerial photos on which vegetation cover was mapped in 3 cover types. Intact forest is where most of the original large (>8 m crown diameter) canopy trees remain; damaged forest where >50% of the original large trees have gone, and non-forest where the majority cover is non woody vegetation. Articles and Government statistics have been cited. The term agriculture includes fiber plantations.

RESULTS

Geographic Setting

Figure 1 shows the state of Riau peatland in 2009. Since 1970 the natural forest cover of Riau has shrunk steadily to make way for 5 M ha of agriculture (Figure 2). From c. 1990 as mineral soils became scarce, clearing of peatland started. Intact forest is now confined to remote locations; the western steep-lands and peninsular of coastal peat. Continued at this rate, legal reserves if they can be protected will be the only forest left by 2025.

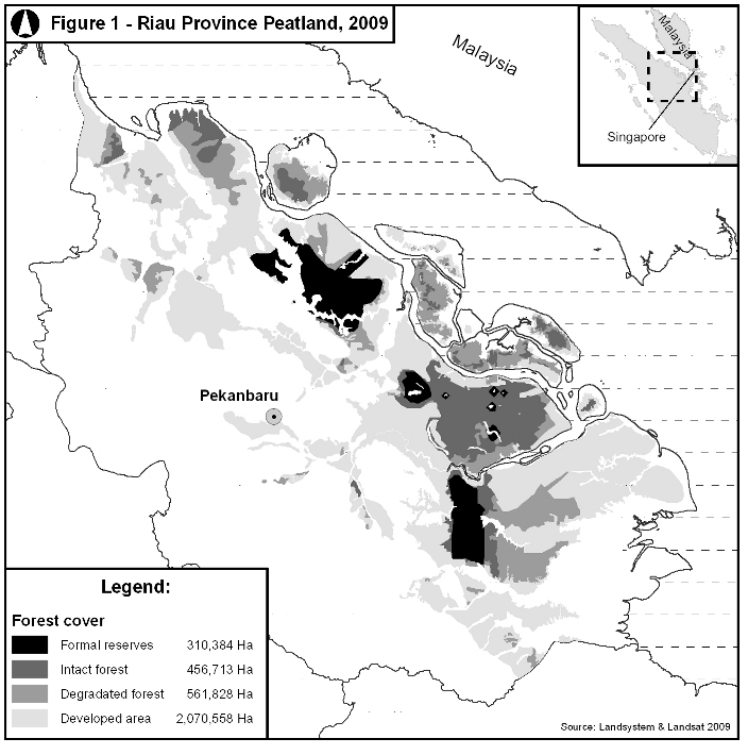
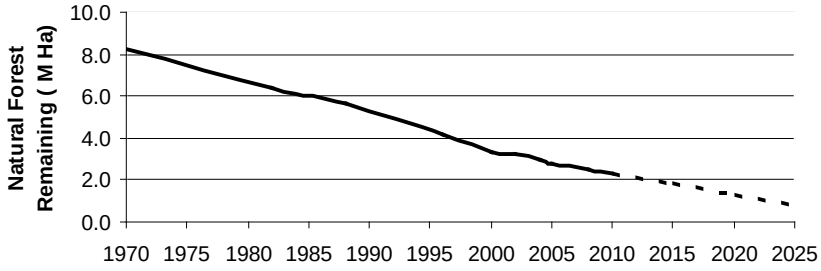
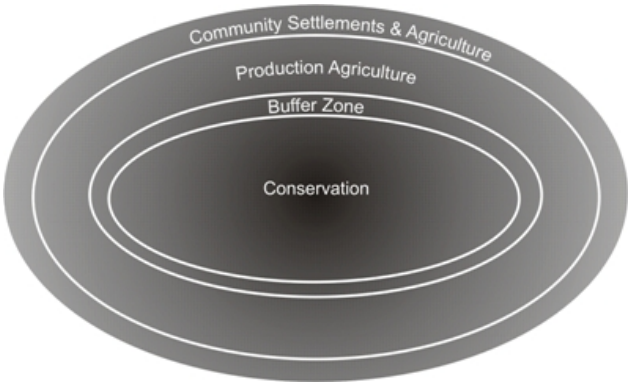


Figure 2 **Deforestation of Riau**



Riau Province Mainland: Adapted from: The 11th Hour for Riau's Forests, WWF Indonesia (2006); Sumatra's Forests, their Wildlife and the Climate - Windows in time 1985-09. WWF Indonesia, (Dec 2010).

Figure 3 Integrated Conservation



The Political-Economic Setting

Until c. 1970 the forest interior had a sparse indigenous population and few settlements away from the major rivers. Subsequently economically motivated immigration including government organized transmigration has boosted population to 5.5 M. In the decade to 2010 population grew at 4% p.a. driven by spontaneous migration. Agriculture is the largest employment sector; 44% of formal jobs. Crude palm oil is the leading value export. Petroleum crude is declining after leading for the previous 50 years. Trading and services are significant. Processing industries are not; the economy is still immature.

GDP growth in the decade to 2010 averaged 8.6%, 1.5 times Indonesia's average. Private sector investment has followed the political reform of the late 1990s. Investment and commodity demand have come from Singapore, Malaysia and Southern China. The attraction of Riau has been land, including mineral and timber resources. Wealth has been built entirely on deforestation. Palm oil, wood pulp and paper and rubber are the main agricultural exports. For the less developed rural districts, agriculture commodities provide up to 63% of small-holder household income (Susila, 2004). Real poverty is still 15-20% in remoter rural communities (Suharyo et al 2005).

Until c. 1980 the coastal peat swamps were a public owned landscape of pristine forest zoned mostly for selection logging. Community lands were small enclaves. Since 1997, an era of rapidly decentralized government and competition between Federal, Provincial and Local agencies, land use change has been rapid and uncertain. A key factor enabling change has been political reform that created local and district political aspirations to reduce rural poverty. Initial pressure for land is from ordinary rural people who need quick income from low-investment slash and burn agriculture. Democracy has facilitated a timber and land grab in the peat swamp forest. Bathgate et al (2011) describe the protracted process of clearing, termed the Agricultural Frontier.

The Agricultural Frontier

The typical steps in the process of transforming natural forest to agriculture are:
1) Concession Selection Logging. This takes place over several decades. Usually logs are extracted without introducing soil drainage and the swamp forest can recover.
2) Illegal Logging. Tracked excavators are widely used to dig narrow ditches that connect to the nearest waterway for log extraction. Ditches are never closed after brief use and flow continuously, reducing ground water levels in porous soils of surrounding peatlands.
3) Slash & Burn. Opportunistic clearing follows the ditches left over from previous logging that offer borrowed drainage for crops. Fire is always used to clear land; ash raises the scarce mineral content of peat soil. Initial planting is sporadic as dry periods allow; later fire takes a toll on earlier planting. Main crops are corn, pineapple and chili.
4) Permanent Agriculture. Over a decade the frontier patchwork is transformed into a landscape of palm oil and rubber estates in which small enclaves of gardens remain. Oil palm is the smallholder's crop of choice now that productivity is well demonstrated.
5) Integrated Land Use. Newly emerged green markets for commodities have led the largest estates to set aside more conservation in order to demonstrate beyond compliance.

Recent Developments

A decade ago attention was on reducing atmospheric haze from land-clearing burning of peatland. Conservation was seen as an alternative land use. The COP13-Bali event raised awareness of Indonesia as a major emitter of carbon from unsustainable development of peatland. The Indonesia Government recently committed to reduce carbon emissions in return for financial incentive. Developers now find it more complex and uncertain to gain the necessary consents to open degraded public lands. The formal sector's expansion on peatland may have slowed. The author's personal observations in the field are that illegal logging and slash and burn practices have not abated in the least. Our analysis of 2011/12 satellite imagery, while perhaps too early to expect a response to government policy, suggests that peatland deforestation has not slowed (analysis incomplete at time of press).

DISCUSSION

Today the influx of people to Riau continues. To maintain social harmony and economic progress there is no alternative to consolidating the land-based economy. The political process of having a say on how to improve living conditions is still being introduced to rural communities (Irawan, 2011). Recent gains in living standards are fragile. Major recession would put more people in poverty and increase pressure on forests. Effective deforestation policies must first raise incomes of rural poor. Raising agricultural output may be a faster route than finding new livelihood opportunities for what are societies least engaged members in terms of health, education and income.

The large area of peatland that is already open needs that low-emission agriculture standards and methods be developed and implemented. A start has been made on this where development and conservation are integrated into the landscape. Biodiversity and carbon values are strictly conserved in a core zone that is buffered by several concentric zones where land use intensifies getting further away from the core (Figure 3).

Now that agriculture is perceived as being highly profitable even on deep peat, to forego it will require that local actors be compensated. And alternative opportunities for them to generate marginal wealth would need to be found. Rural livelihoods are steadily rising on the back of agriculture (Suharyo et al 2012). Whether this is rapid enough to conserve much intact peat swamp forest remains to be seen. Longer term, alleviating rural poverty will be fundamental to policies that reduce carbon emissions from Riau peatlands.

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