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INTRODUCING A REVISED APPROACH TO PEATLAND DEVELOPMENT ON A LARGE SCALE MULTI-STAKEHOLDER LANDSCAPE, RIAU PROVINCE, SUMATRA, INDONESIA

Anthony Greer*, Yogi Suardiwerianto, Nardi, John Bathgate and Muhammed Fikky Hidayat

Asia Pacific Resources International Limited (APRIL), Indonesia

**Corresponding author: anthony_greer@aprilasia.com*

INTRODUCTION

The east coast of Sumatra is characterised by a complex of low-lying riverine plains. Historically these wetland environments have been difficult to settle and develop, and until recently have been left largely unoccupied. However, within the last three decades, some of the development challenges have been overcome. In response to social and economic development needs, the Government of Indonesia issued large scale licenses for development in these areas. This took place before the linkage between climate change and peat land deforestation was fully understood. For peatland areas, licenses generally took the form of either: (i) production forest management regimes; or (ii), permission for conversion of forested land to agriculture. The large scale planning processes and capital intensive requirements for wetland development meant that larger companies necessarily spearheaded development. Subsequent to the opening up of these lands, a wave of medium scale entrepreneurs and smallholders followed, with the influx of settlers continuing until today. However, as the linkage between tropical peatland use and climate change impacts has become more fully realised, all formal development on forested peatlands has been halted – and indeed there is a now a call for restoration of existing developments. It would appear that the ‗normal' forest frontier development process is at an *impasse*. A complete halt to production agriculture, forestry and smallholder gardens on peat would probably result in as many problems as might be solved and would not be practical. Best ways forward must be rationally considered against what can be done and by when. Some form of balanced approach is proposed, the framework of one possible approach is outlined in this paper. Wider applicability of such a model is desirable in the short to medium term.

***Keywords**: peatlands, Sumatra, subsidence, GIS scenarios, management, conservation, production*

APPROACH

Commencing 2002 Asia Pacific Resources International Limited (APRIL) initiated a peat subsidence monitoring programme across its concessions in Riau, Indonesia. Today the programme extends to over 320 points distributed across the landscape, most of which are monitored quarterly. With a focus on the Kampar Peninsula in Riau Province, Sumatra, the results of the monitoring programme are presented here for discussion alongside potential management responses. Simple Geographic Information System (GIS) analysis and modeling predictions extrapolated from this data are also presented.

The ‗Management Period' and the ‗Management Unit' are key concepts here, with the Management Period being largely determined by the options available at that particular point in time alongside the desired management outcomes and the resources available to achieve them. In this instance - the overall desired outcome will largely center on the reduction of Green House Gas emissions and the various ways of doing so. If for instance the desired outcome is to rehabilitate a production area back to near natural state, the timing and costs of doing so need to be understood, as structural adjustments will be required by state and corporate investments. It must be recognized that at least at a local or regional level, production areas are required to finance restoration and conservation initiatives at the time scale necessary to secure the sites i.e. 10 to 100 years or more. Bilateral assistance and funding schemes seldom extend beyond three to five years. All protected area management options for this point in time require a presence on the ground. The Management Unit is defined by land use over the peat dome area.

The overall findings of the paper provide the basis for discussion around an alternative to prevailing predictions and scenarios. The GIS modeling scenarios indicate that a landscape can be managed for production - and protected for conservation i.e. balancing the carbon books - for interim holding periods i.e. ‗Management Period' of up to 100 years or so. Key sections of the paper are outlined below:

1. The case study focuses on the Kampar Peninsula, on the east coast of Sumatra, Indonesia. The area is characterized by an extensive elevated peat dome some 80 x 60 kilometers in extent. The internal morphology of the dome contains bog plains, lakes and rivers interspersed with smaller domes. While most of the actual ‗peat dome proper' is afforded some form of protected status, a broader landscape view of the entire Peninsula shows that some 48% per cent of the land-use is currently protected. The core area comprises of the main peat dome and this is surrounded by a production fringe, largely comprising of industrial tree plantations which make up another 27% of the land use. Presented here are the peat subsidence results from the core areas and surrounding development fringe. Production licenses within the fringe zones also have areas zoned for conservation, most of which were previously disturbed by selective logging and are not pristine. Most of these forests are regenerating today.
2. As with mineral soil erosion rates, across peat lands there is considerable variation in subsidence linked to time and space, with the position on the landscape, topography, climate, peat type, water table regime, land-use and land management all playing a role. A single rate for subsidence for the entire landscapes is not applicable although averages do provide a good indication of landscape response and adjustment.
3. It is assumed that the core is not accumulating new peat (carbon) at this point in time although this assumption remains to be verified. This is a key data gap and an area that requires additional monitoring. The severity of recent droughts has probably resulted in the cessation or much reduced peat formation in the remaining undisturbed peat domes of Sumatra.
4. Simple GIS generated scenarios factoring in the land-use specific subsidence rates across the landscape combined with sea level rise estimates are used to visualize the overall landscape impact of both over time. The results to date show that in the medium term i.e. 100 years - the Management Period, operational fringe areas are impacted but not to the extent that the increased drainage gradients would lead to distal drainage impacts and the collapse of the dome in the manner that is frequently projected. The scenarios also show that subsidence and sea level rise will not result in the widespread loss of current production areas. Rather there is a gradual inundation of riparian reserves and other alluvial plains and channels. Some of the natural slopes occurring within the dome complex exceed those of the production fringe.

DISCUSSION

5. What of the continued contribution of GHG emissions during the planning period? While not insignificant, the model shows that subsidence rates are managed - to the extent that it is possible. The management objective is for subsidence to be monitored against a baseline and continuously reduced. More *ad-hoc* management options which would almost certainly see the loss or severe impact of the forested conservation areas. The continued emissions from the production area need to be considered alongside the economic benefits of the production fringe in conserving the production core zone. Thus contributing towards its overall conservation and the suite of benefits associated with its protection i.e. protection from fire, protection of biodiversity, minimizing subsidence and therefore greenhouse gas emissions.
6. The Management Unit, as demonstrated through this example, often comprises of a range of land use license holders. This will depend on the size of the peat deposit. Government land use planning is critical here.
7. The Management Period is the amount of time required to achieve a management outcome (desired state). For example, adjustments to the Planning Unit may require adjustments to legal licenses which may run from 30 years or more up to 100 years. If, for example, the desired outcome is to convert the land to a totally protected area, the capacity to fund and support this function needs to be in place.
8. The formal protected area networked of Indonesia is currently overwhelmed and under-resourced and lacks the capacity to face all of the development challenges of today. Alternative approached to medium term protected area management are required for the interim period.

PRELIMINARY CONCLUSIONS – THE KAMPAR CASE STUDY

Peat domes managed at the landscape level have the potential to result in better conservation benefits and reduced emissions compared to other development scenarios. While this paper does not advocate the further opening up of undisturbed peat domes by this system it does support the use of this approach for existing areas under production – at this point of development time.