

Highlights

- The article analyses the media portrayal of peatland agricultural practices
- We focus on the narratives surrounding the 2016 International Peat Congress
- It finds four denialist narratives in defending existing unsustainable practices
- These frames bear resemblance to climate change denialism

Abstract

This article analyses the denialist narratives of the negative environmental impact of oil palm plantations on tropical peat by the media of Indonesia, Malaysia and Singapore. Specifically, we focus on media coverage of the 2016 International Peat Congress, where scientifically misleading claims that it is sustainable to develop oil palm plantations on tropical peatlands were made. We found that media reporting of the denialist narrative is more prevalent than that of the peer-reviewed science consensus-view that plantations on tropical peat could cause excessive greenhouse gas emissions and enhance the risk of fires. Four mutually complementary narratives were used by Indonesian and Malaysian media to construe denialism, which closely resemble the four climate denialist narratives identified by Elsasser and Dunlap (2013). These denialist narratives draw heavily upon information advocated by divergent knowledge communities (Goldstein 2016) and appeal to a nationalist sentiment of ‘us’ - palm oil-producing developing countries - and ‘them’ - western developed countries producing research critical of the industry. The Malaysian press has most extensively deployed this nationalistic sentiment, whereas the Singaporean media has not actively endorsed or rejected any of the denialist narratives. Our findings suggests that media representation of the issue is a reflection of an amalgamation of economic, diplomatic and nationalistic concerns, determined by political, socio-cultural nuances specific to each country. Importantly, our article alerts to the continuation of unsustainable practices as justified by the media to the public, and that the prevalence of these denialist narratives constitute a significant obstacle in resolving pressing issues such as transboundary haze, biodiversity loss, and land-use change related greenhouse gas emissions in Southeast Asia.

Keywords

Palm oil; Tropical Peatland; Sustainable Agriculture; Divergent Knowledge; Science Communications; Southeast Asia

1. Introduction

In 2016, the International Peat Congress (IPC2016) was held in Kuching, Malaysia. It was the first time that the conference hosted by the International Peat Society (IPS), a ‘network of peat and peatland experts...from science, NGOs and business’ (IPS *online*), was held in

Southeast Asia (SEA), signifying the acknowledgement of the region's rapid upsurge of peatland development in recent decades for the cultivation of oil palm (OP) (Wicke *et al.* 2011; Miettien *et al.* 2012). Held quadrennially, the IPC enjoys a high profile and authority among peat experts and stakeholders. IPC2016 was co-organised by the Malaysian Peat Society, whose president was coincidentally the director of a Sarawakian state-funded laboratory, the Tropical Peat Research Laboratory (TPRL, recently renamed as Sarawak Tropical Peat Research Institute), with a mandate is to “generate/disseminate scientific knowledge and provide advisory support on the management and wise use of peatland” (TPRL *online*). The conference was funded by the Sarawak State government and the Malaysian Federal Government (EcoBusiness 2016a).

In IPC2016, several keynote speeches and presentations advocated scientifically unproven claims that it is possible to develop OP on tropical peatland without net increases in greenhouse gas (GHG) emissions and increasing the risk of fire; essentially denying scientific consensus over the negative environmental impact of OP plantations on tropical peatland (IPC2016). These claims were picked up by Malaysian and Indonesian press, reporting that a consensus had been reached at IPC2016 that current agricultural practices on tropical peatland do not have a negative impact on the environment. In response, 139 scientists, the majority of whom had attended IPC2016, co-authored an Open Letter to the Editor to the journal *Global Change Biology* (GCB) in September 2016 to contradict such claims, highlighting that scientific consensus suggests OP plantations on tropical peatland causes negative repercussions of increased GHG emissions, ecological damage and air pollution (Wijedasa *et al.* 2017). This rebuttal from the international scientific community attracted another wave of media attention.

Previous studies have found that contrarian claims, labelled as ‘divergent knowledge’ (DK), to scientific consensus over tropical peatland development has been systematically produced by state- or industry-funded ‘research institutions’ to justify continuous agricultural development on tropical peatland (Goldstein 2016). The proliferation of such claims hinders efforts to manage the environmental impact of the industry and reduce GHG emissions of palm oil-producing countries (Wijedasa *et al.* 2017). Literature on media portrayal of science have suggested that the media plays a crucial role in shaping public perceptions, which impacts the political support given to the cause (Nisbet and Myers 2007). Media portrayal of the denial of science and amplification of different contrarian discourse subverts public trust in science and delays political actions needed for addressing the issue (Hmielowski et al 2014; Boykoff and Boykoff 2007).

The objectives of this paper are as follows. First, to analyse the portrayal of science regarding OP plantations on tropical peatland in the media stemming from the contentious IPC2016. Second, to analyse how different media narratives instill trust and skepticism in tropical

peatland science. Third, to identify and explain contrasting portrayals between the Indonesian, Malaysian and Singaporean Press. Fourth, to draw parallels between the contrasted narratives of tropical peatland science to existing literatures of climate change denialism to enrich our understanding of climate skepticism and scientific communications within a SEA-specific context.

Our findings contribute to discussions of media communication and organised skepticism over a science-based problem in the global south (cf. Varkkey 2015, 2012; Forsyth 2014; Manzo and Padfield 2016), specifically to a recently emerged literature concerning media portrayal of tropical peatland and its relation to the controversies of global palm oil consumption (Manzo *et al.* 2019). Through our discussion of the presentation of DK and peer-reviewed science, this article also seeks to contribute to wider debates of cultural, social and power dynamics of the construction and subsequent communication of science (Demeritt 2001). Our findings bear practical implications for understanding GHG mitigation challenges in Malaysia and Indonesia.

Section 2 introduces the concept of DK in the discourse of palm oil development in SEA, and discusses how the process of mass communicating DK could impact the authority of science, as conceptualised within the framework of contested boundaries and policy (Jasanoff 1987). Section 3 explains the methodology. Section 4 presents the four narratives we have identified to portray DK, undermining scientific consensus.

2. Divergent Knowledge, Media Communication of Science, and Political Implications

DK, guised as ‘science’, is produced solely to serve the purpose of countering scientific evidence over tropical peatland exploitation (Goldstein 2016). Unlike most scientific knowledge produced in universities, DK is produced by an alternative network of researchers, based in institutions funded by the state or the industry (*ibid.*). Although DK communities have published in internationally recognised peer-reviewed journals, which is a widely accepted qualification of credible science (Jasanoff 1987), their most prominent claims regarding net emissions reduction or fire risk reduction by certain OP management practices on tropical peatland have only been published in lesser-known journals or industrial publications. Notwithstanding the lack of attention and respect from the international scientific community, DK and its networks are influential in shifting the discourse from the suitability of tropical peatland plantation to tropical peatland management and investment (Goldstein 2016; Evers *et al.* 2017).

The contest between DK and scientific consensus bears environmental, economic and political implications. Years of peer-reviewed scientific research found alarming

environmental consequences related to draining, clearing and fertilising tropical peatland for the purpose of OP plantation. This includes net increases in GHG emissions (Drösler *et al.* 2014; Ramdani & Hino 2013; Jauhiainen & Silvennoinen 2012; Sumarga *et al.* 2016; Lupascu *et al.*, 2019), oxidation of peat (Hooijer *et al.* 2012; Hirano *et al.* 2012), the loss of carbon sinks due to deforestation (Moore *et al.* 2013; Cook *et al.* 2018), peat fires (Smith *et al.* 2018; Gauveau *et al.* 2014) and creating circumstances that increase the risks of peat fire (Amyotte *et al.* 1993; Page & Hooijer 2016; Kettridge *et al.* 2015). Yet, there are economic reasons to expand the industry. Although the figures vary, the latest statistics suggest the palm oil industry contributes 2.5% and 3.8% to the gross domestic product of Indonesia and Malaysia respectively (Indonesia Investments *online*; New Straits Times 2019), and global demand is expected to grow. Subsequently, there are political tensions in the debates surrounding the sustainability of palm oil production. Palm oil-producing countries have defended the industry from a nationalistic stance that they ought to have an equal chance to exploit its environment to develop its economy as their western counterparts have centuries ago (Manzo *et al.* 2019). Concurrently, transboundary haze has caused diplomatic tensions in SEA (Varkkey 2015; Varkkey 2020).

As tropical peatland science is closely related to highly politically charged topics, we believe it is useful to analyse the contestation between science and DK within the framework of ‘contested boundaries’ of science and public policy (Jasanoff 1987). The authority of science stems from its exclusive power to provide an explanation of reality, produced upon the Mertonian norms of openness, objectivity, disinterestedness and scepticism (Jasanoff 1987; Berkhout 2010). However, when science is expected to contribute to policy, especially when dealing with complex and politically sensitive topics such as CC, the authority of science is challenged, as scientific knowledge by its nature is not able to provide certain or complete answers required by policy-making (Jasanoff 1987; Berkhout 2010). The adversarial process of policy-making clashes with the “delicate and informal” processes of negotiation in scientific fact-finding, putting the disinterestedness of science under scrutiny (Jasanoff 1987, p. 198).

The media acts as an intermediary in the relationship between science and society (Berkhout 2010; Boykoff 2008), lending it the power to shape public understanding and perception of scientific knowledge (Elsasser and Dunlap 2013). The role of the media is especially sensitive in portraying complicated and politically controversial topics that require policy action, such as CC (Hmielowski *et al.* 2014). Fair and accurate communication of climate science is a precarious task. Conveying the complexity of climate science in comprehensible language and within the limited space in newspaper articles is in itself a challenging task (Boykoff and Boykoff 2007). Owing to the journalistic norm of balanced reporting, journalists are required to give equal attention to a proposition and dissenting voices, even when the latter only represent a very small proportion of the scientific community;

consequently, scrutiny of the authority of climate science becomes amplified (Boykoff and Boykoff 2007). These shortcomings have been exploited by parties with vested interests to misportray climate science. Specifically, four denialist narratives have been observed (Elsasser and Dunlap 2013). The first two narratives seek to misinterpret or deny ‘science’ by (A) contradicting any evidence of CC (‘it’s not happening’) and (B) denying any human responsibility in causing CC (‘it’s not us’). The latter two narratives interpret climate science with social values and arrive at a policy conclusion where climate action is deemed unnecessary. Narrative (C) ‘it’s not bad’, accuses climate scientists for alarmism and exaggerating the severity of the problem and Narrative (D) ‘it’s too hard’, accepts CC is happening but surrenders that any solutions would be too disruptive and complicated (Elsasser and Dunlap 2013). These narratives are supported by sources that claim to have ‘scientifically’ disproven mainstream, peer-reviewed climate science, usually funded by carbon-intensive industries or conservative lobby groups, with the single objective of encouraging non-action over CC (Dunlap and McCright 2011).

Most research on media communication of CC science has been based in western, economically developed, democratic countries, but there are nuances specific to SEA that might shift the relationship between science, media and society (Forsyth 2014). In particular, state censorship of the media of the three countries in this study shifts the position of the media as a space of deliberation of public opinion to a proponent of state agenda (Goldstein 2016). Existing studies of media portrayal of tropical peatland in Malaysia show that DK has been employed to counter neo-colonial representations of the soil (Manzo *et al.* 2019). However, there has yet to be research detailing how the boundaries of tropical peatland science and DK are negotiated and portrayed in relation to DK in mass media, as a CC issue specific to SEA (Manzo *et al.* 2019; Manzo and Padfield 2016).

3. Methodology

This study has conducted a deductive, qualitative content analysis of printed and online press coverage of the IPC2016 and the publication of the GCB Letter, as a point of inference to broader debate over the sustainability of OP plantation practices. Our analysis focused on articles published in the press of Indonesia, Malaysia and Singapore, three countries that are economically involved in the SEA palm oil industry and are concurrently affected by transboundary haze, a visible proxy of the environmental damage caused by unsustainable tropical peatland agricultural practices.

Conferences of significance have been used to reflect on the development of discourse in a field (MacDonald 2010; Brosius and Campbell 2010). As the controversy over press coverage of the conference only began after the event, it was impossible to undertake an ethnographic methodology as in Brosius and Campbell (2010). Our choice of methodology follows past studies in tropical peat and transboundary haze in public and policy discourse in

SEA (Forsyth 2014; Massey 2000; McLellan 2000; Manzo *et al.* 2019), we decided to conduct a content analysis of articles covering IPC2016 and subsequent debates.

3.1 Identification of News Articles

We used three online search engines, Factiva, LexisNexis and Google News to identify all articles covering the IPC2016 and/or the subsequent rebuttal by the scientific community in the GCB Letter. As some regional papers may not be available online, we also visited the New Straits Times Archive located in Kuala Lumpur which contains historic articles published in Malaysia and Indonesia.

We searched for ‘International Peat Congress’ (and the simplified Chinese equivalent of the term: ‘国际泥炭大会’) between July 2016 to December 2016. It was not necessary to search for the same term in Bahasa Melayu and Bahasa Indonesia because search returns for articles in those two languages presented ‘International Peat Congress’ in its original English form. This timeframe was chosen to capture any related articles that were published in anticipation of the event, and to capture any lingering debates after the GCB Letter was published. We also searched for the name of the lead author of the GCB Letter, ‘Wijedasa’. To ensure the chosen articles were relevant to our research questions, exclusion criteria were applied. Articles that mention IPC2016 but make no reference to the contested narrative over the sustainability of tropical peatland development were excluded. For the purpose of understanding the contested narrative surrounding the conference, we only analysed articles that concurrently mentioned OP plantation on tropical peatlands and the IPC2016 or the GCB Letter. However, we acknowledge larger-scale research on the contested narratives is called for. Articles were translated from Bahasa Melayu, Bahasa Indonesia and Chinese into English by two multi-lingual researchers.

3.2 Analysis of News Articles

The analysis of all articles followed four steps. First, the researchers took note of the manifest content of the articles (see Table 1), including

- (1) Country of publication
- (2) Article circulation figures
- (3) Ownership of the media company
- (4) Section of the newspaper where the article was published, when applicable.

Second, the content of the article was coded against the appearance and frequency of the following six themes:

- (1) Tropical peatland is environmentally valuable

- (2) OP plantations on tropical peatland are environmentally unsustainable
- (3) OP plantations on tropical peatland cause fire, haze or air pollution
- (4) OP plantations on tropical peatland are necessary for economic development
- (5) OP plantations on tropical peatland could be environmentally sustainable
- (6) Advocacy against plantation on tropical peatland is environmentalist propaganda

The first four themes were developed based on the issues of contention that arose at IPC2016 as highlighted by Wijedasa *et al.* (2016). That is, a public debate between scientific consensus and claims made at IPC2016 has arisen over the environmental impact of OP plantations on tropical peatland (Themes 1, 2, 3); that existing tropical peatland plantations have been handled well and sustainably (Theme 5); and that there are strong socio-economic arguments for exploiting tropical peatland (Theme 4). To satisfy our objective to explore how media portrayal affects trust in tropical peatland science, we drew upon Goldstein's (2016) observations of the nature of DK as counter-science and developed the fifth theme. Goldstein (2016) further notes that DK reflects politics of knowledge employed to sow doubt and ignorance (p.755). During the first round of coding, a recurring narrative that criticism of tropical peatland plantations is politically charged 'propaganda' was observed, implicitly undermining trust in the scientific consensus. We added this theme with hopes of bridging existing conceptualisation of DK with that of the role of media in constructing public trust in science. This approach is consistent with the methodological function of deductive content analysis to validate as well as extend a theoretical framework (Hsieh and Shannon 2005).

We tallied the number of times an article mentioned a theme and assigned a score for the article's attitude towards the theme (0 for no mention, 1 for mentioning neutrally, 2 for sympathising, 3 for endorsement). An article could be coded for more than one theme (see Appendix B).

Named references to individuals, such as scientists, politicians or activists were noted. We also noted the content, context and order of these references, as it accords voice and authority to the individual and henceforth their views. The significance of this exercise is to establish whose opinion is given voice, whether that is rebutted by another opinion and whose opinion gets the final concluding say in an article. Based on the themes mentioned and endorsed by the article and the authority the article has afforded to individuals and groups, the researchers decided on the attitude of the article towards the trustworthiness of scientific and/or DK (See Appendix B).

To minimise subjective bias and misunderstandings of researchers' individual judgement, analysis was conducted separately by two researchers with different levels of research

experience and understanding of the topic. The researchers deliberated and came to an agreement on the final results.

As a form of reliability testing, two researchers from different countries (one country within the sample size and one uninvolved country), academic backgrounds and different levels of research experience of the topic were employed to independently code the same set of data. After the first round of coding, the researchers compared the results. When there was disagreement, the researchers would re-read the article together, deliberate over the reason behind their code and reach an agreement of the final code. The final set of codes is therefore the result of a deliberation of expert judgement. This design for reliability is consistent with recent studies on media portrayal of tropical peat (Manzo *et al.* 2019) and builds on earlier studies (e.g. Forsyth 2014) that employ only one coder.

4. Portrayal of Contested Narratives

Our search returned 35 articles by 14 news outlets in total (see Appendix A for full reference list), with more than half published in Malaysia, followed by Indonesia and Singapore. Most of the articles are in English (n=29), followed by Bahasa Indonesia (n=3), Bahasa Melayu (n=1) and Chinese (n=2) (See Table 1).

The size of our sample is consistent with another dataset on the reporting of tropical peat agriculture in English-language newspapers in Malaysia overtime, which reflects the amount of attention accorded to tropical peatland and sustainability in the public discourse (Manzo *et al.* 2019). The relatively small number of articles returned in our search is also due to the niche focus which is on a particular event and a particular publication related to the event. However, there are geographical divisions in the attention accorded to and the language in reporting tropical peatland science and sustainability. For example, The Borneo Post, a newspaper based in the tropical peat-rich state of Sarawak, has published the most articles on the issue, signifying the relevance of the debate to the state. We will return to this observation in greater detail in later sections.

Newspaper	Articles	Country of Origin	Language	Ownership	Circulation (Print; daily, unless specified)	Circulation (Digital; daily, unless specified)
Berita Harian	1	Malaysia	Bahasa Melayu	Media Prima	91,229	14,427
Bernamea Daily	6	Malaysia	English	Malaysian Government	N/A	N/A
The Borneo Post	9	Malaysia	English	The Borneo Post Sdn	65, 990	N/A

EcoBusiness	1	Singapore	English	Bhd Owned by veteran Singaporean journalist, Jessica Cheam, with supporting organisations	N/A	1,300,000 ¹
United Daily	2	Malaysia	Chinese	United Borneo Sdn Bhd	58,495	4,561
KOMPAS	2	Indonesia	Bahasa Indonesia	Indonesia Government	500,000	4,200,000
Jakarta Globe	1	Indonesia	English	Berita Satu Media Holdings	N/A	700,000
The Jakarta Post	4	Indonesia	English	PT Niskala Media Tenggara	88,000	260,000
Malaysiakini	1	Malaysia	English	Mkini Group Sdn Bhd	N/A	2,500,000 ²
Malay Mail	2	Malaysia	English	Malay Mail Sdn Bhd	N/A	4,300,000 ³
The Star	4	Malaysia	English	Star Media Group Berhad	220,972	13,739
The Straits Times	1	Singapore	English	Singapore Press Holdings	277,100	116,200
Tempo	1	Indonesia	Bahasa Indonesia	Tempo Media Group	99,188	N/A

Table 1. Distribution of news articles covering IPC2016 and GCB Letter by country of publication, language, ownership, circulation

¹ Based on its annual unique visitor of 1.3 million (*Ecobusiness online*).

² Based on its monthly unique visitor of 2.5 million (*Malaysiakini online*).

³ Based on its monthly unique viewer of 4.3 million (*Malay Mail online*).

(Sources: Audit Bureau of Circulation, Malaysia, 2016; EcoBusiness *online*; Malaysiakini *online*; Malay Mail *online*; Singapore Press Holding Company 2016; Infosaid 2012; Irwansyah 2011; The Jakarta Post 2018; Tempo 2016)

4.1 Portrayal of the GCB Letter

There were more articles covering the misleading information presented at IPC2016 (n=21) compared to the GCB Letter (n=7). Of the seven articles that reported the scientific rebuttal published in the GCB Letter, four of them were published in Malaysia, two in Singapore and one in Indonesia. Three of these articles are published by conventional printed press, namely *The Straits Times* in Singapore, *The Star* in Malaysia and *KOMPAS* in Indonesia. *The Straits Times* and *The Star* are concurrently the two most prominent English-language papers by circulation in their respective countries (Audit Bureau of Circulation Malaysia 2016; Singapore Press Holdings 2016).

The Straits Times published the only article that distinguished between scientific and DK communities, citing a Singaporean think tank who differentiated “independent scientists” from “government-linked institutes”, leaving the audience to decide whose research is more credible based on the agenda that drives the research (The Straits Times 2016). The article directly interrogates the issue of credibility in its conclusion, quoting the think tank that palm oil companies must consider the perspectives of not only “pro-cultivation scientists” but also independent scientists to be seen as “credible”. Contrastingly, both articles from *The Star* concluded their articles by dismissing the proposition of the GCB Letter as “half truths” backed by political agenda and is “generalised, one-sided and inconclusive”, directly undermining its credibility and authority (The Star 2016a; The Star 2016b).

KOMPAS affords the authors of the GCB Letter a more authoritative voice than *The Star*. Its headline reads: “Experts from 20 countries corrects the content of Congress in Sarawak” (“Pakar dari 20 Negara Luruskan Isi Kongres di Sarawak”), acknowledging firstly the expertise of the authors and GCB and the accuracy of the information that they represent (KOMPAS 2016b). However, unlike *The Straits Times* article, it has not made the differentiation between science and DK.

The articles that most explicitly endorse the scientific consensus were published by *EcoBusiness* and *Malaysiakini*, a Singaporean online news platform that covers issues of sustainable development (*EcoBusiness online*) and an independent, anti-establishment Malaysian online news platform (*Malaysiakini online*).

The coverage of *Ecobusiness* pits the authors of the GCB letter against the TPRL, as scientists “shooting down” the claims made by a “think tank backed by the Malaysian government” (Ecobusiness 2016). By labelling it as a ‘think tank’ instead of a ‘laboratory’ as it styles itself, the article implicitly removes it of its position of an institution of scientific knowledge production, in contrast to the scientist authors of the GCB Letter. Additionally, by revealing its funding sources, the article implies the interests TPRL seeks to serve. This is a stark contrast from the rest of the articles covering this debate that implicitly attribute a ‘scientist’ status to TPRL. Contrastingly, *Malaysiakini* did not differentiate between science and DK. Nonetheless, it attributed legitimacy to the claim made in the GCB letter by acknowledging the consensus as “unprecedented” and “confirms that the weight of evidence backed by many decades of scientific research, is unequivocal: business-as-usual management is not sustainable for tropical peatland agriculture and can no longer be justified” (Malaysiakini 2016). The article quoted the endorsement by Roundtable of Sustainable Palm Oil, an international certification body for sustainable palm oil, confirming the international consensus over the environmental problems of tropical peatland plantation and is best avoided. The article also highlights that Malaysian scientists, representing eighteen organisations, were in the list of authors, which invalidates claims that scientific consensus is mere anti-developmental propaganda. This is the only article published by Malaysian press that is sympathetic to the claims made by the GCB Letter. It is worth noting that *Malaysiakini* is an online press, which means it is subject to a less stringent set of censorship regulations (*Malaysiakini online*).

It is worth noting that the Singaporean press has given much less attention to the debate when compared with Malaysia and Indonesia. Despite physical proximity and the shared problem of transboundary haze, Singapore is posited very differently to Indonesia and Malaysia in the palm oil production chain. While Malaysia and Indonesia are palm oil producing countries, Singapore is solely engaged in the financing of the industry. Therefore, agricultural practices only affect Singapore in terms of the price of the commodity or in some cases, reputationally. However, they do not affect Singapore in the same way they affect the day-to-day practices and livelihoods of Indonesian and Malaysian farmers or plantation workers. Similarly, it is worth noting that The Borneo Post has most coverage of the issue, perhaps due to the important economic consequences of tropical peatland development for the peat-rich Malaysian state of Sarawak, where the newspaper is based.

In alignment with the discrepancy in the coverage between the misleading information presented in IPC2016 versus the GCB Letter, more articles represented the divergent view that it is environmentally sustainable to plant OP on tropical peatland (n=20) than articles that represent the scientific consensus that suggests otherwise (n=8). We have observed four narratives adopted by these articles denying the negative environmental consequences of OP

plantations on tropical peatland. These narratives resemble CC denialist narratives observed in the west (Elsasser and Dunlap 2013; See Figure 1).

4.2 Four Denialist Narratives

4.2.1 (I) Endorsement of DK

Most of the articles supported their claims of the sustainability of OP plantation on tropical peatland with the ‘peat compaction method’ developed by TPRL. Eight articles mentioned this method, endorsing claims that it produces higher palm yield, reduced soil carbon dioxide emissions, lowered susceptibility of peat fire outbreaks by retaining soil moisture and as a result, successfully preventing haze. These claims are used to deny scientific findings that drained tropical peatland is inefficient land for OP plantations and causes excessive GHG emissions, despite the fact that the claims of the effectiveness of the peat compaction method had not been subject to peer-review (Wijedasa *et al.* 2016). This denial or obfuscation of science resembles Narratives (A) ‘it’s not happening’ and (B) ‘it’s not us’ from climate denialism (Elsasser and Dunlap 2013).

Fifteen articles expressed that knowledge produced by TPRL is trustworthy, affording authority to the institution. To support this narrative, some of the articles published by the Malaysian press quoted the endorsement of the credibility of TPRL and its findings by Malaysian and Sarawakian politicians, including the Minister of Plantation Industries and Commodities, Chief Minister of Sarawak and Deputy Chief Minister, Minister of Modernisation of Agriculture and Rural Economy, and Sarawak Second Minister of Resource Planning and Environment. Quoting from a position of authority is a common journalistic tactic in increasing the credibility of a claim (Boykoff and Boykoff 2007). In their speeches, they claim that the establishment of TPRL is a sign of the government’s commitment to develop best practice in the use of tropical peatland for OP plantation (Malay Mail 2016; Bernama Daily 2016b; Bernama Daily 2016c; Bernama Daily 2016d) and that TPRL’s research is a source of reliable science that the industry could turn to (Bernama Daily 2016a; Bernama Daily 2016f; The Borneo Post 2016a; Malay Mail 2016a; The Star 2016a). One of the articles that specifically reports a speech by the Deputy Chief Minister of Sarawak concluded by paraphrasing the minister, stating that planting OP on peat is sustainable, so long as one follows the recommendation of TPRL, suggesting the government’s unwavering trust in TPRL (The Borneo Post 2016). These individuals may seem credible to the reader as they occupy positions of political or social authority, but in fact they lack the relevant qualifications to comment on the scientific credibility of ‘certain knowledge’. Nonetheless, ministers’ endorsements also provide evidence of the close relations between DK networks and the state (Goldstein 2016).

In contrast, only three articles expressed scepticism towards the research produced by TPRL, including the previously discussed *EcoBusiness* and *The Straits Times* articles. Both articles contend that the peat compaction method produced by TPRL is ‘unproven’, and quote authors of the GCB letter to reaffirm the consistent international scientific consensus-view that OP plantation on tropical peat is unsustainable.

The third article that expressed scepticism was published by *The Jakarta Post*. It observes that Malaysia is a “lone-ranger” in SEA in adopting the view that it could be environmentally sustainable to plant OP on tropical peatland. By distancing Indonesia from the practice of OP plantations on tropical peat, the article achieved the effect of disputing the credibility of the DK. The article phrased the success of the compaction method to minimise the risk of fire and reduced carbon emissions of tropical peatland exploitation as “claims” rather than accepting them as scientific facts. Similar to the *Ecobusiness* article, it raised questions over the independence of TPRL by pointing out the political and economic purpose of the establishment of TPRL to produce knowledge in support of the palm oil industry. Further, the article questioned the integrity of TPRL by reporting that the organisation of the Congress was “maneuvered” to be a showcase for the results of TPRL’s research, suggesting that tactics were deployed to ensure that TPRL’s research was presented at the IPC (*ibid.*). Notwithstanding its skepticism, the article did not fully endorse the scientific consensus. Its concluding paragraphs asserts that the sustainability-related criticisms are championed by environmentalists who have little concern for the economic benefits of OP plantations on tropical peatland to the Indonesian economy, suggesting that science is in fact tainted by political motivations, and that there is an economic case for tropical peatland exploitation (see Section 4.2.4).

4.2.2 (II) Undermining the Credibility of Scientists

Complementing the first narrative, eight articles held this second narrative that bolsters the denialist narrative by undermining the credibility of anyone advocating against OP plantations on tropical peatland. This narrative resembles the CC denialist Narrative (C) in that it launches an attack on the scientific community. Critics are depicted as “foreigners” motivated by politico-economic agendas (The Borneo Post 2016b; Benama Daily 2016a). One article depicted the perceived hostility of this ‘foreignness’ by quoting the violent language used in IPC2016 to describe how ‘foreign’ science had been used to attack the palm oil industry, where “Malaysia and Indonesia were always ‘hit black and blue’” in previous Congresses held in Europe, and “accused of being criminals against the environment” (The Jakarta Post 2016b).

This narrative tends to amalgamate all critics, scientists, NGOs and environmental activists alike, under the same umbrella of anti-palm oil development activists (The Star 2016a; The

Jakarta Post 2016b; The Borneo Post 2016b). For example, one article quoted a British geography professor as having “insisted that developing palm oil plantations was unsustainable”, a view which earlier in the same article had been described to be advocated by “militant environmentalists” with a political agenda to undermine palm oil as part of a “trade war” with soya bean and sunflower oil developed in America and Europe (The Jakarta Post 2016b). This implicitly associates the professor’s views to that of radical opposition groups. As a result, it challenges the integrity of scientific knowledge, as scientists are portrayed to be breaking the norms of openness and disinterestedness (Jasanoff 1987).

Note that this attack on foreignness does not critique the quality of the science, but only casts doubt over its credibility. But by highlighting that critics are foreign, the articles are invoking two layers of tension. First, the articles are inflicting a nationalistic sentiment that palm oil-producing countries must protect their industry and economic prosperity the industry provides. By labelling science as a political tool used by foreigners, the articles are convincing their readers to put greater trust in knowledge produced regionally that has industrial and therefore national interests at heart, without interrogating the quality of the knowledge produced. This narrative is consistent with how the palm oil industry is prominently featured in the national imagination of modernisation of Indonesia and Malaysia in recent decades (McCarthy and Cramb 2009).

Second, this reflects a differentiation between ‘us’ and ‘them’ - palm oil-producing countries versus countries that concurrently have demand and produce other vegetable oils - this being a manifestation of nationalistic sentiments. Scientific evidence of environmental problems related to tropical peatland development has been interpreted as the patronising colonial narrative of keeping tropical peatland “idle” (Manzo *et al.* 2019). As such, producers and proponents of such scientific evidence are portrayed as agents of neocolonialism, promoting an antithesis to the prosperity of palm oil producing countries (*ibid.*). Further, environmental science historically has been produced by researchers and institutions funded by the west. As the boundary between science and policy blurs, as in the case of deliberating the environmental consequences of OP plantations on tropical peat, countries that do not produce scientific knowledge become sidelined in these political processes. The emergence of DK does not only signify a type of knowledge that favours agricultural development, it also signifies the ownership of knowledge and therefore a position in the deliberation process.

4.2.3 (III) Framing Dubious Claims as Science

Having discredited scientific claims, Narrative (III) frames dubious claims as science. This skews public understanding of the scientific consensus of the environmental consequences of tropical peatland exploitation. In combination with Narrative (I), Narrative (III) resembles the

CC Narratives (A) and (B) to obfuscate science in favour of knowledge that has been disproven by mainstream, peer-reviewed climate science.

Six articles have made dubious claims, consisting of three categories: draining peat emits less GHG than intact tropical peatland (The Star 2016a; Benama Daily 2016a; Bernama Daily 2016c; Bernama Daily 2016d), methane emitted from pristine peatland could cause ignition of fires (The Star 2016b) and that drained peat is not fire prone (Tempo.co 2016).

Indonesian and Malaysian press have presented these claims as trustworthy by using similar tactics to Narrative (I) by quoting figures of authority. In countering the claims made in the GCB Letter, *The Star* ambiguously quoted that “experts” have claimed that “peat swamps emit methane when underwater and it only takes a tiny spark to lead to peat fires”. As such, “oil palm plantations are not the cause of the annual haze”. Another *Bernama Daily* article reported that Sarawak’s tropical peatland management was effective, quoting the Chief Minister that “carbon emissions from these plantations are actually lower than those from undisturbed peatland or forest” (Benama Daily 2016c). Another article has placed complete trust in the claim that “fire usually occurs in the peatlands that are not managed” made by the Chairman of Sarawak Oil Palm Plantation Owners Association (Tempo.co 2016).

Instead of adhering to the journalistic norm of ‘balanced reporting’ as observed in western media reporting on climate science, none of these articles have presented any alternative thesis. Instead, articles have suggested that tropical peat is under-researched (KOMPAS 2016a; The Borneo Post 2016d; The Jakarta Post 2016), ignoring a wealth of peer-reviewed research on tropical peatland, claiming DK as the only source of tropical peatland science.

4.2.4 (IV) The Economic Case

The final frame highlights the economic benefits of tropical peatland development. Unlike Narratives I-III, it does not tinker the authority of science, but seeks to displace attention away from environmental issues. This narrative is almost identical to CC denialist Narrative (D) ‘it’s too hard’, where economic importance of business-as-usual trump environmental concerns.

Fifteen articles sympathise with or endorse the view that it is necessary to develop tropical peatland for the economic development of palm oil-producing countries. These articles highlight the socio-economic benefits to national and grassroots development. One article attributed OP as an important crop for “socio-economic transformation of its rural population” and that the “development of peatland...provides the impetus for much needed infrastructure and amenity development’ (Benama Daily 2016e). Two articles in *The Borneo Post* state that tropical peatland development is crucial for “eradicating poverty”, specifically

in rural Sarawak. Appealing to readers' sympathies, one of the articles quoted the Chief Minister of Sarawak stating that "rural farmers who are now able to elevate their standard of living and support their children's higher education through income from OP smallholdings" (The Borneo Post 2016a; The Borneo Post 2016b). The economic argument resonates with the wider "common but differentiated responsibility" principle that acknowledges the dilemma between taking aggressive climate action and sustaining economic development faced by developing countries. This narrative also aligns with existing observations of media portrayal of CC in developing countries, where this dilemma features prominently (Schmidt *et al.* 2013; Shanahan 2009; Manzo and Padfield 2016). Interestingly, three articles from the Sarawakian *The Borneo Post* expressed this tension in nationalistic sentiments, employing the colonial metaphor of the "last frontier" of arable land in Sarawak to depict the necessity of exploitation (The Borneo Post 2016a; Benama Daily 2016e; The Borneo Post 2016h). Deployed in tandem with Narrative (II), the anti-colonial, nationalist tensions of equal opportunity to exploit the environment for economic development is apparent. These narratives of rural and national economic development are only championed by the Malaysian press, despite Indonesia being the bigger palm oil exporter of the two countries. This reflects the role palm oil plays in the national imagination of climate change and economic development (Manzo and Padfield 2016).

Finally, none of the Singaporean press endorsed any of the denialist narratives. As previously mentioned, unlike Indonesia and Malaysia that produce palm oil, Singapore only invests in the commodity. Criticisms of environmental destruction and excessive GHG emissions tend to be directed towards the producing countries, whereas being the investor, Singapore is one step removed from the bulk of the blame, meaning there is no need to defend existing plantation methods. At the same time, except for the *EcoBusiness* article which addresses an environmentally-conscious audience, the Singaporean press avoid strongly endorsing or defending the scientific consensus, despite Singapore being affected by transboundary haze regularly. This reflects the precarious diplomatic relations arising out of the issue of transboundary haze: despite being a more economically developed country with no palm oil plantations, Singapore cannot be seen as overtly criticising its close neighbours upon whom it relies heavily on for imported goods and national security (Varkkey 2020; Forsyth 2014).

**Climate change denialism
(Elsasser and Dunlap 2013)**

**Denial of environmental
issues with oil palm on
tropical peatlands**

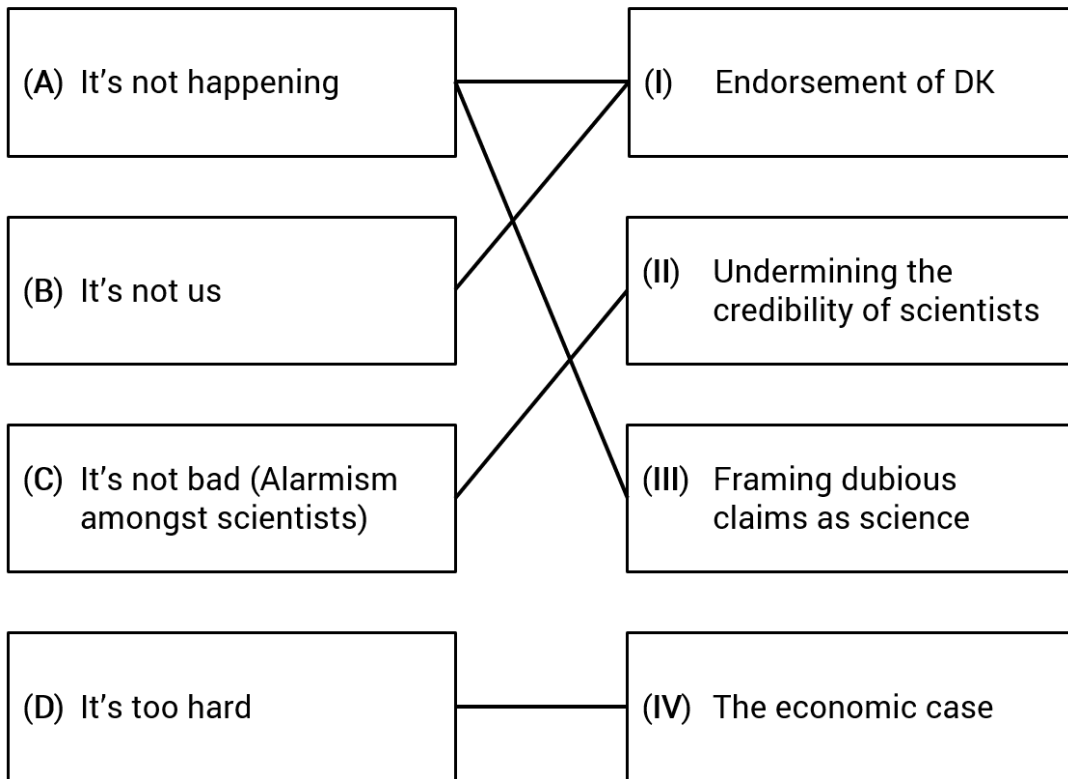


Figure 1. A summary of the resemblance between denialism of CC and the environmental issues related to oil palm plantation on tropical peatland

5. Conclusion

We find that the denialist narratives have received significantly greater press coverage than the scientific consensus-view of the unsustainability of OP plantation on tropical peat. The Malaysian press published the greatest number of articles that took a denialist stance, followed by Indonesia. None of the Singaporean press coverage showed explicit sympathy towards the denialist narratives. Thus, media representation of the issue is a reflection of an amalgamation of concerns relating to economic development, diplomacy and nationalism, determined by specific political, socio-cultural nuances of each country.

We identified four narratives employed by the denialists. Narrative (I) endorses DK - that it is possible to plant OP on tropical peat sustainably. Complementing this narrative, Narrative (II) discredits scientists as politically-charged foreigners seeking to undermine the palm oil industry. To counter scientific claims, Narrative (III) uses dubious claims to obfuscate public understanding of tropical peatland science. Narrative (IV) stresses the necessity of tropical

peatland development for the economies of palm oil producing countries to sideline environmental concerns. The combination of these narratives send a coherent message: research funded by the Malaysian state has proven that tropical peatland could be sustainably used for OP plantation. Any critics, regardless of their scientific qualifications, bear a political agenda to undermine the industry and henceforth the economic development of palm oil producing countries.

Similar to the four narratives of CC denial (Elassaer and Dunlap, 2013), these narratives work in concert to maintain business-as-usual. Similarly, business-as-usual in the palm oil industry ensures short-term economic benefit to the industry and palm-oil producing countries. It is therefore unsurprising that the narratives and strategies of tropical peatland denialism and CC denialism share commonalities (Manzo and Padfield 2016). What is unique in this case is the nationalist sentiment found in Narrative (II) that questions the disinterestedness of science, and Narrative (IV) that defends continued tropical peatland exploitation. These narratives agree with media representation of tropical peatland in SEA (Manzo *et al.* 2019), but have not been previously observed in climate denialist narratives as these are largely based in the west.

The prevalence of the denialist narrative bears alarming implications for the palm oil-producing countries in SEA, their neighbours and the wider CC discourse. By endorsing environmentally unsustainable practices in the industry, the mass media is instilling scientifically inaccurate views amongst the general public. The public is therefore unlikely to scrutinise existing practices on tropical peatland in the palm oil industry. Without public scrutiny, unsustainable practices and their negative consequences are likely to persist, causing environmental, economic and social harm to the palm oil-producing countries and their immediate neighbours. On a global scale, the drainage and combustion of tropical peat would release excessive GHGs into the atmosphere, thus delaying the progress of reaching global CC mitigation goals.

Climate denialist narratives are created to defend the interest of fossil fuel and other carbon intensive industries (Dunlap and McCright 2011). Here, it is worth reflecting on the benefactors of the dissemination of DK. The knowledge provides justification for business-as-usual, which liberates the palm oil industry from costly transformation throughout the supply chain to ensure that new tropical peatland is not exploited; existing plantations are not burnt; and existing tropical peatland concessions are restored or redeveloped for more sustainable purposes. Thus, the promotion of DK narratives appears to benefit the intricately intertwined 'patronage' network of the palm oil industry (Varkkey 2015). The details of the DK deployment mechanism and its implications would be topics for future research.

References

- Audit Bureau of Circulation Malaysia (2016a). Circulation Figures - Paid Newspapers Print Edition - By States - West and East Malaysia. July 2016 - December 2016 Available online:
<http://abcm.org.my/wp-content/reports/2016/abc-circulation-figures-jul-16-to-dec-16-newspapers-states-distribution.pdf> [Accessed on 5th April 2019]
- Audit Bureau of Circulation Malaysia (2016b) Circulation Figures - Digital Republica - Newspapers. July 2016 - December 2016. Available online:
<http://abcm.org.my/wp-content/reports/2016/abc-circulation-figures-jul-16-to-dec-16-digital-replica.pdf> [Accessed on 21st October 2019]
- Boykoff, M. T. (2008). Media and scientific communication: a case of climate change. *Geological Society, London, Special Publications*, 305(1), 11-18.
- Boykoff, M. T., & Boykoff, J. M. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum*, 38(6), 1190-1204.
- Brosius, J. P., & Campbell, L. M. (2010). Collaborative event ethnography: conservation and development trade-offs at the fourth world conservation congress. *Conservation and Society*, 8(4), 245.
- Cook, S., Whelan, M. J., Evans, C. D., Gauci, V., Peacock, M., Garnett, M. H., ... & Page, S. E. (2018). Fluvial organic carbon fluxes from oil palm plantations on tropical peatland. *Biogeosciences*, 15(24), 7435-7450.
- Demeritt, D. (2001). The construction of global warming and the politics of science. *Annals of the Association of American geographers*, 91(2), 307-337.
- Drösler M, Verchot LV, Freibauer A et al. (2014) Chapter 2: Drained inland organic soils. In: 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (eds Hiraishi T, Krug T, Tanabe K, Srivastava N, Jamsranjav B, Fukuda M, Troxler T), pp. 1–79. IPCC, Switzerland.
- Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. *The Oxford handbook of climate change and society*, 1, 144-160.

- Elsasser, S. W., & Dunlap, R. E. (2013). Leading voices in the denier choir: Conservative columnists' dismissal of global warming and denigration of climate science. *American Behavioral Scientist*, 57(6), 754-776.
- Evers, S., Yule, C. M., Padfield, R., O'reilly, P., & Varkkey, H. (2017). Keep wetlands wet: the myth of sustainable development of tropical peatlands—implications for policies and management. *Global Change Biology*, 23(2), 534-549
- Forsyth, T. (2014). Public concerns about transboundary haze: A comparison of Indonesia, Singapore, and Malaysia. *Global Environmental Change*, 25, 76-86..
- Gaveau D. L. A. , Salim M., Hergoualc'h K et al. (2014) Major atmospheric emissions from peat fires in Southeast Asia during non-drought years: evidence from the 2013 Sumatran fires. *Scientific reports*, 4, 1–7
- Goldstein, J. E. (2016). Knowing the subterranean: Land grabbing, oil palm, and divergent expertise in Indonesia's peat soil. *Environment and Planning A: Economy and Space*, 48(4), 754-770.
- Hmielowski, J. D., Feldman, L., Myers, T. A., Leiserowitz, A., & Maibach, E. (2014). An attack on science? Media use, trust in scientists, and perceptions of global warming. *Public Understanding of Science*, 23(7), 866-883
- Hooijer, A., Page, S., Jauhiainen, J., Lee, W. A., Lu, X. X., Idris, A., & Anshari, G. (2012). Subsidence and carbon loss in drained tropical peatlands. *Biogeosciences*, 9(3), 1053-1071.
- Indonesia Investments (online). Commodities: Palm Oil. Available online: <https://www.indonesia-investments.com/business/commodities/palm-oil/item166>. [Accessed 21st October 2019]
- Infoasaid. (2012). *Indonesia Media and Telecoms Landscape Guide*. Available online: <http://www.cdacnetwork.org/contentAsset/raw-data/0df69be9-1727-43af-8e97-c3e72bb9596f/attachedFile>. [Accessed 21st October 2019]
- Irwansyah. (2011). Indonesia Media Landscape. In *Future Media International Forum*. Moscow. Available online: http://vid-1.rian.ru/ig/fmf/ss/Future_Media_Forum_2011_Irwansyah.pdf. [Accessed 21st October 2019]

- Jasanoff, S. S. (1987). Contested boundaries in policy-relevant science. *Social studies of science*, 17(2), 195-230.
- Jauhiainen, J., & Silvennoinen, H. (2012). Diffusion GHG fluxes at tropical peatland drainage canal water surfaces. *Suo*, 63(3-4), 93-105.
- Kettridge N, Turetsky MR, Sherwood JH et al. (2015) Moderate drop in water table increases peatland vulnerability to post-fire regime shift. *Scientific Reports*, 5, 8063.
- Lupascu, M., Akhtar, H., Smith, T. E. L., & Sukmaria binti Hj Sukri, R. (2017, December). Post-fire fluxes and sources of carbon in previously burnt tropical swamp peatlands, Brunei. In *AGU Fall Meeting Abstracts*.
- MacDonald, K. I. (2010). Business, biodiversity and new ‘fields’ of conservation: The world conservation congress and the renegotiation of organisational order. *Conservation and Society*, 8(4), 256-275.
- Manzo, K., & Padfield, R. (2016). Palm oil not polar bears: climate change and development in Malaysian media. *Transactions of the Institute of British Geographers*, 41(4), 460-476.
- Manzo, K., Padfield, R., Varkkey, H. (2019). Envisioning tropical environments: Representations of peatlands in Malaysian media. *Environment and Planning E: Nature and Space*.
- Massey, B. L. (2000). How three Southeast-Asian newspapers framed the haze’ of 1997–98. *Asian Journal of Communication*, 10(1), 72-94.
- McLellan, J. (2001). From Denial to Debate—And Back Again! Malaysian Press Coverage of the Air Pollution and ‘haze’ Episodes, July 1997–July 1999. *Forest Fires and Haze in Southeast Asia*.
- Miettinen, J., Hooijer, A., Shi, C., Tollenaar, D., Vernimmen, R., Liew, S. C., ... & Page, S. E. (2012). Extent of industrial plantations on Southeast Asian peatlands in 2010 with analysis of historical expansion and future projections. *Global Change Biology Bioenergy*, 4(6), 908-918.
- Moore, S., Evans, C. D., Page, S. E., Garnett, M. H., Jones, T. G., Freeman, C., ... & Gauci, V. (2013). Deep instability of deforested tropical peatlands revealed by fluvial organic

carbon fluxes. *Nature*, 493(7434), 660.

New Straits Times (2019). Malaysia to cap 6.5m ha of oil palm plantations by 2023.

Available online:

<https://www.nst.com.my/business/2019/03/466143/malaysia-cap-65m-ha-oil-palm-plantations-2023>. [Accessed on 10th October 2019].

Nisbet, M. C., & Myers, T. (2007). The polls—trends: Twenty years of public opinion about global warming. *Public Opinion Quarterly*, 71(3), 444-470.

Page, S. E., & Hooijer, A. (2016). In the line of fire: the peatlands of Southeast Asia. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 371(1696), 20150176.

Schmidt, A., Ivanova, A., & Schäfer, M. S. (2013). Media attention for climate change around the world: A comparative analysis of newspaper coverage in 27 countries. *Global Environmental Change*, 23(5), 1233-1248.

Shanahan, M. (2009). Time to adapt? Media coverage of climate change in non industrialised countries. *Climate change and the media*, 145-157.

Singapore Press Holdings (2016). The Straits Times/ The Sunday Times Product Fact Sheet.

Available online:

http://investor.sph.com.sg/misc/annualreport/2016b/SPH_AR2016_daily_average.pdf [Accessed 5th April 2019]

Smith, T. E. L., Evers, S., Yule, C. M., & Gan, J. Y. (2018). In situ tropical peatland fire emission factors and their variability, as determined by field measurements in Peninsula Malaysia. *Global Biogeochemical Cycles*, 32(1), 18-31.

Sumarga E, Hein L, Hooijer A, Vernimmen R (2016) Hydrological and economic effects of oil palm cultivation in Indonesian peatlands. *Ecology and Society*, 21, 52.

Tropical Peat Research Institute (TPRL) (online). Objective. Available online:

http://tropicalpeat.sarawak.gov.my/modules/web/pages.php?mod=webpage&sub=page&id=41&menu_id=0&sub_id=93 [Accessed 5th April 2019]

Varkkey, H. (2020). Addressing transboundary haze through Asean: Singapore's normative constraints. *Journal of International Studies*, 7, 83-101.

Varkkey, H. (2015). *The haze problem in Southeast Asia: palm oil and patronage*. Routledge.

Varkkey, H. (2012). Patronage politics as a driver of economic regionalisation: The Indonesian oil palm sector and transboundary haze. *Asia Pacific Viewpoint*, 53(3), 314-329.

Wicke, B., Sikkema, R., Dornburg, V., & Faaij, A. (2011). Exploring land use changes and the role of palm oil production in Indonesia and Malaysia. *Land Use Policy*, 28, 193–206.

Wijedasa, L. S., Jauhiainen, J., Könönen, M., Lampela, M., Vasander, H., Leblanc, M. C., ... & Lupascu, M. (2017). Denial of long-term issues with agriculture on tropical peatlands will have devastating consequences. *Global change biology*, 23(3), 977-982.

Appendix A - Newspaper References

- Berita Harian. (2016). Kekalkan Keseimbangan tanah gambut. Accessed via New Straits Times Archives.
- Bernama Daily (2016a). “M’sia’s Oil Palm Industry on Peatland will not Lead to Environmental Degradation” in *Bernama Daily*. Accessed via Factiva.
- Bernama Daily (2016b). “Sarawak Peat Fires Control Mechanisms Model for World” in *Bernama Daily*. Accessed via Factiva.
- Bernama Daily (2016c). “Sarawak’s Effective Peatland Plantation Management has Prevented Peat Fires” in *Bernama Daily*. Accessed via Factiva.
- Bernama Daily (2016d). “Problematic peatlands can be developed, says NREB's Sawal” in *Bernama Daily*. Available online: <http://bepi.mpob.gov.my/news/detail.php?id=21544> [Accessed 5th April 2019]
- Bernama Daily (2016e). “Peatland is Sarawak last frontier of Arable Land for Development - Awang Tengah”. in *Bernama Daily*. Accessed via Factiva.
- Bernama Daily (2016f). “Successful International Peat Congress, says Organiser”. in *Bernama Daily*. Accessed via Factiva.
- The Borneo Post (2016a). “Peatland - the last frontier of oil palm industry” Available online: <https://www.theborneopost.com/2016/08/04/peatland-the-last-frontier-of-oil-palm-industry/>. [Accessed on 5th April 2019]
- The Borneo Post (2016b) “Sarawak opening up coastal lowland areas for agriculture, plantation devt — Adenan”. Available online: <https://www.theborneopost.com/2016/08/17/sarawak-opening-up-coastal-lowland-areas-for-agriculture-plantation-devt-adenan/> [Accessed on 5th April 2019]
- The Borneo Post (2016c). “Lau: Govt, timber industry and NGOs should work together”. Available online: <https://www.mpi.gov.my/index.php/en/rss-content-english/62-mpic-di-dalam-akhbar-2016-bi/1597-timber-lau-govt-timber-industry-and-ngos-should-work-together/> [Accessed on 5th April 2019]

- The Borneo Post (2016d). “Sarawak’s young oil palm industry needs most attention”. Available online: <http://soppoa.org.my/archives/press-releases/sarawaks-young-oil-palm-industry-needs-most-attention.php>. [Accessed on 21st October 2019]
- The Borneo Post (2016e). “No More Open burning after 2020”. Available online: <https://www.pressreader.com/malaysia/the-borneo-post/20160819/281655369481501>. [Accessed on 21st October 2019]
- The Borneo Post (2016f). “Peat Knowledge leads to agro-environment management”. Available online: <https://www.pressreader.com/malaysia/the-borneo-post/20160819/281638189612317>. [Accessed on 21st October 2019]
- The Borneo Post (2016g). “Oil palm planting on peat soil handled well, says Uggah”. Available online: <https://www.pressreader.com/malaysia/the-borneo-post/20160819/281749858762013>. [Accessed on 5th April 2019]
- The Borneo Post (2016h). “Peatland is state’s last frontier of arable land - Awg Tengah”. Available online: <https://www.theborneopost.com/2016/08/19/peatland-is-states-last-frontier-of-arable-land-awg-tengah/>. Available online: [Accessed on 21st October 2019]
- The Borneo Post (2016i). “For Peat’s Sake!”. Available online: <https://www.theborneopost.com/2016/09/25/for-peats-sake/> [Accessed on 21st October 2019]
- EcoBusiness (2016a) 15th International Peat Congress 2016. Available online: <https://www.eco-business.com/events/15th-international-peat-congress-2016/>. [Accessed on 5th April 2019]
- EcoBusiness. (2016b) 139 scientists shoot down ‘misleading’ reports from Malaysia peat congress. Available online: <https://www.eco-business.com/news/139-scientists-shoot-down-misleading-reports-from-malaysia-peat-congress/> [Accessed on 5th April 2019]
- EcoBusiness (online). About Us. Available online: <https://www.eco-business.com/about/> [Accessed on 5th April 2019]

- Jakarta Globe (2016). Experts Call for Balanced Scientific Facts on Tropical Peatlands. Available online: <https://jakartaglobe.id/business/experts-call-balanced-scientific-facts-tropical-peatlands/>. [Accessed 21st October 2019]
- The Jakarta Post. (2018). Media Kit: Reader's Profile and Reading Habit. Available online: https://docs.wixstatic.com/ugd/f929a7_00c4c3ab648448869ddba8bc85c0b9cb.pdf. [Accessed 21st October 2019]
- The Jakarta Post. (2016a). Peat Congress opens in Malaysia with call for further research into Peatland. Available online: <https://www.thejakartapost.com/news/2016/08/16/peat-congress-opens-with-call-for-further-research-into-peatland.html> [Accessed on 5th April 2019]
- The Jakarta Post. (2016b). Congress may change views on cultivation of peatland: IPS. Available online: <https://www.thejakartapost.com/news/2016/08/18/congress-may-change-views-on-cultivation-of-peatland-ips.html>. [Accessed on 5th April 2019]
- The Jakarta Post. (2016c). Stop blame game, start working, experts say. Available online: <https://www.thejakartapost.com/news/2016/08/18/stop-blame-game-start-working-experts-say.html>. [Accessed on 5th April 2019]
- The Jakarta Post. (2016d). "Malaysia challenges the world over palm oil on peatland". In *The Jakarta Post*. Available online: <https://www.thejakartapost.com/news/2016/08/24/malaysia-challenges-the-world-over-palm-oil-on-peatland.html> [Accessed 5th April 2019]
- KOMPAS (2016a). "Ternyata, Luas Lahan Gambut Tropis Hanya 8 Persen di Seluruh Dunia". Available online: <https://money.kompas.com/read/2016/08/16/203000226/Ternyata.Luas.Lahan.Gambut.Tropis.Hanya.8.Persen.di.Seluruh.Dunia>. [Accessed 5th April 2019].
- KOMPAS. (2016b). "Pakar dari 20 Negara Luruskan Isi Kongres di Sarawak". Available online: <http://print.kompas.com/baca/sains/lingkungan/2016/10/03/Pakar-dari-20-Negara-Luruskan-Isi-Kongres-di-Sarawak>. [Accessed on 5th April 2019]
- Malay Mail (2016a). "Malaysia's oil palm industry on peatland will not lead to environmental degradation, Mah says". Available online:

<https://www.malaymail.com/news/malaysia/2016/08/16/malaysias-oil-palm-industry-on-peatland-will-not-lead-to-environmental-degr/1184631> [Accessed on 5th April 2019]

Malay Mail (2016b). “Sarawak’s effective peatland plantation management proven successful, CM says”. Available online: <https://www.malaymail.com/news/malaysia/2016/08/16/sarawaks-efforts-in-managing-peatland-plantations-proven-successful-cm-says/1184623>. [Accessed 5th April 2019].

Malay Mail (online). Advertise with us. Available online: <https://www.malaymail.com/advertise> [Accessed 25th November 2019]

Malaysiakini (2016). “Business-as-usual management is not suitable for peatland agriculture”. Available online: <https://www.malaysiakini.com/letters/358077>. [Accessed 21st October 2019]

Malaysiakini (online). About Malaysiakini. Available online: <https://about.malaysiakini.com/>. [Accessed 25th November 2019]

The Star. (2016a). “Yield of palm oil on peatland can be doubled”. Available online: <https://www.thestar.com.my/business/business-news/2016/08/16/yield-of-oil-palm-on-peatland-can-be-doubled>. [Accessed on 5th April 2019]

The Star. (2016b). “WWF: State’s peat forests need our help”. Available online: <https://www.thestar.com.my/metro/community/2016/10/25/wwf-states-peat-forests-need-our-help-organisation-urges-state-government-to-examine-its-agriculture>. [Accessed on 5th April 2019]

The Star. (2016c). “Debate rages over impact of tropical peat conversion”. Available online: <https://www.thestar.com.my/news/nation/2016/10/28/debate-rages-over-impact-of-tropical-peat-conversion/>. [Accessed on 21st October 2019]

The Star. (2016d). “Let us better manage peatlands”. Available online: <https://www.thestar.com.my/news/nation/2016/10/28/let-us-better-manage-peatlands-ngos-contemporary-agricultural-techniques-just-wont-do-anymore/>. [Accessed on 21st October 2019].

The Straits Times. (2016). Can peatland turn into oil palm fields and not cause haze? In *The Straits Times*. Available online: <https://www.thestar.com.my/news/nation/2016/10/28/debate-rages-over-impact-of-tropical-peat-conversion/> [Accessed 5th April 2019]

Tempo.co (2016). Cegah Kebakaran Lahan, Begini Malaysia Kelola Lahan Gambut.

Available online:

<https://bisnis.tempo.co/read/796424/cegah-kebakaran-lahan-begini-malaysia-kelola-lahan-gambut/full&view=ok> [Accessed 5th April 2019]

Tempo (2016). Laporan Tahunan. Annual Report of PT Tempo Inti Media Tbk. Available online:

<https://korporat.tempo.co/uploads/tentang/ea763be2c0cf3cf71cd01c749261e949.pdf>.
[Accessed 21st October 2019]

聯合日報. (2016a). 砂耕地最後防線 泥炭地具發展潛能. Available online:

<https://eunited.com.my/7650/>. [Accessed on 5th April 2019]

聯合日報. (2016b). 保存圖的生態系統 砂泥炭沼澤林須保護. Available online:

<https://eunited.com.my/24335/>. [Accessed on 5th April 2019]