



Denial of long-term issues with agriculture on tropical peatlands will have devastating consequences

Journal:	<i>Global Change Biology</i>
Manuscript ID	Draft
Wiley - Manuscript type:	Letters to Editor
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Abstract:	This manuscript presents the consensus among peatland scientists and practitioners on the current sustainability of peatland agriculture. It clarifies the resource extractive nature and long term implications of contemporary peatland management and outlines the current moves towards better management and the search for actual sustainable agriculture methods.

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1 ***TITLE PAGE***2 ***Title:***

3 **Denial of long-term issues with agriculture on tropical peatlands will have devastating**
 4 **consequences**

5 ***Running head:***

6 **Denial of long-term issues with tropical peatland agriculture**

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188 ***Keywords***

189 Tropical peatlands, agriculture, sustainability, emissions, subsidence, oil palm, Acacia.

190 ***Type of paper***

191 Letter to the Editor

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193 **Main Text:**

194 The first International Peat Congress (IPC) held in the tropics - in Kuching (Malaysia) - brought
195 together over 1000 international peatland scientists and industrial partners from across the world
196 (“International Peat Congress with over 1000 participants!,” 2016). The congress covered all
197 aspects of peatland ecosystems and their management, with a strong focus on the environmental,
198 societal and economic challenges associated with contemporary large-scale agricultural
199 conversion of tropical peat

200 However, recent encouraging developments towards better management of tropical peatlands
201 have been undermined by misleading newspaper headlines and statements first published during
202 the conference. Articles in leading regional newspapers (“Oil palm planting on peat soil handled
203 well, says Uggah,” 2016; Cheng & Sibon, 2016; Nurbianto, 2016a, 2016b; Wong, 2016) widely
204 read across the region, portrayed a general consensus, in summary of the conference, that current
205 agricultural practices in peatland areas, such as oil palm plantations, do not have a negative
206 impact on the environment. This view is not shared by many scientists, or supported by the
207 weight of evidence that business-as-usual management is not sustainable for tropical peatland
208 agriculture.

209 Peer-reviewed scientific studies published over the last 19 years, as reflected in the
210 Intergovernmental Panel on Climate Change (IPCC) Wetland Supplement on greenhouse gas
211 inventories, affirms that drained tropical peatlands lose considerable amounts of carbon at high
212 rates (Drösler *et al.*, 2014). Tropical peat swamp forests have sequestered carbon for millennia,
213 storing a globally significant reservoir below ground in the peat (Page *et al.*, 2011; Dommain *et*
214 *al.*, 2014). However, contemporary agriculture techniques on peatlands heavily impact this
215 system through land clearance, drainage and fertilization, a process that too often involves fire.
216 Along with biodiversity losses driven by deforestation (Koh *et al.*, 2011; Posa *et al.*, 2011; Giam
217 *et al.*, 2012), the carbon stored in drained peatlands is rapidly lost through oxidation, dissolution
218 and fire (Couwenberg *et al.*, 2009; Hirano *et al.*, 2012; Ramdani & Hino, 2013; Schrier-Uijl *et*
219 *al.*, 2013; Carlson *et al.*, 2015; Warren *et al.*, 2016). Tropical peat fires are a major contributor to
220 global greenhouse gas emissions and produce transboundary haze causing significant impacts on
221 human health, regional economies and ecosystems (Page *et al.*, 2002; Marlier *et al.*, 2012; Jaafar
222 & Loh, 2014; Chisholm *et al.*, 2016; Huijnen *et al.*, 2016; Stockwell *et al.*, 2016). With future El-

223 Niño events predicted to increase in frequency and severity (Cai *et al.*, 2014) and with fire
224 prevalence now decoupled from drought years (Gaveau *et al.*, 2014), future large scale fire and
225 haze events are imminent given the extensive areas of now drained fire prone drained peatlands
226 (Kettridge *et al.*, 2015; Turetsky *et al.*, 2015; Page & Hooijer, 2016).

227 In reality, just how much of the estimated 69 gigatonnes of carbon (Page *et al.*, 2011) stored in
228 Southeast Asian tropical peatlands is being lost due to agricultural operations under the current
229 management regime is still uncertain. Of great concern is that none of the agricultural
230 management methods applied to date have been shown to prevent the loss of peat and the
231 associated subsidence of the peatland surface following drainage (Wösten *et al.*, 1997; Melling *et al.*,
232 2008; Hooijer *et al.*, 2012; Evers *et al.*, 2016). Recent projections suggest that large areas of
233 currently drained coastal peatlands will become un-drainable, and progressively be subjected to
234 longer periods of inundation by river and ultimately sea water (Hooijer *et al.*, 2015a, 2015b;
235 Sumarga *et al.*, 2016). With growing risk of saltwater intrusion, agriculture in these coastal lands
236 will become increasingly untenable, calling into question the very notion of “long-term
237 sustainability of tropical peatland agriculture”.

238 A more accurate view of drained peatland agriculture is that of an extractive industry, in which a
239 finite resource (the peat) is ‘mined’ to produce food, fibre and fuel, driven by global demand. In
240 developing countries with growing populations, there are strong socio-economic arguments for
241 exploiting this resource to support local livelihoods and broader economic development (Mizuno
242 *et al.*, 2016). However, an acceptance that on-going peat loss is inevitable under this scenario.
243 Science-based measures towards improved management, including limitations on the extent of
244 plantation development, can be used to minimise the rate of this peat loss (President of Indonesia,
245 2011). Such an evidence-based position, supported with data and necessary legal instruments are
246 needed for sustainable futures. The scientifically unfounded belief that drained peatland
247 agriculture can be made ‘sustainable’, and peat loss can be halted, via unproven methods such as
248 peat compaction debilitates the effort to find sustainable possibilities. To a large extent, the issues
249 surrounding unsustainable peatland management have now been recognized by sections of
250 industry (Wilmar, 2013; APP, 2014; Cargill Inc., 2014; Mondelēz International, 2014; Sime
251 Darby Plantation, 2014; APRIL, 2015; Olam International, 2015), government (President of
252 Indonesia, 2014, 2016; Mongabay, 2015; Mongabay Haze Beat, 2015; Hermansyah, 2016) and
253 consumers (Wijedasa *et al.*, 2015). In recognition of the constraints and risks of peatland

254 development, many large and experienced oil palm and pulpwood companies have halted further
255 development on peat and introduced rigorous management requirements for existing peatland
256 plantations(Lim *et al.*, 2012). However, the denial of the empirical basis calling for improved
257 peatland management remains persistent in influential policy spaces, as illustrated by the articles
258 reporting on the conference (“Oil palm planting on peat soil handled well, says Uggah,” 2016;
259 Cheng & Sibon, 2016; Nurbianto, 2016a, 2016b).

260 The search for more responsible tropical peatland agriculture techniques includes promising
261 recent initiatives to develop methods to cultivate crops on peat under wet conditions (Giesen,
262 2015; Dommain *et al.*, 2016; Mizuno *et al.*, 2016). While a truly sustainable peatland agriculture
263 method does not yet exist, the scientific community and industry are collaborating in the search
264 for solutions(International Peat Society, 2016), and for interim measures to mitigate ongoing
265 rates of peat loss under existing plantations. Failing to recognize the devastating consequences of
266 the current land use practices on peat soils and failing to work together to address them could
267 mean that the next generation will have to deal with an irreversibly altered, dysfunctional
268 landscape where neither environment nor society, globally or locally, will be winners.

269

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21 September 2016

Dr Simon Long
Editor, *Global Change Biology*.

Dear Dr Long,

RE: “Denial of long-term issues with agriculture on tropical peatlands will have devastating consequences”

We submit the above Letter to the Editor for consideration for publication in *Global Change Biology*. We feel this manuscript is an important, timely and has global significance since it addresses the recent, persistent, denial of the global consequences of continued peatland conversion to crops including oil palm and Acacia.

Our manuscript highlights the incongruence between the views on peatland management held by the scientific community at large and those expressed by regional private sector and government experts. This culminated in erroneous reporting and political statements made around the recent inaugural International Peat Congress (IPC) in Kuching (Sarawak), Malaysia. This meeting brought together nearly 1000 peatland scientists, land managers, industry and policy makers, who utilize peatlands or are involved in their management and was characterized by a well-balanced discussion of the scientific evidence and of society's needs.

The conference organizers, driven by certain sections of the peatland agriculture industry, used selective mainstream media coverage to present the view that scientists agreed on the sustainable nature of peatland agriculture. This was used to further the vested interest of further development of oil palm on peatlands.

This attempt to undermine the urgent search for sustainable peatland management methods and collaborations between industry and academia has brought together 139 leading peatland scientists and practitioners with 115 affiliations representing regional governments, academia and industry in support of this policy paper which sets out the current status of scientific knowledge and future of tropical peatland agriculture.

The consensus among the leading experts in tropical peatlands achieved in this paper is unprecedented. It is a balanced response that clarifies the resource extractive nature and long term implications of contemporary peatland management and outlines the way forward. We hope that *Global Change Biology*, where many of the leading research on tropical peatlands are published, will provide a platform for reasoned contribution to the debate.

Yours sincerely,



Lahiru S. Wijedasa
(corresponding author, on behalf of all authors)