



Received: 25 February 2016
Accepted: 24 May 2016
First Published: 26 May 2016

*Corresponding author: Lian Pin Koh,
School of Biological Sciences, University
of Adelaide, Adelaide, South Australia
5005, Australia
E-mail: lianpin.koh@adelaide.edu.au

Reviewing editor:
Serge Wich, Liverpool John Moores
University, UK

Additional information is available at
the end of the article

ENVIRONMENTAL MANAGEMENT & CONSERVATION | REVIEW ARTICLE

Evolution of sustainable palm oil policy in Southeast Asia

Helena Ivancic¹ and Lian Pin Koh^{1*}

Abstract: Over the years large areas of primary and secondary forest have been cut or burned down to make way for oil palm plantations, particularly in Indonesia and Malaysia, the two countries which produce 80.5% of the world's palm oil. To tackle the many complex sociopolitical issues surrounding the industry, a variety of regulations, treaties and campaigns have been developed by governments and non-governmental organisations (NGO) over the years attempting to create a more sustainable industry, partly in response to pressure from the environmental community. The roundtable on sustainable palm oil is an international non-profit that created the first sustainable palm oil certification scheme. A range of other industry and government initiatives aimed to reduce deforestation due to oil palm expansion were developed and implemented over the years. The emerging themes in the evolution of sustainable palm oil in Southeast Asia include a greater recognition of the complexity of the issue, the importance of maintaining true transparency, and a greater consideration of indigenous land rights. Furthermore, manufacturing companies and consumers are beginning to see the power that they hold when choosing to purchase certified sustainable palm oil, so greater awareness and education is key to further improvement. Governments should take greater control of the issue, catch up to the activity being led by NGOs and industry members, work together with them, and invest more into education and technology.

Subjects: Biodiversity & Conservation; Conservation - Environment Studies; Environmental Sciences

Keywords: palm oil; deforestation; Southeast Asia; government; environmental policy; palm oil policy; sustainability

ABOUT THE AUTHORS

Helena Ivancic is a student at the University of Adelaide in South Australia. She is set to complete her undergraduate bachelor's degree in science and natural resources in mid-2016. This review paper was inspired by travels to Southeast Asia for a study tour as well as being awarded a summer research scholarship by the School of Biological Sciences at the University.

Lian Pin Koh is an associate professor at the University of Adelaide in South Australia. Research within his group addresses emerging environmental and socio-economic challenges, including land-use conflicts, carbon emissions, and threats to natural ecosystems and wildlife.

PUBLIC INTEREST STATEMENT

With Southeast Asia being home to some of the last remaining primary forests and a global diversity hotspot, its forests are of high conservation value. The prevalence of the palm oil industry has put these forests in danger. Governments, industry stakeholders and environmental groups acknowledge this and are aiming to protect the environment by means of both local and global policies and initiatives.

1. Introduction

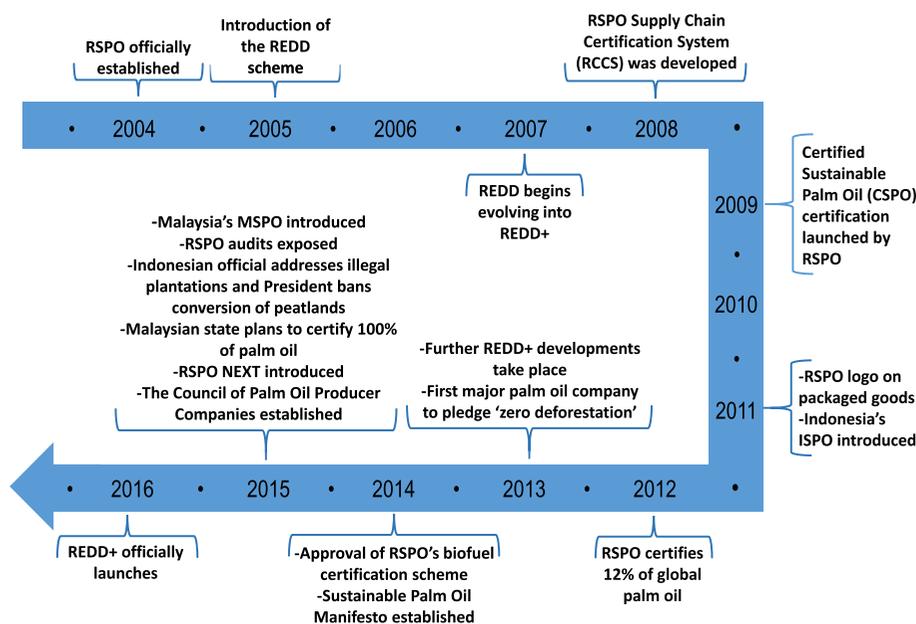
Palm oil agriculture in Southeast Asia began in 1917 during the decline of the rubber industry, but only experienced rapid expansion within the past sixty years (Basiron, 2007). During this time there has been a high demand for palm oil globally; especially so from China and India due to their growing economies (Afriyanti, Kroeze, & Saad, 2016). Palm oil is extremely profitable in the region and offers employment to locals as well as improving infrastructure in rural villages (Wilcove & Koh, 2010). It is also very high yielding compared to other oil crops like soy and canola (Laurance et al., 2010). Unfortunately, these developing countries often favour short-term economic gain over sustainable development and conservation of natural habitats (Koh, 2008).

Over the years, large areas of primary and secondary forest have been cut or burned down to make way for oil palm plantations, particularly in Indonesia and Malaysia, the two countries which produce majority of the world's palm oil (Oosterveer, 2015). This is especially alarming since Malaysia and Indonesia are home to approximately 11% of the world's remaining tropical forests which are considered global biodiversity hotspots and are home to many endemic and rare species (IUCN Red List, 2015; Koh & Wilcove, 2008). These tropical rainforests are important for the conservation of not only biodiversity but also other important ecosystem services such as preventing floods, providing fresh oxygen and providing a food source for local villages (Hanafiah, 2015; Koh & Wilcove, 2008). Furthermore, slash and burn methods of forest and peatland removal release large amounts of carbon dioxide into the atmosphere (Gokkon, 2015). Tropical deforestation contributes approximately 15% to total global anthropogenic carbon emissions (Venter & Koh, 2012). Preserving these forests will help to reduce the amount of greenhouse gas released and therefore minimise the palm oil industry's contribution to global warming.

Since researchers and non-governmental organisations (NGOs) such as World Wildlife Fund (WWF) became aware of the extent of the damage that the palm oil industry has on biodiversity there have been many media debates and boycott campaigns regarding the issue (Koh & Wilcove, 2007; Roundtable on Sustainable Palm Oil, 2016). They believe that although oil palm plantations support the economies of developing nations and help to satisfy the global demand for oil, their expansion should not be done at the expense of valuable rainforest habitat. To tackle the many complex sociopolitical issues surrounding the industry a variety of regulations, treaties and campaigns have been developed by governments, NGOs and the industry over the years attempting to minimise the negative environmental and social impacts of their activities, partly in response to pressure from the environmental community (see Figure 1). Ultimately the industry should continue, but in a way that does not discount the environment, indigenous people, and biodiversity.

Figure 1. A timeline of the significant developments in the Southeast Asian palm oil industry which are discussed further in the text.

Note: Created by Helena Ivancic using Microsoft PowerPoint 2013.



A timeline of some of the most significant developments in the Southeast Asian palm oil industry will be used to introduce the overview of how each initiative and policy was established and implemented. The two major non-governmental initiatives include the roundtable for sustainable palm oil and reducing emissions from deforestation and forest degradation. Significant industry and government actions and policies are also described.

2. The roundtable on sustainable palm oil

The roundtable on sustainable palm oil (RSPO) is an international non-profit association that aims to bring together multiple stakeholders to develop and implement strategies regarding sustainable palm oil (Roundtable on Sustainable Palm Oil, 2016). They also highlight their efforts to promote sustainable palm oil and improve transparency within the industry (Laurance et al., 2010). The RSPO was officially established under the Swiss Civil Code in 2004 after the WWF commenced seeking interest among other groups and industry stakeholders in 2001 (Roundtable on Sustainable Palm Oil, 2016).

Over the years the RSPO continued to develop to suit the needs of the industry. In 2008 the RSPO supply chain certification system (SCCS) was developed and finalised. This system ultimately aims to guide RSPO members to stop expanding plantations into forests and peatlands in order to gain sustainable palm oil certification. The SCCS was fully adopted soon after being finalised and led to the current certification system we see today (Roundtable on Sustainable Palm Oil, 2016). In 2009 the RSPO began to label palm oil as certified sustainable palm oil (CSPO) for being produced in a way that is in line with RSPO criteria (Mongabay, 2012). Despite setbacks such as low initial demand for CSPO (Butler, 2010), by 2011 the first million hectares of CSPO farmland was in production and the RSPO logo was present on consumer goods packaging (Mongabay, 2012; Roundtable on Sustainable Palm Oil, 2016). Less than two years later the RSPO certification logo could be found on consumer goods in 13 different countries (Mongabay, 2012). Consumers in those nations now have an increased choice and are able to make informed decisions when purchasing products containing palm oil.

In terms of incentives for companies to become certified and to stop deforestation, there is ultimately a struggle between environmental protection and economic growth (Mongabay, 2013a). This is why it is important to create a demand for certified palm oil in order to pull the supply chain in a more sustainable direction (Mongabay, 2013a). Consumers have the power to purchase goods with the RSPO logo and to also contact manufacturers and demand sustainably sourced ingredients (Mongabay, 2013a). It is important to increase awareness about sustainable palm oil so as to not scare consumers and cause them to not buy into CSPO since removal of palm oil from the market would only increase deforestation due to other oil crops not being as high yielding (Mongabay, 2013a).

As RSPO membership grew, a number of milestones were reached. As of 2012 the RSPO had certified 12% of the world's palm oil as CSPO (Mongabay, 2012). The RSPO grew to approximately 1,000 members from over 50 different countries since it was first established (Mongabay, 2012).

Over time, palm oil became a more popular option for use in biofuels (Butler, 2013). In 2014, the trade of CSPO for biofuels commenced in Europe following the approval of the RSPO's biofuel certification scheme by the European Commission's Renewable Energy Directive (Roundtable on Sustainable Palm Oil, 2016). The approval was preceded by the drafting of laws that banned the import of biofuel derived from land considered to be of conservation value (Koh & Wilcove, 2008). This included the tropical forests in Southeast Asian countries like Malaysia and Indonesia.

The RSPO NEXT scheme was introduced in 2015, its main purpose being to further improve transparency and credibility of existing RSPO members by verifying actions taken that exceed the basic RSPO criteria such as increased public reporting (Roundtable on Sustainable Palm Oil, 2015). Consumer companies were concerned over the credibility and transparency of the RSPO certification scheme, whether the palm oil was in fact sustainably grown and produced, and this was reflected by

the fact that only half of CSPO produced was ever labelled and sold as such due to weak demand (Arcus Foundation, 2015). This lack of trust from consumers ultimately fuelled the development of RSPO NEXT.

Despite all of the positive developments that the RSPO created, the association itself needs to develop and improve. The Environmental Investigation Agency (EIA), London, found that the RSPO was involved in dishonest and falsifying assessments of palm oil companies that resulted in hidden breaches of sustainability standards (Environmental Investigation Agency (EIA), 2015; Vit, 2015). A report was released by the EIA in 2015 entitled “who watches the watchmen?” The problems with the audit process were acknowledged by the RSPO and a report was ordered from a dedicated task-force to investigate further (Jacobson, 2015a). It is important to settle occurrences such as these publicly so as to retain transparency within the industry and gain the trust of consumers and stakeholders. Furthermore, by improving the audit process the RSPO can truly make a difference in the industry given its great potential (Vit, 2015).

The RSPO is currently one of a number of other groups and initiatives which also aim to improve the sustainability of palm oil such as the Palm Oil Innovations Group (POIG) and the Sustainable Palm Oil Initiative (SPO). Many of these groups are linked by having common stakeholders such as the WWF and Greenpeace. In addition to these types of specialised groups, there are many more NGOs and environmental groups which aim to provide informative resources and media attention towards the cause including media platforms like Mongabay and research networks like Earth System Governance. RSPO in particular stands out from the others as it has made the greatest impact globally, in the Southeast Asian palm oil industry, and in the consumer market.

3. Reducing emissions from deforestation and forest degradation

With increasing awareness of the impacts of the palm oil industry, new and multidisciplinary solutions began arising. A popular approach that environmentalists consider in preventing further forest removal whilst reducing carbon emissions involves providing an incentive to growers to refrain from cutting or burning down forests for oil palm. One such scheme takes into account the carbon stored in forests by quantifying and valuing avoided deforestation in the form of carbon credits (Center for International Forestry Research, 2009). Reducing Emissions from Deforestation and Forest Degradation (REDD) was first addressed by the United Nations Framework Convention on Climate Change (UNFCCC) during the 11th Conference of the Parties (COP) in 2005 (Bala, Biswas, & Mazumdar, 2006; United Nations Framework Convention on Climate Change, 2014a). REDD provides financial compensation to land owners for avoided deforestation and thereby redirects money from developed countries to developing countries for preventing the release of carbon (Venter & Koh, 2012; Wilcove & Koh, 2010). Ultimately, to make the scheme more appealing, the carbon credits could be traded in global Kyoto-compliance markets, further increasing incentives (Wilcove & Koh, 2010).

Some arguments have been made regarding the effectiveness of this scheme at preventing biodiversity loss since there is not always a good correlation between areas with high carbon stocks and areas containing high biodiversity on the local scale (Venter & Koh, 2012). However, it is important to consider that many other activities contribute to biodiversity loss (Venter & Koh, 2012). Despite possible negative outcomes like leakage, REDD could still hold great potential in making oil palm plantations more sustainable if it were to be developed and improved over time.

In 2007 REDD began its evolution into “Reducing Emissions from Deforestation and Forest Degradation plus conservation, sustainable management, and enhancement of forest carbon stocks” (REDD+) during the 13th COP (United Nations Framework Convention on Climate Change, 2014a). It is a result of efforts aiming to further recognise the carbon benefits of forest conservation and potential reforestation as well as addressing some suggested improvements (Venter & Koh, 2012). The main developments included “Recognising the complexity of the problem, different national circumstances and the multiple drivers of deforestation and forest degradation” and “Recognising also that the needs of local and indigenous communities should be addressed when

action is taken” (United Nations Framework Convention on Climate Change, 2014b). The first main development mentioned provides a chance for oil palm expansion to be considered and targeted by the initiative. Additionally, the increasing acknowledgement of the role that indigenous communities play in protecting forests is an important step towards the sustainable use of forest ecosystems (Erickson-Davis, 2014).

There was no specific mention of biodiversity conservation during COP talks, only that REDD+ has co-benefits which can complement other international agreements (United Nations Framework Convention on Climate Change, 2014b), which may include sustainable palm oil initiatives such as the RSPO.

The REDD+ scheme continued to be discussed and refined over the years but was finalised during COP 19 in 2013 (United Nations Framework Convention on Climate Change, 2014b). An amendment which was made in preparation for it to be officially launched is one that recognises the need to incentivise non-carbon benefits for the long-term sustainability of the scheme (United Nations Framework Convention on Climate Change, 2014c). Details regarding measuring, verification and reporting were also addressed.

World leaders formally recognised REDD+ in the Paris Climate Agreement meeting in 2015. This involved acknowledging the role that forests have in slowing climate change and the importance of finding a way to stop deforestation for palm oil and other land uses (Butler, 2015b). The benefits that come with formal recognition include increased funding and a widespread involvement internationally so that additional issues such as indigenous land rights can be globally addressed (Paquette, 2016). There are still constant criticisms of the scheme, including that policies should not value ecosystem services solely on their economic value as it is not practical in remote and undisturbed regions and that market-based mechanisms are not viable in the long term (Carrasco, Nghiem, Sunderland, & Koh, 2014; Fletcher, Dressler, Büscher, & Anderson, 2016). These are important in forming better conservation and sustainability schemes in the future. REDD+ officially goes into action in 2016 and would benefit from further media attention to increase interest in the cause (Butler, 2016).

A study of more than eighty REDD+ projects around the world found that some projects were focused on reducing emissions through preventing deforestation and others were focused on afforestation and reforestation (Panfil & Harvey, 2015). It was found that there was a lack of specificity in most of the projects’ biodiversity conservation goals; furthermore, less than half of the reforestation projects used only native species (Panfil & Harvey, 2015). The authors suggest that conservation outcomes can be improved by quantifying targets and objectives, making them time-bound, and explicitly describing the methodology used to monitor biodiversity changes. Furthermore, future reforestation projects should favour the use of native species. The authors concluded that REDD+ projects have variable outcomes in terms of conserving or improving biodiversity due to the lack of specificity.

4. Industry initiatives

4.1. The Sustainable palm oil manifesto

Public pressure in response to NGO initiatives like RSPO caused palm oil companies to take matters into their own hands. In 2014, some of the largest palm oil producing companies came together to create their own sustainable palm oil criteria under the title of the Sustainable Palm Oil Manifesto (SPOM) (Butler, 2014). These multinational companies include Sime Darby, Asian Agri, IOI Corporation, Kuala Lumpur Kepong, Wilma, and Musim Mas (Pirard et al., 2015). The SPOM aims to adhere to and build upon the criteria set out by the RSPO by fostering transparent supply chains, not removing High Carbon Stock (HCS) areas for oil palm expansion, and ensuring positive social impact and economic change (Carbon Stock Study, 2016). They have funded their own research projects to determine the definition of HCS forests and what thresholds for expansion are (Carbon Stock Study, 2016; Pirard et al., 2015). The SPOM have received a lot of criticism from environmental groups for not stopping

deforestation until they have defined HCS areas and for having various loopholes within the criteria (Butler, 2014). Greenpeace have warned large consumer companies not to be fooled by these types of commitments (Butler, 2014). This type of public pressure from NGOs and media is beneficial in the fight for creating effective initiatives and greater transparency in the industry.

4.2. Wilmar's zero deforestation policy

In 2013 one of Asia's major palm oil companies, Wilmar International, adopted a "zero deforestation" policy after pressures from environmentalists and consumer companies (Mongabay, 2016). Large consumer companies including Avon, Astra Agro Lestari, and Cargill gradually began to follow suit, banning their suppliers from converting peatlands and forests for oil palm plantations and even developing their own policies in some cases (Gaworecki, 2015a, 2015b; Jacobson, 2015b). The policy is somewhat an extension of RSPO criteria as both include protection of peatlands and prevention of deforestation to some extent. Wilmar's Sustainability Reports also detail RSPO certification achievements, supporting the fact that this industry initiative is a strengthening of an existing NGO initiative (Wilmar International, 2016). These developments demonstrate the level of influence that the general public as consumers have on companies' behaviour. This type of industry action has proven to be effective since suppliers need to sell their produce to make profit, and without their usual buyers they would suffer losses. Some experts believe that industries are ahead of governments in terms of sustainable palm oil actions (Gaworecki, 2015a).

5. Government initiatives

5.1. Indonesian sustainable palm oil

Amidst movements by NGOs, the Indonesian government introduced its own sustainable palm oil scheme in 2011. Indonesian Sustainable Palm Oil (ISPO) is a national interpretation of the international RSPO scheme (Gillespie & Harjanthi, 2012). It is legally binding to all palm oil plantations within Indonesia and involves fines and sanctions whereas becoming an RSPO member is voluntary (Gillespie & Harjanthi, 2012). This trend towards mandatory state governance as opposed to voluntary private governance is said to be due to "state bureaucracies and big industry interests" (Sahide, Burns, Wibowo, Nurrochmat, & Giessen, 2015). There have been speculations regarding the credibility of ISPO due to the government being perceived as corrupt and having vested interests in the palm oil industry (Butler, 2016; Gillespie & Harjanthi, 2012); however, in comparison to the RSPO, ISPO have certain criteria that are more detailed and specific (Gillespie & Harjanthi, 2012). With this in consideration, further development and regular third-party assessments of the national scheme could help it to be of great benefit to the industry.

It would be particularly beneficial to adopt both types of schemes as each challenges and strengthens the other (Sahide et al., 2015). The RSPO cannot force compliance since it is voluntary, so ISPO can take on this role to ensure that all growers are involved in some type of standard as a minimum. This brings certain plantations which are not interested in RSPO closer to achieving RSPO standards and might lead them to take on full certification in the future. As ISPO is perceived as being corrupt and not credible, RSPO certification would strengthen the validity and credibility of the actions taken by growers as RSPO is much more developed and robust in the criteria that need to be met and documented to receive certification. Furthermore, achieving RSPO certification requires state law to be adhered to, and since ISPO is part of state law, RSPO directly strengthens compliance to ISPO standards within its own criteria (Sahide et al., 2015).

5.2. Malaysian sustainable palm oil

The Malaysian government followed in the footsteps of the Indonesian government when the Malaysian Sustainable Palm Oil (MSPO) initiative was created. MSPO was first implemented in 2015 and is the third certification scheme of this type (Adnan, 2015; Sustainable Palm Oil Transparency Toolkit, n.d.). It allows Malaysian palm oil to be certified independently from palm oil produced in other countries and offers less strict compliance criteria in terms of sustainability compared to the RSPO (Mongabay, 2013b). Because of this the scheme has received criticism from environmental

groups (Mongabay, 2013b). It is not compulsory for companies to be MSPO approved, therefore claims that the initiative will lessen the environmental impact of palm oil plantations are unlikely to prove themselves. Furthermore, the best possible level of sustainability will not likely be reached if companies were to move away from being RSPO certified and only adopt MSPO certification. The scheme could be improved and could be more beneficial if companies comply with both national and international certifications.

5.3. Banning the conversion of peatlands and peatland restoration plan in Indonesia

Forest and peatland fires have long been a problem in countries like Indonesia, and 2015 brought with it some of the most devastating peatland fires seen in the country. What is now known as the “Haze Crisis” has caused the Indonesian President to take action to protect the peatlands. The president, Joko Widodo, publicly banned the conversion of peatland to oil palm plantations; however, his bans are not yet laws and can be overturned by parliament (Butler, 2015a). This is likely to be the case since many members of parliament are involved in or influenced by the palm oil industry (Butler, 2015a). The wildfire was believed to have originated from fires used for land clearing in the region (Gokkon, 2015). Peatlands are especially flammable and as a result created large amounts of dangerous haze and smoke that affected the lives of millions in Southeast Asia (Gokkon, 2015). The Indonesian Government has instated a peatland restoration plan over the next 5 years in response to being criticised by neighbouring countries for the incident (Gokkon, 2015).

5.4. One hundred per cent certification agreement

The growing peatland fires also prompted the Malaysian state of Sabah to announce plans to certify 100 per cent of palm oil grown in the area by 2050 (Mongabay, 2015a). This pledge was also proposed by the state in Central Kalimantan and Aceh. The government will provide assistance to achieve this goal under the criteria outlined by the RSPO. Complete certification will not only increase sustainability but will differentiate the region’s palm oil from others in the market (Mongabay, 2015a). This collaboration between an NGO and government will help to pave the way for other regions in Southeast Asia.

5.5. Indonesian government official takes action

A general greater awareness of sustainability and preventing deforestation has caused individuals in government positions to show some accountability in the need to protect the ecosystem from further degradation. In 2015 a government official from Aceh Tamiang in Indonesia publicly cut down an oil palm whilst announcing the need for removal of illegal plantations before planting a native tree in its place (Hanafiah, 2015). These actions are said to be in response to severe flooding in previous years, particularly the 2006 floods which displaced tens of thousands of people and raised the issue higher up on the national agenda (Hanafiah, 2015). These types of public actions are important to raise awareness of the continuous oil palm expansion in the region as well as the need for better policies (Hanafiah, 2015, 2016).

5.6. The council of palm oil producer companies

In response to recent “zero deforestation” agreements made by palm oil consumer companies, Malaysia and Indonesia established the Council of Palm Oil Producer Companies in 2015 (Mongabay, 2015b). It is an intergovernmental association which aims to change the “no deforestation” agreements upheld by consumer companies in order to make it easier for smallholders to persist under intense competition from larger growers (Mongabay, 2015b). Although this moves against what NGOs and consumers were initially rallying for, the governments believe it to be a necessary move to ensure that smallholders can gather enough funds to access better quality seeds and fertilisers (Mongabay, 2015b). Whether this is true and whether the council can be of benefit is uncertain. The proposed changes should be reviewed on an international scale before being implemented in order to develop a way of supporting smallholders in Malaysia and Indonesia without resorting to further deforestation or peatland removal and to avoid clashing with existing initiatives like the RSPO.

6. Conclusion

The emerging themes in the evolution of sustainable palm oil in Southeast Asia include a greater recognition of the complexity of the issue, the importance of maintaining true transparency, and a greater consideration of indigenous land rights. Furthermore, manufacturing companies and consumers are beginning to see the power that they hold when choosing to purchase CSPO, so greater awareness and education are key to further improvement (Harfenist, 2015).

Achieving true transparency is difficult due to the presence of government corruption, a lack of accountability, and vested interests of stakeholders; however, with third-party assessments and public scrutiny there can continue to be further improvements in that area. Pressure from NGOs and neighbouring governments has helped to generate action, as seen with Indonesia's president reacting to widespread peatland fires, and therefore should continue into the future. Keeping issues such as these in the public eye can also help to address the lack of public education on the palm oil industry.

Governments should take greater control of the issue, catch up to the activity being led by NGOs and industry members, work together with them, and invest more into education and technology. Some emerging technologies help to identify and map palm oil plantations, help to catch poachers and illegal loggers, and can identify genes in the oil palm which are linked to higher oil yield. Investing into education can create a paradigm shift away from rapid unsustainable economic growth and can ultimately ensure lasting infrastructure and sustainable practice for future generations. This is key because the palm oil industry in Southeast Asia must and will continue, but the manner in which it is done is up to us.

Funding

Helena Ivancic was supported by the Summer Research Scholarship from the School of Biological Sciences, University of Adelaide. Lian Pin Koh was supported by the Australian Research Council [grant number FT140100670].

Author details

Helena Ivancic¹
E-mail: helena.ivancic@student.adelaide.edu.au
ORCID ID: <http://orcid.org/0000-0002-0147-6356>
Lian Pin Koh¹
E-mail: lianpin.koh@adelaide.edu.au

¹ School of Biological Sciences, University of Adelaide, Adelaide, South Australia 5005, Australia.

Citation information

Cite this article as: Evolution of sustainable palm oil policy in Southeast Asia, Helena Ivancic & Lian Pin Koh, *Cogent Environmental Science* (2016), 2: 1195032.

References

- Adnan, H. (2015). *Newly-implemented Malaysian Sustainable Palm Oil means more business*. Malaysia: The Jakarta Post. Retrieved February 19, 2016, from <http://www.thejakartapost.com/news/2015/03/02/newly-implemented-malaysian-sustainable-palm-oil-means-more-business.html>
- Afriyanti, D., Kroeze, C., & Saad, A. (2016). Indonesia palm oil production without deforestation and peat conversion by 2050. *Science of The Total Environment*, 557-558, 562-570. <http://dx.doi.org/10.1016/j.scitotenv.2016.03.032>
- Arcus Foundation. (Ed.). (2015). From process to impact of a voluntary standard: The roundtable on sustainable palm oil. In *Industrial agriculture and ape conservation, state of the Apes* (Chapter 5, pp. 135-164). Cambridge University Press. Retrieved April 19, 2016. doi:10.1017/CBO9781316488959
- Bala, S., Biswas, S., & Mazumdar, A. (2006). Potential of carbon benefits from eucalyptus hybrid in dry-deciduous coppice forest of Jharkhand. *Journal of Engineering and Applied Sciences*, 7, 1614-1622.
- Basiron, Y. (2007). Palm oil production through sustainable plantations. *European Journal of Lipid Science and Technology*, 109, 289-295. [http://dx.doi.org/10.1002/\(ISSN\)1438-9312](http://dx.doi.org/10.1002/(ISSN)1438-9312)
- Butler, R. A. (2010). *Consumers should help pay the bill for 'greener' palm oil*. Mongabay. Retrieved February 18, 2016, from <http://news.mongabay.com/2010/01/consumers-should-help-pay-the-bill-for-greener-palm-oil/>
- Butler, R. A. (2013). *Europe importing more palm oil for biofuels, raising risks for rainforests*. Mongabay. Retrieved February 18, 2016, from <http://news.mongabay.com/2013/09/europe-importing-more-palm-oil-for-biofuels-raising-risks-for-rainforests/>
- Butler, R. A. (2014). *New palm oil sustainability manifesto met with criticism from environmentalists*. Mongabay. Retrieved February 4, 2016, from <http://news.mongabay.com/2014/07/new-palm-oil-sustainability-manifesto-met-with-criticism-from-environmentalists/>
- Butler, R. A. (2015a). *Indonesia bans peatlands destruction*. Mongabay. Retrieved February 1, 2016, from <http://news.mongabay.com/2015/11/indonesia-bans-peatlands-destruction/>
- Butler, R. A. (2015b). *The year in rainforests: 2015*. Mongabay. Retrieved February 9, 2016, from <http://news.mongabay.com/2015/12/the-year-in-rainforests-2015/>
- Butler, R. A. (2016). *What's ahead for rainforests in 2016? 10 things to watch*. Mongabay. Retrieved February 1, 2016, from <http://news.mongabay.com/2016/01/whats-ahead-for-rainforests-in-2016-10-things-to-watch/>
- Carbon Stock Study. (2016). *About the sustainable palm oil manifesto*. Author. Retrieved February 4, 2016, from <http://www.cabonstockstudy.com/the-manifesto/about>
- Carrasco, L. R., Nghiem, T. P. L., Sunderland, T., & Koh, L. P. (2014). Economic valuation of ecosystem services fails to capture biodiversity value of tropical forests. *Biological Conservation*, 178, 163-170. <http://dx.doi.org/10.1016/j.biocon.2014.08.007>

- Center for International Forestry Research. (2009). *Simply REDD: CIFOR's guide to forests, climate change, and REDD*. Indonesia: Author. Retrieved January 19, 2016, from <http://www.cifor.org/library/2812/simply-redd-cifors-guide-to-forests-climate-change-and-redd?pub=2812>
- Environmental Investigation Agency. (2015). *Who watches the watchmen? Auditors and the breakdown of oversight in the RSPO*. Washington, DC: Author. Retrieved February 1, 2016, from <https://eia-international.org/wp-content/uploads/EIA-Who-Watches-the-Watchmen-FINAL.pdf>
- Erickson-Davis, M. (2014). *True stewards: New report says local communities key to saving forests, curbing global warming*. Mongabay. Retrieved February 3, 2016, from <http://news.mongabay.com/2014/07/true-stewards-new-report-says-local-communities-key-to-saving-forests-curbing-global-warming/>
- Fletcher, R., Dressler, W., Büscher, B., & Anderson, Z. R. (2016). Questioning REDD+ and the future of market-based conservation. *Conservation Biology*, 30, 673–675. <http://dx.doi.org/10.1111/cobi.2016.30.issue-3>
- Gaworecki, M. (2015a). *Second largest palm oil producer in Indonesia commits to zero deforestation*. Mongabay. Retrieved February 25, 2016, from <http://news.mongabay.com/2015/09/second-largest-palm-oil-producer-in-indonesia-commits-to-zero-deforestation/>
- Gaworecki, M. (2015b). *Cargill commits to removing deforestation from supply chain by 2030*. Mongabay. Retrieved February 25, 2016, from <http://news.mongabay.com/2015/09/cargill-commits-to-removing-deforestation-from-supply-chain-by-2030/>
- Gillespie, P., & Harjanthi, R. S. (2012). *ISPO, RSPO: Two sides of the same coin?* Indonesia: The Jakarta Post. Retrieved February 1, 2016, from <http://www2.thejakartapost.com/news/2012/11/02/ispo-rspo-two-sides-same-coin.html>
- Gokkon, B. (2015). *Haze is gone but answers remain thin*. Jakarta Globe. Retrieved January 12, 2016, from <http://jakartaglobe.beritasatu.com/news/haze-gone-answers-remain-thin/>
- Hanafiah, J. (2015). *Aceh official takes chainsaw to illegal oil palm trees*. Mongabay. Retrieved January 13, 2016, from <http://news.mongabay.com/2015/12/aceh-official-takes-chainsaw-to-illegal-oil-palm-trees/>
- Hanafiah, J. (2016). *Palm oil expands in Aceh*. Mongabay. Retrieved February 3, 2016, from <http://news.mongabay.com/2016/01/palm-oil-expands-in-aceh/>
- Harfenist, E. (2015). *Palm oil company revs up deforestation in Malaysia*. Mongabay. Retrieved February 1, 2016, from <http://news.mongabay.com/2015/11/palm-oil-company-revs-up-deforestation-in-malaysia/>
- IUCN Red List. (2015). *Table 8: Total endemic and threatened endemic species in each country (totals by taxonomic group)*. Retrieved January 22, 2016, from http://www.iucnredlist.org/about/summary-statistics#Table_8
- Jacobson, P. (2015a). *RSPO pledges reform after NGO exposes shoddy PO audits*. Mongabay. Retrieved February 1, 2016, from <http://news.mongabay.com/2015/11/rspo-pledges-reform-after-ngo-exposes-shoddy-palm-oil-audits/>
- Jacobson, P. (2015b). *Avon the latest major palm oil user to make zero-deforestation pledge*. Mongabay. Retrieved February 25, 2016, from <http://news.mongabay.com/2015/07/avon-the-latest-cosmetics-giant-to-commit-to-no-deforestation/>
- Koh, L. P., & Wilcove, D. S. (2008). Is oil palm agriculture really destroying tropical biodiversity? *Conservation Letters*, 1, 60–64. <http://dx.doi.org/10.1111/j.1755-263X.2008.00011.x>
- Koh, L. P., & Wilcove, D. S. (2007). Cashing in palm oil for conservation. *Nature*, 448, 993–994. <http://dx.doi.org/10.1038/448993a>
- Koh, L. P. (2008). Can oil palm plantations be made more hospitable for forest butterflies and birds? *Journal of Applied Ecology*, 45, 1002–1009. <http://dx.doi.org/10.1111/jpe.2008.45.issue-4>
- Laurance, W. F., Koh, L. P., Butler, R., Sodhi, N. S., Bradshaw, C. J., Neidel, J. D., ... Mateo vega, J. (2010). Improving the performance of the roundtable on sustainable palm oil for nature conservation. *Conservation Biology*, 24, 377–381. <http://dx.doi.org/10.1111/cbi.2010.24.issue-2>
- Mongabay. (2012). *Roundtable on sustainable palm oil hits 10 year mark*. Author. Retrieved February 8, 2016, from <http://news.mongabay.com/2012/10/roundtable-on-sustainable-palm-oil-hits-10-year-mark/>
- Mongabay. (2013a). *The palm oil debate: Can the world's most productive oilseed be less damaging to the environment?* Author. Retrieved February 8, 2016, from <http://news.mongabay.com/2013/10/the-palm-oil-debate-can-the-worlds-most-productive-oilseed-be-less-damaging-to-the-environment/>
- Mongabay. (2013b). *Malaysia to launch palm oil certification scheme to compete with RSPO*. Author. Retrieved February 8, 2016, from <http://news.mongabay.com/2013/09/malaysia-to-launch-palm-oil-certification-scheme-to-compete-with-rspo/>
- Mongabay. (2015a). *With fires wreaking havoc across Indonesia, Malaysian state targets greener palm oil*. Author. Retrieved February 16, 2016, from <http://news.mongabay.com/2015/11/with-fires-wreaking-havoc-across-indonesia-malaysian-state-targets-greener-palm-oil/>
- Mongabay. (2015b). *Aircraft fight Sumatran fires as Indonesian minister looks to counter no-deforestation pledges*. Author. Retrieved February 25, 2016, from <http://news.mongabay.com/2015/10/aircraft-fight-sumatra-fires-as-indonesia-minister-looks-to-relax-no-deforestation-pledge/>
- Mongabay. (2016). *Palm oil co suspends forest conversion to comply with Wilmar's zero deforestation policy*. Author. Retrieved February 25, 2016, from <http://news.mongabay.com/2016/01/palm-oil-co-suspends-forest-conversion-to-comply-with-wilmars-zero-deforestation-policy/>
- Oosterveer, P. (2015). Promoting sustainable palm oil: Viewed from a global networks and flows perspective. *Journal of Cleaner Production*, 107, 146–153. <http://dx.doi.org/10.1016/j.jclepro.2014.01.019>
- Panfil, S. N., & Harvey, C. A. (2015). REDD+ and biodiversity conservation: A review of the biodiversity goals, monitoring methods, and impacts of 80 REDD+ projects. *Conservation Letters*, 9, 142–150.
- Paquette, M. (2016). *Some indigenous groups wary of REDD+ following Paris climate agreement*. Mongabay. Retrieved February 16, 2016, from <http://news.mongabay.com/2016/02/some-indigenous-groups-wary-of-redd-following-paris-climate-agreement/>
- Pirard, R., Fishman, A., Gnych, S., Obidzinski, K., & Pacheco, P. (2015). *Understanding 'deforestation-free': An application to Indonesia to inform TFD's April-May 2015 dialogue*. Bogor, Indonesia: CIFOR.
- Roundtable on Sustainable Palm Oil. (2015). *RSPO next: Taking the principles & criteria to the next level*. Author. Retrieved February 10, 2016, from <http://www.rspo.org/news-and-events/news/rspo-next-taking-the-principles-and-criteria-to-the-next-level>
- Roundtable on Sustainable Palm Oil. (2016). *About us: History & milestones*. Author. Retrieved January 19, 2016, from <http://www.rspo.org/about>
- Sahide, M. A. K., Burns, S., Wibowo, A., Nurrochmat, D. R., & Giessen, L. (2015). Towards state hegemony over agricultural certification: From voluntary private to mandatory state regimes on palm oil in Indonesia. *Journal of Tropical Forest Management*, 21, 162–171.
- Sustainable Palm Oil Transparency Toolkit. (n.d.). *Standards, zoological society of London*. Retrieved February 8, 2016, from <http://www.sustainablepalmoil.org/standards/>
- United Nations Framework Convention on Climate Change. (2014a). *Reducing emissions from deforestation*

- and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD-plus). Author. Retrieved January 27, 2016, from http://unfccc.int/land_use_and_climate_change/redd/items/7377.php
- United Nations Framework Convention on Climate Change. (2014b). *Key decisions relevant for reducing emissions from deforestation and forest degradation in developing countries (REDD+)*. Author. Retrieved January 27, 2016, from http://unfccc.int/land_use_and_climate_change/lulucf/items/6917.php
- United Nations Framework Convention on Climate Change. (2014c). *Warsaw framework for REDD-plus*. Author. Retrieved February 8, 2016, from http://unfccc.int/land_use_and_climate_change/redd/items/8180.php
- Venter, O., & Koh, L. P. (2012). Reducing emissions from deforestation and forest degradation (REDD+): Game changer or just another quick fix? *Annals of the New York Academy of Sciences*, 1249, 137–150.
<http://dx.doi.org/10.1111/j.1749-6632.2011.06306.x>
- Vit, J. (2015). *Greenwashing? RSPO audits rife with 'mistakes and fraud' report finds*. Mongabay. Retrieved February 1, 2016, from <http://news.mongabay.com/2015/11/greenwashing-rspo-audits-rife-with-mistakes-and-fraud-report-finds/>
- Wilcove, D. S., & Koh, L. P. (2010). Addressing the threats to biodiversity from oil-palm agriculture. *Biodiversity and Conservation*, 19, 999–1007.
<http://dx.doi.org/10.1007/s10531-009-9760-x>
- Wilmar International. (2016). *Sustainability reports - transformation through engagement*. Author. Retrieved April 24, 2016, from <http://www.wilmar-international.com/sustainability/information-resources/>



© 2016 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



Cogent Environmental Science (ISSN: 2331-1843) is published by Cogent OA, part of Taylor & Francis Group.

Publishing with Cogent OA ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a Cogent OA journal at www.CogentOA.com

