

Home > Institute of Physics Publishing (IOP) > SUSTAINABLE ENVIRONMENT, AGRICULTURE AND FARMING SYSTEM. SRIWIJAYA CONFERENCE. 2021. (SAC-SAFSE 2021)



SUSTAINABLE ENVIRONMENT, AGRICULTURE AND  
FARMING SYSTEM. SRIWIJAYA CONFERENCE. 2021.  
(SAC-SAFSE 2021)

Item #: 064516

Our Price: \$142.00

Add To Cart

Details	
Title:	Sriwijaya Conference on Sustainable Environment, Agriculture and Farming System (SAC-SAFSE 2021)
Date/Location:	Held 29 September 2021, Palembang, Indonesia.
Series:	IOP Conference Series: Earth and Environmental Science Volume 995
ISBN:	9781713854753
Pages:	416 (1 Vol) (approx)
Format:	Softcover
Publisher:	<u>Institute of Physics Publishing (IOP)</u>
POD Publisher:	Curran Associates, Inc. ( Jul 2022 )

PAPER • OPEN ACCESS

## Peatlands Restoration Policies in Indonesia: Success or Failure?

To cite this article: Agung Wicaksono and Zainal 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **995** 012068

View the [article online](#) for updates and enhancements.

You may also like

- [Effectiveness of Roundtable on Sustainable Palm Oil \(RSPO\) for reducing fires on oil palm concessions in Indonesia from 2012 to 2015](#)  
Megan E Cattau, Miriam E Marlier and Ruth DeFries
- [Fire emissions and regional air quality impacts from fires in oil palm, timber, and logging concessions in Indonesia](#)  
Miriam E Marlier, Ruth S DeFries, Patrick S Kim et al.
- [Spatial patterns and drivers of smallholder oil palm expansion within peat swamp forests of Riau, Indonesia](#)  
Jing Zhao, Janice Ser Huay Lee, Andrew J Elmore et al.

### ECS Toyota Young Investigator Fellowship

For young professionals and scholars pursuing research in batteries, fuel cells and hydrogen, and future sustainable technologies.

At least one \$50,000 fellowship is available annually.  
More than \$1.4 million awarded since 2015!



Application deadline: January 31, 2023



TOYOTA

**Learn more. Apply today!**

# Peatlands Restoration Policies in Indonesia: Success or Failure?

Agung Wicaksono<sup>1,2\*</sup>, Zainal<sup>2</sup>

<sup>1</sup>Corvinus University of Budapest, Budapest 1093, Hungary. <https://orcid.org/0000-0002-0659-7376>

<sup>2</sup>Universitas Islam Riau, Pekanbaru 28284, Indonesia. <https://orcid.org/0000-0002-2472-843X>

\*agung.wicaksono@stud.uni-corvinus.hu

**Abstract.** This paper describes and analyzes the peatland restoration policy undertaken by the Indonesian government. The Indonesian government has since implemented the first phase of peatland restoration in 2016-2020. It can be said that the restoration of the peatland area of 2.4 million hectares faces several problems. One of the main problems is the unsuccessful restoration of peatlands in the company's concession areas. Companies that are obliged to restore peatlands in their concessions do not comply with regulations set by the government. As the program's leader, the Peatland Restoration Agency is powerless to do much because its authority extends only to supervising the company's concession area. Restoration of peatlands outside the concession area (cultivated land and protected forest) can be satisfied because the government can directly restore these peatlands. This paper uses various reliable document sources as the primary data source, which becomes material for analysis.

## 1. Introduction

In their natural state, peatlands store carbon for thousands of years. Carbon is stored because crop production and peatlands accumulation generally outpace the rate of organic matter decomposition. Apart from carbon storage, natural peatlands provide various ecosystem services to indigenous people [1]. They protect rare species and regulate water flow and storage in areas that frequently extend beyond the peatlands. Numerous peatlands have been intensively managed and drained to make them available for agricultural and forestry purposes [1].

Indonesia has over 15 million hectares of peatlands, accounting for more than 12% of the country's forest land, which is spread across Sumatra, Kalimantan, Sulawesi, and Papua. Indonesia is the world's largest tropical peatland, followed by the Democratic Republic of Congo, which has a peatland area of approximately 9 million ha, and the Republic of Congo has a peatland area of approximately 5.5 million ha [2]. Over time, the peatland ecosystem has undergone significant changes to accommodate other land uses, resulting in the degradation of a large portion of the peatland. The leading causes of peatland degradation in Indonesia have been cited as logging, conversion to industrial forest plantations, and conversion to oil palm plantations [3]. The destruction of the peatlands ecosystem is the root of forest fires in Indonesia, which has resulted in frequent haze disasters [4], [5].

The Indonesian government has affirmed its commitment to reducing forest fires in Indonesia by restoring the peatland ecosystem [6], [7]. This policy is known as the peatlands restoration policy. Degraded peatlands are where forest fires frequently occur every year in Indonesia. The Indonesian government realizes that tackling forest fires in Indonesia must restore degraded (dry) peatlands [8].



The government started this peatland restoration policy in 2016 to respond to the forest fires in 2015, which were named the worst forest fires in the last two decades. At that time, more than 2.6 million hectares of forest were burned, and the majority occurred on peatlands that had damaged ecosystems [6], [9], [10]. The Indonesian government quickly formed a special institution called the Peatland Restoration Agency, based on Presidential Regulation Number 1 of 2016 [6]. The Peatland Restoration Agency (BRG) is a non-structural agency directly responsible under the president to carry out restoration and future management of peatlands. This is very important because of the vitality of peatlands and is the root cause of the forest fire disaster so far [11]. It is hoped that BRG will coordinate and synchronize various programs related to peatlands restoration.

Approximately five years after the peatland restoration policy was implemented in Indonesia. This policy will continue until 2024 because this program is deemed very important to consider that forest fires still frequently occur today in Indonesia. This paper describes and analyzes how the peatland restoration program was implemented from 2016 to 2020. This paper measures the extent to which the peatland restoration program has achieved the targets previously set by the Indonesian government. This is consistent with whether the peatlands restoration policies in Indonesia have been running so far have succeeded or failed?

## **2. Methodology**

This research is research that uses qualitative methods. This study uses a literature study to obtain data from various valid sources. Existing data is then analyzed to get a conclusion then. This study obtained data from the Peatlands Restoration Agency and various literature from NGOs, then attached as references.

## **3. Result and Discussion**

### **Understanding Peatlands Restoration**

Why is the peatlands restoration policy important for Indonesia? This is vital because peatlands restoration is the primary solution for handling forest and land fires in Indonesia [12], [13]. However, also many people do not know what is meant by peatland? How can it be one of the causes of forest fires in Indonesia?

Peatlands are ecosystems in which biomass production outnumbers decomposition. As a result, organic matter derived from plant debris accumulates and dominates the peatland vegetation [14]. Peatlands have a hydrological function, namely having a very high water absorption (acting like a sponge), so they can absorb rainwater and reduce the danger of flooding. In the dry season, peatlands swamps release water as river flows. Peatlands swamps are very important for the downstream area, a rain storage area. Its hydrological function is helpful for agriculture and concerning socio-economics such as transportation, health, and the availability of fish in the ecosystem (Rochmayanto et al., 2013). It is known that peatlands are wet [16]. Thus, forest fires cannot occur above it. However, the problem is that many peatlands in Indonesia are currently damaged. This damage means that it becomes dry due to the conversion of peatlands to oil palm plantations and eucalyptus (paper raw material), which cannot survive on wet peatlands [17]. So that many companies then drain the peatland which was originally wet by making large canals, which release water in the peatlands to the sea. The peatlands then become dry. These dry peatlands are at the root of forest fires in Indonesia [18]. If a bit of fire spatters this dry peatland, the fire will be devastating, considering peatlands store carbon [19]. We know why peatlands restoration policies are one of the leading solutions for solving forest fires in Indonesia.

It is this damaged peatland that the Indonesian government wants to restore. The Indonesian government uses the 3R concept through the Peatlands Restoration Agency, which means rewetting, revegetating, and revitalizing the community's economy (around peatlands) to carry out the restoration [11]. Rewetting is the wetting of peatlands in the most common way, namely canal blocking. Canal Blocking is a system where the canals are blocked so that existing peatlands water can be retained to return to being wet. This method is one of the most commonly used methods early in peatlands restoration [3], [20]. After the wet peatlands, the peatlands are then planted with native plants on

peatlands such as sago, durian, pineapple, and other forest plants (Revegetation) [12], [19], [21]–[23]. Then after that, enter the final stage, namely providing added economic value to peatlands for the community, namely by providing training in planting high-value crops on peatlands, cultivating water fish on peatlands, and various other pieces of training (revitalizing community life) [11], [23]–[25].

However, peatlands restoration using the 3R concept is specifically carried out on cultivated land and protected forest areas controlled by the state. This concept does not apply to degraded peatlands in the concession areas of industrial forestry companies or plantations. Peatlands restoration in company concession areas is only limited to rewetting where there must be good management of wetting peatlands during the dry season, which companies in company concession areas must carry out ([11], [26]–[28]. This restoration only focuses on not burning in the peatland areas controlled by the company.

### **Indonesia's Peatland Restoration Target 2016-2020**

The peatlands restoration policy in Indonesia is outlined in Presidential Regulation No.1 of 2016 concerning the Peatlands Restoration Agency. In addition to explaining the presence of BRG as an agency with a special duty to restore peatlands, this regulation also explains the targets the Indonesian government wants to achieve from 2016 to 2020. In general, the task of BRG is to coordinate and facilitate the implementation of peatlands restoration in Indonesia, which focuses on 7 Priority Provinces, namely Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan, and Papua Province (Badan Restorasi Gambut, 2016). BRG said that these seven provinces have the largest peatland area in Indonesia, with a total area of 12.9 million hectares. Of this, 2.4 million hectares in the area of degraded peatland have become the target of BRG for restoration through the implementation of the peatlands restoration program [2], [28]. The 2.4 million hectares of land mainly were land burned in the devastating forest fires in 2015 [28].

Below is a table of targets for peatlands restoration work in Indonesia based on the area in 2016-2020

*The target of peatland restoration work by the Government of Indonesia based on the area in 2016-2020*

<i>Years</i>	Area in million hectares	Percentage
<i>2016</i>	0,72	30%
<i>2017</i>	0,42	20%
<i>2018</i>	0,42	20%
<i>2019</i>	0,42	20%
<i>2020</i>	0,24	10%
<i>Total</i>	2,4	100%

Table 1. The target of peatland restoration work by the Government of Indonesia based on the area in 2016-2020. Source: (Peatland Restoration Agency, 2016)

However, the government does not do the work alone in its implementation. BRG must collaborate with the private sector and non-governmental organizations to implement it in the field. This is also a mandate from Presidential Regulation No.1 of 2016, which states that the private sector (which has permits to use peatlands related to the forestry industry) is obliged to carry out peatlands restoration in their respective concession areas.

The following table describes the peatland restoration targets in more detail, including the responsible actors.

Peatlands restoration targets are based on the division of labor between the government, private sector, and NGOs.

Actor	Area in million hectares	Note
<b>Government</b>	1	This amount of land is the amount of peatland that the government can directly restore. There is a division of labor between the central government, provincial governments, and regency/city governments.
<b>Private Sector</b>	1,4	This amount of land is the amount of land that must be restored by forestry/plantation companies that have concessions on peatlands. BRG here only supervises peatlands restoration carried out by the company
<b>NGO</b>	-	They support the government and the private sector in restoration planning, mapping, restoration infrastructure construction, empowering communities around peatlands, monitoring the implementation of peatlands restoration.

Table 2. Peatlands restoration targets are based on the division of labor between the government, private sector, and NGOs. Source: [28]

The targets above are targets that the peatland restoration agency must achieve as a leader who is given the government's responsibility to restore peatlands set at 2.4 million hectares.

#### **Peatlands Restoration Progress**

Empirically, in 2016, when the peatland restoration program was first started, there was a reduction in Indonesia's forest fires disaster. The government claims that forest fires have decreased by 90% [29]. In 2017 and 2018, there were also no severe forest fires. Everything tends to go well. This is linked to the ongoing BRG program to ensure that peatlands are damaged and flammable and can become wet again and not cause forest fires. However, in 2019, forest fires were quite severe again. Pantau Gambut (2019) said 2019 forest fires could be due to damaged canal blocking points, which can cause the peatlands to dry out again and burn quickly. However, the fires in 2019 were not as severe as those in 2015, and they are more often than not under government control. The government claims that forest fires decreased by 81% in 2020 compared to 2019 [31].

In addition, there are several other achievements that BRG has achieved in restoring peatlands in Indonesia [30]. The government has succeeded in restoring peatlands of approximately 900 thousand hectares by 2019. The government says this figure has met 87% of their target as a percentage. Meanwhile, for concessions where the company has implemented peatlands restoration, the progress

achieved is only approximately 500 thousand hectares (29%) [30], [32]. This number is still far from the expected target.

### **Problems Faced in Peatlands Restoration**

As previously explained, the five years of peatland restoration come to two conclusions. First, direct restoration carried out by the government through BRG and other agencies can almost reach the targets that have been previously set. 87% is a high number considering that peatland restoration is huge, namely 2.4 million hectares. The second conclusion is that peatlands restoration, which is being implemented by the private sector, is progressing slowly. Pantau Gambut (2019) notes that only 29% of peatland has been successfully restored by private parties supervised by the peatlands restoration agency.

Why does this happen? Several main problems pose obstacles to implementing peatlands restoration in company concession areas. Some of these are:

1. Law enforcement against companies that do not restore peatlands in their concession areas is feeble. The government has not taken firm action against this. [33]
2. The peatland restoration agency is only given technical authority to restore peat. However, other non-technical matters, such as emphasizing the company to restore, were not given. So BRG is weak in the supervision of peatlands restoration carried out by the private sector [33].
3. There are frequent misunderstandings between BRG and other government agencies, such as the main one being the Ministry of Environment and Forestry. Perceptions are often unequal, especially regarding the status of peatlands to be restored in company concessions. [30]
4. Companies are reluctant to restore peatland in their concessions because it can interfere with company performance, especially raw materials [11].

These four factors are why peatlands restoration on concessions has been so slow. This resulted in the BRG target mandated by the president is far from the target it should have been.

### **Failure or Success?**

The question arises, is peatlands restoration in Indonesia successful or unsuccessful? The answer is that peatlands restoration tends to be successful on peatlands outside the company's concession areas directly undertaken by the government and various other related agencies. The other main actors are the Ministry of Environment and Forestry the Environment and Forestry Service at the Provincial and regency / City Levels. BRG tends to find it easier to exploit degraded peatlands for immediate evacuation because it has sufficient resources for this.

For peatlands restoration in concession areas, the company has failed. Because according to existing data, peatlands restoration that BRG can supervise is only 1/5 of the total target that must be done in five years. It is admitted that this restoration is quite tricky considering that many companies still have not complied with the president's orders to restore peatlands in their areas voluntarily. Then, coupled with the weak law enforcement for companies that do not restore peatlands in their area. It is pretty tricky for BRG to force companies to undertake peatlands restoration, considering that BRG does not have the authority to take action or put direct pressure on companies to act.

### **The Government Almost Dissolved BRG**

The Peatland Restoration Agency is only in charge for five years from 2016 to 2020, according to Presidential Regulation No.1 of 2016. This statement was stated by one of the top government officials, Moeldoko (the President's Chief of Staff), who said that one of the agencies being evaluated for its existence is the Peatland Restoration Agency, there is a possibility that this institution will not be renewed again [34]. However, many parties, especially those related to environmental issues, objected to the discourse after the rebellion. Even though its performance is considered not optimal, BRG can still be expected to be one of the actors contributing to improving the peatlands ecosystem in Indonesia [35]. It is hoped that this institution is still feasible to maintain and extend its tenure for the next five years.

At the urging of many for five years from 2016 to 2020, in the end, the president maintained the position of BRG and issued Presidential Regulation Number 120 of 2020 concerning the Peatlands and

Mangrove Restoration Agency (BRGM). A new nomenclature was added, namely mangrove, which was then followed by additional tasks to restore damaged mangrove ecosystems in Indonesia. This addition is at least proof of the government's seriousness in repairing the existing natural damage for the sake of commitment to preventing global climate change.

#### 4. Conclusion

The Indonesian government's policy to restore damaged peatlands has been widely appreciated nationally and internationally. This policy is a positive first step to show that Indonesia is committed to preventing climate change. The policies contained in Presidential Regulation Number 1 of 2016 have been implemented from 2016 to 2020. Along the way, the peatland restoration policy did not run smoothly as previously imagined. There are many technical and non-technical obstacles to implementing peatlands restoration in 7 provinces in Indonesia.

The Peatlands Restoration Policy can be said to be partially successful. Peatlands restoration policies have been successfully implemented in non-concession areas, namely areas that the government can restore directly. The restoration target is 87% of the total target area of approximately 1 million hectares. On the other hand, the peatlands restoration policy has failed to be implemented in company concessions where the government can only supervise peatlands restoration.

The peatland restoration policy for the second phase, where there are additional tasks for mangrove ecosystem restoration, is expected to run well in the future. This policy can be a good step for Indonesia to help the world prevent climate change that is increasingly threatening life.

#### References

- [1] B. Runkle and L. Kutzbach, *Towards climate-responsible peatlands management*, no. 9. 2014.
- [2] Ministry of Environment and Forestry Republic of Indonesia, "Managing Peatlands to Cope with Climate Change: Indonesia's Experience," Jakarta, 2018.
- [3] A. Dohong, A. Abdul Aziz, and P. Dargusch, "A Review of Techniques for Effective Tropical Peatland Restoration," *Wetlands*, vol. 38, no. 2, pp. 275–292, 2018, doi: 10.1007/s13157-018-1017-6.
- [4] M. E. Harrison, S. E. Page, and S. H. Limin, "The global impact of Indonesian forest fires," *Biologist*, vol. 56, no. 3, pp. 156–163, 2009.
- [5] S. Edwards and F. Heiduk, "Hazy Days: Forest Fires and the Politics," *J. Curr. Southeast Asian Aff.*, vol. 34, no. 3, pp. 65–94, 2015.
- [6] A. Hansson and P. Dargusch, "An Estimate of the Financial Cost of Peatland Restoration in Indonesia," *Case Stud. Environ.*, vol. 2, no. 1, pp. 1–8, 2018, doi: 10.1525/cse.2017.000695.
- [7] D. Puspitaloka, Y. S. Kim, H. Purnomo, and P. Z. Fulé, "Defining ecological restoration of peatlands in Central Kalimantan, Indonesia," *Restor. Ecol.*, vol. 28, no. 2, pp. 435–446, 2020, doi: 10.1111/rec.13097.
- [8] D. Sonya, "Peat and land clearing fires in Indonesia in 2015: Lessons for polycentric governance," pp. 1–4, 2015.
- [9] W. Giesen and E. N. N. Sari, "Tropical Peatland Restoration Report : the Indonesian case," 2018. doi: 10.13140/RG.2.2.30049.40808.
- [10] M. Adriani, S. Moyer, A. Kendrick, G. Henry, and S. Wood, "The cost of fires," *Batim. Int. Build. Res. Pract.*, vol. 9, no. 2, pp. 68–68, 2016, doi: 10.1080/09613218108550926.
- [11] A. Wicaksono, "Kolaborasi Multi Aktor dalam Program Restorasi Gambut di Provinsi Riau," *J. Adm. dan Kebijak. Publik*, vol. 4, no. 2, pp. 99–113, 2019, doi: 10.25077/jakp.4.2.111-125.2019.
- [12] I. Budiman *et al.*, "Progress of paludiculture projects in supporting peatland ecosystem



- restoration in Indonesia," *Glob. Ecol. Conserv.*, vol. 23, p. e01084, 2020, doi: 10.1016/j.gecco.2020.e01084.
- [13] S. K. Uda, G. Schouten, and L. Hein, "The institutional fit of peatland governance in Indonesia," *Land use policy*, vol. 99, no. September 2017, pp. 0–1, 2020, doi: 10.1016/j.landusepol.2018.03.031.
- [14] F. Quinty and L. Rochefort, *Peatland Restoration Guide, 2nd edition*. 2003.
- [15] Y. Rochmayanto, D. Darusman, and R. Teddy, *HUTAN RAWA GAMBUT dan HTI PULP dalam BINGKAI REDD+*. 2013.
- [16] M. Schumann and J. Hans, "A Global Peatland Restoration Manual," 2006.
- [17] J. Jaenicke, H. Wösten, A. Budiman, and F. Siegert, "Planning hydrological restoration of peatlands in Indonesia to mitigate carbon dioxide emissions," *Mitig. Adapt. Strateg. Glob. Chang.*, vol. 15, no. 3, pp. 223–239, 2010, doi: 10.1007/s11027-010-9214-5.
- [18] CIFOR, "Fires in Indonesia: causes, costs and policy implications," *Fires Indones. causes, costs policy Implic.*, no. 38, 2002, doi: 10.17528/cifor/001552.
- [19] H. Gunawan, *Indonesian peatland functions: Initiated peatland restoration and responsible management of peatland for the benefit of local community, case study in riau and west kalimantan provinces*, vol. 7. Springer Singapore, 2018.
- [20] H. Ritzema, S. Limin, K. Kusin, J. Jauhiainen, and H. Wösten, "Canal blocking strategies for hydrological restoration of degraded tropical peatlands in Central Kalimantan, Indonesia," *Catena*, vol. 114, pp. 11–20, 2014, doi: 10.1016/j.catena.2013.10.009.
- [21] A. Dohong, A. A. Aziz, and P. Dargusch, "A review of the drivers of tropical peatland degradation in South-East Asia," *Land use policy*, vol. 69, no. September, pp. 349–360, 2017, doi: 10.1016/j.landusepol.2017.09.035.
- [22] M. Taufik, A. A. Veldhuizen, J. H. M. Wösten, and H. A. J. van Lanen, "Exploration of the importance of physical properties of Indonesian peatlands to assess critical groundwater table depths, associated drought and fire hazard," *Geoderma*, vol. 347, no. July 2018, pp. 160–169, 2019, doi: 10.1016/j.geoderma.2019.04.001.
- [23] I. T. C. Wibisono and A. Dohong, "Panduan Teknis Revegetasi Lahan G," *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2017.
- [24] Badan Restorasi Gambut, "Pulihkan gambut, pulihkan kemanusiaan," *Badan Restorasi Gambut Republik Indonesia*, p. 32, 2016.
- [25] S. Najiyati, L. Muslihat, I. Nyoman, and N. Suryadiputra, "Panduan Pengelolaan Lahan Gambut Untuk Pertanian Berkelanjutan. Proyek Climate Change, Forest and Peatlands in Indonesia. Bogor (ID). Wetlands International," p. 241, 2005.
- [26] S. A. Cahyono, S. P. Warsito, W. Andayani, and D. H. Darwanto, "Faktor-Faktor Yang Mempengaruhi Kebakaran Hutan Di Indonesia Dan Implikasi Kebijakannya," *J. Sylva Lestari*, vol. 3, no. 1, p. 103, 2015, doi: 10.23960/jsl13103-112.
- [27] I. N. N. Suryadiputra *et al.*, *Panduan penyekatan parit dan saluran di lahan gambut bersama masyarakat*. 2005.
- [28] Badan Restorasi Gambut (BRG), "Mengawali Restorasi Gambut Indonesia," Jakarta, 2016.
- [29] K. J. Fabian, "Pemerintah Klaim Kebakaran Hutan pada 2016 Menurun 90 Persen," *Tribunnews Pekanbaru*, pp. 1–2, 2017.
- [30] Pantau Gambut, "Nasib restorasi gambut indonesia," *www.pantaugambut.id*, 2019. .
- [31] M. Zulfikar, "Kebakaran hutan dan lahan turun 81 persen pada November 2020," *www.antaranews.com*, 2020. .
- [32] Badan Restorasi Gambut, "Laporan Kinerja Brg 2020," Jakarta, 2020.

- [33] Greenpeace Indonesia, *Restorasi Hilang Dalam Kabut Asap: Kekalahan dalam perlindungan gambut*. Jakarta: Greenpeace Indonesia, 2021.
- [34] D. Prabowo, “BRG Mau Dibubarkan Jokowi, Berikut Tunjangan Kepala hingga Tenaga Ahli di Dalamnya,” *www.kompas.com*, p. 1, 2020.
- [35] L. Arumingtyas and R. Hariandja, “Menanti Perpanjangan dan Penguatan Badan Restorasi Gambut \_ Mongabay,” *www.mongabay.co.id*, p. 1, 2020.