Policy Analysis of PP 71/2014

Summary

1. The Government of Indonesia recently adopted Government Regulation 71/2014 on the Protection and Management of Peat Ecosystems (PP71), which aims to "preserve the function of peat ecosystems and prevent damage". PP71 provides some useful improvements to the regulatory framework but also includes aspects that may undermine the potential of PP71 to achieve its aims. This paper provides a review and analysis of PP71 and presents recommendations on how the aims of PP71 can be best achieved.

2. Three main issues have be raised concerning PP71, namely (i) the feasibility and economic impacts of maintaining water tables at a depth of no more than 0.4m from the peat surface, (ii) claims that peatlands can be managed sustainably with water tables maintained in the range of 50-80cm and (iii) proposals that peatland more than 3m deep should be made available for development. This debate hinges on two key aspects of peatland management: (1) the area of peatland that can be brought into productive use while maintaining peatland function and (2) the type of management, in particular water management and the target water table depth that is considered appropriate for the goals of PP71.

3. Peatland science shows that peatland land-use based on drainage is fundamentally unsustainable both in environmental and economic terms due to the subsequent land subsidence that is a major impact of drainage. Long-term subsidence rates of between 3 and 5 cm per year are typical in plantations on drained peats in the tropics following initial subsidence of more than one metre immediately after drainage, higher than in temperate regions due to the higher ambient temperatures of the tropics. Moreover, subsidence and the associated carbon emissions cannot be stopped if a peatland is drained. Peatland drainage is also a key factor that makes peatland landscapes highly susceptible to fires in the dry season.

4. The impacts of drainage and subsidence on peatlands are well known globally and will result in frequent waterlogging and progressively worsening flooding until the plantation will need to be abandoned. Pumped drainage systems are unlikely to be an option in the wet tropics and other land uses may be impossible at this stage. With the high subsidence rates in the tropics, these impacts will be experienced within decades (compared to centuries in temperate climates). Water management approaches may in some cases reduce subsidence rates but generally by no more than 20 percent and can at best only extend plantation life. The end point for all plantations on

peat will come when irreversible flooding begins to affect production leading to plantation abandonment. Extensive peatland drainage in Indonesia will ultimately result in loss of land and its associated economic production at a scale not seen before anywhere in the world.

5. However, PP71 with its focus on controlled water management does not effectively address these risks. In reality, PP71 provides for (1) widespread use through enabling the development of existing licenses due to its transitional arrangements (Article 45, PP71) that enable all existing licenses including those that are not yet operational to remain valid and in place and (2) moderate drainage levels (0.4m water table depth below the surface) of peatland ecosystems[i]. PP71 will therefore likely lead to an expansion of peatland drainage, and so will do little to prevent further damage to peatland ecosystems. While plantation companies will need to keep water table depths at 0.4m or higher, this would still result in peatland degradation, at a rate that is only slightly slower than if water table depths were lower. Much of PP71 is focused on the implementation of controlled drainage as a best management practice. This might have been be a good strategy if the impacts of controlled drainage water management systems were limited - they are not - or if the area of peatland defined as legally available for drainage by PP71 would be limited. In short, the desired win-win scenario of best management practice for oil palm and pulp plantations while maintaining peatland ecological integrity is simply not possible with drainage as envisaged and directed under PP71.

6. The debate around PP71 has led to calls for its revision. Proposals contained in the recent academic paper from the Ministry of Envrionment and Forestry on the revision of PP71, specifically for peatland protection policies to focus only on peatland with a primary forest land cover with the remaining peatland area available for drainage-based plantations, will actually make the situation worse and will lead to a major expansion of plantations and drained peatland compared to the current situation. The major flaw in these proposals is that expanding the drainage of peatlands will increase subsidence and carbon emissions, not control them, and will not meet the stated goals of the PP71 as a policy. Instead, the Government should focus on limiting further increases in the extent of peatland drainage, protecting remaining peat swamp forest and, over time, reducing the area of drained peatland. The economic future of peatland regions and the long-term interests of the communities living there would be better served by the phasing out of drainage-based land uses on peat and phasing in of alternative zero drainage production systems on peat.

7. There are therefore really only two long-term policy options to address this challenge: (1) Maintain extensive peatland drainage to maximise short-term economic opportunities and ignore the long-term consequences, or (2) Develop and implement a peatland land use policy that will enable a responsible phasing out of drained based land-use in peatlands and promote the introduction and up-scaling of zero drainage production systems that involve the restoration and maintenance of peatland hydrological integrity and sustainable economic production. Option 2 - while more challenging - will in the medium to long term provide far more economic, environmental and social benefits, and ultimately is the only sustainable option for Indonesia.

8. The initiative of the Government of Indonesia to strengthen the legal framework for the protection and the prevention of damage to peatland ecosystems is much needed. This report provides the following recommendations for strengthening its efforts to achieve this:

1) Create a harmonised and integrated long-term peatland land use policy framework based on PP71 across all sectors. As much peatland is found in the national forest area (*kawasan hutan*), this will require specific actions in the forestry sector as well as other land use sectors;

2) Review the aspects of PP71 relating to the treatment of existing licenes and extent of peatland that will be impacted by drainage in the future, specifically the transitional arrangements in Article 45 of PP71. Industry is seeking the environmental standard on water table depths to be relaxed from 0.4m to a slightly deeper range depending on commodity but many in the sector also have an interest for all existing non-operational licenses to be accommodated and for these to remain valid. These two aspects combined will lead to widespread and continued damage to peatland ecosystems and a failure of PP71 to achieve its goals. PP71 should therefore incorporate a clause that prohibits further expansion of peatland drainage through cancelling non-operational licenses on deep peat, in particular in priority landscapes. Only this course of action will enable the remaining ecological function of peatland to be maintained and further damage prevented;

3) Develop technical guidelines and regulations relating to peat and swamp management required for the effective implementation of PP71 in an open and transparent manner that engages with the private sector and civil society;

4) Develop an emergency program to protect, reserve and rehabilitate priority peatlands based on PP71. Almost all drained peatlands in Sumatra and Kalimantan should now be considered in a state of 'ecological urgency' (see PP71, Article 11, Clause 3), and peatlands licensed for drainage-based land-use development should be considered under threat, with a loss of remaining function being inevitable. All remaining peat swamp forest in priority landscapes should be protected. Detailed guidelines on this need to be drafted as Ministerial Regulations. This and other actions related to inventory and planning in PP71 may take years to complete. As a consequence, Government should put in place a temporary moratorium on (i) all new peatland drainage and (ii) clearance and felling of natural peat swamp forest that applies to all peatland, licensed and unlicensed. Only such a moratorium can prevent further unwanted damage while PP71 is reviewed and peatland inventory and planning completed;

5) Develop the basis for long-term sustainable peatland use through zero drainage agriculture and forestry involving small holders, community-based enterprises and the private sector, in particular through investments in applied research and development.

Background

1. The Government of Indonesia has been under pressure from sections of the plantations sector to review and revise the recent Government Regulation 71/2014 on the Protection and Management of Peat Ecosystems, here referred to as PP 71. This analysis presents a review of the issues and proposes steps and actions that could help Indonesia achieve sustainable development in its peatland areas.

2. PP 71 came into force on 12 September 2014 with the explicit goal of enabling "systematic and integrated efforts to *preserve the function of peat ecosystems and prevent damage*" (Article 1, Clause 1) to the nation's peatland, in particular potential damage associated with the clearance and drainage of peatlands (see Figure 1 for a summary of PP71). This regulation forms part of Indonesia's environmental regulations and is mandated by the 2009 Law on the Protection and Management of the Environment.

3. Several plantation companies and others associated with the sector have raised three main issues with regard to PP71 as follows:

    1) PP 71 defines peatland with a water table lower than 0.4m as damaged, so that peatland managers are required to maintain water table depths at this level or higher. Concerns have been raised that this water level will significantly affect yields of oil palm and *Acacia*, and consequently business performance and the economy.[ii]

    2) Sections of the plantations sector and their supporters claim that peatland can be drained sustainably using appropriate water management systems and technologies with a lower water table depth of 50-80cm and still meet the goals of PP71.[iii]

    3) Following on from this, proposals have been made that deep peatland more than 3 metres deep, notably areas that are already deforested, should be converted to plantations under best practice water management and still meet the goal of PP71.[iv] This is contentious as Indonesia's land use planning framework has protected peat more than 3 metres deep since 1990 including PP71.

4. These views present a challenge for government: whether to prioritise the business interests of those in the plantations sector wishing to expand on peat, or avoid all expansion on peatland as called for by the Roundtable for Sustainable Palm Oil (RSPO), non-governmental groups and an increasing number of companies with voluntary sustainability commitments, or try to find other solutions that can create a basis for long-term sustainable economic and environmental benefits on peatland?[v]

5. The debate revolves around two separate aspects of peatland management, namely: (1) the area of peatland that can be brought into productive use while maintaining peatland function and (2) the type of management, in particular water management and the target water table depth that is considered appropriate for the goals of PP71. Views on these issues are in turn dependent on an understanding of peatland science and the impacts of drainage.

The Impacts of Drainage and Plantation Management on Peatland

6. As peatlands are wetlands, and peat soil consists of 90% water, the cultivation of crops that cannot tolerate waterlogged conditions such as oil palm and *Acacia* requires the land to be drained through the digging of canals. However, this drainage causes the surface of the peatland to subside. Land subsidence following drainage initially occurs mostly through the physical processes of consolidation and compaction of the peat. Typically more than one metre of subsidence occurs after initial drainage (known as the dewatering period) but after that subsidence is predominantly the result of the oxidation of the peat by decomposition and fires associated with the lower water tables (i.e. the organic carbon is turned into carbon-dioxide (CO_2) and released into the atmosphere). Peat oxidation, as an unavoidable result of drainage, is therefore responsible for the high carbon emissions from peatland (FAO 2014).

7. Long-term subsidence rates of between 3 and 5 cm per year are typical in plantations in the tropics following the initial drop of more than one metre, higher than in temperate regions due to higher ambient temperatures rather than any differences in management (Volk 1973, Stephens *et al* 1984, Andriesse 1988, Hooijer *et al*. 2012, FAO 2014, Mazwar & Agus 2014). As the peat subsides, canals will need to be maintained so that the water table remains sufficiently low for optimum crop growth. Crucially, subsidence and carbon emissions can never be stopped if a peatland is drained (Stephens *et al* 1884, DID Sarawak 2001).

8. The impacts of drainage and subsidence on peatlands are well known and widely documented in SE Asia (see reviews in Andriesse 1988, Hooijer *et al*. 2012) and elsewhere in Europe and USA (Stephens *et al* 1984, Hutchinson 1980, Deverel and Leigton 2010). As the land surface subsides over time and gets closer to the elevation of river water levels, it will become harder and harder for the canals to drain excess water from the peatland to the rivers. Eventually the drainability limit will be reached when there is insufficient gradient to drain water from the plantation to the river (Figure 2). At this point frequent waterlogging and occasional shallow flooding in the plantation will be inevitable through much of the wet season, leading to crop productivity losses and mortality. This condition will progressively worsen as subsidence proceeds until the peatland will experience frequent, prolonged and deep floods. There are only two options at this point – either (a) abandon the plantation and return it to nature, or (b) install pump-operated drainage systems, which are unlikely to be economically feasible in rural areas of the wet tropics where land use is dominated by agriculture and plantations. If action is taken early enough and prolonged deep flooding can be prevented, a third option of agriculture without drainage (paludiculture) is possible as a sustainable land use (see Giesen 2013). Alternatively, ecosystem restoration, involving rewetting of peatlands and restoration of peat swamp forests, can be undertaken.

9. In Indonesia, most peatlands are raised above the surrounding land as peat domes (Figure 2). New analyses show that recently drained peatland plantation landscapes will likely lose drainability and experience flood problems within a few decades across about half of the area and in most of the area within a century (Hooijer *et al.* 2015a, Hooijer *et al.* 2015b). Ironically, these problems will be first experienced in the shallow peatlands closer to rivers, which in Indonesia are the areas legally available for cultivation and often planted by smallholder farmers as well as companies. In fact, such problems can already be seen in many drained peatland areas in the wet season (Figure 3).

Moreover, rising sea levels due to climate change, while much less significant compared to peat subsidence rates of 3-5 cm each year, will only make this problem worse.

10. Peatland water management systems based on controlled drainage such as 'eko-hidro' are therefore not sustainable management regimes for peatlands.[vi] At best, these approaches may in some cases reduce subsidence rates while optimizing crop growth and extending plantation life (DID Sarawak 2001). The scientific evidence is that the benefit of controlled drainage (i.e. with water control structures and a target water table depth of 0.4-0.8m) will be marginal in protecting peatland ecological and hydrological functions and likely to reduce subsidence rates by less than 20 percent – in other words, subsidence may be reduced by no more than 1cm per year. This will somewhat extend the time for drainage-based land use but will not secure production over the long term. On the contrary, extensive peatland drainage in Indonesia will ultimately result in loss of land and its associated economic production at a scale not seen before anywhere in the world.

How does PP71 enable the protection and management of peatland ecosystems?

11. As explained earlier, the debate over PP71 hinges on two aspects: (1) the area of peatland that can be brought into productive use while maintaining peatland functions and (2) the type of management, in particular drainage including the target water table depth, that is considered appropriate for the goals of PP71. Different interest groups have adopted different positions with regards to these aspects, which in general can be characterised as follows:

    1) Certain companies, business associations and their supporters are seeking (1) continued expansion and widespread use of peatland for plantations and (2) claim that this will be sustainable when relatively moderate (0.4-0.8m) water table depths are maintained;

    2) Other companies have announced voluntary corporate sustainability policies, most of which contain commitments for (1) no further expansion of their own and suppliers' plantations on peatland and (2) best practice management of existing plantations on peat, which is likely to entail similar water table depths in the range of 0.4-0.8m and result in a minor reduction in impacts not their avoidance. Such a position broadly mirrors that of the Roundtable on Sustainable Palm Oil (RSPO).[vii] In addition, RSPO requires drainability assessments prior to replanting on peat to determine the long-term viability of the necessary drainage for oil palm growing.

3) Conservation groups advocate (1) no further expansion of drainage based land-use on peatlands and (2) natural or near-natural high water tables to protect the sensitive forest ecosystems where they remain, including (3) development of zero drainage wetland agriculture (also known as paludiculture in Europe) as a sustainable land-use system on peat (see also FAO 2014). The International Peat Society advocates avoiding deforestation and drainage of tropical peatlands for agriculture or plantations (Clarke & Rieley 2010).

12. In reality PP71 provides for (1) widespread use and expansion through enabling the development of existing licenses and (2) moderate drainage levels (0.4m water table depth below the surface) of peatland ecosystems[viii]. PP71 will therefore lead to an expansion of peatland drainage, and so will do little to prevent further damage to peatland ecosystems from plantation expansion, due to its transitional arrangements (Article 45, PP71) that enable all existing licenses to remain valid and in place, including those that are not yet operational if they become operational by September 2016.[ix] While plantation companies will need to keep water table depths within 0.4m of the surface, this would still result in peatland degradation at a rate that is only slightly slower than if the water table was lower.

13. Despite several studies suggesting water table depths of 40cm present a threshold for fire risk in peatland, there is no strong evidence to support this. Moreover, there is no specification of what a water table depth of 0.4 m below the surface actually means, which itself is a legitimate concern of existing peatland users. This could be an average, but it needs to be acknowledged that water levels fluctuate over the seasons by over 0.5 m. If it is an average water table depth of 0.4 m, then the actual level will likely be higher during the wet season, and lower during the dry season, rendering most plantation management impossible and therefore making it extremely unlikely that this target can be met by any company. In fact, no proven example of water management achieving this target exists outside of small research plots in conditions of constant rainfall (such as in Sarawak, Malaysia) where water level control is easier than in the highly variable climate that characterizes most peatland areas in Indonesia.

14. Much of PP71 is focused on the implementation of controlled drainage as a best management practice. This might have been be a good strategy if the impacts of controlled drainage water management systems were limited, which is not the case, or if the area of peatland defined as legally available for drainage by PP71 would be limited. The combination of significant drainage impacts, even at theoretical water table depths of 0.4m below the ground surface, with transitional provisions that will result in substantial expansion of drainage-based land-use in peatlands, greatly compromises PP71 as a regulation to prevent damage and preserve the function of peat ecosystems. Furthermore, the concerns of industry regarding the potential impacts of 0.4m water table depths on crop growth for existing plantations and technical challenges for managing and monitoring water tables need to be addressed by government as there is no point in legislating a target that cannot be achieved in practice. **In short, the desired win-win scenario of best management practice for oil palm and pulp plantations while maintaining peatland ecological integrity is simply not possible with drainage as envisaged and directed under PP71.**

The Academic Paper for the Revision of PP71

15. The Ministry of Environment and Forestry has produced an academic paper (*naskah akademis*) as part of the process of reviewing PP71 for revision[1]. This paper concludes that (a) the target water level of 40cm should be changed to 40-80cm to meet the crop requirements of the plantations industry and (b) peatland land use planning and the classification of peatland for protection (*lindung*) and development (*budidaya*) should be based on clear criteria that optimalise peatland land use. The paper highlights that conservation is clearly a priority in certain peatland areas and that production on peatlands must also be able to control subsidence and carbon emissions as well as prevent fires.

16. The academic paper proposes major changes to PP71, in particular over peatland land use zoning, target water levels and the transitional provisions.

    1) For peatland land use zoning and protection, Article 9 Clause 4a is proposed to be changed from "peat with a thickness of 3m or more" to "primary peat swamp forest [on peat] with a thickness of 3m or more" – in effect this allocates the millions of hectares of degraded and undeveloped deep peat for plantations;

    2) The target water levels in plantations (Article 23 Clause 3a) is proposed to be changed from 0.4m to (i) 0.4m for annual crops, (ii) 0.6m for plantations such as oil palm and (iii) 0.8m for timber plantation crops such as Acacia;

    3) The transitional provisions (Article 45) are proposed to be deleted – the reason for this is that these become broadly redundant due to the large increase in peatland allocated to development by the change to Article 9 Clause 4a and which therefore sanctions the development and drainage of peatland covered by existing licenses.

17. The combination of these three revisions will lead to a major expansion of plantations and drained peatland compared to the current situation. The major flaw in these proposals is that expanding the drainage of peatlands will increase subsidence and carbon emissions, not control them, and will not meet the stated goals of the PP71 as a policy. Instead, they will accelerate peatland subsidence and will eventually lower the peatland to a point where gravity-based drainage is no longer possible, leading to increased and prolonged flooding and thus loss of productive land.

Long-term policy options and PP71

18. A policy to protect and prevent damage to peatlands that allows extensive peatland drainage is clearly not achievable. Government should instead focus on limiting further increases in the extent of peatland drainage, protecting remaining peat swamp forest and, over time, reducing the area of drained peatland. The economic future of peatland regions and the long-term interests of the communities living there would be better served by the phasing out of drainage-based land uses on peat and phasing in of alternative zero drainage production systems on peat. Such systems can be combined with the efficient use of very shallow peats and surrounding mineral soils for priority cash crops and/or subsistance crops.

[1] Naskah Akademis Perlindungan dan Pengelolaan Ekosistem Gambut Untuk Revisi Peraturan Pemerintah No. 71 Tahun 2014. Badan Penelitian, Pengembangan dan Inovasi, Kementrian Lingkungan Hidup dan Kehutanan. Draf 7 (Final).

19. Ultimately, the long-term prospects for drained agriculture and forestry on peatland in Indonesia are poor: eventually most plantations for crops requiring drainage on peatland will have to be abandoned. There are really only two long-term policy options to address this challenge:

    1) **Maintain extensive peatland drainage to maximise short-term economic opportunities and ignore the long-term consequences.**

       Such a policy may have significant short-term economic benefits in the form of continued and increased palm oil and pulp wood production. However, in the medium (less than 25 years) to long-term (more than 50 years) it will be associated with increasing flooding problems and resulting loss of productive land (see Figure 2). Eventually industry will be forced to withdraw due to the inevitable inundation and flooding, which is likely to lead to plantations in peatlands being abandoned in the absence of realistic and economic land use options. The abandoned plantations will experience fires and haze in the dry season. This will severely affect the economic development prospects of the next and future generations in these rural areas.

    2) **Develop and implement a peatland land use policy that will enable a responsible phasing out of drained land-use in peatlands and promote the introduction and up-scaling of zero drainage production systems that involve the restoration and maintenance of peatland hydrological integrity and sustainable economic production.**

       An approach to achieve the goals of PP71 needs to truly protect and restore the hydrological function of peatland hydrological units and ecosystems. Such an approach would prioritise sustainable economic development for local people in lands surrounding communities and villages, while maintaining extensive deep peatland areas for protection in line with existing land use regulations. Large scale plantations will need to focus their investments on existing operational plantations in peatland areas and suitable mineral soils that have already been deforested. The voluntary commitments of many plantation companies, including the RSPO, to avoid further expansion on peat needs to be adopted as broad government policy. Successful roll out of such a transition requires four main policy priorities and actions:

       a) Conservation and restoration of remaining natural peat swamp forests.

       b) The strict protection of any undeveloped peatland including licensed peatland with a peat soil deeper than 3 meters as defined in regulations since 1990 (Perpres 32/1990, PP47/1997, PP26/2008 and others).

       c) Phasing out of drainage based land use systems, planned well before the gravity drainage limit is reached, recognizing that once flooding problems become evident alternative land-use options will also diminish.

       d) Development of environmentally and economically sustainable land uses on rewetted peatlands (paludiculture), involving mainly perennial crop species and commodities that do not require peatland drainage (see Giesen 2013).

Whereas current policies and practices follow Option 1, it is Option 2 that will in the medium to long term provide far more economic, environmental and social benefits, and ultimately is the only sustainable option for Indonesia. The benefits of Option 2 include:

- Long-term **economic benefits** to the private sector in being able to develop a long-term sustainable cash flow and business without being left with unproductive land assets – the sooner companies change to productive peatland use without drainage, the lower their risk of drainage related flooding, lost productivity, declining financial performance and ultimately business failure - the RSPO attempts to mitigate this risk by requiring *"drainability assessments….prior to replanting on peat to determine the long-term viability of the necessary drainage for oil palm growing. Where drainability assessments have identified areas unsuitable for oil palm replanting, plans should be in place for appropriate rehabilitation or alternative use of such areas. If the assessment indicates high risk of serious flooding and/or salt water intrusion within two crop cycles (i.e. 45 years), growers and planters should consider ceasing replanting and implementing rehabilitation"* (RSPO Principles & Criteria 2013);

- Long-term **environmental benefits:** Zero drainage will result in much lower subsidence, stabilizing the land surface. The planning of perennial crops adapted to swamp conditions such as timber and pulp from native swamp species, illipe nut, jelutung, rattan, sago and other native peatland species with commercial value will reduce fire risks through ensuring the water table is at or near the peat surface and provide an economic incentive for fire prevention;

- Long-term **social benefits:** Sustainable zero drainage peat-based land use can also be combined with land-uses on mineral soils around peatland such as palm oil and pulp wood and with village based agricultural development outside of the land use sector such as chicken and duck farming, swallow-nest farming, aquaculture and others. Option 2 will therefore ensure long-term opportunities for local farmers and communities, provide a range of income sources for men and women, and protect communities from long-term hazards of flooding and haze. Such an economic strategy is much more likely to reduce poverty in peatland regions compared to large-scale plantations based on contract labour.

- Long-term **fiscal benefits:** Less public money spent on fires, floods, maintaining roads and other peatland drainage and land subsidence related problems.

But time is critical. PP71 requires government to complete a peatland inventory and produce a final definitive map of peatland hydrological units by 12 September 2016, and to produce a peatland land use zoning plan by 12 September 2018. It may be assumed that only by then can peatland protection and management plans be devised and that implementation will follow some time after that. Moreover, the challenge of monitoring and inspecting water table depths across millions of hectares of peatland is huge and unproven and not covered by environmental regulations.[x] In other words, PP71 is likely to have real impact on the ground only many years into the future, whereas action is required now to prevent the loss of the limited area of peat swamp forest that still remains in Indonesia (outside of Papua), and address the challenge of subsidence and fires in peatland. <u>One way of accelerating implementation is to prioiritise particular peatland landscapes and hydrological units to complete peatland inventory, zoning and planning at the landscape scale rather than trying to complete a national inventory prior to zoning and planning.</u>

Recommendations for Strengthening PP71

The initiative of the Government of Indonesia to strengthen the legal framework for the protection and the prevention of damage to peatland ecosystems is much needed. This initiave will need to recognise that:

1. Peatland drainage is unsustainable economically and environmentally over the long-term;

2. Maintaining water table depths at 0.4m, even if technically and agronomically feasible for current cropping systems, will still result in continued peat soil subsidence which eventually will result in increased flooding and ultimately loss of productive land;

3. Local communities in peatland areas have been marginalised in terms of investment and economic development opportunities;

4. Past land use planing policies in peatlands, in particular the designation of protected status based on past national spatial plans (PP47/1997 and PP26/2008) to peatland within the national forest estate, have not been fully implemented leaving most peatland classified as production forest and legally available for licensing of drainage-based land-uses; and

5. The transitional arrangements for existing licenses are critical as they define the likely future expansion of peatland drainage. At present, legal and operational licenses are valid for their duration regardless of where they have been issued, while existing inoperational licenses will be valid if they begin operations by 11 September 2016. The intent of peatland land use regulations since 1990 has been clear in terms of protecting peatland with a thickness of three metres or more, so it shoud not be a surpirse to investors that such land is not available for production. As a consequence, existing inoperational licenses on deep peat are clearly outside the intent of land use regulations and should be cancelled.

The Government of Indonesia should bring together plantation companies, business associations, NGOs and other stakeholders to build on existing private sector sustainability commitments relating to peatland - in particular commitments for 'no further expansion on peatland' - and collaborate to implement and where necessary improve PP71 by the following actions:

1. Create a harmonised and integrated long-term peatland land use policy framework based on PP71 across all sectors.

   As most peatland is found in the national forest area (*kawasan hutan*), this will require a number of specific actions in the forestry sector but also agriculture sectors:

   - Revision of Article 23(4b) of PP 44/2004 on Forest Planning to align with PP71 in terms of peatland land use planning criteria;

   - Ensure that Article 11(3a) of PP71/2014 includes (i) peat with a thickness of more than 3 meters as defined in Article 9(a) and (ii) specific and/or endemic genetic resources (*plasma nutfah*) as defined in Article 9(b) as criteria for that can be applied to change the status of peatland from development to protection (Article 11(1)).

   - Ensure enforcement of Permenhut 3/2008 that requires the protection of natural forest on peat more than 3 metres deep in existing timber plantation (HTI) concessions;

   - Alignment and enforcement of Permentan 14/2009 on oil palm plantations on peat;

   - Prioritise key peatland areas in Sumatra and Kalimantan, and elsewhere in Indonesia (especially Papua but also Sulawesi and Moluccas) with remaining natural forest for protection, and target already degraded deep peatlands with restoration and production without drainage that truly has the potential to be sustainable;

- Solicit proposals for the protection of peatland areas by third parties, including Ecosystem Restoration Concessions, noting the flawed historical basis for the classification of peatland as production forest (i.e. the lack of application of peat depth of 3 metres as a criteria in land use zoning), and solicit proposals for the rehabilitation and sustainable development without drainage of degraded/deforested peatland areas.

2. Review the aspects of PP71 relating to the treatment of existing licenes and extent of peatland that will be impacted by drainage in the future. Industry is seeking the environmental standard on water table depths to be relaxed from 0.4m to a slightly deeper range depending on commodity but some also have an interest for all existing operational and non-operational licenses to be accommodated and remain valid. These two aspects combined will lead to widespread and continued damage to peatland ecosystems and a failure of PP71 to achieve its goals. Instead, PP71 should incorporate a permanent moratorium to the expansion of peatland drainage by both (a) cancelling non-operational licenses on deep peat and (b) only allowing the development of plantations without drainage in areas that have already lost their natural forest cover. Only this course of action will enable the remaining ecological function of peatland to be maintained and further damage prevented.

   This will require:

   - Government should acknowledge the sustainability commitments already made by leading companies in the plantations sector and the RSPO regarding no further expansion on peatland and adopt similar standards in policy and legislation to ensure a level playing field and that these commitments are really achieved on the ground.

   - The provision in PP71 that non-operational licenses located on peatland that should be legally protected according to PP71 are considered valid (PP71, Article 45(b)) should be reviewed in order to limit the expansion of drainage across sensitive peatland landscapes. Instead, only licenses that were valid and operational on 12 September 2014 (or the date of the revison of this Article) should be considered legally valid. All legal non-operational licenses could either (a) be revoked or redelineated outside of the proteted peatland zone as defined by PP71 or (b) a condition of their operations in the environmental permits if not yet issued should be for zero drainage use.

   - For non-operational licenses, this will require licensees to revise business plans or give up the license. Such a course of action will not affect those currently working in the plantations sector and will thus not have serious negative impacts on employment.

3. Develop technical guidelines and regulations relating to peat and swamp management required for the effective implementation of PP71 including:

   - Develop Ministerial Regulations for implementation and detailed technical guidelines on achieving the objectives and standards set out in PP71. If considered necessary by *existing operational* license holders, this could include relaxing the environmental limit of 0.4m to a water table depth of 0.4-0.6m but only for existing, operational license holders.

   - Develop Ministerial Regulations for water management and other guidelines in swamps and peatlands as mandated by PP73/2013 on Swamps. In particular these should address: (1) Regulation of water table depths in swamps including peat swamps, monitoring and supervision; (2) Delineation and control of use of swamp buffer zones; (3) Guidance on how to maintain water in swamps used for production and prevent off-site hydrological impacts; (4) Audit of water management operations; and (5) Water management guideline.

   - Develop regulations on swamp buffer zones as defined in PP 73/2013 (Article 25) – this is important as impacts of drainage can extent for several kilometers beyond the drained area. Swamp buffer zones should be located within existing concessions and development areas and have no artificial drainage. They should be broad enough to ensure that drainage impacts do not

extent beyond the plantation. This is of particular importance where plantations border protected areas or Ecosystem Restoration Concessions and areas protected or set-aside areas within plantations (*kawasan lindung*) .

- Involve private sector and civil society in the development of Ministerial Regulations for implementation.

4. Develop and expand an emergency program to protect, reserve and rehabilitate peatlands, based on PP71. Most if not all of the peatlands in Sumatra, Kalimantan and Sulawesi should now be considered in a state of 'ecological urgency' (see PP71, Article 11, Clause 3), with a loss of remaining function being inevitable if business as usual continues. At a minimum, all remaining peat swamp forests should be protected. Detailed guidelines on this need to be drafted as Ministerials Regulations. Nevetheless this and other actions related to inventory and planning in PP71 will take years to complete. For this reason, the following is proposed:

    - A temporary moratorium on (i) all new peatland drainage, and (ii) clearance and felling of natural peat swamp forest that applies to all peatland, licensed and unlicensed. Only such a moratorium can prevent further unwanted damage while PP71 is reviewed and peatland inventory and planning completed.

    - Provide a legal definition of 'ecological urgency' (Article 11(3)) that can be immediately applied to protect sensitive peatlands – given the ecological state of many peatlands in Sumatra, Kalimantan and Sulawesi, this is an important action to achieve the goals of PP71.

    - Complete a rapid assessment of peatland landscapes with ecological urgency and put in place regulations to protected or reserve such areas (see Article 33 and 34) as required to maintain ecological functions. Priority peatland areas for this include (a) areas with High Conservation Value or with High Carbon Stock natural peat swamp forest remaining, (b) areas that have limited hydrological damage and where any artificial drainage can be blocked easily, (c) areas with significant peat layer (> 1 meter) remaining, (d) shallow peat layers (< 1 m) underlain by potential acid sulphate soils (sulphaquents) and (e) peatlands where subsidence is causing the peat surface to approach the drainage limit.

    - Accelerate the implementation of PP71 by completing peatland inventory on a landscape by landscape basis rather than at the national scale. This will enable inventory, land use zoning and designation to be completed quickly for priority landscapes where there is already much data and which thus should not have to wait for a national peatland inventory to be completed.

    - Completion of technical guidelines for revising the land use status of peatland (Article 11(6))

5. Develop the basis for long-term sustainable peatland use through zero drainage agriculture and forestry involving small holders, community-based enterprises and the private sector through:

    - Maintaining a landscape perspective and facilitating solutions amongst stakeholders through an open and transparent landscape planning process that includes sufficient opportunities for public participation.

    - Investment in a Research and Development (R&D) program involving the public and private sector for zero drainage use of peatland that maintains ecological functions (i.e. especially maintains wetness/hydrological function to halt peatland subsidence) and provides an economic return

    - Development of long-term peatland protection and management plans based on a managed reversal of extensive peatland drainage to peatland land use without drainage.

In conclusion

Peatland land-use management and planning should include full consideration of current knowledge of the impacts of peatland drainage and the consequences of different policy options in relation to specific peatland issues, including the disproportionately high GHG emissions, the unavoidable soil subsidence and its impacts on drainability, fire risks, traditional uses, paludiculture options and biodiversity values.

Sustainable peatland management can still be achieved but requires the concerted efforts of all stakeholders, government, industry, civil society organisations and other stakeholders. In the short to medium-term (1-5 years) this should create a peatland management system based on PP 71 that reduces as far as practical the impacts of drainage on the nation's peatlands, while in the longer-term peatland management should move towards a more sustainable use by phasing out drainage-based land-uses and replacing these with sustainable paludiculture production systems (i.e. without artificial drainage) and where appropriate with nature restoration.

Only such a policy will enable healthy sustainable productive peatland landscapes for people and nature that will meet the goals of PP71 and Indonesia's sustainable economic development policy.

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Figure 1: Summary of PP71/2014

PP71 covers seven main aspects of peatland protection and management: planning, utilisation, control, maintenance, supervision, sanctions and transitional provisions. The two main areas of discussion surround (1) determination of function, in particular the criteria and use of 3m and (2) a water table depth of 0.4m being an indicator of peatland damage in developed peatland.

PLANNING

A. Planning (Article 4-19)

1. Peatland Inventory (Articles 5-8)
- Use satelite images & photos
- Delinate peatland units (KHG)
- Defines content of peat maps

2. Determination of function (Articles 9-13)

Protected peatland includes:
1) 30% of peatland unit, plus:
2) peat > 3m
3) endemic biodiversity
4) protected species*
5) protected peatland*

3. Peatland Protection and Management Planning (Articles 14-19)
- National, provincial & district plans
  - National = cross province KHG
  - Provincial = cross district KHG
- Plans include:
  1) Utilisation and/or reservation (see Article 34)
  2) Maintenance and protection of quality and/or function
  3) Control, monitoring enhancement & preservation
  4) Climate change mitigation and adaptation

IMPLEMENTATION

B. Utilisation (Articles 20-21)

Definition of Legal Uses (Article 21)

For protected (*lindung*) and development (*budidaya*)
1. Protected peatland: Research, knowledge, education and environmental services (Article 21)
2. Development peatland: All utilisation as defined in peatland protection and management plans (Article 21)

C. Control (Article 22-32)

1. Prevention of damage (Articles 23-26)

Damage in protected peatland:
1) Manmade drainage
2) Exposed acid sulphate
3) Exposed sand substrates
4) Reducation in area and/or volume of land cover

Damage in developed peatland:
1) Water level lower than 40cm**
2) Exposed acid sulphate soil (ASS)
3) Exposed sand substrates

Prohibited activities on all peatland (Article 26) include:
1) Open protected peatland
2) Drainage that causes peat to dry out
3) Burning peat land
4) Activities that cause damage as above

2. Response to damage (Articles 27-29)
- Damage from (i) fires, (ii) exposing ASS, (iii) exposing sand, (iv) drainage that drys out peat and (v) opening peatland must be responded to within 24 hours with:
  1) Fire suppression
  2) Isolate exposed areas
  3) Block canals/build water controls
  4) Other measures

If no response in 24 hours, third party will handle. Costs borne by license holder

3. Recovery (Articles 30-32)
- Recovery to damage within and outside of concession must be completed
- Recovery includes: (1) Rehabilitation, (2) Restoration, (3) Other means
- Thirty day time limit to commence

D. Maintenance (Articles 33-35)

1. Reservation of peatland (Article 34)
- Designation of peatland that cannot be managed for a specific time period by Minister, Governor or Bupati. Defined by:
  1) Protected peatland covering less than 30% of KHG
  2) Development peatland of which 50% is already licensed or is already damaged
  3) Moratorium peatland
  4) Development peatland redesignated for protection

2. Peatland and Climate Change (Article 35)
1) Mitigation
2) Adaptation

MONITORING & SANCTIONS	**E. Supervision (Articles 36-39)** **1. Responsibilities (Article 36)** * Minister, Governor & Bupati – according to responsibilities * Environmental Monitoring Officers to be appointed * Assisted by civil investigator **2. Authority (Articles 37-38)** 1) Monitor 2) Request information 3) Copy documents 4) Entry to places 5) Photograph 6) Make recordings 7) Take samples 8) Inspect equipment 9) Inspect installations 10) Stop certain violations **F. Administrative Sanctions (Articles 40-44)** **1. Types (Article 40)** * Minister, Governor & Bupati – according to responsibilities as follows: 1) Written warning 2) Government enforcement 3) Suspension of environmental license 4) Cansellation of environmental license Government enforcement: a. Temporary suspension b. Transfer of quipment c. Blocking canals d. Demolition e. Confiscation of equipment f. Temporary suspension of all activities g. Other actions **2. Sanctions (Articles 41-44)***** 1) All prohibitied actions (Article 26) 2) No respons to damage (Articles 27 & 28) 3) No recovery actions (Articles 30 & 31) Of these occur, will lead to **government enforcement**; If no response, will lead to **suspension of environmental license**; If no response, will lead to **license cancellation**
TRANSITIONAL PROVISIONS	**G. Transitional and Closing Provisions (Articles 45-47)** **1. Provision for existing licenses (Article 45)** From time this regulation legal (i.e. 12 September 2014) 1) Licenses of activities to use protected peatland issued before this regulation and already operational are valid until license expires 2) Activities to utilize protected peatland that are already licensed but not yet operational, the license is valid but with an obligation to protect the peatland hydrological function 3) If license holder does not maintain hydrological function for two years, the license will be revoked **2. Timeline for Implementation (Article 46)** * Peat maps to be produced in 2 years by 12 September 2016 * Peat function to be designated in 4 years by 12 September 2018

Ministerial Regulations (to be drafted and Issued):

1. Peatland Inventory
2. Formation of study team for changes to function of peatland
3. Proposal of change in status of peatland function
4. Designation of peatland function
5. Formulation, legalisation and change of plans
6. Criteria for recovery of function of damaged peatlands
7. Criteria and time for enforcement, suspension and revocation of environmental licenses

Notes

* These criteria and 'ecological urgency' are used to reclassify peatland from development to protection (Article 11(3))
** Peat <1m is excepted – here criteria to define damage in developed peatland will be defined in environmental license
*** No specific sanctions are defined for exceeding damage thresholds defined in Articles 23-24

Figure 2: Peat subsidence from drainage will lead to a lowering of the drained peatland surface and eventually a loss of drainability and flooding as the land surface nears the elevation of river water levels (Hooijer *et al* 2006/2010).

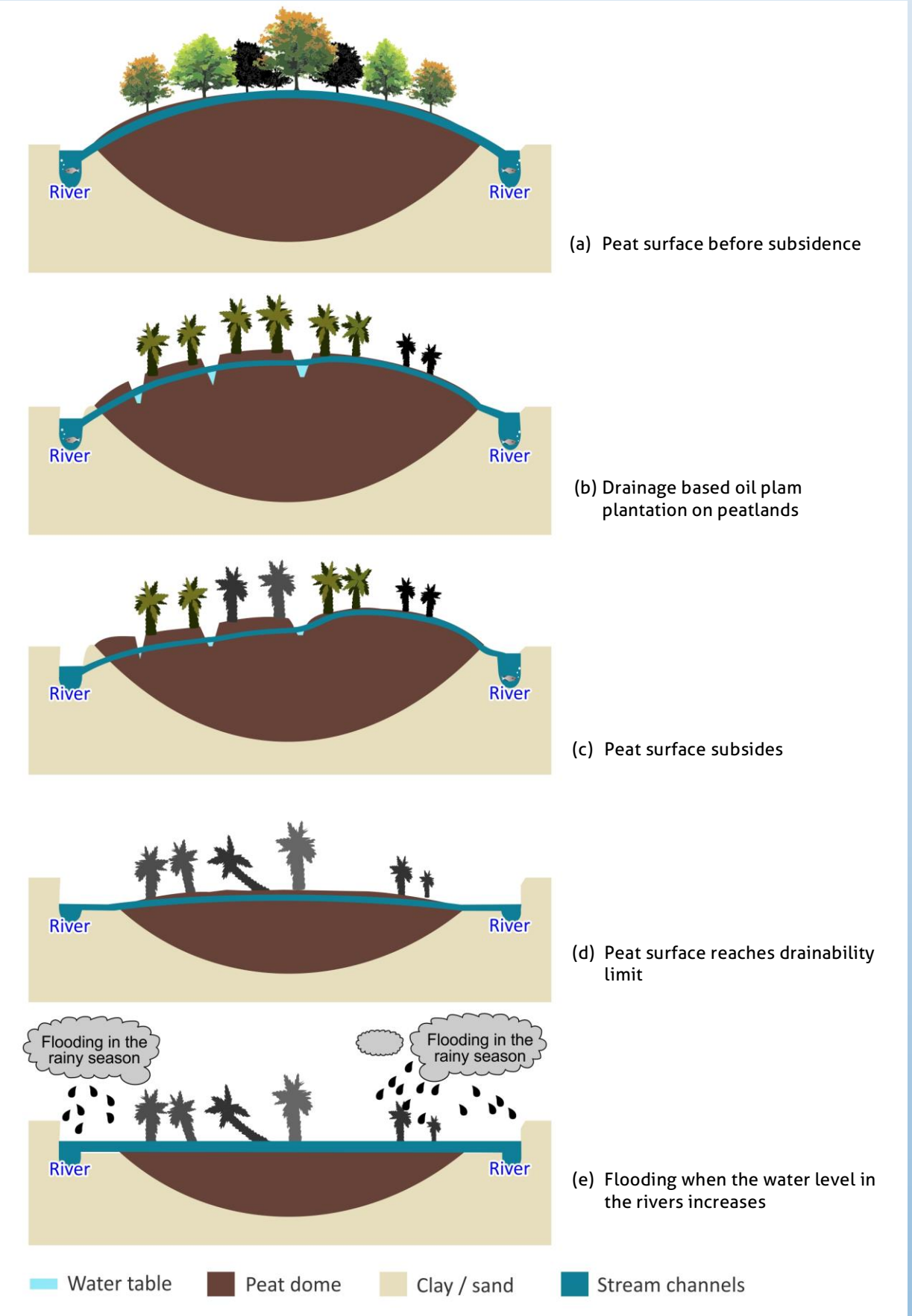

Figure 3: Photos of flooded oil palm etc..

(Photo by: Nyoman Suryadiputra)

(Photo by: Dedi Mulyadi)

(Photo by: Marcel Silvius)

(Photo by: Yus Rusila Noor)

Endnotes

[i] Moderate drainage levels are defined here in terms of their impact on subsidence and emissions.

[ii] A number of industry organisations have claimed that PP71 could lead to hundreds of thousands of job losses and other economic impacts. While PP71 provides generous transitional arrangements for industry including legal certainty that all operational licenses will remain valid and non-operational licenses are provided with two years to initiate development, these claims appear to be based on the notion that a ground water depth of 0.4m is not feasible for oil palm and *Acacia* plantations, therefore forcing these plantations to close. Such economic impacts are clearly an extreme outcome and not the intention of PP71 as seen in the transitional arrangements.

[iii] See, for example, *PP Ekosistem Gambut Direvisi, Akademisi Usulkan Batas Muka Air 1 Meter* (December 2014, Sawit Indonesia, http://sawitindonesia.com/berita-terbaru/pp-ekosistem-gambut-direvisi-akademisi-usulkan-batas-muka-air-1-meter); Teknologi Ekohidro Tuntaskan Masalah Gambut (3 November 2014, Sinar Harapan, http://sinarharapan.co/news/read/141103031/teknologi-ekohidro-tuntaskan-masalah-gambut)

[iv] See for example, *Batas Muka Air Jadi Fokus Revisi Peraturan Lahan Gambut*, 27 December 2014, Indonesia Palm Oil, http://indonesiapalmoil.net/batas-muka-air-jadi-fokus-revisi-peraturan-lahan-gambut/

[v] The companies in the Roundtable on Sustainable Palm Oil (RSPO) represent more than half of the palm oil sector

[vi] *Eko-hidro* is a controlled drainage water management system applied by PT RAPP in Riau and described in Tropenbos-APRIL-Ministry of Forestry (2010) Data dan Informasi Dasar Penilaian Menyeluruh Nilai Konservasi Tinggi Semenanjung Kampar. Many of the claims of eko-hidro do not agree with published studies regarding the impacts of peatland drainage and a review finds technical flaws in the supporting water balance model of peatlands (see Mawdsley et al. (2013) Technical Guidance for Peatland Policy Development. Quick Assessment and Nationwide Screening (QANS) of Peat and Lowland Resources and Action Planning for the Implementation of a National Lowland Strategy. Government of Indonesia & Partners for Water Programme, The Netherlands.)

[vii] The RSPO Principles and Criteria 2013 require: (1) For new developments: Planting on extensive areas of peat soils should be avoided. Total area of planting on such soils should not be greater than 100 ha. Recognizing that small growers have fewer options, for the development of 500 ha or less, no more than 20% should be on peatland. (2) In existing plantations on peat, the subsidence of peat soils shall be minimized and monitored. A documented water and ground cover management plan shall be in place. The water table should be maintained at an average of 50 cm (between 40 – 60) cm below ground surface, or an average of 60 cm (between 50 – 70) cm below ground surface as measured in water collection drains, through a network of appropriate water control structures. (3) Drainability assessments shall be required prior to replanting on peat to determine the long-term viability of the necessary drainage for oil palm growing. Where drainability assessments have identified areas unsuitable for oil palm planting, plans should be in place for appropriate rehabilitation or alternative use of such areas. If the assessment indicates high risk of serious flooding and/or salt water intrusion within two crop cycles, growers and planters should consider ceasing replanting and implementing rehabilitation.

[viii] Moderate drainage levels are defined here in terms of their impact on subsidence and emissions.

[ix] Under Article 45 of PP71, operational licenses will remain valid for their legal duration, while non-operational (inactive) licenses are provided with a period of 2 years to become operational. No provision is made for a verification process of whether a license is actually operational or not in September 2016.

[x] Provisions for the management of peat swamp water resources are actually provided in PP73/2013 on Swamps.

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