The Challenges of High Carbon Stock (HCS) Identification Approach to support No deforestation Policy of Palm Oil Company in Indonesia: Lesson Learned from Golden-Agri Resources (GAR) Pilot Project

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Abstract

Increasing awareness of the environmental consequences of palm oil cultivation by consumers and the campaigns of environmental Non Governmental Organizations (NGOs) have led the palm oil industry to see ways to break the links between palm oil and forest destruction. This has been achieved by means of a pragmatic methodology, entitled the High Carbon Stock (HCS) approach, to protect not only established or mature forest but also young regenerating forests to let them grow further as forests.

The HCS methodology is relatively new to the industry. With increasing industry commitment for forests protection, it is necessary to analyze this method to learn about the challenges and to further develop a win-win solution between business interests and forest conservation.

This paper deals with the analysis of the HCS methodology in a pilot project in Indonesia. First, an introduction of the palm oil industry in Indonesia and its link to deforestation is presented. This is followed by a description of the HCS methodology and the pilot project process. Finally, an analysis of its challenges from the technical, local community, government, and industrial aspects will be performed.

Keywords: Palm Oil, No deforestation policy, High Carbon Stock (HCS), forest conservation.

I. Introduction

I.1. Indonesia’s Forests
According to the Ministry of Forestry (2011), Indonesia’s total forests area is nearly 136,174,000 ha. Although Indonesia occupies only 1.3% of the world's land area, some 17% of species on earth are found there. Its forests contain 11% of the world's plant species, as well as 15% of reptiles and amphibians, 17% of birds, and 12% of mammal species. Over 1,400 species of birds have been recorded in Indonesia, 420 species being endemic (Down to Earth, 2002).
Unfortunately, Indonesian forests have been labeled as being at extreme risk regarding deforestation. Quoting data from the Ministry of Environment, the average of deforestation was 830,000 million ha per year between 2006-2009 (Ministry of Environment, 2013). Greenpeace (2013a) reported that 620,000 ha per year of Indonesia’s forest were deforested between 2009-2011. Deforestation mostly happened inside so-called designated forests areas reaching 73.4%, while the remaining was outside the forests area (Ministry of Environment, 2013). According to PEACE (2007), reasons for deforestation are illegal logging, forest fires, forest conversion and agriculture expansion, while the emissions from deforestation and forest fires are five times those from non-forest emissions, making Indonesia one of the largest emitters of CO2 in the world.

Based on the Indonesian Forestry Law No. 41/1999 and revised under the Ministry of Forestry Regulation No. P.50/Menhut-II/2009, forests are categorized as: conservation forest, protected forest and production forest. Production forest is further classified into limited and convertibly production forest. The latter is defined as a forest which can be converted to a non-forest area for other purposes. Unclear land classification and inadequate forest governance in Indonesia pose serious challenges to prevent forests lost and community disputes. Rosenberg et al (2013) reported that 70 % of the total Indonesian land area is classified as forest estate (kawasan hutan) and that the remaining 30% was classified as non-forest estate (Areal Penggunaan Lain-APL). Only this area can be developed for other purposes such as settlement and agriculture, including palm oil plantation.

The decentralization system has added to the complications of forestry management in Indonesia. The World Bank (2006) reported that the management of the forests under decentralization, which came into effect in 1999, faces hurdles, especially with respect to revenue sharing. The World Bank explains this because of an unclear relationship between the regional authority and decentralization laws and forestry laws. The Forestry Law No.41/1999 gives the central government control over forestry issues, but The Regional Autonomy Laws No.22/1999 transferred back the authority to the local governments. This is creating further disputes between the central government and local government.

The lowland and other main forest types on the three islands of Sumatera, Kalimantan and Sulawesi have been lost between 1900-1997 (FWI/GWF, 2002). Carlson et al (2012) wrote that deforestation in Kalimantan is merely caused by forest conversion to oil palm plantation. In fact, the forests classifications do not represent the situation on the ground. Many forest estates are already occupied or degraded, and non-forest estates also contain dense primary forests, like in Sumatera and Kalimantan island. As result, many palm oil plantations take place on High Conservation Value (HCV)3 forest, including peatlands.

Based on Government Regulation No. 10/2010 (Articles 33-42), a conversion of limited production forests to convertible production forest is not allowed in provinces whose forest covers below 30% of the land area. According to Government Regulation No. 10/2010 and the subsequent Ministry of Forestry Decree No. P.34/ Menhut-II/2010 regarding re-classification of forest lands functions, it is intended to potentially delineate and change the forests classification because of biophysical condition changes. The regulation has opened the possibility to switch permanent forests to convertible production forests, where most palm oil plantations are developed.

I.2. Palm Oil Expansion and Deforestation

One of the major drivers of deforestation in Indonesia is palm oil plantation. The competitive price of Crude Palm Oil (CPO) and the global increase of biofuel demand has led to palm oil expansion on forested lands of the main islands of Indonesia (Sumatera and Kalimantan), increasing the risk of biodiversity loss, forests genuine functions and social conflicts (Caroko et al, 2011). According to PwC (2012), the World Bank predicted that an additional 6.3 million ha of palm oil plantation will be required to meet global demand by 2020. In 1995, the palm oil plantation area was reported as approximately 992,400 ha and currently, the Indonesian Central Statistics Office (BPS, 2012) reports that total palm oil plantation in Indonesia was 5,349,800 ha in 2011 and increased to 5,592,000 ha in 2012. Latest data from IPOC (2013) stated that total palm oil plantation is reaching 9 million hectares with total production at 25.7 millon ton.

According to PEACE (2007), Indonesia has 24 billion tons of carbon (GtC) stored in the vegetation and soil. Tropical forests like those in Indonesia represent large storages of carbon, contain a rich biodiversity, and are vital for the livelihoods of communities depending on them. About 80 percent of carbon is stored in the standing forests; but the amount is dropping.
dramatically due to CO₂ (Green House Gases) emission release as result of deforestation and land use change. Indonesia has been ranked as the third largest emitter of GHG in the world®. The main emitter is the forestry sector through deforestation, peat land degradation and forest fires which account for 85 percent of annual emissions.

Palm oil products have multiple applications, such as cooking oil, the snack industry, personal care products to biofuel. Its yield per hectare is ten times higher than other vegetable oils such as soybeans (PwC, 2012). It is also the second largest agricultural traded commodity in the world after soybeans. The use of palm oil as cooking oil is increasing in India and China, where the food industry is shifting from hydrogenated fats to palm oil. Palm oil is also increasingly used as an ingredient in cosmetics and health products (PwC, 2012).

Figure 1 presents the growth of palm oil production from Indonesia and other producer countries.

Figure 1. Growth of Palm Oil production in Indonesia and other key producer countries


The European Union (EU) has policy to reduce GHG emissions and, for that purpose, 10% of fuels in the transportation sector will have to come from renewable (i.e. non-fossil) energy sources by 2020. Hence, each Member State is obliged to set a biodiesel target and it is expected that palm oil will replace mineral oil. According to PwC (2012), this policy will require an estimated 7.9 million ha for biofuel crops outside the EU. This land conversion potentially causes 31 to 65 million tons of GHG emission per year.

Despite of its multi-use and its economic contribution for Indonesia, palm oil can create negative impacts on the environment and local communities. It may lead to destruction of natural forests and social conflicts. Key wildlife habitat is destroyed, harming endangered species such as the Sumatran tiger and the Orangutan (Greenpeace International, 2013a). Deforestation and the draining of peat swamps encourage climate change due to releasing large quantities of GHG. Moreover, food security in Indonesia may be affected. This development may be aggravated if policies for the promotion of biodiesel through subsidies are implemented.

Environmental NGOs have heavily criticized this situation. Industry responded with the foundation of the Round Table for Sustainable Palm Oil (RSPO). Its aim is to promote sustainable palm oil through multi-stakeholders dialogue in the framework of certification schemes. The certification process is based on eight sustainability principles, including High Conservation Values (HCV) forest protection, zero burning policy, waste reduction and prevention of social conflicts.

Unfortunately, The RSPO has made limited progress. Many environmental NGOs, including Greenpeace, strongly criticizes RSPO on its failure to protect forests due to systemic problems within RSPO. Greenpeace reported that badly managed palm oil companies tend to use the certification and membership to hide their unsustainable operations (Greenpeace International, 2013b). According to PwC (2012), RSPO is dominated by palm oil consumer companies while putting a extra cost burden on palm oil growers.

The Indonesian government has set a target of GHG emissions reduction to 26% without international assistance by 2020. Presidential Instruction No. 6/2013 placed a moratorium on rainforest logging until 2015 (Ministry of Home Affairs, 2013), within a cooperation framework between the Indonesia and the Norwegian governments. The moratorium covers a postponing of new licenses for palm oil plantation developments on primary forests and peat lands, restoring 300,000 ha of damaged forests to maintain biodiversity values as well as enforcing the law on illegal trade of protected species. (Leng, 2013). Moreover, the Indonesian government launched the ISPO (Indonesia Sustainable Palm Oil) in 2011 as mandatory certification scheme for
voluntary certification schemes for palm oil such the RSPO and mandatory certification (ISPO) have advantages and disadvantages. Importantly, they greatly rely on the capacities of the certification bodies and effective enforcement.

II. No Deforestation Policy and High Carbon Stock Methodology

The palm oil sustainability concept applied by the private sector is not only a form of business responsibility, but also intends to address the increasing pressure of customers to implement measures for ensuring that products and operations along their supply chain are not linked to deforestation, social conflicts and do not contribute to global GHG emissions. Some NGOs such as the Forest People Program (FPP), Rainforests Action Network (RAN) and Greenpeace actively campaign on this issue.

As result of intense consumer and NGOs pressure, in February 2011, the palm oil company Golden Agri Resources Limited (GAR) and its subsidiary PT SMART Tbk (SMART) announced a new Forest Conservation Policy (FCP) that commits to prevent development in areas with HCV area, peat lands and to have a no deforestation footprint i.e. zero gross deforestation via the conservation of High Carbon Stock (HCS) forests.

In order to implement its FCP, an efficient method that is able to identify the high carbon stock forests is required that can differentiate the high carbon stock forests from degraded areas with lower biodiversity and carbon value to support decision making for palm oil development the HCS forest methodology was developed. It is now being tested in several tropical regions in Indonesia, Papua New Guinea and Africa.

In Indonesia, the HCS methodology distinguishes among six different strata of vegetation in the humid tropics on mineral soils namely High Density Forest (HK3), Medium Density Forest (HK2), Low Density Forest (HK1), Old Scrub/Young regenerating forest (BT), Young Scrub (BM), and Cleared/ Open land (LT). (Greenpeace International, 2013c). These strata (Table 1) correspond to the Indonesian Ministry of Forestry classification (Krisnawati et al, 2012).

Once the vegetation stratification has been completed, the HCS strata threshold is then applied (e.g. Figure 4). The HCS threshold is set between BT (young regenerating forest) and BM (scrub). The potential HCS forest areas include HK3, HK2, HK1 and BT, while the area of non-HCS covers BM (young scrub) and LT (cleared/open land) that would be potentially for palm oil development.

Table-1 Six Strata of Vegetation Covers

<table>
<thead>
<tr>
<th>Strata Identified</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Density Forest (HK3)</td>
<td>Remnant forest or advanced secondary forest close to primary condition</td>
</tr>
<tr>
<td>Medium Density Forest (HK2)</td>
<td>Remnant forest but more disturbed than High Density Forest</td>
</tr>
<tr>
<td>Low Density Forest (HK1)</td>
<td>Appears to be remnant forest but highly disturbed and recovering (may contain plantation/mixed garden)</td>
</tr>
<tr>
<td>Old Scrub (BT)</td>
<td>Mostly young re-growth forest, but with occasional patches of older forest within the stratum</td>
</tr>
<tr>
<td>Young Scrub (BM)</td>
<td>Recently cleared areas, some woody re-growth and grass-like ground cover</td>
</tr>
<tr>
<td>Cleared/ Open Land (LT)</td>
<td>Very recently cleared land with mostly grass or crops, few woody plants</td>
</tr>
</tbody>
</table>

Source: GAR and SMART (2013a)

The basic approach of the HCS methodology consists the estimation of carbon stocks using vegetation stratification and subsequent forest patch analysis, in part with the help of a Geographical Information System (GIS) as described in Table-1.

Figure-4 Forests structure cross section showing strata and the HCS threshold

With more dense and complex vegetation, the volume of biomass and woody material (such as trees) is larger and the amount of carbon held within the vegetation is also higher. On the basis of the HCS stratification, a land-use decision making system is established to determine the types and strata of vegetation to be conserved and those which can be cleared based on a carbon stock threshold.

The vegetation stratification is carried out through a
pilot project including other 7 concessions and followed by combination and calibration of analysis of satellite imagery and field plot data. From this process, potential HCS forest areas are identified and mapped

Identified sample plots (50mx10m) in the field study are used to measure Above Ground Biomass (AGB) in trees ≥ 5 cm Diameter at Breast High (DBH). The coefficient of variance for the target strata is calculated using the Winrock Terrestrial Sampling Calculator with a 5% sampling error. Estimation of a tree’s biomass is performed by taking the DBH and using a generic allometric by Brown\(^\text{10}\) for Tropical Moist Forests.

**Figure-2 HCS Implementation Process**

Source: GAR and SMART (2013a)

The HCS methodology has two main phases (1) HCS identification process and (2) the HCS forests patch analysis and conservation (Figure-2). The first phase consists of a combination of remote sensing, Geographical Information System (GIS) and field plotting methods leading to a stratification i.e. grouping land cover images into homogenous strata with high resolution combined with calibration from field plot inventory data.

The second phase consist in an analysis of identified HCS forest patches for shape, size, connectivity, landscape aspects, and quick biodiversity checks, as well as risks/threats in order to set for conservation objectives for appropriate area. In this phase, social aspects are also considered to ensure that lands utilization respects the rights of local communities through a free, prior informed consent (FPIC)\(^\text{11}\) and safeguards the legal status of lands. Land that is essential for food production is not considered HCS (such as areas in a shifting cultivation cycle), and communities must give their consent to HCS forest conservation areas.

In a certain sense, the HCS methodology allows for a distinction between forest and degraded former forest lands. In this process, peat lands and HCV areas can be integrated in land-use decision making. In that way, it creates a balance between palm oil plantations and forests which can be conserved and further restored to sequester carbon, and it helps to maintain the ecosystem functions as well as the biodiversity richness (See Figure-3).

**Figure-3 HCS Forest patch Analysis and Conservation Process**

Source: GAR and SMART (2013a)

The HCS methodology can assist palm oil companies to revert areas to their natural ecological status as forests and to protect biodiversity and reduce GHG emissions. They can distinguish themselves a deforestation free palm oil producers, responding to increasing global demand for “no deforestation free palm oil“. They can also engage in a multi-stakeholder platform in which government, civil society and, especially, local communities are involved.

**III. The Challenges of the HCS methodology: Learning from the GAR Pilot Project**

In the second year of implementation of its Forest Conservation Policy, GAR initiated a pilot project with the HCS approach. The current active palm oil developments of GAR-SMART in Indonesia consist of eight concessions in East and West Kalimantan, namely PT.Agro Lestari Mandiri, PT. Bangun Nusa Mandiri, PT. Cahaya Nusa Gemilang, PT. Kencana Graha Permai, PT. Buana Adhitama (BAT), PT. Kartika Prima Cipta (KPC), PT. Persada Graha Mandiri (PGM) and PT.Paramitra Internusa Pratama (PIP). GAR/ PT SMART Tbk, tested the HCS methodology in its PT KPC concession as a pilot project\(^\text{12}\), starting on March, 13, 2013, and also their other concessions with the main objective to establish a framework for the adoption of the HCS methodology by the palm oil industries.
The results provide vital information on the vegetation cover strata in order to give guidance for planning development and conservation. According to the HCS threshold (see Figure-4), BM and LT were classified as non-HCS areas which can be further developed, while the HCS area to be conserved comprises BT, HK1, HK2 and HK3. Figure 5 and Figure 6 show stratification maps of PT KPC and the conservation areas.

Figure-4 PT KPC Stratification Map

Source: GAR and SMART (2013b)

Table 2 presents the results of the HCS area identification for PT. KPC and other concessions.

Table 2 Results of the HCS area identification for PT. KPC and other concessions (in ha)

<table>
<thead>
<tr>
<th>Concessions</th>
<th>HK3</th>
<th>HK2</th>
<th>HK1</th>
<th>BT</th>
<th>BM</th>
<th>LT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT. KPC</td>
<td>610</td>
<td>478</td>
<td>739</td>
<td>1,293</td>
<td>2,228</td>
<td>6,895</td>
<td>12,243</td>
</tr>
<tr>
<td>7 other concessions</td>
<td>0</td>
<td>137</td>
<td>7,82</td>
<td>4,023</td>
<td>20,55</td>
<td>15,14</td>
<td>51,729</td>
</tr>
<tr>
<td>Total</td>
<td>610</td>
<td>615</td>
<td>8,56</td>
<td>9,316</td>
<td>22,82</td>
<td>22,04</td>
<td>63,971</td>
</tr>
</tbody>
</table>

Source: GAR and SMART (2013b)

Overlying HCS areas and HCV areas is important because non-HCS areas might also overlap with HCV areas. The success factor of the HCS methodology depends also on the quality of the HCV and environmental impacts assessment process. A good quality of those assessment potentially will be able to reduce the cost of rapid biodiversity assessment required in the HCS assessment process in some specific patches.

Figure-5 Proposed HCS Forest Conservation Areas for PT KPC

Source: GAR and SMART (2013b)

Any HCS area will be excluded from a conservation area plan if the patches do not meet the connectivity requirements and therefore they will not be viable for conservation.

It should be note that HCS methodology requires expertise in GIS and mapping analysis for successful outcomes. More homogenous vegetation will be easier to be stratified than heterogenous vegetation, since the mapping image of the latter will show more colors representing more vegetation than the image of the former. Additionally, it is also challenging for an inexperienced person to differentiate mixed gardens of local people from a young regenerating forest, therefore, social and demographic related data are also needed to provide guidance.

If the expertise is given, the HCS methodology is relatively simple, practical, quick, and cost-effective for industrial application. It is not, however, appropriate for carbon accounting purposes since it only counts above ground biomass (AGB) focusing only on the trees>5cm and not on below-ground biomass. Therefore, it underestimates true total biomass carbon by approximately 50% (Greenpeace International, 2013c).

The application of HCS methodology in the palm oil industry is relatively new, it can be challenging to convince palm oil growers to adopt this approach as they are questioning the scientific basis of this
methodology and how it address business point of view.

III.2. Community

On one side, palm oil plantations can provide jobs, social services and contribute to the economic development of local people. On the other side, land use change, potentially lower the people’s livelihood. The expansion of palm oil plantation is currently still leading to social conflicts.

Impacts of palm oil developments on local communities are not new in Indonesia. According to Sawit Watch data (Friends of the Earth et al., 2008), the total number of social conflicts related to palm oil in Indonesia in 2008 reached 513 active conflicts with the highest number in South Sumatera. Figure 6 presents the numbers of social conflicts in Indonesian provinces in 2008.

![Figure-6 Oil Palm Related Conflicts in Indonesian Provinces](image)


HCV and HCS forests conservation will potentially reduce access for companies to plant palm oil. GAR/PT Smart Tbk is developing conservation management plan that involve local community in the conservation activities as well as to maintain and develop potential non timber forest products products (NTFPs) in the HCV or HCS conserved area.

There is also big challenge to make local community understand regarding HCS forest conservation concept. Local communities mostly concern about the issue why they can not have access anymore to use forests or plant palm oil or why they can not hold their own land for their own use, therefore free prior informed consent (FPIC) process is very critical. A guideline for the implementation of FPIC would be very useful.

III.3. Government

The Indonesian Government can have benefit from the implementation of the HCS methodology in fulfilling its commitment of reducing the country’s GHG emissions from the forestry sector. Unfortunately, there are still different interests, rampant risks of corruption and different maps used by different ministries, such as Ministry of Forestry, Ministry of Agriculture, Ministry of Environment, Ministry of Mining and Resources etc. concerning conservation policies.

There are still some problematic regulations in Indonesia that doesn’t give incentive for conservation practice inside the palm oil concessions and granting process of palm oil concession is based on designation area for other purpose and lack of assessment weather the concession encompass high carbon stock or high carbon value. Specifically, the regulation on abandoned land\(^3\) for example, states that if a specific land is not used as authorized purpose, then it can be claimed and handled over back to government, otherwise the concession owner has to request new authorization purpose for some of areas in its concession that has been planned to be conserved, therefore, regulation review is urgently needed.

Actually there is one regulation is potential to address this problematic situation namely regulation of land swap\(^4\) stipulated in the Government Decree No.10/2010 concerning the revision of forests allocation and function. It can be an incentive to the palm oil concession owner to behave more responsibly. However, the implementation of this regulation remains unclear since the landbank for alternative land, including degraded land according to Government Regulation No 60/2012 and Government Regulation No. 61/2010 is difficult to assign because the alternative land for land swap has to be free from any ownership/authorization and zero conflict.

III.4. Industry

On the industry side, the cost of implementing the HCS methodology is high and possibly not feasible. GAR estimated its one-off cost for HCS forest assessments around US$20/ha in its pilot project. It remains an open question whether experiences with the pilot project will reflect the real cost on implementation of the HCS methodology on a regular basis which my decrease along a learning curve. It is expected that such cost reductions will appear.
All supply and value chains in the palm oil industry play a strong role in transforming the industry. Some palm oil progressive companies are members of a Palm Oil Innovation Group (POIG) i.e Agropalma Brazil, DAABOON Group and New Britain Palm Oil Ltd and they act as pioneers - going beyond certification schemes such as RSPO. They now include protection for HCS forest and all peatland regardless the depth (Greenpeace International, 2013d).

Use companies, such as Nestle\textsuperscript{15}, also act as pioneer for traceable sustainable palm oil to ensure no-deforestation since 2012. They implement HCS forest protection as a key element of their policy. In November, 2013, Unilever\textsuperscript{16} launched its sustainable palm oil sourcing policy which includes „no-deforestation“ and protection of HCS forests with full traceability. By 2014, all suppliers not complying with the policy will be reviewed with the cancellation of contracts. Similarly, Ferrero Rocher announced its Palm Oil Charter on November 11, 2013, including HCS forest conservation and 100% traceable segregated RSPO certified palm oil by the end of 2014\textsuperscript{17}. In the same spirit, Mondelez International launched a similar policy with a 2020 time-line\textsuperscript{18}. Finally, in January 2014, L’Oreal published its sustainable ingredients policy with a commitment to zero deforestation and a target of 100% traceability of palm oil and major palm oil derivatives by 2015\textsuperscript{19}.

Obviously these industry initiative set strong incentives to palm oil growers and traders and growers. The case study of GAR\textsuperscript{20} has shown how an affected company may react to such new developments. In particular, the HCS methodology offers a viable option to be further tested and implemented by the industry in order to support no deforestation policy.

IV. Conclusion

The HCS methodology proposes a practical and scientifically based approach to achieve “no-deforestation” palm oil production. The methodology requires multi-stakeholders inclusion. It is a demanding method for the forest and palm oil industries. If appropriately used, it facilitates cutting the link between palm oil and deforestation while providing a win-win situation for the industries and the environment.

Some challenges remain in the application of the HCS methodology in respect of dealing with social issues and the Free Prior Informed Consent of local communities, technical issues in relation to replication in different forest regions, industrial and government aspects, especially in Indonesia where the regulations on forests issues remain unclear, overlapping and giving no or little incentives to the industry for a good voluntary initiative towards sustainability.

In the longer run, the HCS methodology will potentially be widely used by palm oil producers, given its practical approach and the flexibility for allowing palm oil development to address the global demand for free deforestation product of palm oil. Further study and research will be needed to assess the HCS methodology in terms of effectiveness and business perspective to complete the gap of pilot projects and ready to be adopted by broader industry.
Notes

1. No deforestation policy by definition according to Greenpeace is no human induced conversion of natural forests, with exclusion of small-scale low intensity subsistence conversion. Only degraded forest lands that are not High Carbon Stock, High Conservation Value, or peatlands may be converted to non-forest, it also involves the active conservation, protection, and if necessary, restoration of natural forests by those who control and/or manage them.

2. According to Ministry of Forestry Regulation No. P.50/Menhut-II/2009 concerning confirmation of the state and function of forests area, Indonesia’s forest area is designated by the government to be permanent forest. The designation of forest area is determined by the Minister for Forestry in the form of Ministerial Decree on the Designation of Provincial Forest Area and Inland Water, Coastal and Marine Ecosystem which is based on the integrated and harmonized of Provincial Spatial Planning and Forest Land Use by Consensus (Tata Guna Hutan Kesepakatan-TGHK).

3. HCV forest is a particular forest that need to be managed sufficiently to preserve its high conservation values. The concept and methods were firstly introduced and developed by Forest Stewardship Council (FSC) in 1999. Source: http://us.fsc.org/download.fsc-us-hcvf-assessment-framework.97.pdf

4. Press Release from Zoefly J. Bachroenny, Head of Indonesian Palm Oil Association (GAPKI) at 9th Indonesian palm Oil Conference (IPOC) and 2014 Price Outlook on 27-29 November 2013 in Bandung

5. Fact Sheet Norway_Indonesia REDD Partnership May 25, 2010: http://www.norway.or.id/PageFiles/404362/FactSheetIndonesiaGHGEmissionMay252010.pdf


7. Golden Agri-Resources Ltd (GAR) is the second largest palm oil plantation company globally with a total planted area of 467,000 hectares (including smallholders) as at 30 September 2013, while PT. SMART Tbk is one of its subsidiary company. Source: http://www.goldenagri.com.sg/about_overview.php and http://www.smart-tbk.com/about_overview.php accessed on December 3, 2013

8. There are two different target approach of zero deforestation, one is gross which means that reduction of deforestation of native forests and increase in the establishment of new forests on previously cleared lands (reforestation), while net deforestation refers to inherently equate the value of protecting native forests with that of planting ones. (Brown, sandra., Zarin, Daniel, 2013, What Does Zero defestation mean?, Science 15 November 2013: Vol. 342 no. 6160 pp. 805-807, DOI: 10.1126/science.1241277)

9. In Indonesia’s forests, the average carbon of 192tC/ha for HK3, 166tC/ha for HK2, 107tC/ha for HK1, 60tC/ha for BT, 27tC/ha for BM, and for LT 17tC/ha. For the HCS pilot in Kalimantan, the boundary between BT and BM supported the provisional Carbon threshold that was agreed of 35tC/ha. It can be expected that the stratification would be similar in any humid tropics area, but the tC/ha may differs from the 35tC used in Kalimantan (Greenpeace, 2013a)

10. Biomass = 42.69 - 12.800*DBH + 1.242*DBH^2

11. ‘Free prior and informed consent’ (FPIC) was advanced by Forest People Program (FPP) and adopted in international law under UNDRIP United Nation Declaration of Rights for Indigenous People and jurisprudence pertinent to indigenous people to acknowledge that a community has the right to give or withhold its consent to proposed projects that may affect the lands they customarily own, occupy or otherwise use. Source: http://www.forestpeoples.org/guiding-principles/free-prior-and-informed-consent-fpic

12. The total area of PT. Kartika prima Citra (PT. KPC) accounted for 19,200 ha according to Head of Regency Decree No. 525/13/DISPERHUT/BUN/A dated on December 8, 2006, where some of 2,816 ha already planted.
13. Government Regulation No.11/2010 article 2 and 3

14. Land swap is getting an alternative land to be exchanged for the area that cannot be used according to its allocation due to physical nature, conservation etc.


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