

Industrial Agriculture and Apes: The Experience of Olam International in Gabon

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The Global Context: Palm Expansion

Historically, the negative impact on biodiversity of large-scale agriculture (whether large industrial projects or extensive smallholder farming) has been a combination of direct habitat loss and increased human pressure on remaining natural habitats (increased hunting, forest degradation). The fragmentation of forest blocks by roads is a direct precursor (and a good predictor) of the disappearance of disturbance-sensitive species, including great apes. Viable populations of species with large home ranges therefore require the preservation and protection of very large expanses of relatively undisturbed forests. Land use planning is an essential prerequisite to maintaining such habitats and populations; unfortunately, in most ape range states (and indeed the developed world) this process is disjointed, ineffective or simply determined by economic priorities, and very weakly influenced by conservation needs. In such cases, land selection decisions by plantation companies can be a determining factor for the survival of many rare, threatened or endemic species. Increasingly, for large international companies, such decisions are influenced by reputational risk in consumer markets and the purchasing policies of major buyers and manufacturers.

Palm oil plantations have been responsible for the large-scale conversion of tropical forests in Southeast Asia, and have the potential to similarly replace highly biodiverse forests in Central and West Africa. The industrial plantation model pioneered in Asia, where individual palm estates are commonly greater than 30 km² (3,000 ha) and companies may manage tens of thousands of hectares of palm monocultures, is vastly more efficient and profitable than traditional smallholder farms, and vastly more effective at homogenising the landscape. Industrial palm estates leave few interstitial habitats, and the high yields essential to competitive economics are achieved through the use of chemical inputs that are likely to have a further, incremental negative impact on the remaining fauna: herbicides reduce herbaceous plant diversity, insecticides reduce prey availability at the base of the food chain and fertilisers may contribute to eutrophication of water bodies. Poor practice in the application of these chemicals is therefore likely to exacerbate the impact of habitat loss. As a result, palm oil plantations support fewer species overall, and fewer forest specialists, than comparable areas of either intact or degraded forests.

Many plantation companies retain patches of semi-natural forests, mainly on slopes or other 'uplantable' areas; these are generally too small to support viable populations of larger mammals or birds, though there is abundant evidence that individuals or small groups of apes (such as gibbons and orangutans) may persist on such fragments for years. Unless they are relocated, however, these hangers-on are effectively isolated and unable to perpetuate their species.

Site selection is overwhelmingly the most important decision that determines the overall environmental and social impact of a new plantation. It is also a determining factor in the economic viability of a plantation; however, modern techniques have enabled palm plantations to be profitable in areas that would have been previously considered marginal or undesirable. The pressure for land in Southeast Asia has led plantation companies to develop on difficult terrain such as peat swamp forest (including very deep peat in Sumatra and Borneo) through extensive drainage; on steep slopes (>20°) through large-scale terracing; and on deeply nutrient-poor soils (such as white-sand areas in south and central Kalimantan) through organic matter imports and heavy fertilisation. Therefore, in landscapes with broad climatic suitability for palm agriculture, many technical or economic constraints on palm production can be alleviated or overcome, and environmental or social considerations must be a primary driver for rational site selection.

The Gabon Context

Gabon is a highly forested nation, with 88% forest cover and among the lowest deforestation and forest degradation rates in Africa—averaging 0.12% and 0.09% per year, respectively (Blaser *et al.*, 2011). The population of Gabon (about 1.67 million people) is very small relative to its land area (257,670 km² or 25.8 million ha) and is highly urbanized (ca. 87%) (World Bank, n.d.). Rural populations are extremely sparse (0.86 people/km²) and mainly concentrated along road axes, so there are still very large, very remote areas where human pressures are extremely low, relative to neighboring countries. Gabon has also benefited from the creation of 13 national parks in 2002; this network covers 11% of the national territory, is well resourced and is highly representative of the diversity of habitats across Gabon. Consequently, Gabon is spectacularly rich in unique and important plant and animal species, and a stronghold for gorillas, chimpanzees and elephants, which are threatened by habitat loss and fragmentation as well as large-scale poaching across Central and West Africa.

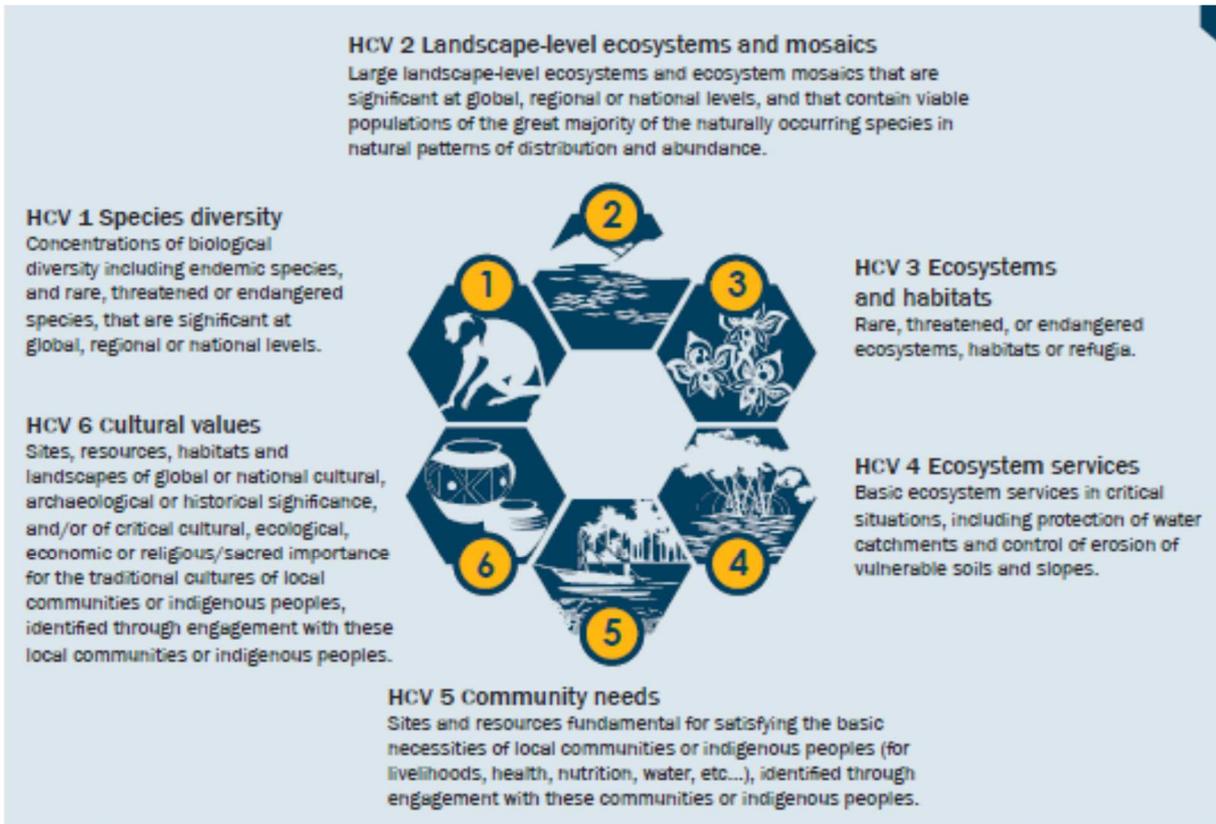
Gabon is also an economic outlier in the region, a relatively wealthy country that is in urgent need of diversifying its economy. The Government of the Republic of Gabon (GoG) seeks to increase GDP from US\$11 billion to over US\$20 billion by 2025, raising the country's Human Development Index to reflect the country's wealth of natural resources. Export trade currently accounts for 85% of the country's GDP, mainly based on oil (80%), manganese and timber. Agriculture, normally a pillar of economic development, contributes less than 5% of GDP, and Gabon imports 60% of its food—clearly a high risk for an economy dependent on non-renewable resources. The current unemployment rate is 21%, and 32.7% of the population is at or below the poverty line (World Bank, n.d.). The GoG has therefore outlined an ambitious development strategy—the Strategic development Plan for an Emerging Gabon (Plan Stratégique Gabon Emergent (PSGE))—with a 'green' strategic axis ("Gabon Vert") that seeks to promote the sustainable expansion of the timber industry, agriculture and ecotourism.

In November 2010, the GoG signed a joint venture (JV) with Olam International to develop up to 1,000 km² (100,000 ha) of industrial palm oil plantations, 300 km² (30,000 ha) of smallholder palm and 500 km² (50,000 ha) of rubber plantations, in two phases. Olam, a Singapore-listed company, is a global leader in food ingredient and agricultural supply chain management with 25 years' experience working closely with small-scale farmers in Africa. Olam's national JV subsidiaries Olam Palm Gabon (OPG) and Olam Rubber Gabon are responsible for the day-to-day management of the plantation businesses, bringing in plantation expertise from Asia and elsewhere in the region.

Olam brought its own sustainability policies and commitments to the table. The company has committed to 100% compliance with international standards of the Roundtable on Sustainable

Palm Oil (RSPO), which cover all aspects of plantation development (see Boxes 1 and 2). Notably, the requirements call on members to complete a comprehensive and independent environmental and social impact assessment (ESIA), to subject any proposed new plantings to stakeholder consultation, to avoid primary or high conservation value (HCV) forests (see Figure 1), and to obtain the free, prior and informed consent (FPIC) of local communities. In addition, Olam's Palm Policy supplements the RSPO, notably with a commitment to invest in local communities, minimize the carbon footprint of its oil palm operations by avoiding high carbon stock (HCS) forests and peatlands, and support national land use planning processes.

Figure 1 The Six HCVs



Courtesy of © HCV Resource Network

Note: The RSPO requires that palm developments maintain or enhance any or all HCVs that are found within and around plantations.

Box 1 RSPO Certification: Key Safeguards for New Palm Oil Plantations

The Roundtable on Sustainable Palm Oil is the main international certification scheme for palm oil mills and plantations. Like other voluntary certification schemes, such as the Forest Stewardship Council or Fair Trade, it is based on a standard composed of principles and criteria that cover environmental, social and economic aspects of production. Compliance against the standard is verified by accredited auditors, and production of certified sustainable palm oil can be claimed from specific mills in proportion to their RSPO-compliant supply base (including industrial plantations and verified third-party suppliers such as smallholders).

Important environmental safeguards in the RSPO standard are embedded in its Principles 5 and 7, which require planters to avoid damaging or converting areas of primary forest or HCV, manage impacts on rare or threatened species, and include mitigation measures related to carbon emissions from land use change in their management plans. For new plantation developments,

planters must also comply with the RSPO New Plantings Procedure (NPP), which requires an independent environmental and social impact assessment and HCV assessments, the latter being conducted by assessors vetted and approved by the HCV Resource Network (n.d.). These assessments must specifically consider the presence and status of *primary forests, HCV areas, peat and local people's land* and have to be posted alongside relevant management plans on the RSPO website for a 30-day public consultation period. The RSPO considers comments on the new plantings project within this period and any serious or sustained objections must be resolved before field operations commence.

While adherence to RSPO is voluntary, an increasing number of international retailers and lenders are phasing out non-RSPO sources, and there is a strong market incentive for suppliers to achieve and maintain RSPO certification.

Box 2 The RSPO, Deforestation and Carbon

The RSPO standard does not explicitly rule out deforestation. It prohibits the conversion of primary or HCV forests, limits planting on peat (a major issue in Southeast Asia due to peat swamp forest carbon emissions) and requires that planters take into account “avoidance of land areas with high carbon stocks and/or sequestration options” so as to minimise greenhouse gas emissions. It also explicitly recognises that secondary or degraded forests can support HCVs—thus requiring protection (RSPO, 2010). Nevertheless, some non-governmental organizations (NGOs) consider the RSPO to be weak on forest protection and have run high-profile campaigns to encourage companies to go beyond it.

As a result, many companies have made additional commitments to avoid deforestation, which has been conflated in practice with the notion of “high carbon stock” forest. As of September 2014, it was unclear how this relatively new concept would be defined or applied. A collaboration between two palm oil companies and The Forest Trust (TFT) and Greenpeace established thresholds and a process for HCS in Indonesia, which defined HCS as areas where carbon emissions from land clearance could be sequestered by palm growth over one planting cycle (i.e., 35–40t C.ha⁻¹) (GAR and SMART, 2012). This is equivalent in biomass terms to tall scrub, very young secondary or extremely severely degraded tropical forest.

It is clear as of now that widespread adoption of this threshold would prevent the development of RSPO-certified agriculture in some rainforest-rich nations that, unlike Malaysia or Indonesia, do not have an abundance of agriculturally suitable, degraded or low-carbon lands. This might have the perverse result of discouraging responsible planters and allowing companies that supply undemanding end markets (e.g., India and China) to expand without the safeguards inherent in certification. If such rainforest-rich countries are to be “allowed” to enter certified sustainable markets as part of their agricultural development strategy, then other safeguards need to exist, including site selection and land use planning that integrates carbon and biodiversity maps, as well as socio-economic data, to prioritise areas that deliver the greatest benefits and least negative impacts on these and other ecosystem services.

Olam's Journey in Gabon

Significantly for Olam, and for any plan to expand agriculture in order to meet the national development needs, most of the land suitable for palm expansion in Gabon is forested. Some areas of savannah and gallery forest are present in the south of the country, but only a small proportion of these receive sufficient rainfall for sustained economic yields. Therefore, Olam has been working with the GoG and national conservation organisations to identify areas of

secondary vegetation, significantly degraded and overhunted forest, and/or agriculturally suitable savannah. The objective of site selection is to maximize the economic and social benefits of plantation developments, minimize impacts on biodiversity and vulnerable communities (through a landscape approach and HCV assessments), and minimize carbon emissions from land conversion (through HCS assessments).

In order to meet its own and the RSPO standards and to achieve the high standards of transparency and stakeholder scrutiny required, Olam appoints both an independent national expert team to carry out the regulatory ESIA and a highly regarded international consultancy (Proforest UK) to handle the HCV assessment and stakeholder consultation requirements. These assessments are conducted concurrently and are subject to national consultation processes—in which NGOs such as the World Wide Fund for Nature (WWF), the Wildlife Conservation Society and Brainforest are consulted alongside national experts and institutions, including the National Parks Agency—and results are published according to RSPO requirements on the Olam and RSPO websites prior to any land clearance.

The early experiences of site selection were a salutary learning experience. In November 2010, the GoG allocated an initial 519 km² (51,920 ha) of land for palm development in Estuaire province, in three separate concessions. It was soon apparent, however, that the large majority of the land bank did not meet RSPO requirements, because of the presence of swathes of primary forest, large-scale seasonal flooding and overlapping designations, including a Ramsar site. Based on the due diligence results, Olam returned two concessions to the government and retained a single concession of 200 km² (20,030 ha) of partially logged-over, degraded forest (Lot 8, known as the Awala plantation), of which 71 km² (7,134 ha) were initially considered suitable for plantation following the RSPO New Plantings Procedure. This land was then subject to an FPIC negotiation with local villagers, to obtain local consent to use land encumbered with traditional access and use rights. As of 2014, planting was complete in the Awala plantation, with 65 km² (6,502 ha) planted, the remaining area having been set aside from development for conservation of HCV forests, steep areas and riparian buffer zones.¹ Therefore, sustainable plantations cover less than 13% of lands originally allocated.

Following this experience, Olam worked closely with the GoG and notably with the National Parks Agency (Agence Nationale des Parcs Nationaux (ANPN)) to help the OPG JV optimise its land selection process and rule out unsuitable areas. At about the same time, the GoG initiated a thorough review of the national land use allocations, in line with the PSGE, through an inter-ministerial working group under the tutelage of the presidency, working towards a National Land Use Plan (Plan National d'Affectation des Terres, or PNAT). The PNAT builds on a comprehensive spatial database of environmental and social criteria, including biodiversity data collated over about a decade by Dr Michelle Lee of Oxford University's Wildlife Conservation Research Unit (WildCru), biophysical data (slopes, elevation, rainfall, soils and geology), forest carbon data from remote sensing and field studies in collaboration with NASA and Duke University (United States), social data and physical infrastructures, existing land use allocations and other relevant data sources. Olam contributed to this Plan by sharing the agronomic suitability criteria for palm and rubber, and worked in parallel with Gabonese stakeholders (including the responsible ministries and NGOs) to develop a national interpretation of the RSPO standard with indicators tailored to the Gabonese situation. The RSPO standard should be approved early in 2016 whilst the PNAT has had limited public exposure through conferences organised by the GoG. OPG used versions of the PNAT data sets to provide a landscape context and guide site selection decisions in its new focal area of the Ngounié province of southern Gabon.

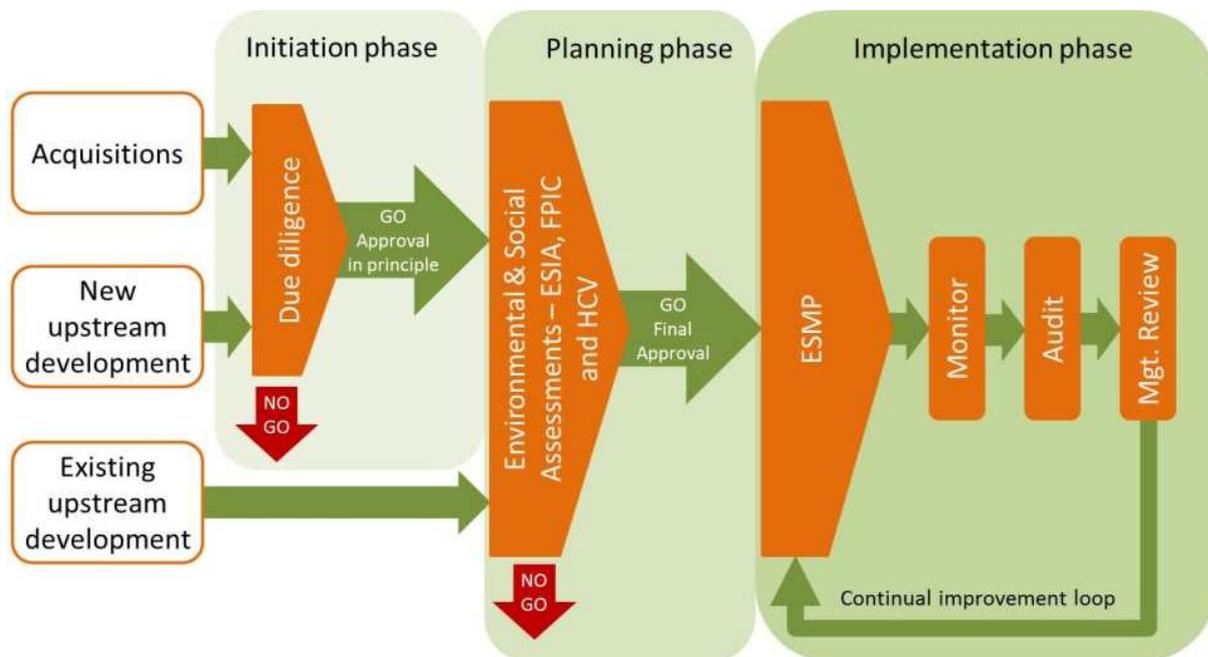
¹ For a summary of HCV findings for Awala, see Proforest (n.d.).

To date (January 2016), Olam in Gabon has completed four ESIA, HCV and FPIC processes for its palm plantations, totalling about 1110 km² (111,000 ha). Olam expects to develop 500 km² (50,000 ha), or 45%, of this total land area by 2018/2019, having planted 300 km² (30,000 ha) of palm between 2011 and 2015. Most of the HCV areas are comprised of large, contiguous forest blocks. A similar process has been followed for 290 km² (29,000 ha) of rubber plantations in the north of the country.

The Land Development Process

Olam developed its current land development process around the OPG developments near the town of Mouila (Ngounié province). Land development can be divided into three main stages (see Figure 2).

Figure 2 Olam’s Land Development Process, Simplified



1. Project Initiation and Scoping: OPC Due Diligence

Each potential land area is subject to a scoping study against a checklist of criteria set out in the Olam Farms and Plantations Code (OPC, equivalent to the RSPO for oil palm), which comprises a legal review and secondary data assessment (including a literature review and spatial data supplied by the GoG and NGOs), interviews with stakeholders and scoping fieldwork. In due course, spatial data provided by PNAT should eliminate most risks of selecting HCV or HCS areas, and allow the operator to assess residual risks that require field verification, thus streamlining the ESIA process. If the scoping/due diligence phase is favourable, a full ESIA can proceed.

2. Planning: Regulatory and RSPO NPP Compliance, ESIA, HCV and FPIC Processes

- a) A full ESIA is carried out by an independent consultancy, in compliance with RSPO and legal requirements on environmental permitting in Gabon. Surveys for the ESIA include forest and botanical inventory work and habitat classification; a habitat carbon assessment; faunal

surveys (mammals, birds, fish, aquatic invertebrates); rainfall, hydrology and water quality assessments; soil surveys; socioeconomic surveys; and participative mapping of community lands and resources. To date, Olam has supplemented ground surveys with airborne light detection and ranging (LiDAR) at all its sites, which allows detailed geographic information system (GIS) mapping of habitats and topography. Olam is sponsoring research to calibrate LiDAR data against forest carbon plots to allow accurate carbon stock estimates to be made at scales of thousands of hectares. Likely impacts of the project are assessed and mitigating measures are proposed in a draft environmental and social management plan.

- b) Concurrently, survey results from different disciplines are combined and synthesised in an HCV assessment, which categorises the findings into six types of nationally or globally significant environmental and social values (see Figure 1). This allows a holistic view of the project and its impacts and includes a detailed landscape assessment; the HCV process is subject to a separate consultation process and recommendations for establishing and managing any areas that are found to support HCVs. Any HCVs identified are treated as the highest priority for conservation and must be maintained or enhanced through specific and spatially explicit management measures (see Box 3). In future, the RSPO may require that HCV assessments be subject to mandatory expert review by licensed assessors.
- c) The combined ESIA and HCV results are reviewed by an independent, RSPO-licensed auditor. As per the NPP, the auditor's review and summaries of the ESIA and HCV assessments and proposed management plans are posted to the RSPO website for a 30-day period, during which time any stakeholder may raise reasonable objections to the project. Any sustained objection must be resolved prior to project initiation.
- d) The ESIA—including the environmental and social management plan (ESMP)—is subject to regulatory review by the Ministry for Protection of Environment and Natural Resources, which coordinates an inter-ministerial review. Revisions required by the Ministry must be approved prior to project initiation. If the project is approved, a certificate of compliance is issued and the company is bound by law to implement the avoidance and mitigation measures prescribed in the ESMP.
- e) Finally, an FPIC process is carried out to ensure that local people support the project. This process typically lasts six months to a year, and starts with the participatory mapping of community lands and the presentation of the plantation project to local people. If local people agree to the exploratory stages of the process, participatory maps are established by independent experts guided by appointed village representatives, and validated through village meetings. The project impacts (on completion of the ESIA) are presented to local communities, and concerns of local people are addressed where possible. A documented process is then set up to guide negotiations on land access; villagers nominate representatives to a steering committee, which carries out the social contract negotiations according to rules agreed with the communities. This is finally read out in the presence of the committee, members of the public and local authorities, and signed by all the concerned stakeholders. The social contract governs the commitments of the company to local communities, including areas conceded for village activities, and specific investments (such as schools, roads and materials) requested by the villagers and agreed through negotiation. The company respects the right of communities to refuse access to their lands, in which case the corresponding boundaries are redrawn and the project goes no further on these lands.
- f) On the basis of the ESIA, HCV and FPIC processes, a pre-final spatial plan is drawn up by the company, setting aside community lands, HCV forests, steep slopes and other unplatable

areas, and riparian buffer zones. Wherever possible, opportunities are sought to meet multiple social and conservation objectives and retain connectivity in the landscape. For example, in Olam's Mouila Lot 1, a 'conservation corridor' of a minimum 300-metre width was retained between two main HCV areas, incorporating both a widened riparian buffer zone and a patch of tall, mostly unlogged forest (see Figure 5). This spatial plan may be subject to minor modifications during land preparation as a function of discoveries and observations made on the ground (e.g., uncharted lakes, forgotten graves and areas of specific importance to wildlife).

3. *Implementation: Project Management, ESMP*

Once the project is underway, Olam deploys an environmental and social team to each site; the team reports operationally to each site's general manager and functionally to Olam's corporate responsibility and sustainability (CRS) management. This team, comprising staff with environmental and social experience and qualifications, is responsible for coordinating the implementation of the ESMP with the operational development needs. Principal activities of the team include:

- measuring and marking out buffer zones, HCV areas and community lands;
- implementing and monitoring progress on the social contract;
- identifying any unforeseen environmental or social issues ahead of land preparation;
- monitoring land clearance and compliance with spatial plans and standard operating procedures;
- carrying out supplementary surveys, including wildlife and hunting surveys and water sampling, as necessary;
- monitoring compliance with good practice in waste management and pollution prevention;
- liaising with communities to document and resolve any grievances and improve worker relations; and
- reporting on a weekly and monthly basis to correct any issues that arise.

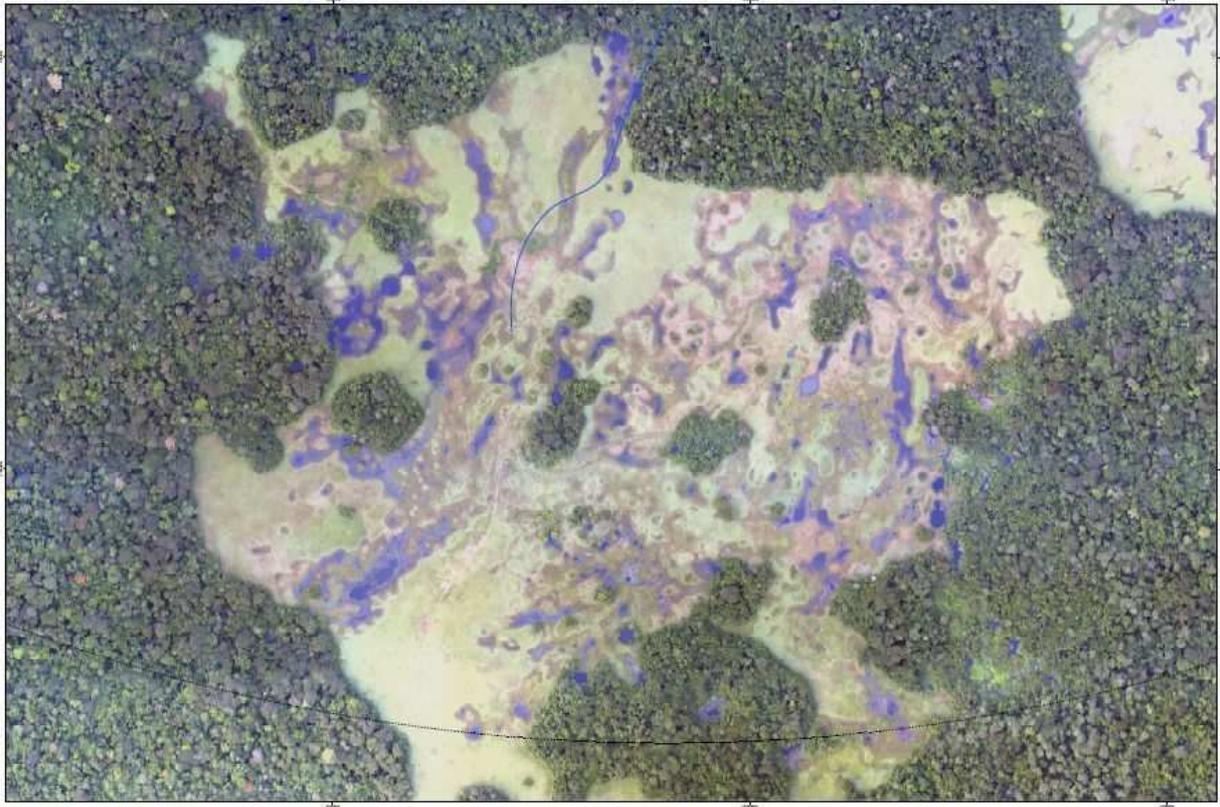
Box 3 Management of Wetland Ecosystems (HCV 3) in an Oil Palm Concession in Gabon

Olam Palm Gabon's Mouila Lot 1 concession lies at edge of a vast, contiguous forest-savannah mosaic belt that extends from southern Gabon through to the Democratic Republic of Congo and Central Africa. The site borders a major river, the Ngounié, and the deeply weathered karstic landscape is typified by flat or very gently undulating topography. Almost all of the forest was logged over at least once, and probably several times, by local operators in the past several decades.

The original HCV assessment² showed that about 60% of the concession was suitable for sustainable palm plantations but identified unique complexes of wetlands, rivers and seasonal flooded forests as HCV 3 ecosystems (nationally important habitats typified by endemic tree and fish species). Using then-available information—LiDAR-derived digital elevation model (DEM) vegetation surveys and aerial photography—large contiguous wetland areas with dense networks of known lakes and ponds were identified and set aside as HCV protection areas (see Figure 3). Olam was also required to identify, map and protect any remaining wetlands prior to any planting activities, in localised areas dominated by networks of shallow depressions of unknown hydrological status.

² For a detailed summary, see Ecosphere and Proforest (2012).

Figure 3 An aerial photo of the seasonally flooded savannah within the main HCV area in the northwest of the concession, at the beginning of the wet season (September–October 2011), showing clusters of lakes, ponds and seasonal wetlands



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Olam Palm Gabon commissioned research to support management decisions in these complex areas, including direct detection of surface water and modelling of hydrological regimes (Saatchi, 2013). Satellite radar data (ALOS PALSAR³ 2007–10) were analysed to detect and classify permanent wetlands and seasonal flooding. A landscape “wetness index” was modelled using 1 m Shuttle Radar Topography Mission DEM and daily precipitation data. The resulting maps were combined and used to guide Olam’s field identification of wetlands in specific target areas. Olam’s team studied field conditions over more than a year to understand seasonal variations, flooding cycles and other wetland characteristics.

Using this knowledge as a guide, Olam deployed trained ‘buffer zone’ teams to classify wetlands in the field, based on surface area, depth and vegetative characteristics, according to a written standard operating procedure. The ‘buffer zone’ teams worked block by block in target areas to mark out and map wetlands. Isolated larger lakes (>1,000 m²) and lake complexes (several permanent small lakes <1,000 m² connected to each other or to a larger lake, via seasonal marshes) were designated as conservation areas with no access for operations. These are protected with a buffer zone of 30–50 m depending on size (see Figure 4). Isolated ponds <1,000 m² were retained as operational water reservoirs; they may be modified or deepened according to operational need and their banks are re-vegetated after clearance. Shallow seasonal floods <0.01 km² (1 ha) unconnected to permanent lakes or rivers may be drained for planting or modified to water reservoirs as appropriate, on advice from the site environment manager and operations team.

³ ALOS PALSAR stands for Advanced Land Observing Satellite Phased Array L-band Synthetic Aperture Radar.

A critical feature of the environment management system is the coordination between the ‘buffer zone’ and land clearance teams. Training was organized and Olam encouraged constant communication between the teams, including joint teams and weekly planning meetings to ensure that buffer zone limits were understood and respected, and any errors were quickly detected and corrected.

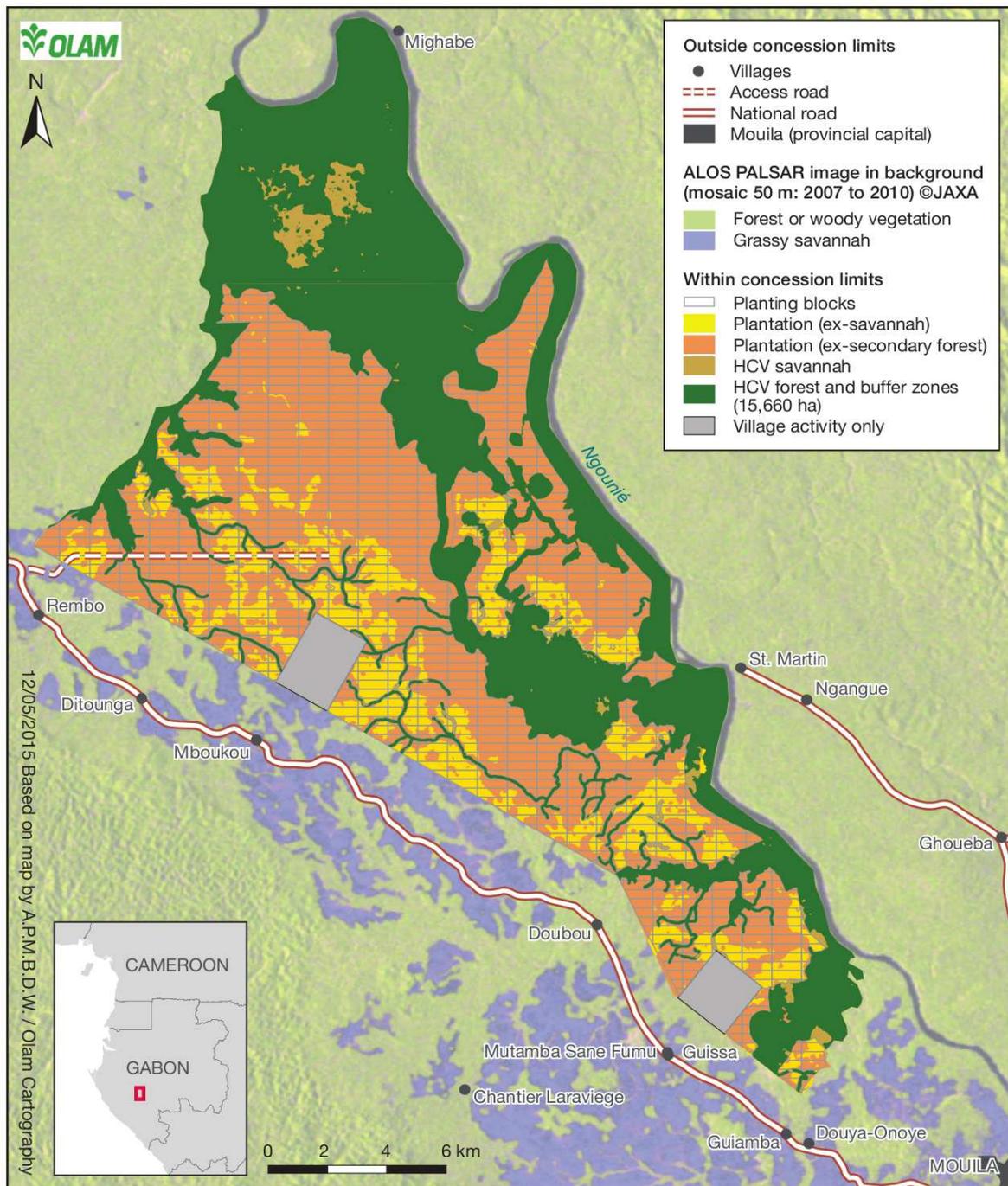
Land preparation in these sensitive conditions requires a combination of excellent information, clear operating procedures, training, communication and teamwork. Effective cooperation preserves the integrity of the HCV 3 ecosystems, and the additional buffer zones enhance habitat connectivity for the rich wildlife that inhabits the core HCV areas and surrounding landscape. Through this process, some land is lost from the plantable area as originally calculated; however, the work done to protect natural wetlands has major economic benefits, as the risk of flooding in planted areas is greatly reduced, and drainage construction and maintenance are scaled down. There are also less tangible ecosystem service benefits: more water is retained in the landscape, which may increase humidity, reduce fire risks and enhance yields through the dry period.

Figure 4 This large permanent lake (>2,000 m²), shown here in the wet season, requires a 50 m buffer zone



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Figure 5 Spatial zoning of Olam’s Mouila Lot 1 Palm Plantation, showing the extensive and contiguous network of protected HCV blocks, corridors and riparian buffers that provide habitat connectivity for species of conservation concern in Gabon



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Note: The large habitat block to the northwest is connected to continuous forest cover that extends into the interior forests of Gabon.

Apes, Wildlife Management and Oil Palm in Gabon

Great apes (chimpanzees and gorillas) are flagship species in Gabon and Central Africa, and a global conservation priority. Despite localised hunting and the massive impacts of the Ebola virus in particular on important ape populations, both ape species can be found in low to medium densities in most suitable habitat across Gabon, and scattered individuals or small groups can be

even be found close to major cities, such as in the Mondah forest a few kilometres from Libreville (Lee White, personal communication, 2014).

Excluding all potential ape habitat from development would effectively preclude any kind of agricultural expansion, which is not compatible with the goals of the GoG “Gabon Emergent” Strategic Plan; likewise, classifying habitat as HCV on the basis of the sole presence of apes (rather than significant populations or concentrations), would have a similar effect, precluding any responsible company from investing in Gabon and perhaps opening the door to less scrupulous developers. The challenge for agriculture in Gabon as a whole, and for Olam in particular, is to avoid major ape concentrations altogether, safeguard or improve the status of viable ape populations wherever they are found through suitable habitat conservation and management measures, and avoid harming individual apes either directly or indirectly in land development. Clearly, the PNAT must play a leading role in steering development away from ape priority landscapes.

Outside of ape priority landscapes, in areas of low overall concern for conservation and where other factors are suitable for plantation development, companies operating within ape range states must still employ a precautionary approach to ape conservation, and develop specific policies and plans to manage risks to apes. Provided that their core forest range is sufficiently large and that they are not relentlessly hunted, apes can happily survive alongside palm plantations; it may even be of some benefit to chimpanzees, for which palm fruit can be an important food source. Chimps may become crop-raiding pests to palm smallholders, although their depredations are insignificant on the scale of a large industrial estate producing 20+ tonnes of fruit per hectare. As chimpanzees in particular are highly territorial, it is important to consider spatial options that respect existing home ranges and allow groups to move freely to and from core areas of habitat within their original range, as chimps that are forced by habitat loss into neighbouring territories may be killed by their conspecifics.

Olam has included ape surveys in the ESIA's for all of its sites, none of which are within current ape priority landscapes. In Mouila Lot 1, faunal transects and anecdotal evidence indicated that chimpanzees and gorillas were sparsely present across the concession as a whole, with more ape signs far from the main road and in less accessible, swampy areas. The faunal experts also came across direct evidence of great apes being hunted and eaten by local villagers. Encounter rates were much too low in this survey to attempt a population estimate, but based on the sparse data, habitat evidence, home range requirements and expert views, the HCV assessors considered that resident ape populations were likely to have been severely depressed by hunting, and to be significantly lower than carrying capacity.

In consequence, they recommended that Olam set aside and rigorously protect an initial 139 km² (13,868 ha) of suitable habitat in the first instance, in two major HCV forest blocks connected by a network of riparian buffer zones (variable width) and broad conservation corridors (minimum 300-m width). The largest HCV block to the north of the concession is contiguous with an unbroken forested landscape, allowing free movement of animals into and out of the concession. A very tentative estimate of 20 to 40 animals of either species, in one to two groups, was suggested as a potential target for a fully protected population of either species in these HCV areas. The conservation organisations consulted during the NPP also required Olam to conduct further faunal surveys and develop an ape management plan prior to entering potentially sensitive areas.

Olam therefore hired an independent scientist in 2013 to initiate supplementary faunal studies using a combination of camera trapping and sign surveys according to a statistically rigorous

sampling design, and to train Olam's staff to use these methods for long-term monitoring. Based on preliminary results, which found ape signs in a previously undersampled area, and on the advice of the zoologist in charge of the surveys, Olam set aside a further 10 km² (1,000 ha) of suitable ape habitat in a third forest block, connected to the first two by a 1-km wide riverine forest corridor, and completed surveys across the entire concession.

These surveys and photographic analysis confirmed that gorilla presence is limited to a very small number of individuals, and it is unclear if there is a reproducing family unit within the concession. Surveys also confirmed somewhat higher-than-expected habitat occupancy by chimpanzees (demonstrating the value of the precautionary approach), and camera analysis suggested the presence of two potentially distinct chimpanzee groups with home ranges overlapping the main HCV blocks (almost all signs were either inside HCV areas or within 1.25 km of the set-asides). The two groups may also be fissioned subgroups of a larger family clan; further monitoring may resolve this.

An ape management plan (see Box 4) has also been developed and is being implemented to ensure further protection of ape populations while economically viable operations are maintained. This formalizes steps already taken and actions still needed to safeguard great ape individuals and groups at potential risk from palm development.

Box 4. The Six Pillars of Olam's Ape Management Plan

Olam aims to avoid major ape concentrations altogether, to maintain or enhance the status of viable ape groups or populations that could potentially be affected by plantations, and to avoid harming individual apes either directly or indirectly in land development. Our site-specific ape management plan in Mouila Lot 1 rests on 6 pillars:

1. Spatial planning and conservation of ape habitat

Large blocks of intact habitat (HCV areas) are preserved, including much of the better-quality, unfragmented forest in the concession, distributed in three main blocks across the concession and augmented by riverine buffer zones, offering a viable refuge for apes. The current HCV areas are being augmented by suitable habitat corridors and 'stepping stones' determined through block-by-block surveys as land preparation progresses; they will protect 157 km² (15,660 ha) by the completion of land preparation.

2. Ongoing data collection and monitoring

To ensure that HCV areas and buffer zones are respected, Olam deploys trained, GPS-equipped 'HCV teams' that guide and continuously monitor land preparation. Extensive baseline biodiversity data was also collected using line transects and camera traps, and as of early 2014, Olam has been working with the National Parks Agency to further analyse this data, refine our methods and make the best use of long-term monitoring. These results will be integrated with hunting controls (see point 5, below).

3. Scheduling and coordination of the land preparation process

Land preparation (secondary forest clearance and stacking) is carried out according to a schedule that allows any animals to move ahead of the disturbance front and find refuge in HCV areas, without creating shrinking 'islands' of habitat that might 'trap' animals without direct access to the protected habitat network. Weekly coordination meetings between sustainability and operation teams guide land clearing operations to ensure compliance with land clearance and planting schedules.

4. Mitigating the potential risk of disease transmission between humans and apes

Workers are strictly forbidden to enter HCV areas outside of crossing roads, to contaminate rivers or water bodies with human waste, or handle or consume the meat of apes or protected species. Housing incorporates well-maintained latrines, septic tanks and other waste management measures, and workers are sensitised to the risks of transmissible diseases. A medical service is available on site to all workers and periodic medical check-ups are conducted to ensure that diseases do not spread.

5. Hunting controls and awareness raising

Workers are strictly forbidden to hunt, carry guns or bushmeat, or transport hunters at any time. Local people with traditional access rights are allowed to continue traditional activities, under a controlled access scheme. A partnership agreement has been drawn up between Olam and the responsible ministry for the protection of fauna, with technical assistance from WWF Gabon and advice from Gabon's National Parks Agency, to mobilise faunal law enforcement staff, patrol the concession and apprehend poachers, train Olam workers, and raise awareness among local communities on prevailing wildlife laws.

6. Subsistence programmes promoting alternatives to hunting

In partnership with local development institutions, Olam has initiated several small-scale agriculture programmes to provide alternative employment, improve local food security and reduce the attractiveness of bushmeat as a food source. This programme needs to be expanded to incorporate animal husbandry and pisciculture.

Abbreviations

ANPN	National Parks Agency of Gabon (<i>Agence Nationale des Parcs Nationaux</i>)
DEM	Digital elevation model
ESIA	Environmental and social impact assessment
ESMP	Environmental and social management plan
FPIC	Free, prior and informed consent
GoG	Government of the Republic of Gabon
HCS	High carbon stock
HCV	High conservation value
JV	Joint venture
LiDAR	Light detection and ranging
NGO	Non-governmental organisation
NPP	New Plantings Procedure
OPG	Olam Palm Gabon
PNAT	National Land Use Plan of Gabon (<i>Plan National d’Affectation des Terres</i>)
PSGE	Strategic development Plan for an Emerging Gabon (<i>Plan Stratégique Gabon Emergent</i>)
RSPO	Roundtable on Sustainable Palm Oil
WWF	World Wide Fund for Nature (also: World Wildlife Fund)

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