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Pathways to zero deforestation oil palm in Peru

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Oil Palm in Peru: Production on the crop's frontier

As suitable areas for expansion in the conventional oil palm production regions of Malaysia and Indonesia are exhausted, and international political pressure increasingly drives moratoria on expansion in these regions, the palm oil sector is turning its attention to new countries with suitable land for oil palm production.¹ Countries in Africa (particularly Cameroon, Democratic Republic of Congo, and Liberia) and South America (particularly Peru, Brazil, and Colombia) have been identified as 'new frontiers' based on the opportunities presented by their favourable environmental and socio-political contexts: substantial areas of 'suitable' land, political willingness to expand production, and rural populations targeted for economic development schemes and/or cheap labor forces.²

Peru is among the countries on oil palm's next frontier with the most rapid recent growth rate. While there were only 97,773 hectares (ha) of oil palm in Peru in 2017, this represents a 160% increase since 2012.³ Peru produced 295,073 tons of palm oil in 2017 and has recently shifted from a net importer to a net exporter of palm.⁴ The country currently exports to Chile & Colombia among other countries.⁵ Moreover, there are almost 4 million hectares (Mha) of suitable cleared area in Peru in addition to current oil palm plantations, and 51 Mha forestlands of at least moderate suitability.⁶ In Latin America, oil palm expansion has largely occurred on already deforested pasture land. Peru is an exception to this trend, and had the highest rate of woody vegetation converted to oil palm (15,685 ha or 76% of new oil palm planted) in Latin America from 2000-2014.⁷ Peru has the second largest extent of forests in Latin America and its forests hold 6.928 Petagrams Carbon (Pg C).⁸

The Peruvian government has promoted the cultivation of oil palm as an economic alternative to illicit coca production, for poverty alleviation, and for industry growth in the Amazon, including by issuing decrees that declared expansion of oil palm to be in the national interest in 2000, and again in 2016.^{9,10} The Ministry of Agriculture has announced plans for an additional 250,000 ha in the coming years. Other political incentives for producing oil palm in Peru include tax exemptions for investments in oil palm production (from production of fresh fruit to refining of crude oil) and a mandate to mix 5% biodiesel in diesel oils.¹¹ While the government has put these incentives for oil palm production in place, it also signed a letter of intent for "Zero Net Deforestation" with Germany and Norway in 2014, which was reaffirmed in 2017.¹² This letter committed to increasing 5 Mha of forested titles to indigenous peoples on lands, which they hold legal, communal, or customary rights to, amongst other 'pro-forest' political promises. The new oil palm growers' umbrella federation, the Junta Nacional de Palmicultores del Perú (JUNPALMA), announced in August 2019 that they are committing to sign a zero-deforestation commitment (ZDC), although the terms of the agreement are still being discussed.

Such concurrent commitments to increase palm oil production and to protect forests may prove difficult to fulfil without deliberate and careful land use planning. However, while there have been efforts to identify the best areas for oil palm cultivation in Peru, there has been virtually no territorial planning in the rural development sector to date. At the same time, the Peruvian Amazon is experiencing unprecedented development of extractive, infrastructural and agricultural projects including oil palm, leading to a growing number of conflicts and increasing impacts on the environment caused by new development (particularly industrial development) in the Amazon region.¹³

Efforts toward zero-deforestation palm production began in 2015 with the Rio Branco Declaration, which was signed by a group of 26 states and provinces of Brazil, Indonesia, Mexico, Nigeria, Peru, Spain and the United States, during the VIII Annual Governors' Climate and Forest Task Force (GCF) meeting in August of 2014 in Rio Branco, Brazil. The Declaration formalized the commitment to continue reducing deforestation in the agro-sector, developing alliances with private sector initiatives that take advantage of the opportunities available through jurisdictional programs, and quickly and efficiently channeling funds to promote the economic development of forest producers, farmers, ranchers, indigenous peoples, local communities and other

stakeholders in the forestry sector. To achieve these objectives, signatories identified the need for improved financial and technical assistance, and above all, for the creation of performance-based compensation mechanisms (national and international/commercial and non-commercial) for reducing emissions in the agricultural sector.¹⁴

Indeed, there is growing awareness that all producers will need to at least meet Roundtable on Sustainable Palm Oil (RSPO) standards for future market integration in a changing market. Large companies such as Alicorp, Grupo Palmas, Nestlé, Danone and Starbucks have incorporated zero deforestation oil palm commitments into their agendas, and where this applies to their supply chains, fresh fruit bunch and crude oil producers will have to follow suit. Nevertheless, Peru's RSPO has had a slow and rocky start with large companies and corporations being expelled for non-compliance. RSPO Peru has also received complaints from important stakeholders such as indigenous federations about non-representation at the round table. Smallholders in Peru, as in other regions, have faced challenges in meeting the technical requirements for certification. Therefore, although there are many important members of the RSPO in Peru including large corporations and smallholder associations¹⁵, the role it will play in encouraging deforestation-free palm oil to Peru is uncertain.

Here we assess recent expansion of oil palm plantations in Peru, including deforestation associated with this expansion, and the potential for further oil palm-driven deforestation based on the current supply chain infrastructure and the availability of oil palm suitable land; we provide insights into market dynamics, including estimates of market shares of major producers; and, finally we assess the role that Peru's palm oil supply chain dynamics and production modalities may play in determining the pathways toward deforestation-free oil palm in Peru.

Recent expansion of Peruvian oil palm plantations and potential for future expansion

Peru's palm oil plantations are concentrated in the country's northern and central inland regions, including locations that are within the Amazon forest and Andes-Amazon transition. As of 2017, Peru had 97,773 ha of palm plantations distributed across four departments: Huánuco, Loreto, San Martín, and Ucayali, according to palm extent maps created by Sociedad Peruana de Ecodesarrollo (SPDE). These departments are forested and hold the majority of Peru's carbon stocks, with the 3.61 Pg (52.1%) in Loreto, 0.99 Pg (14.2%) in Ucayali, .30 Pg (4.2%) in San Martín and .15 (2.1%) in Huánuco.¹⁶

A sizeable portion of these plantations can be attributed to recent clearing. Based on analysis of official government deforestation data combined with the SPDE palm extents, approximately 24,038 ha of forests were cleared and converted to oil palm plantations between 2010 and 2017 (25% of the 2017 palm extent); most (15,505 ha) of this recent clearing for palm occurred in the department of Ucayali (Figure 1). Nearly all of this recent clearing for palm (97%) took place in zones under the influence of mills primarily dependent on industrial-scale production.

Recent clearing that has not yet been converted to palm plantations has been even more widespread across supply sheds (60 km radius around palm mills) for Peru's 19 mills¹⁷, indicating that the potential as of yet unrealized impacts of palm on forests may be much greater. Altogether, 346,450 ha of forest were cleared in palm mill supply sheds between 2010 and 2017. Half of all mills had more than 100,000 ha of post-2010 clearing in their supply sheds (Table 1). We overlaid these areas with global palm oil suitability data created by the International Institute for Applied Systems Analysis (IIASA), which is a biophysical suitability map based on climate, soil, and topography variables, and classifies global land into one of 6 suitability classes – not suitable, marginally suitable, moderately suitable, suitable, highly suitable, or perfectly suitable.¹⁸ We found

that most of cleared areas in palm mill supply sheds have at least moderate suitability for palm production (81%; 305,237 ha).

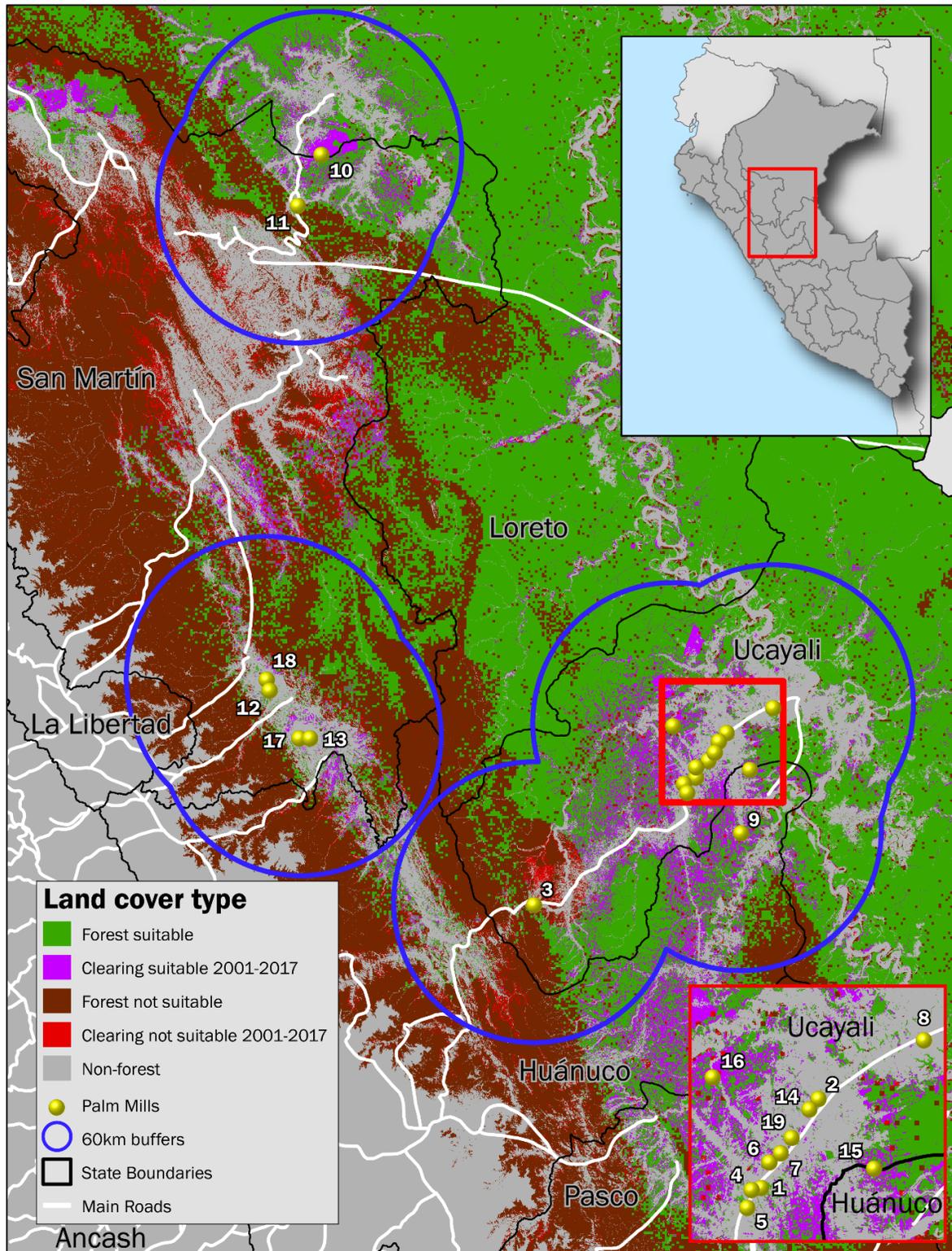


Figure 1. Forest cover and deforestation by suitability for oil palm production in palm production zones; Forest Cover; Source: Pirker J & Mosnier A (2015). Global oil palm suitability assessment. IIASA Interim Report. IIASA, Laxenburg, Austria: IR-15-006; Ministerio del Ambiente (2019). Bosque y Perdida de Bosque, <http://geobosques.minam.gob.pe/geobosque/view/descargas.php?122345gx345w34gg>; mill locations from SPDE.

TABLE 1: Suitability of Cleared Areas in Palm Mill Supply Sheds

Mill ID (corresponds with map in Figure 1)	Mill name (parent company if different from mill name)	Clearing 2001-2009 (ha)** (% moderately to perfectly suitable)		Clearing 2010-2017 (ha)** (% moderately to perfectly suitable)		Clearing 2001-2017 (ha)** (% moderately to perfectly suitable)	
1	OLAMSA-1 (Oleaginosas Amazonicas)	99,036	98%	155,358	98%	254,394	98%
2	OLAMSA-2 (Oleaginosas Amazonicas)	82,926	97%	126,931	97%	209,857	97%
3	OLPASA (Oleaginosas Padre Abad)	53,370	78%	78,219	69%	131,589	74%
4	INDOLMASA (Industrias oleaginosas Monte Alegre AS)	99,414	98%	155,877	98%	255,291	98%
5	INDEPAL UCAYALI SA (Industria de Aceite de Palma y Derivados - Ucayali S.A.)	100,234	98%	156,400	98%	256,634	98%
6	AGROPECUARIA ROSSEL SRL	95,464	98%	151,833	98%	247,297	98%
7	OLPUSAC (Oleaginosas Pucallpa SAC)	93,810	98%	148,971	98%	242,781	98%
8	INDUSTRIAS PALM OLEO SAC	60,894	96%	81,530	96%	142,424	96%
9	OLNA PERU SAC	96,516	97%	119,318	97%	215,834	97%
10	INDUSTRIAS DEL SHANUSI SA (Grupo Palmas)	60,416	95%	60,155	93%	120,570	94%
11	INDUPALSA (Industria de Palma Aceitera de Loreto y San Martin S.A.)	67,716	87%	53,608	79%	121,324	82%
12	OLPESA (Oleaginosas del Peru AS)	21,906	66%	29,699	76%	51,605	70%
13	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	22,199	67%	31,538	78%	53,737	71%
14	BIOANDES EIRL	85,449	97%	132,676	97%	218,125	97%
15	ASOCIACION AGROPECUARIA NUEVO AMANECER (Prestamo Agroideas)	92,111	97%	122,308	97%	214,419	97%
16	BIODIESEL UCAYALI SRL	78,016	98%	130,733	98%	208,748	98%
17	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	22,199	67%	31,538	78%	53,737	71%
18	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	23,521	68%	30,697	76%	54,218	71%
19	Pucallpa Plantation (non-operational, Grupo Palmas)	91,294	98%	143,591	98%	234,885	98%

**Mill supply sheds overlap so totals for the mills do not sum to the overall extents.

Source: Suitability data from Pirker & Mosnier, 2015; clearing data from Ministerio del Ambiente, 2019; mill locations from SPDE.

Recent clearing in palm mill supply sheds is suggestive of a threat to forests by palm plantations, but it also presents opportunities for expansion of oil palm without additional deforestation going forward. For example, all oil palm mill supply sheds have at least 50,000 ha of total cleared area, excluding current palm extents, and considering all deforestation since 2001 (Table 1). The largest cleared areas (>240,000ha) are in the department of Ucayali and include Agropecuario Rossel S.R.L., OLPUSAC, OLAMSA-1, INDOLMASA, INDEPAL UCAYALI S.A., with most of this clearing on areas that would be at least moderately suitable for oil palm.

Oil palm mills also have large areas of forests remaining in their supply sheds, ranging from 481,851 ha (42% of the supply zone) around Asociación Agropecuario Nuevo Amanecer to over 800,000 ha in each of the catchments of Industrias del Espino's two mills. Most (63%; 2,442,242 ha) of the total forested area in palm mill supply sheds is on land that is at least moderately suitable for oil palm cultivation (Table 2). Forests in areas that are both suitable for oil palm production and within distances that are easy to transport palm fruit bunches may be at high risk for conversion if oil palm development expands. Industrias Palm Oleo has the most highly suitable forest within its supply shed (208,447 ha) of any of the existing mills.

Only about a quarter of the of the palm-suitable forestlands (670,785 ha) are located solely within supply zones of mills primarily dependent on industrial-scale production. At least 1,771,457 ha of suitable forestland (73% of the total moderately to perfectly suitable forested area) is located within the supply sheds of the mills that depend on sourcing from small or independent producers.¹⁹

TABLE 2: Suitability of Forests in Palm Mill Supply Sheds

Mill ID (corresponds with map in Figure 1)	Mill name (parent company if different from mill name)	Total Forest 2017 (ha)**	Moderate to Perfect Suitability Forest (ha)**	Percent of Forest that is Moderate to Perfectly Suitable
1	OLAMSA-1 (Oleaginosas Amazonicas)	537,881	520,568	97%
2	OLAMSA-2 (Oleaginosas Amazonicas)	518,028	497,675	96%
3	OLPASA (Oleaginosas Padre Abad)	810,921	450,004	55%
4	INDOLMASA (Industrias oleaginosas Monte Alegre AS)	544,139	527,450	97%
5	INDEPAL UCAYALI SA (Industria de Aceite de Palma y Derivados - Ucayali S.A.)	551,618	533,947	97%
6	AGROPECUARIA ROSSEL SRL	523,703	507,360	97%
7	OLPUSAC (Oleaginosas Pucallpa SAC)	515,191	498,198	97%
8	INDUSTRIAS PALM OLEO SAC	576,769	545,129	95%
9	OLNA PERU SAC	588,754	516,412	88%
10	INDUSTRIAS DEL SHANUSI SA (Grupo Palmas)	693,915	549,714	79%
11	INDUPALSA (Industria de Palma Aceitera de Loreto y San Martin S.A.)	579,087	378,145	65%
12	OLPESA (Oleaginosas del Peru AS)	838,668	282,188	34%
13	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	801,635	227,805	28%
14	BIOANDES EIRL	515,736	496,039	96%
15	ASOCIACION AGROPECUARIA NUEVO AMANECER (Prestamo Agroideas)	481,851	455,001	94%
16	BIODIESEL UCAYALI SRL	610,338	592,322	97%
17	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	801,635	227,805	28%
18	INDUSTRIAS DEL ESPINO SA (Grupo Palmas)	842,901	296,746	35%
19	Pucallpa Plantation (non-operational, Grupo Palmas)	511,396	493,487	96%

**Mill supply sheds overlap so totals for the mills do not sum to the overall extents.

Source: Suitability data from Pirker & Mosnier, 2015; forest extent from Ministerio del Ambiente, 2019; mill locations compiled by SPDE.

Finally, there are 23,397,164 ha of forests on land that is highly suitable for oil palm (93% of the total highly suitable area) that are located outside of the supply sheds of existing mills. These forests may be at risk from oil palm expansion if they become part of a mill supply shed or a concession in the future. The need for large tracts of contiguous land, amongst other topographical criteria, means that these forests could indeed be threatened by future industrial-scale production. However, the socio-environmental scandal surrounding new industrial-scale plantation development could limit future plantations of this type.²⁰

Some studies have found that the area deforested for oil palm is nearly evenly split between smallholders and largeholders.²¹ However, evidence suggests that 70% of 'high yield' or intensive large industrial plantations expanded into old growth forests, while smallholder oil palm plantations expansion into forests comes in at 30% or below.²² Between 2010 and 2016, smallholders utilized 21,070 ha more land area for oil palm than industrial producers, but in contrast to industrial plantations, smallholder plantations predominantly (56%) came from previously degraded lands. Smallholder use of larger areas of previously degraded land and secondary forest is linked to the typical management approach of Amazonian smallholders (as described below), which includes fallowing and maintenance of forest areas. Furthermore, where large plantations have incorporated smallholders into their partnership initiatives, rates of deforestation (relative to the size of plots) are elevated on these smallholder plots compared to smallholder oil palm producers affiliated with other modes of production.²³

Supply Chain Dynamics

Modes of Production

Broadly speaking there are four major modes of oil palm production in Peru. These are supported smallholders, independent smallholders, medium holders, and large holders/industrial-scale producers, and are described in greater detail below. Understanding the modes of palm oil production in Peru can provide insights into the potential for mechanisms such as corporate commitments and REDD+ to support zero-deforestation palm oil production. According to JUNPALMA, there are now approximately 7,000 families working on small oil palm plantations.

Supported smallholders

Since the 1990's, association-based smallholder production on plots smaller than 50 ha has been the predominant mode of smallholder engagement with oil palm in Peru.²⁴ Supported smallholders derive support from the government or the private sector, sometimes backstopped by international aid schemes. Initially this was pioneered following the Agrarian Reform in the 1960s, during which period private investment was banned and so-called "agricultural societies with social interest", known in Peru by their acronym in Spanish, SAISes, and later the United Nations (UNODC, "United Nations model") projects, created associations of growers and leveraged funds for them to build and run processing mills.²⁵ More recently, the government has created new projects that are light on debt burdens but require demonstrated commitment from the farmer, including a project under the umbrella of AGROIDEAS in which a percentage (20%) of the installation costs of the plantation is covered by the smallholder, and the rest is provided by the government without repayment. Between AGROIDEAS and similar efforts by Peru's public bank, Agrobanco, this updated approach to rural development through oil palm has benefitted more than 1600 families over 10,000 hectares of either new or improved²⁶ small plantations. Although the environmental impact has not been evaluated, the socio-economic results of these projects have been favourable.²⁷

In these programs, farmer support is usually given in the form of seed stock, juvenile palm trees, fertilizers, pesticides, infrastructural support such as new access roads, financial support for clearing and preparing the plot, and technical training. Such support is generally provided on credit, and farmers are expected to begin to make repayments on these debts as soon as they reap their first harvest (usually about three years after planting). These types of agricultural incentive programs, and the banks and funds that support them could promote deforestation-free production as a condition for ongoing support and could be a good opportunity to leverage REDD+ funding.

Small producers associated under the United Nations model are contracted to sell to the specific processing plants that correspond to their association. They have strong incentives to abide by the contracts because many of the farmers also hold a share in the mill companies linked to their associations. Additionally, the shares themselves act as a sort of informal economy, where shareholders may use their documents as a shareholder as leverage for informal loans, or the lease of farmland from a neighbour, for example (Bennett, Ravikumar et al. 2019).²⁸ Nevertheless, for a variety of reasons, side-selling is common despite the benefits of having a share in a company. For example, some mills will deduct from the farmer if the fruit is over or under ripe so farmers with less-than-perfect fruit will opt for a more lenient mill. Second, the UN associations deduct a small amount per delivery for a "social fund" (health and bereavement cover and to a limited extent some agricultural insurance) from members for members, which may be avoided by selling to a different company. Finally, producers can sometimes earn more by selling to a mill that is operating under capacity. For example, at times when production is low, mills often compete to get smallholder oil palm fruit offering better prices, reducing the rigidity of their fruit selection standards, by facilitating free transport from farms to mills or offering other incentives. During these times, the local market dynamic can change dramatically whilst smallholders take advantage of the favourable market conditions.

Oil palm investments carried out under this model cover as much as half of the area planted (46,559 ha) with oil palm in Peru and include at least six processing mills for oil palm fruit seven associations of 4700 families (SPDE).²⁹ This model revolutionized the industry since the nineties and is arguably one that remains globally innovative in both its socio-economic organization and its low deforestation outcomes.

Independent smallholders

Independent smallholders cultivate oil palm using their own financial resources, without direct outside assistance. The more well-off of these independent producers amass capital through credit, or through other family businesses such as shops. In other cases, independent smallholders acquire capital through other means, including through financing new oil palm extensions on their farms with the earnings they make on their established producing oil palm areas. As mentioned above, not all independent production is voluntary, but rather may be a consequence of lack of availability of spaces for membership in preferred associations. Nevertheless, independent growing and – more importantly - independent selling are socially, culturally and economically desirable as well as empowering, as these smallholders not only have the liberty to sell to whatever mill they wish, but also to cultivate as and how they desire, including to cease producing palm completely, in favor of another crop. However, independent smallholders often form temporary associations to be able to access benefits from new projects including government schemes like AGROIDEAS, and municipal level projects.

Graduated independent smallholders are those associated smallholders that have ‘graduated’ from government or development bank projects, meaning that they have paid off all of their loans and choose to disassociate from formal farmers’ associations or cooperatives. Graduated independent smallholders employ the same economic production strategy as independent smallholders, however their experience with being a member of an association gives them a political advantage in terms of knowing how to lobby the government (at various levels) for support of different kinds.

Finally, there are a significant number of smallholders that would like to be part of a functioning formal association, particularly those smallholders whose associations have dissolved. Membership in the UN model associations is particularly sought after, however there is a limited capacity for members in these associations and so many smallholders cannot enter. As such, targeted REDD+ programs could provide additional opportunities for these producers and other independent smallholder producers to associate while incentivizing deforestation-free production.

Medium holders

Defining medium holders is difficult as there are many modalities by which a landowner or group of landowners may reach ‘medium holder’ status. For example, in a USAID report from 2015, USAID defined medium holders as those that have 50 to 1000 hectares, with ‘large corporate’ qualified as those that exceed 1000. Nevertheless, later in the report authors define shareholders holding land for oil palm within the Sociedad Anonima Cerrada (SAC), a corporate structure used in Peru for private enterprises with fewer than 20 shareholders, as medium holders. Under the last scenario, several medium holders could theoretically make up a large plantation. Medium holders also exist in the form of multi-site plantations, where a family may own several plots of 20-30 hectares equivalent to well over the 50 hectares ‘cut off’. Due to a lack of publicly available information on landholdings, these actors are difficult to identify. Furthermore, there is a growing number of medium holders, dubbed “Great Gatsbys” by local researchers, that make a lucrative living off of 500-700 hectares of oil palm and live unusually luxurious lives in the cities of Pucallpa and Lima. This group of producers warrant future research, as their activities and relation to deforestation has not been empirically assessed.

JUNPALMA

The Junta Nacional de Palma Aceitera en Peru (JUNPALMA) was created in 2015 as the umbrella organization for the oil palm sector, and, in particular, to represent small and medium holder producers. Its creation involved the merging of two smallholder federations CONAPAL y FENAPALMA. It professes to operate on the philosophy of a 'sustainable' horizon for the sector, acknowledging all three pillars of sustainability: economic, social and environmental.

Indeed, JUNPALMA has made a reasonably rapid, bold and relatively successful move towards strategically positioning itself as an important front-line political organization for the development of new policies and projects in the oil palm sector. By 2019, they claimed to represent 80% of the producers nationally.³⁰ However, the federation recognizes that it continues to face important challenges such as weak governance, low productivity among members, informality and barriers in accessing financial support. The federation also acknowledges the low commitment of their own associates, admitting that most do not comply with the agreements and recommendations made by JUNPALMA (JUNPALMA, 2019 p. 13). Interviews undertaken in the regions of Ucayali and Lima by the third author echoed these sentiments, and highlighted that the prospect of a zero-deforestation agreement was one of the many discordances amongst the membership in JUNPALMA, essentially undermining one of the three pillars on which it was established.³¹

Large Holders/Industrial-scale producers

The first oil palm plantation was developed by a government company (EMDEPALMA) in the 1970s in the Tocache province of the department of San Martín, in the Huallaga valley. This was soon followed by a plantation installed by a private company Grupo Palmas in Palmawasi, also in Tocache, now covering approximately 13,000 ha, under a similar "alternative development" project by the UNODC, as described above. However, during the 1980s and 1990s, Peru experienced internal armed conflict and an economic, institutional and political crisis, which led to the withdrawal of many state companies from the faraway Amazon region. Eventually, a new opportunity to expand the oil palm industry presented itself when, in 2003, Peru passed a Law of Promotion of Biofuels,³² which spurred the development of many new biofuel projects nationwide and incentivized plantation expansion in the country.

Geography of oil palm production modalities

Background factors that determine where different modalities dominate include socio-economic and political policies, swings between populist and neoliberal governance, decentralization of the government, and internal conflict and terrorism. Smallholder producers, in particular, often migrate in response to the impacts of factors like these elsewhere and may begin producing palm due to their arrival in a region with a mill. For example, the region of Masisea in Ucayali is currently experiencing a large influx of migrants because of coffee crop failure in the highlands. These types of migrants, already experienced in government and/or NGO agro-development schemes and the formation and working of farmers associations, are savvy in accessing or petitioning for new agro-projects. Thus, with relation to smallholder areas, palm planting usually occurs in response to mill access, access to seedlings, and/or government projects, meaning that these areas are likely to expand in a successional manner in areas where the crop already exists. Even in new projects that include mills as part of the design phase, NGO's or governments are unlikely to implement these in new production areas. At the moment, even large companies such as Grupo Romero are playing it safe with new oil palm endeavours. However, the capacity for companies to supersede industrial plantation size, management and organization limitations, and to take advantage of policy loopholes such as the "best land use" (cambio de uso mayor) classification system that allow for standing forests to undergo large-scale agricultural development with little government oversight, has been described by several authors (EIA 2015, Dammert 2017, Bennett, Ravikumar

et al. 2018), which also makes it difficult to predict where new plantations may emerge, since the weak governance system around the Amazon and its forests is often one in which anything goes.³³

Market Share of Palm Companies in Peru

In the absence of transparent market data, we estimated market shares based on area, using two methods, one at the mill scale and one at the association scale. We estimated the market shares of the companies with palm oil mills in Peru based on the area of palm plantations in the immediate vicinity of each mill, without double counting any mills, by dividing the planted areas around the mills using Thiessen polygons. However, many mills were clustered close together (see Map 1), and production areas around these mills could reach more than one mill, not just the closest one. Ownership information about planted areas or detailed sourcing information would be needed to resolve these uncertainties. Grupo Palmas is the dominant producer in the industry and is owned by Grupo Romero, which controls Alicorp, Grupo Palmas, Primax, Ransa, Tisur, Tramarsa. This allows for full vertical integration of production and commercialization of several product lines including but not limited to: crude palm oil (CPO), industrial products, biodiesel and consumer goods, and exports. It has mills and plantations in three departments and has significant partnerships with smallholders in Ucayali and San Martín. Grupo Romero has 9% market share in oils and fats, 5% in soap, and 1% in butter products.³⁴ Their primary clients are: Pasternak Baum and Co, Mondelez (Perú), R. Trading, Camilo Ferron Chile, y Almacenes de la Selva; with 10 domestic clients representing 41% of their sales and ten international clients representing 18% of their total sales.²⁸

Table 3. Market Share of Companies with Palm Oil Mills

Company	Palm area (ha)	Percent Market Share	Rank in Market Share
Grupo Palmas	66,574	58%	1
Biodiesel Ucayali SRL	20,907	18%	2
Oleaginosas del Peru SA	6,021	5%	3
Oleaginosas Padre Abad	5,138	4%	4
Industrias Oleaginosas Monte Alegre SA	3,065	3%	5
Industria de Palma Aceitera de Loreto y San Martin S.A.	2,997	3%	6
Oleaginosas Amazonicas	2,644	2%	7
Agropecuaria Rossel S.R.L.	2,628	2%	8
Industria de Aceite de Palma y Derivados - Ucayali S.A.	1,739	2%	9
Oleaginosas Pucallpa SAC	1,133	1%	10
Prestamo Agroideas	978	1%	11
Industrias Palm Oleo	809	1%	12
Bioandes Eirl	515	0%	13
Olna Peru SAC	462	0%	14
TOTAL	115,611		

Source: Palm mills locations and reported area in production compiled by SPDE

As the potential zero deforestation agreement is likely to operate at the level of the umbrella organization, JUNPALMA. It is also important to understand the area controlled by various plantations, affiliated smallholders (i.e. associations), and independent smallholders (Table 4).

Table 4. Area based estimates of market share by association and company

Association or company	Palm Area (ha)	Percent Market Share	Rank in Market Share
Asociación de Palmicultores Palmas de Loreto (APPAL)	15,770	19%	1
Asociación Jardines de Palma (JARPAL)	13,843	16%	2
Grupo Palmas	12,511	15%	3
Federación Regional de Palma Aceitera San Martín (FREDEPALMA-SM)	10,196	12%	4
Biodiesel de Ucayali	7,527	9%	5
Asociación Central de Palmicultores de Tocache (ACEPAT)	7,527	9%	6
Ocho Sur	4,500	5%	7
Comité Central de Palmicultores de Ucayali (COCEPU)	4,500	5%	8
Asociación Agropecuaria Nuevo Amanecer (AANA) & Asociación de productores de Palma Aceitera Honoria	4,343	5%	9
Independent producers	2,447	3%	10
Palmas del Huallaga	1,000	1%	11
Palm Oil Farmers Association of Shambillo (ASPASH)	1,000	1%	12
TOTAL	85,164		

Source: Reported area in production compiled by SPDE

Conclusions and Recommendations

Peru's palm oil sector is under increasing scrutiny for its role in deforestation, but our review of current oil palm locations, of locations where oil palm could expand in the future, and of the roles of the main players and modes of production in oil palm illuminates possible pathways for the sector to move forward as an increasingly important palm oil producer, without clearing additional forests. Our overall findings are below:

1. Deforestation for palm oil is significant in palm areas.
2. The risks for additional deforestation for palm are also high especially in the absence of land use zoning that incentivizes expansion on already cleared suitable land. It is important for JUNPALMA, which has an estimated coverage of 80% of palm production, to follow-up on their commitment to the zero-deforestation agreement.
3. Certain mills, for example, those in Ucayali, have outsized exposure to deforestation risk given the high portion of surrounding forest that is on very suitable land.
4. Market share and exposure to deforestation risk are not perfectly linked, but, for example, the largest processor, Grupo Palmas, has some mills with very high risk (>95% of nearby forest is very suitable).
5. Smallholder production, concentrated in Ucayali, may be out of the reach of corporate ZDCs but could be an opportunity for REDD+ projects.

Importantly, we found that most remaining suitable forestlands in palm production zones falls in areas with smallholder producers. Most recent clearing for oil palm expansion, on the other hand, has been taken place in production zones dominated by industrial-scale production. Furthermore, vast extents of forested, suitable areas fall outside of current production zones; these are most at risk from expansion of large-scale plantations. Thus, ongoing support for the ZDC and its expansion to include most mills and large-scale producers would be an important step in protecting Peru's forests from oil palm expansion.

Transparency and traceability in the sector are low and will need to be improved in order to effectively implement an agreement. For example, more information about which mills sell to international markets vs. which sell primarily to domestic markets could help design better targeted interventions to slow deforestation using the most effective leverage. However, even without this kind of data, efforts to reach smallholders, including via REDD+ projects administered via existing associations or new projects aimed at independent smallholders, could focus on known locations with smallholder concentrations, such as Ucayali, and play an important role in saving forests, especially those nearby to existing smallholder production areas, and could help bolster the effectiveness of the ZDC.

¹ Kuepper, B., Steinweg, T., Thoumi, G. (2016). Palm oil frontiers: Lessons learned from SE Asian Corporate Expansion to Africa. Chain Reaction Research. <https://chainreactionresearch.com/wp-content/uploads/2016/10/palm-oil-frontiers.pdf>; Pirker, J., Mosnier, A., Kraxner, F., Havlík, P., and Obersteiner, M. (2016). What are the limits to oil palm expansion? *Global Environ. Change* 40, 73–81. doi: 10.1016/j.gloenvcha.2016.06.007; Ordway, E. M., Naylor, R. L., Nkongho, R. N., and Lambin, E. F. (2017). Oil palm expansion in Cameroon: Insights into sustainability opportunities and challenges in Africa. *Global Environ. Change* 47, 190–200. doi: 10.1016/j.gloenvcha.2017.10.009

² Kuepper et al. (2016); Furumo, P. R., & Aide, T. M. (2017). Characterizing commercial oil palm expansion in Latin America: land use change and trade. *Environmental Research Letters*, 12(2).

³ USDA FAS Commodity Intelligence Report 21 September 2016 <https://ipad.fas.usda.gov/highlights/2016/09/peru/index.htm>; Sociedad Peruano de Eco-Desarrollo (SPDE) (2017). Plantaciones de la Palma Acietera.

⁴ FAOSTAT (2020). <http://www.fao.org/faostat/en/#data/TP>; SPDE (2019) Camino hacia la libre deforestación en la cadena de palma aceitera del Perú. https://sociedadostenible.co/wp-content/uploads/2020/02/Policy_Camino-hacia-la-libre-deforestacion_SPDE_NWF_CDise%C3%B1o2.pdf

⁵ Pinzon, A. 2018. Sustainable Palm Oil Production in Peru. Global Canopy.

⁶ Pirker J & Mosnier A (2015). *Global oil palm suitability assessment*. IIASA Interim Report. IIASA, Laxenburg, Austria: IR-15-006; Ministerio del Ambiente (2019). Bosque y Perdida de Bosque.

<http://geobosques.minam.gob.pe/geobosque/view/descargas.php?122345gxe345w34gg>. Some of these forests may be in areas officially considered to be ineligible for palm expansion

⁷ Furumo, & Aide, 2017.

⁸ Csillik, O., Kumar, P., Mascaro, J., O'Shea, T., & Asner, G. P. (2019). Monitoring tropical forest carbon stocks and emissions using Planet satellite data. *Scientific reports*, 9(1), 1-12.

⁹ Bennett, A., Ravikumar, A., McDermott, C. Malhi, Y. (2019) Smallholder oil palm production in the Peruvian Amazon: Rethinking the promise of associations and partnerships for economically sustainable livelihoods. *Frontiers in Forests and Global Change*.

<https://doi.org/10.3389/ffgc.2019.00014>;

¹⁰ <https://www.minagri.gob.pe/portal/download/pdf/marcolegal/normaslegales/resolucionesministeriales/2016/junio/rm281-2016-minagri.pdf>

¹¹ USDA FAZ Global Agricultural Information Network. 27 June 2012.

https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Biofuels%20Annual_Lima_Peru_6-27-2012.pdf

¹² <https://www.regieringen.no/contentassets/b324ccc0cf88419fab88f2f4c7101f20/declarationofintentperu.pdf>;

<https://www.regieringen.no/contentassets/2c039f2b25a241e99ddeb53dd560df3d/joint-declaration.pdf>

¹³ Bennett, A., Ravikumar, A., Cronkleton, P. (2018) The effects of rural development policy on land rights distribution and land use scenarios: The case of oil palm in the Peruvian Amazon. *Land Use Policy*, 70, 84-93 <https://doi.org/10.1016/j.landusepol.2017.10.011>;

¹⁴ Rio Branco Declaration, https://earthinnovation.org/wp-content/uploads/2014/10/RioBrancoDeclaration_EN.pdf

¹⁵ OLPESA, ALPAMAYO, Palmas del Espino, Alicorp, Junpalma, Indupalsa and Inka Crops

¹⁶ SPDE, unpublished fieldwork; Csillik et al 2019.

¹⁷ 18 mills are operational with one mill in Pucallpa owned by Grupo Palmas set to go online soon

¹⁸ <http://pure.iiasa.ac.at/id/eprint/11682/1/IR-15-006.pdf>

¹⁹ Some land is located in supply zones covered by both industrial-scale production and smallholder production.

²⁰ Hajek, F. (2015). Towards Zero Deforestation Oil Palm in Peru: Understanding Actors, Markets and Barriers. Lima: USAID; Dammert, J. L. (2017). Contested Booms: The politics of oil Palm Expansion in the Peruvian Amazon. Doctor of Philosophy, Clark University.

²¹ Glinkis, E., Gutiérrez-Velez, V.H. (2019). Quantifying and understanding carbon emissions from land cover changes between large and small oil palm expansion regimes in the Peruvian Amazon. *Land Use Policy* 80, 95-106.

²² Glinkis & Gutiérrez-Velez 2019; Gutiérrez-Velez, V.H., DeFries, R., Pinedo-Vasquez, M., Uriarte, M., Padoch, C., Baethgen, W., Fernandes, K., Lim, Y. (2011). High-yield oil palm expansion spares land at the expense of forests in the Peruvian Amazon. *Environmental Research Letters* 6, 5pp.

²³ Bennett, Ravikumar & Cronkleton, 2018.

²⁴ The question of why smallholders initially join and affiliate with associations can be answered simply: because they must join in order to receive support. In the Amazonian culture, non-kin based associations of this kind are not a normal social construct, and likely account at least partially for the reason that it is migrants rather than locals that prefer to plant oil palm (Hajek 2015, Bennett A. 2017). Nevertheless, studies have shown that

in most cases where associations persist, such as in the case of most UN model associations, smallholders prefer to stay in the associations even after their debts are paid because of the continued perceived benefits, including access to future projects and incentives including credit and even land titling (Fort and Borasino, 2016; Bennett et al., 2019).

²⁵ For example, the first project of this kind was a project co-led by the UNODC and the regional government of Ucayali project, for 1,350 hectares of alternative development for 252 families grouped into 'base committees' located in villages. In this context the Comité Central de Palmicultores de Ucayali (Central Committee of Oil Palm Growers of Ucayali –COCEPU) was borne (made up of the base committees), which is run by the farmers. The Peru-Canada Counter-Value Fund (*Fondo Contravalor Perú-Canada*) financed the establishment of a mill for COCEPU in 1996, with 252 founding members managing to produce oil for the first time in 1998. This involved the creation of OLAMSA (Oleaginosas Amazónicas), to which members of COCEPU sell their fruit for immediate cash payment, of which members of COCEPU are the majority share-holder also mainly operationalised by farmers. Although the farmers are theoretically shareholders of 48% of the company, legally COCEPU is a non-profit civil association and its income cannot be divided among its members, but rather must be bestowed to farmers as goods or services including but not limited to seeds, nurseries, fertilizers, agricultural extension and healthcare.

²⁶ By improved, we mean improved productivity, yield, pest or plague management, access to market improvement such as shared machines/vehicles, new young plants to replace old plantations etc.

²⁷ Bennet, A., Ravikumar, A., McDermott, C., and Malhi, Y. (2019) Smallholder Oil Palm Production in the Peruvian Amazon: Rethinking the Promise of Associations and Partnerships for Economically Sustainable Livelihoods. *Frontiers for Global Change* 2(14), doi: 10.3389/ffgc.2019.00014.

²⁸ Bennet et al 2019.

²⁹ SPDE, unpublished field work.

³⁰ SPDE, 2019.

³¹ SPDE, 2019.

³² Between 2003 and 2005 legislation was pushed through towards a progressive blending schedule of biofuels with a view to implementation of a 5% biodiesel blend in diesel by 2009.

³³ EIA (2015). Deforestación por Definición. Lima: EIA; Dammert, 2017; Bennett, Ravikumar & Cronkleton, 2018.

³⁴ Pacific Credit Rating (2019). PALMAS DEL ESPINO Y SUBSIDIARIAS

<https://www.ratingspcr.com/application/files/1015/5958/1975/PE-PALMAS-201812-FIN-BC.pdf>