



Smallholder Oil Palm Production in the Peruvian Amazon: Rethinking the Promise of Associations and Partnerships for Economically Sustainable Livelihoods

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Smallholders play a major role in the expansion of oil palm as a global commodity crop. Yet outside of Southeast Asia, there is limited research on how it impacts smallholder livelihoods. This paper examines how different smallholder modes of production have emerged in the largest oil palm producing region of the Peruvian Amazon, Ucayali, and presents a typology of these arrangements. The socio-economic outcomes of these modes are analyzed using a survey of 200 smallholders and 14 months of participant observation. Results show that there is considerable variation in *how* smallholders produce oil palm, and in the *outcomes* associated with different production strategies. Independent production, corporate partnerships, and government assistance programs were viewed positively by smallholders. However, smallholders' knowledge about the workings of the market, the role of associations, and their own financial circumstances was poor. Different modes of production yield different outcomes in terms of debt burdens, dependency on powerful actors for information, and crop and livelihood diversity. These outcomes had implications for the economic sustainability of oil palm for smallholder livelihoods. Importantly, corporate partnerships have generated comparatively massive debt burdens for smallholders. On the other hand, under other production scenarios smallholders may hold significant power over decisions, and can benefit economically from oil palm, which has important implications for ethical oil-palm debates and decision making.

Keywords: smallholders, sustainable livelihoods, oil palm, palm oil, Peru, Amazon, Ucayali

INTRODUCTION

The global oil palm sector is at a pivotal moment. As frontiers of oil palm expansion in Malaysia and Indonesia close, the sector has turned its attention to countries like Peru, Colombia, the Democratic Republic of The Congo, Liberia, and other forest countries with suitable land for new production (Kuepper and Thoumi, 2016; Pirker et al., 2016; Ordway et al., 2017). However, the increasingly negative reputation of oil palm for its adverse socio-economic and environmental impacts at production sites in main producer countries has generated pressure from environmentalists, land

rights activists, as well as private agricultural interests to make current and future production more socio-environmentally sustainable and equitable (Greenpeace, 2015; Oosterveer, 2015; Austin et al., 2017; Moreno-Peñaranda et al., 2018). On the other hand, despite critiques, other studies have shown that in many cases smallholders and grassroots groups themselves continue to engage in oil palm production and even drive its expansion (Feintrenie et al., 2010; Dammert, 2017; Hall et al., 2017; Bennett et al., 2018c), often resulting in positive economic outcomes (Feintrenie et al., 2010; Cahyadi and Waibel, 2015). Thus, international aid agencies and the governments of frontier countries interested in sustainable rural development, poverty alleviation, equitable production and trade of palm oil are considering *how* and *to what extent* to support oil palm expansion in new regions, especially with relation to smallholding farmers.

It is estimated that more than 75% of the world's agricultural land is operated by smallholding family farms (Lowder et al., 2016), and globalization along with rising global trade in commercial crops such as palm oil has connected an increasing number of smallholders to global commodity crop value chains (Lee et al., 2013; Rigg et al., 2016). Accordingly, at least 3 million smallholders make a living (or part of a living) from oil palm globally, and they produce more than 41% of the world's palm oil through various modes of production (Soliman et al., 2016; RSPO, 2018). By "mode of production," we mean: a production system with key characteristics as to who *owns* the land, who *works* the land, who provides *inputs*, including physical infrastructure, credit, chemicals, seedlings, and if and how, producers and workers organize to negotiate for their interests (Vermuelen and Cotula, 2010; Borasino, 2016; Jelsma et al., 2017b).

Rural development programs commonly seek to improve the livelihoods of smallholders by grouping them into collectives, be it through farmers' associations, cooperatives or company-community partnerships (Cramb and Sujang, 2013). This ostensibly provides for economies of scale and a technological support base that strengthens good practices in plantation management and reduces costs and risk for all stakeholders. Some smallholders also disaffiliate from associations to pursue independent production. This results in vital new questions emerging about which modes of production are in fact best for smallholders. This paper interrogates the received wisdom about the benefits of associations and challenges an emerging technocratic consensus that company-community partnerships are a desirable pathway forward.

Despite the prevalence of smallholders in the sector, the magnitude of their contribution to palm oil production and their profile as targets of rural development programs, there has been limited research on socioeconomic outcomes in the small-farm oil palm sector (Euler et al., 2017). Additionally, in some cases, simplified ideas about smallholder modes of production, such as the notion that there are two simple categories of company-assisted and independent production (Lee et al., 2013; Brandt et al., 2015; Euler et al., 2017; Jelsma et al., 2017a) have fueled development policies that may have failed to adequately account for the wide range of actors they represent, the diverse modes of production that characterize the sector, and the unique challenges

and opportunities that smallholders face (Jelsma et al., 2017a). Thus, as a starting point, this paper contributes to the literature by *advancing a typology* of the *current* modes of smallholder oil palm production in the Peruvian Amazon than what is currently available. Understanding the present situation with respect to oil palm production requires a historical overview, especially given that Ucayali's unique history has shaped rural development in ways that differentiate it from other oil palm producing countries.

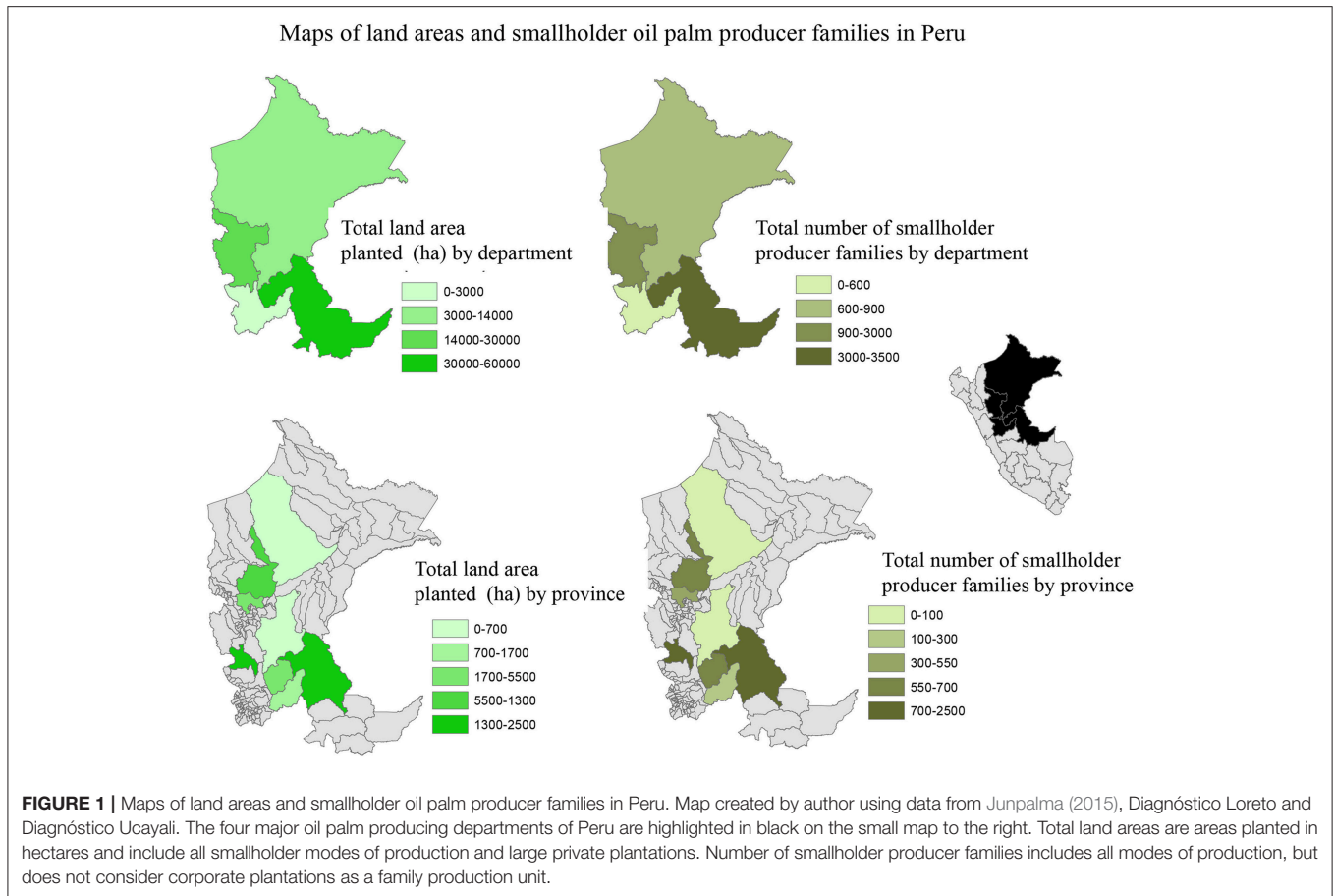
Research concerning how smallholders are engaging in this market is timely, particularly for frontier countries like Peru, where more oil palm projects are likely to take place (Bennett et al., 2018b). In Peru, smallholding farms account for more than 60% of the cultivated area (MINAGRI, 2016), but information about the modes of production through which they engage with the oil palm sector or how they fare therein is scant (Fort and Borasino, 2016; Dammert, 2017). Nevertheless, international aid agencies and government programs alike advocate oil palm for rural poverty alleviation, and additionally new private firms are already arriving and creating new modes of production (Dammert, 2014; EIA, 2015; Bennett et al., 2018b). This paper provides new information concerning impacts of these new initiatives on smallholders with respect to income, debt burdens, empowerment in the decision process, and contractual enclosure.

This paper fills a critical research gap by examining the socio-economic impacts of these diverse and sometimes new modes of oil palm production vis a vis the following research questions:

- a) What modes of production are currently prevalent in the Peruvian Amazon region of Ucayali, and why?
- b) What are the implications of production systems for smallholders in terms of debt, market access, contractual enclosure, and social empowerment?
- c) What can we learn from this case study about smallholder oil palm expansion in new and old commodity frontiers?

We address these questions using a case study from the region with the largest planted area of oil palm in Peru (42%), and the most numerous number of smallholder families engaged in production: Ucayali (**Figure 1**). Ucayali has experienced a 97% increase in cultivated area since 1990, and now has over 40,000 hectares planted (DRSAU, 2017) with a further 342,671 hectares identified for future expansion (DRSAU, 2015). Additionally, the social infrastructure has expanded momentously from just under 300 families in the mid 90's to at least 3,244 families, and nine processing mills today (authors' own data adapted from DRSAU, 2015). We draw on data from a survey of almost 200 Ucayali-based oil palm smallholders, key informant interviews and extensive participant observation between 2012-2017.

In the next section, we introduce the study site and present the methods. We then describe the history of oil palm in Peru and explore how the particular historical political ecology of the Peruvian Amazon has led to diverse modes of production today. Based on this historical analysis, we present a useful typology of production systems found today in Peru. Finally, we present quantitative and qualitative results from our empirical exploration of the debt, markets, contractual enclosure and social empowerment context of smallholders.



STUDY SITE AND METHODS

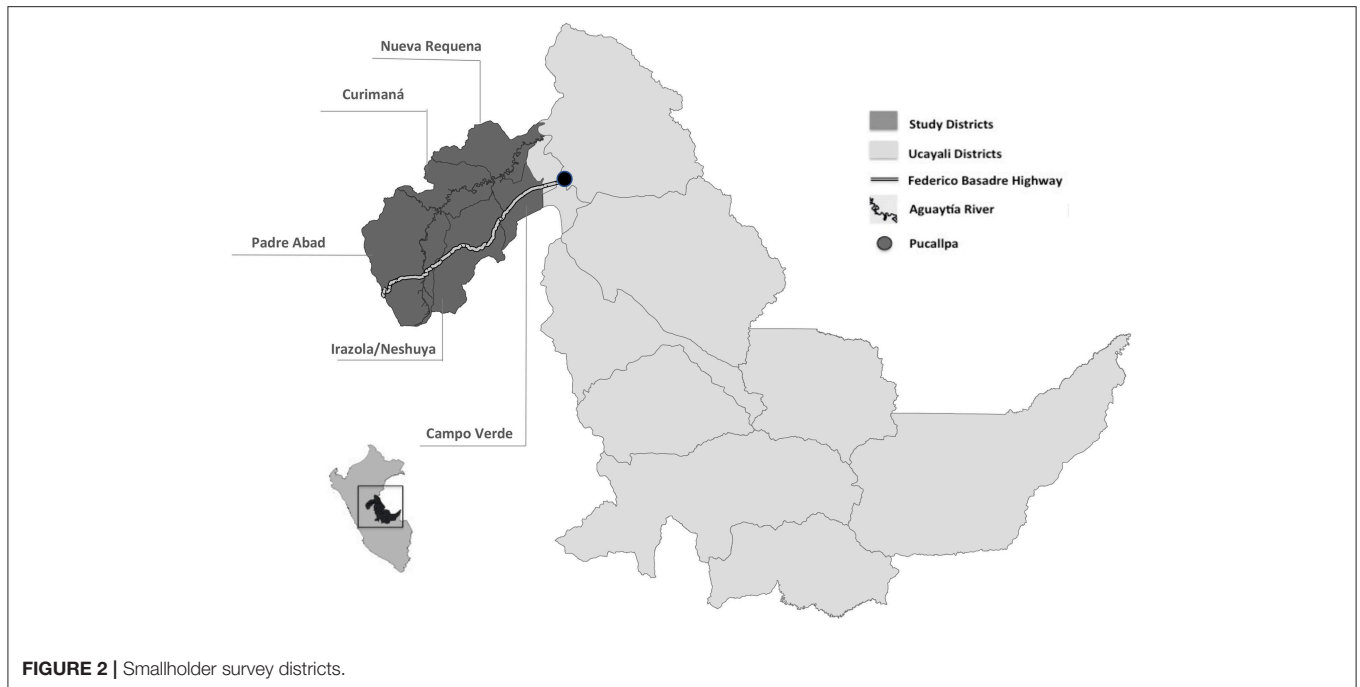
Because the Ucayali region is one of the most important and volatile frontiers for oil palm development in Peru, we decided to focus our research there. The department of Ucayali is an inland region of Peru situated in the central western zone of the Amazon rainforest (**Figure 2**). Ucayali's economy is mainly based on agriculture and extraction of natural resources such as minerals and timber (INEI, 2012). Its capital city, Pucallpa, is linked by an 846 km highway to the national capital Lima, making it the Peruvian Amazon's most accessible regional capital. The peri-urban and rural landscape outside of Pucallpa is a mosaic of indigenous territories, non-indigenous villages and smallholder farms, large plantations of oil palm, timber concessions, abandoned lands, young and old second-growth forests, and vast expanses of mature rainforest. Smallholder farms are traditionally subsistence crop/fallow systems, but are increasingly moving toward planting commodity crops such as oil palm and cocoa. Additionally, as we describe in the next section A Historical Political Ecology of Smallholder Oil Palm in Ucayali a rich historical political ecology has shaped the different production strategies, livelihood choices, and management approaches of different smallholders even within

the oil palm cohort. Nonetheless, smallholder monocultures, even of commodity crops, are rare. Rather, new crops are being incorporated into old systems (Bennett et al., 2018c), where heterogeneous production strategies are employed on smallholders farms incorporating subsistence agriculture, commodity crops (mainly cocoa, oil palm, and pepper), and natural resource activities such as soft-wood extraction (Putzel et al., 2013) and charcoal (Bennett-Curry et al., 2013; Bennett et al., 2018a).

Oil palm has expanded into four lowland Amazon departments¹ in Peru; Loreto, Ucayali, San Martín and Huánuco—with Ucayali currently ranking as the biggest producer region in the country with ~42% of the total national area of oil palm (MINAGRI, 2016) (**Figure 1**). Additionally, Ucayali has been the source of international scandal in recent years, due to the large-scale deforestation and social conflict driven by new oil palm expansion (EIA, 2015; Dammert, 2017; Bennett et al., 2018a).

The region also reflects heterogeneous development patterns, including some areas that produce commodity crops and are connected to national markets by roads, and other areas that have only more recently been settled or connected to external markets.

¹There are 25 departments in total in Peru.



In these latter cases, emerging corporate community-company partnerships (CCCPs) have been established and are the first of their kind to reach local producers. Overall, different modes of production exist in the region, making it possible to study their various socio-economic contexts.

Ucayali has four provinces, two of which currently host oil palm production. Within these two provinces, there are six oil palm producing districts, research was conducted in all of them (**Figure 2**). To generate a sample set we created a list of oil palm producer districts and villages using information we derived from oil palm farmers' associations, the regional government and scoping field-work we undertook. Scoping enabled us to also include areas in producer districts where there were smallholders producing oil palm that were not on formal lists, thus maximizing the potential to find and include independent smallholder producers as well as include smallholders that were members of the CCCP that were not on lists. From the final list, we took a random sample of areas.

To generate a sampling frame at the household level, we drew up a list of resident landowners using participatory mapping activities in villages. We excluded households in villages that had no land of their own, households that did not produce oil palm, as well as absentee landlord households. Suitable households were selected using two random number tables, the second for use if households from the first chose not to participate. Finally, we interviewed 200 households in 33 villages. Participant observation undertaken by the first author included a total of almost 14 months. Due to intense land conflict and social unrest that developed between the private company and the local people during the time we undertook the survey and the fear

generated therein, eleven informants asked us not to use their survey responses in this analysis, so our final dataset includes 189 survey responses.

Surveys included structured, semi-structured and open-ended questions devised to answer our central questions. Surveys had four main sections: The first solicited information about the interviewee, their land (crops and land uses), tenure and land rights, and historical experience with farmers' associations, previous to oil palm. The second part of the survey evaluated the oil palm projects and requested information about credit and goods. Following this, the association model of governance was explored, and the final section asked questions about the market. The survey was designed in collaboration with stakeholders in the field and underwent four pilot testing processes. Where appropriate, survey answers were coded and analyzed in the statistical software SPSS 24. Finally, data from participant observation and ethnographic inquiry collected over a period of 14 months was used to complement the surveys. This information is used to deepen the analysis of smallholder perceptions of changes in their landscapes over time.

Informants and participants were asked for oral consent after having received information about the context and aims of the research, and an explanation on how the data would be used after anonymization. The option to opt out at any time was made explicit to informants, as is evident in our non-use of several of the interviews of the partnership smallholder group in this paper. All methodologies and methods for this study were approved by the ethical screening procedure of the Central University Research Ethics Committee (CUREC) at Oxford University.

A HISTORICAL POLITICAL ECOLOGY OF SMALLHOLDER OIL PALM IN UCAYALI

As oil palm production accelerates in the Peruvian Amazon, old modes of production are also expanding while new ones are being introduced. However, policy makers have an inadequate understanding of what these modes of production are. Reductive analyses that recognize only very few modes of production (e.g., independent smallholder production, private plantations, and smallholder associations) have tended to guide policy-making. In fact, this research shows that the Peruvian Amazon hosts an increasingly complex array of smallholder oil palm production, which policy-makers, conservation advocates, and scholars must understand in order to engage appropriately with the sector.

The oil palm sector has emerged in a region with a rich historical political ecology of resource extraction and boom-and-bust economic cycles often shaped by market incentives as well as government policies promoting specific resource extraction, crop expansion and land use designations. For example rubber at the end of the nineteenth century and barbasco in the 1940's were two crops the boomed whilst international markets favored their trade and went bust when other regions such as Southeast Asia came to dominate the market commerce (Coomes et al., 1994; Arce-Nazario, 2007). The local people in the Peruvian Amazon have had their history shaped by complex socio-political dynamics that have included political change and turmoil, colonization and evangelization, displacement, migration, and resettlement schemes as well as the socio-ecological and economic impact of agricultural and aquicultural resource market booms and failures (Schmink et al., 1989; Hecht and Cockburn, 2010; Sears and Pinedo-Vasquez, 2011). This rich history has had a profound impact on both Amazonian people, in-migrant people and the landscapes they inhabit, resulting in a very heterogenous social-ecological system where marked cultural differentiation and heterogeneity in lifestyles and indeed livelihood management can exist right down to the household level. Varied experiences of regionally and locally targeted economic investment and development and/or political conflict for example, will impact how a given smallholder may view the promise for prosperity in any new development projects such as oil palm.

In the first results section, we present a typology of the modes of production currently found in the Amazon. In order to understand the present situation, it is necessary to examine the particular history of rural development and agricultural production in the Peruvian Amazon. This history has led to a different configuration of land tenure regimes, smallholder associations, and relationships between capital and labor than is found in other parts of the global South. As Peru is a relatively new frontier for oil palm, these particulars are important for stakeholders involved in the sector to understand.

The information presented in this section is based on participant observation, key informant interviews and secondary literature. Through these means, we have identified four main “phases” within which oil palm production and its relative modes of production evolved in Ucayali. These phases serve to provide a general overview of the scenario but should not be understood

as specific “projects.” The phases overlap in space and time, and involve a large number of projects.

SAISES and Social Innovation: The Forgotten Beginnings of Ucayali Oil Palm (1980's-1990's)

The Agrarian Reform in the early 1960s instigated a massive redistribution of land and had long-lasting reverberations in Peruvian agriculture. Serfdom was abolished, and peasants and indigenous people were (theoretically at least) given direct ownership of land. The reform banned private investment, favoring collective agrarian associations (agricultural societies with social interest—hereafter SAISEs for their Peruvian initials), which organized peasant farmers into collective production systems for decades. Even though the idea was to liberate the smallholders from the estate model of production, the central managers of SAISEs were still called “*padronados*,” a term that also described semi-feudal landholders in the colonial and early post-colonial era. While oil palm was rare, the notion that associations would work together to produce cash crops was well-established in the wake of the Agrarian Reform. At our field site, where migrations and settlements from the Andes to the Amazon began after the Reform, SAISEs were established in 1973, where land was used for a variety of productive purposes. Migrants from the Andes were tasked by the government with training indigenous and riverine locals in modern agriculture. Ultimately, they worked together to graze cattle, grow subsistence crops, and, to a limited degree, produce cash crops. This type of farming as well as the structure of outgrowing farmer associations was completely new to the Amazon region but migrants from the highlands came with more experience of this type of social organization around agriculture production. The lasting effect of this history is that, in most cases, migrants have more exposure to and experience of association models of governance. This history may be part of the reason that more migrants are engaging with oil palm in Peru, since oil palm is predominantly channeled to smallholders through farmers' associations and partnerships.

The first oil palm of this kind in Ucayali was in a SAIS in the district now called Campo Verde where they established 475 hectares of oil palm in the 1980's. The association has since fallen apart, due in large part to its abandonment by the management during the Shining Path terrorism and the subsequent resistance of the government to grant the land to the association members left behind. Most of the land has since been occupied by new settlers. However, original members of the SAIS still reside there, and a sense of a missed opportunity through the loss of this oil palm plantation prevails as these smallholders now see their neighbors with newer oil palm benefitting from its harvest.

Smallholder Oil Palm as an Alternative for Illicit Coca: The First “Social” Oil Palm Projects (1990's to Present)

Since the 1990s, efforts to establish oil palm in the Peruvian Amazon have in large part been driven by the government's broader “alternative development” program, which aims to eradicate coca production by giving local people other viable

economic options (MINAG, 2001; Salisbury and Fagan, 2011; Fort and Borasino, 2016). An international boom in cocaine use, together with a chaotic and violent political situation in Peru, caused coca cultivation in Peru to increase exponentially and provided financial and social feedstock for the Shining Path terrorists to increase their power. The Peruvian government, backed by United States money, took a two-pronged approach to eradication: (1) fight powerful guerilla groups that controlled coca production zones with military force, by forced crop eradication, including physical removal and chemical destruction of fields, and (2) provide smallholder farmers growing coca with incentives for shifting to alternative economically competitive crops² (“alternative development”).

The first project of this kind was established in our study site in 1991 by the United Nations Office on Drugs and Crime (UNODC) and supported by the government. The project targeted 252 families in six villages with 1,350 hectares of oil palm and only those smallholders that formed part of those villages were eligible for the project. Most were migrants: refugees fleeing violent conflicts between Maoist guerilla groups and government and paramilitary reaction. These UN-government supported smallholders were organized into six village committees (locally called “bases” henceforth base-committees), and given the support to establish their oil palm. In 1992, these six base-committees were incorporated into a larger umbrella central association. This set-up of base committees and associations can be understood as a multi-level governance structure with two levels of social organization around agricultural production. Base committees are local (village-based), and smallholders must become a member of a base-committee before they can associate with a larger central association. Such associations incorporate multiple base committees, each made up of a number of farming families. Base-committees have a leadership, which is responsible for communicating information between the farmers and the association and vice-versa. Whilst individual smallholders are welcome to attend association meetings, committee leadership is expected to do so.

By 1998³, a mill had been established and was operational as an active commercial entity. A progressive rural development strategy was implemented so that smallholding members of the association became 44% shareholders of the palm oil company (mill). Since then shareholding members have benefitted financially from the success and profits of the mill at the end of each year. Members can sell and buy shares amongst themselves as they wish, though this has resulted in many shares ending up in the hands of fewer members than might be hoped. Whilst the UN project has expanded to include more members, membership has been limited only by the carrying capacity of the association itself, and the geographical remit of smallholders became more flexible. This has made oil palm and associativity accessible to any smallholder that wished to take part so long as they had some kind of formal rights to their land and there was space within the

association. Since farming land is free to any citizen, in theory this requirement is not itself an inhibiting factor.

The first UN association has expanded to incorporate more than 500 members today and it’s mill also processes the palm of more than 200 independent producers. There are now six of these oil palm United Nations bases-association-mill/companies in the Peruvian Amazon (two in Ucayali), all of which have grown dramatically over time. This model of oil palm production is commonly referred to as the “UN Model” (Borasino, 2016; Dammert, 2016, 2017).

Oil Palm in the National Best Interest: The Government for Smallholders and Smallholders for Themselves

Coincidentally, the year that the first UN-smallholder oil palm project started (1991), was the same year that the Agrarian Reform Law ended. New laws moved away from the prevention of private investment in the Amazon to focus now on *encouraging* private sector investment in the Amazon⁴. Consequently, in 2001, the National plan for the promotion of oil palm 2000–2010 was approved. The plan proposed rural development through settling families practicing migratory farming, reforestation “degraded” land, combatting illicit coca production, as well as improving rural livelihoods as a pathway out of poverty mainly through “social organization” (MINAG, 2001, pp. 2 and 16).

At the regional and municipal level in Ucayali, many projects were implemented targeting different numbers of smallholders for different development agendas. For example, in 2008, a regional government project for “economic development” invested 2, 117, 700 USD⁵ to support 160 families to establish 800 hectares of oil palm in the Nueva Requena district. It included “access to the market” through credit and formalized buyers. Smallholders were not asked to form committee-bases or associations. They were given 700 plants each (equivalent to 5 hectares) for free, and were expected to secure bank loans for the rest of what they needed to establish their plantations (fertilizer, pesticide, transport). This approach turned out to be problematic. Oil palm takes 3 years between planting and first harvest and many smallholders were not used to and not interested in taking out loans for such a long-term endeavor, so many recipients simply sold off the free palm trees they had been given. This was one of the consequences of the lack of economic education, as the director for economic affairs of the regional government told “We did everything, we gave them the plants, we gave technical training in how to tend those plants, we gave them access to credit and markets but we didn’t give any economic training! So now what do you see in the oil palm areas? Ramshackle houses with the roof falling in and a plasma screen t.v. inside” (Interview in Regional Directorate of Agriculture, 2014).

By 2011 new projects started to emerge that demonstrated some growth and learning on the part of the government. For example, The Program of Compensation for Competitiveness (AGROIDEAS) scheme, which had as its central aim to increase

²Decreto Legislativo 753 “Ley de Bases de la Estrategia Integral de Desarrollo Alternativo para Erradicar el Tráfico Ilícito de Drogas con la Participación de la Población” (1991)

³With support from international funding ‘El Fondo Contravalor Perú-Canadá’

⁴Law 653. Agrarian Sector Investment Law *Ley de la Inversión en el Sector Agrario*.

⁵S/6, 205, 069 PEN (calculated using exchange rate from September 2008)

market competitiveness of agricultural smallholders between 2012 and 2016, worked more collaboratively with smallholders. The project provided 80% of the costs (non-returnable), with some terms and conditions. For example, the smallholder was required to provide the first 20% of the costs, thus ensuring commitment. They were also expected to have had some experience with oil palm cultivation (even just as a labor hand) and finally, the project broke the mold of giving plants, credit, fertilizer and training and encouraged smallholders to allow smallholders to ask for what they specifically needed depending on their circumstances (machinery, a vehicle, plants, fertilizer, a fire extinguisher etc.). One again, it was required that they did this as a formalized organized social group, a *base-committee* or association: “The government says that organized groups will have better access to incentives, we can only grow together.” (AGROIDEAS promotor: participant observation log, August 2015).

Despite advancements, oil palm producers of various sizes including smallholders started lobbying for increased effort by the government to expand a better oil palm sector. Disillusioned with the governments overall inaction in properly implementing the promises of the 2000–2010 plan, and the relative failures of the promises for large expansion made in the 2003 biofuels law (Dammert, 2017), these groups started to put pressure on the government for a new, more modern, national oil palm plan and through a process of round tables and regional meetings including all stakeholders a new plan was indeed drafted: The National Plan 2016–2026. The word “Associativity” replaced “social organization” but maintained the same premise: smallholders fare better when they are part of an organized production system. The 2016 document moves away from the strong alternative development discourse of the 2000 document, preferring to focus the social aspects of the thesis on associativity and “social responsibility within companies”, as a result of new modes of production that had recently emerged.

Private Plantations and Smallholder “Partnerships”: A Corporate Model Arrives in Ucayali

By 2012, twelve private companies were registered in Ucayali, with plantation extensions between 500 and 3,000 hectares. These companies generally did not engage much with local smallholders, but rather operated alongside the other actors on this heterogeneous farm-forest landscape. However, that same year a new large-scale mode of production emerged. In 2011, the regional government sold land shares equivalent to 12,188 hectares to a Malaysian company (henceforth “the company”) for oil palm. Since such large plantations require contiguous land areas, they were established in a more remote, and forested, area than the rest of the oil palm in the region. As such environmental damage caused by the company was the focus of a lot of negative reports (EIA, 2015; Finer et al., 2015; Finer and Novoa, 2016; Salazar and Rivadeneyra, 2016; Bennett et al., 2018b). Additionally, issues of land rights violations, land grab, and inequitable socio-political conditions of the local people connected to the company was also noted (Forest Peoples

Programme, 2015; Bennett et al., 2018b). In part to mitigate this, the company set up a “partnership” with some local villages, using the model they were accustomed to in Malaysia (Cramb and Sujang, 2013). The company intended to incorporate 700 families over almost 5,000 hectares of land by 2017⁶. Again, base-committees and a central association were set up. In addition to this, smallholders were given credit through two forms of binding contract: one for their original loan and a 25-year credit line contract.

RESULTS

Current Modes of Oil Palm Production in Ucayali: A Typology

In order to create a smallholder typology, our research asks the questions, what modes of production are currently prevalent in the Peruvian Amazon, and why? The previous section describes the “why” through four distinguishable phases between the early 90’s and today. Each was motivated by different socio-political and economic circumstances and agendas at various levels of governance from the local to the international. Each of these historical phases influenced the modes of production in Peruvian agriculture and has affected oil palm production today. The historical phases do not correspond to singular development projects. Rather, our dataset shows that smallholders had engaged with dozens of different projects of varying types during these phases, and that projects of one sort or another took place during most years between 1991 and 2017. The approach and scope of these projects vary widely, covering a wide range of modes of production, as might be expected in view of the history preceding them.

Considering the complexity and number of projects involved, we have chosen “project experience” as the unit of analysis for this research. A “project experience” refers to a particular project in which a smallholder participated. Many smallholders had multiple “project experiences,” and, consequently, some individuals appear multiple times in the dataset (Table 1). This makes sense because we are examining the impact of different modes of production on smallholder livelihoods, in particular by assessing household debt impacts and qualitative perceptions. As a smallholder may incur different levels of debt from different projects that she participates in over her lifetime and may have different perceptions of different projects, “project experiences” are the most appropriate unit of analysis for this research. At the same time, it is important to recognize that for a given smallholder, past involvement with oil palm projects is likely to affect their future experiences. We explored controlling for these intra-smallholder effects with lagged variables, but found that there were too many different sets of individual experiences across smallholders to provide meaningful control categories. Moreover, the history of agricultural policy in the region—namely, the shift from central associations run by legacy landholders, to national,

⁶The company has not yet achieved this goal.

TABLE 1 | Smallholder oil palm project experiences.

No. of experiences	1	2	3	4
No. of Smallholders	182	67	20	4
Total Experiences				273
Total smallholders (<i>n</i>)				182

TABLE 2 | Typology of smallholder modes of oil palm production.

Source of support	Type of association		
	No association	Farmers' Association	Corporate Partnership
Independent Graduated	36	0	0
Independent Own Resources	7	0	0
Government/UN supported	6	109	0
Corporate	0	0	31
Total surveyed population	189		

and international programs, and eventually to new company-community partnerships makes variable analyses complex. Smallholders may have had any number of experiences with these projects, but as discussed below, we find that there are large differences in debt burdens between the different models for oil palm production, and that having had prior experiences tends to improve future outcomes, regardless of what those prior experiences were. However, the variety of different smallholder experiences and the order in which they had them produced a large number of categories relative to our sample size. Moreover, there were large qualitative variations in terms of how smallholders service debt and their overall mix of livelihoods activities. As a result, the most salient analysis that we could carry out was to examine how debt burdens accrued across the different modes of production captured in this study, with an eye to the question of whether or not early experiences seemed to be correlated with better outcomes in later experiences.

Taken together, an analysis of the historical background, survey data and fieldwork revealed that over time a nuanced context has emerged and as such our typology presents three broad groups and five subgroups of oil palm smallholder producers (**Table 2**).

Although almost all the smallholders interviewed ($n = 182/96\%$) had had project experiences, 43 of them self-identified as *independent* producers. Independent smallholders can broadly be defined as those smallholders that do not have a contract of any kind, who manage their plantations free of technical assistances and agricultural inputs from oil palm estates or the government. The occurrence of independent oil palm smallholders—and the relative socio-economic implications of and for their existence in the oil palm forest/farm landscape—has become an important element of the discussion about smallholder modes of production (Brandão and Schoneveld, 2015; Erniwati et al., 2017; Jelsma et al., 2017a; Suhada et al., 2018). The 43 independent smallholders we surveyed can be

grouped into two separate collections: First, the “graduated”⁷ smallholders ($n = 38$), referring to farmers that had used a supported project as springboard into oil palm production and markets, later choosing to become independent after they had fulfilled all their contractual requirements (liquidated debt). Except for the corporate model which includes a 25-year credit line, once debts are paid oil palm smallholders are permitted to leave associations and live contract-free as they please.

The second group of independent smallholders are seven smallholders that had never engaged with any project. Rather, they had established their plantation themselves using their own financial resources and availing of the infrastructure (roads, nurseries, processing mills) put in place by previous projects (**Table 2**). A similar occurrence has been observed in other producer countries such as Malaysia (Cramb and Sujang, 2013). It is evident here that where the option to become independent is available, some smallholders do prefer to operate autonomously. However, it is also true that the better associations are constantly at capacity. For example, overall 60% ($n = 144$) of surveyed smallholders were in a UN association and transcripts indicate that some others were awaiting the opportunity to join. Smallholders overwhelmingly agreed that farmers’ associations assured a better market price (68%, $n = 129$) and/or guaranteed a market for smallholders (74%, $n = 140$). Nonetheless, 20% of them choose to be independent because they prefer autonomy over their own livelihoods or do not have access to their preferred association.

Exploring the Economic Context: Investment, Debt and Markets

This section uses survey data, ethnographic information from participant observation and tertiary data published by the government as well as other scholars to explore question 2: What are the implications of these production systems for smallholders in terms of debt, markets, contractual enclosure and social empowerment? We evaluate credit and debt scenarios mostly from the pursue of whether credit scenarios are set up in a way that smallholders can viably pay off debt within the timeframe projected for the loan⁸. Contractual enclosure refers here to the geographical, social and economic entrapment (including the exposure to risk of dispossession) of smallholders that are bound to financial contracts and credit lines. We use the term “market” to refer both to international value-chain market access and local markets and market dynamics.

The average investment required to establish a plantation of oil palm in Peru is often estimated at 3,000–3,500 USD per

⁷The term ‘graduated’ is not ours, it is a typology used elsewhere to define smallholders that have gone through a similar (but not identical) process of becoming independent (McCarthy, Cramb, Vermuelen)

⁸Debt is generated for a combination of a selection of the following activities and goods depending on the project and smallholder needs and own resources and ability: Land preparation (can contracted manual labor and vehicle hire) excavation and removal, piling earth for drainage, clearing for roads, compression of roads, pipe cleaning, drainage, gasoline for vehicles and chainsaws, palm plants, biological and chemical fertilizers (Boro, Phosphoric rock, Dolomite, Nitrogen, Potassium Chloride), transport of plans and materials (driver and/or vehicle hire), manual labor for sowing, Other expenses (e.g., manual earth piling, manual drainage, technical support, agricultural insurance).

TABLE 3 | Smallholder debt per hectare normalized (Peruvian Nuevo Sol).

	Debt figures			
	Mean	Minimum	Maximum	Median
Government/UN Supported	1,998	200	5,184	2,200
Corporate (CCCP)	6,770	4,125	11,914	6,750

hectare (Hajek, 2015; MINAGRI, 2016), and discussions and debate around access to credit and the oil palm market are made with this consideration (ibid). However, whilst that figure may reflect the *total* overall investment, our results show that the amount that *individual smallholders themselves* had to invest⁹ in their plantations to get them started with the crop varied greatly. In fact, debt figures were so wide-ranging that taken as a whole, the data did not explain very much. Different credit scenarios are related to the nature of the different projects, as described in the previous section. Thus, in order to understand the credit context a little more, we normalized the data.

We identified three factors that were skewing the debt data. First, for 138 (52%) of the total 273 “project experiences,” (Table 1) smallholders had incurred no debt. This is an important finding. Much of this is attributable to the government “social” development and alternative development projects. However, the prevalence of these government programs does not by itself explain the number of debt-free project experiences; even with government projects that provided palm plants and other inputs directly as in-kind assistance, smallholder beneficiaries needed credit for the preparation, planting and maintenance costs of the new oil palm.

Our ethnographic work revealed that in fact the high number of debt-free cases is in part due to local socio-political activity. For example, on at least two occasions, municipal and regional governments had been forced to pardon loans they had provided to smallholders growing oil palm, after smallholders objected to the poor quality of the palm trees they had been given and to delays in road construction prohibiting access to the market, amongst other complaints. Furthermore, in some cases projects simply vanished after implementation. As one farmer explained: “At first the idea was to return the money they lent us, we even signed a contract with the regional government and the bank and the money went through the association. But I don’t know what the association did, the leaders all left, I don’t know what happened but in the end [the government] said there was an amnesty, and we [the farmers of these committees] didn’t have to pay anything.” (smallholding farmer, September 2016).

The second issue skewing the debt data were the cases of atypically high debt. Our survey data, along with copies of loan contracts showed that all unusually high figures pertained to smallholders engaged in the CCCP. Thus, the simultaneous occurrence of the debt-free “social” projects and

⁹All debt numbers are original total debt including interest. We were not able to assess the actual status of debt in cases where smallholders had been unable to pay on time and debt figures had increased dramatically since smallholders themselves did not know figures.

TABLE 4 | Reported ability of Government/UN supported smallholders to liquidate debt.

Ability to repay loans	Valid percent of responses (n)	Valid number of responses (n)
I have been able to pay with very few problems	37.7	32
I have had a few difficulties but most of the time can pay	27.5	23
I am not/have not usually been able to pay my debt on time	15.9	13
I am/have not been able to pay my debt at all	17.4	14
other answer	1.5	1
Total	100	83

the debt-heavy corporate model conflated to create the wide range in overall data.

Third, the value of currency in Peru over the time-period (1990–2017) was highly volatile for several years after the period of hyperinflation between 1990 and 1998. Therefore, we removed the experiences where no debt had been incurred (138), removed debt scenarios pre-2000 (3), and separated corporate loans from the government-supported loans. This left 132 cases of project experiences involving credit amongst 83 smallholders that were able to respond about their debts, which we analyze in the debt calculations. However, it is important to highlight here that whilst there is some within-group variance, Table 3 shows the CCCP model clearly generates far larger debts for smallholders than other supported programs.

Smallholder loan repayment results were positive overall. Of the supported cohort, 38% ($n = 32$) had been able to pay back their loans on time with very little difficulty (Table 4) although the number of debt that defaulted was not negligible (17%/ $n = 14$). This may be partially attributable to lack of financial education. When we examine this data over time (incremental project experiences), we can see that the ability to pay greatly increased the second time round, whilst the least favorable outcome of not being able to pay at all reduced from 22 to 5%¹⁰ ($n = 18/ n = 2$) (Table 5). Furthermore, almost 45% ($n = 156$) of producing smallholders had been able to expand their plantations themselves without further support, a result that very much supports development rhetoric in Peru which touts smallholder oil palm projects as a springboard to economic independence and growth (MINAGRI, 2016). When asked why it had been easy to repay the loan, the general response was that the income from the oil palm itself paid it back, with some individuals saying that other income sources helped reduce the pressure of the debt and ensure timely payments. Reasons for not being able to pay varied a lot ranging from personal reasons (illness, death in the family), to a dislike for the work of oil palm farming, inability to transport their harvest because of poor roads or extreme weather, or bad quality plants/insufficient yield.

¹⁰We have excluded project 3 and 4 because only one smallholder had oil palm in production at the time, and as such no debt for projects 3 and 4 were due for repayment yet.

TABLE 5 | Ability of Government/UN supported smallholders to liquidate debt for first project experience and second project experience that involved credit.

Ability to repay loans	Valid percent of responses (n) first project experience	Valid number of responses (n) first project experience	Valid percent of responses (n) for second project experience	Valid number of responses (n) second project experience
I have been able to pay with very few problems	32.70%	27	52.6%	21
I have had a few diff but most of the time can pay	26.5%	22	26.3%	10
I am not usually able to pay my debt on time	16.3%	13	15.8%	6
I am have not been able to pay my debt at all	22.4%	18	5.3%	2
other answer	2.0%	2	0.0%	0
Total	100%	83	100%	41

TABLE 6 | Corporate partnership (CCCP) smallholders' predicted ability to repay loan.

Predicted ability to repay loans	Valid number of responses (n)	Valid percent of responses (n)
I will be able to pay with very few problems	21	65.6
I will have a few difficulties but most of the time will be able pay	2	6.3
I will not usually be able to pay my debt	5	15.6
It is unlikely I will be able to pay my debt	0	0
I do not know	3	12.5
Total	31	100.0

We asked the CCCP smallholders how they perceived their future capacity to prepay their debt. Since they were not yet producing, responses were based on information they had been given by the company, knowledge they had about neighbors' experience with debt and oil palm, personal circumstances, and individual character. The transcript segment below shows how information was being given to local people by the company. The discourse was pervasive and compelling, but imprecise and potentially misleading toward creating unrealistically high expectations from local people that may not have other reliable information sours. In addition, although all 31 surveyed CCCP smallholders stated that they had signed a contract, only four CCCP farmers been given physical copies of these. Thus, whilst responses are subjective, they do give an idea of how and why farmers understood their financial situation to be so promising, despite the heavy debt burden they had incurred. For example, none foresaw inability to pay (**Table 6**).

What is oil palm? Where will it take us? Well, look at this (removes four credit cards from his pocket) look how I have credit cards like a casino! One for my wife, one for me, another one for my wife, and another one for me. That is what oil palm is. And you guys are not going to have to wait long for that, just wait months and there is your money. You are now 'palmeros' (oil palm growing smallholders), and in being palmeros automatically you are going to have this in three years time. From there, if you want a loan, you just say to the banks 'Sir; I want 30 thousand soles' and the bank man... will give it to you. Every 15 days I earn almost 6,000 soles but you guys will be earning almost 10,000 - because the company will never allow you to have a low yield... The

harvest only costs about 30 soles, one day you will hardly spend 100 soles and then you have 7 or 8 tons so that's 72 thousand soles a year and only spending 5 thousand on your maintenance." (Company representative speaking to an audience of indigenous farmers: June 2014)

Price, Production, Markets, and Knowledge

The previous section has shown that, supported smallholders have been largely successful in paying back loans, and that capacity to pay improves as they grow more palm and/or gain more experience with formal credit systems. Now we look at the market conditions under which they have achieved this, and the question of the debt/yield/wellbeing trade-offs.

Despite assurances about the booming oil palm market, significant price movements have always been a feature for the leading vegetable oils traded on world markets, and palm oil is no exception (CIF, Rotterdam). International vegetable oil prices have an obvious impact on the raw fruit rates given to the producer farmers in sites of production. For example, in August of 2015 oil palm fruit in Ucayali was being bought by mills at ~90 USD/ton, contrasted with a high of more than 250 USD/ton in the summer of 2012 (own data). Furthermore, rural agricultural prices and markets are not only determined by international standards, but are also subject to regional and local political-economic and environmental dynamics.

A hectare of smallholder oil palm in our study region produces an average of 14 raw fruit tons per hectare per annum (RFT/ha/pa) (Gutiérrez-Vélez et al., 2011). Additionally, the annual costs of producing this palm is ~593/USD/ha/year¹¹. Taking our average size of oil palm plot (4.7 hectares, rounded up to 5) this would mean that that at the lowest price they have experienced smallholders earned ~3,336 dollars per year from their oil palm plot, and 14,500/USD/ha/year at the highest price to date. As we explained in section Study Site and Methods, most oil palm smallholders have additional on and off farm sources of income (Padoch et al., 2014; Zegarra and Vargas, 2016; Bennett

¹¹This estimation is based on the calculations that Zegarra and Vargas (2016) made for costs in Aguaytia and Neshuya. These account for only two of our seven districts, there is quite a difference in the data produced by Zegarra and Vargas for the two. We have used an average of the two datasets from these authors that pertain to our field site to get an approximate idea of smallholder costs.

TABLE 7 | Minimum and maximum prices given to smallholders in the region for 2012 and 2013 (in USD per ton).

	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct	Nov	Dec
YEAR 1												
Min	124	121	178	184	126	256	184	150	170	151	143	135
Max	171	171	224	224	245	Miss	212	176	185	176	164	Missing
YEAR 2												
Min	120	113.7	120	120	135	126	126	128	130	130	130	130
Max	124	121	126	132	126	135	136	142	138	135	139	144

et al., 2018c), so the income generated by oil palm is one of several economic activities in households.

Ethnographic fieldwork (participant observation) and survey questions revealed that although smallholders ($n = 134/53\%$) recognized that the market was not consistent and disclosed that this volatility did usually impact them negatively, a changeable market was not generally viewed by the smallholders as a problem specific to oil palm. In our experience, price fluctuation was perceived as an inherent characteristic of agricultural livelihoods with a small number of producers (15%/ $n = 23$) claiming that the price/income was in fact *better* overall than they thought it would be when they started.

As we mentioned in the previous section, advocates of the CCCP “estate” model of production are in a better position to realize higher yields than other types of supported and independent smallholders because they uniquely have access to expensive high-quality technology and plantation knowledge and experience provided by the plantation company (Beekmans et al., 2014). With a higher yield, incomes can be increased, although in the first years at least, there are the huge debts incurred through the CCCP agreement to consider. Bennett et al. (2018b) detail the goods and services included in the credit scenario of this CCCP. Zegarra and Vargas (2016) have said that in other regions in Peru where similar estate models are already producing, the average yield is 17 RFT/ha/pa (Zegarra and Vargas, 2016). At a possible 15 tons more per five hectare plot annually the extra yield creates non-negligible financial margins in terms of smallholder income. However, at this difference, they are close enough to the (smaller) yields of supported and independent smallholders that a discussion on tradeoffs related to models of production and overall economic wellbeing is warranted. We will delve into this in the discussion section.

The standard market rates, however, are just an approximation as to what the smallholder takes home. First, there is wide variation in production costs for different smallholders depending on distance from mills, quality of roads, and vulnerability to weather affecting access to mills, the stage of life the palm is at, as well as the way a smallholder chooses to maintain their palm (Lee et al., 2013; Soliman et al., 2016). In addition to the lively socio-economic context already described, there are other local factors that influence income. For example, over 350 smallholder sales receipts collected in the field show that the price that smallholders received was not the same in a given month, sometimes varying quite significantly (Table 7).

The reasons for this disparity in payment are several. First, mills will deduct a/the price from the farmer if the fruit is over or under ripe. Second, the UN associations deduct a small amount per delivery for a “social fund” (health and bereavement cover) from members for members. Independent producers do not incur this cost, nor do they benefit from the fund. Third, mills sometimes set their own prices in response to the availability of palm fruits. For example, at times when production is low, mills often compete to get smallholder FFBs by offering better prices and reducing the rigidity of their fruit selection standards, by facilitating free transport from farms to mills or offering incentives. During these times the local market dynamic can change dramatically whilst smallholders take advantage of the favorable market conditions by side-selling.

Smallholders’ Understanding of Their Economic Circumstances

With so much uncertainty and change in the international and local markets, it seems somewhat surprising that smallholders were so overwhelmingly positive about their situation. It is possible that smallholders are accustomed to such a context and as such expectations of development projects are generally low; markets have always been unstable, sometimes fleeting, and often unfair for smallholders in the region. Boom and bust agricultural (Coomes et al., 1994; Santos-Granero and Barclay, 1998; Arce-Nazario, 2007) and natural resource cycles (Sears and Pinedo-Vasquez, 2011) and unsuccessful and inappropriate development schemes (Coomes, 1996) have left their mark on both the people and the environment in Ucayali. Furthermore, since oil palm producers also produce other crops/natural resources, they do not have all their proverbial eggs in one basket. Perhaps the apparent enthusiasm revealed in the survey data in fact reflects a vague keenness at a specific moment in time. Nevertheless, our hypothesis when designing the study was that *perceptions* and *knowledge* may diverge. If this were the case, there would be important implications for our discussion and in answering the last of our central questions. To assess this, the last part of the survey assessed smallholders’ knowledge of their economic situation by asking some basic questions to which there was a correct and incorrect answer.

We began by asking about the workings of the market and the economics of oil palm. Although most producers (77%/ $n = 146$) said that they understood why the oil palm market prices changed, in fact only 31% ($n = 59$) provided a

correct answer¹². Whilst most smallholders said that they got information about markets from their associations, only 50% ($n = 70$) of associated smallholders attended meetings. Equally, knowledge about contract terms and conditions was low; only 10% ($n = 14$) gave the correct number, and a worrying 49% ($n = 41$) of smallholders with debt responded that they did not know what the rate of interest was or how this would affect the final amount owed. In general the consequences of not repaying loans was relatively well understood (61%/ $n = 19$ correct) compared to other models.

With relation to the relative economic performance of oil palm to other crops, perceptions changed as we refined the questions to the specific context of our field site using our ethnographic information. For example, initially, most smallholders (89%/ $n = 168$) said that oil palm was more economically competitive than any other crop. However, this number fell to 56%/ $n = 106$ when we asked if oil palm was more economically competitive than cocoa, the main commodity crop in the region. Similarly, when taken alone, 89% of our informants said that oil palm had the best market relative to other crops; however, this number dropped to 39% when we asked how it compared to cocoa. As one farmer stated “there’s always a better market with cocoa, because I can take cocoa [to markets] on my horse” (village interview, June 2015). This quote serves to illustrate the value attached to having control over the marketing infrastructure of a crop, as well as to independent living and autonomous livelihoods. We return the subject of the value of independence for holistic economic wellbeing in the discussion.

The vast majority of associated smallholders stated that they felt involved in the decisions of both their committees (92%/ $n = 129$) and their associations (84%/ $n = 118$). However, decisions were made at group meetings and whilst base-committee (i.e., inter-village-level) meetings were well attended (85%/ $n = 119$), only 50% ($n = 70$) of associated smallholders said they attended association meetings. Furthermore, only 26% ($n = 36$) of members knew the name of the association leader. Since one of the principal purposes of the base-committees is to act as an intermediary between the association and the smallholder, these relative numbers are not surprising. Furthermore, this system seems to be working as 83% ($n = 116$) said that the leaders of their committee attended the association meetings on their behalf. Although most smallholders initially scored committees very high on all counts of fulfilling their duties, on further questioning 60% ($n = 84$) revealed that they had seen conflict or corruption within their committee, and 31% ($n = 40$) of those said that this had irreparably broken their trust in the system.

Interestingly, corporate smallholders scored much better in terms of knowledge about the overall debt they had accrued,

interest rates, and association leaders. They also scored much higher on knowledge about the consequences of defaulting on loans and the cause of market price fluctuations. However, they scored lower on empowerment variables such as being involved in group decision making, feeling included and attending meetings.

Finally, whilst almost half (46%/ $n = 87$) of the smallholders said that oil palm had improved their general quality of life, 51% ($n = 96$) said they *did not know if it had*. This ambiguity about the crop was further highlighted when 83% ($n = 157$) stated that they did not intend to be oil palm growers forever. In fact, participant observation revealed a very relaxed attitude toward oil palm as “just another crop,” to be simply injected with poison or sold off as “developed land” if a better opportunity came along, if personal circumstances changed or if they tired of the demanding work. This may also be explained by the historical political ecology of previous booms and the many development projects smallholders have experienced, as mentioned earlier.

DISCUSSION AND CONCLUSIONS

This paper set out to understand how different modes of oil palm production have emerged in Peru and analyze their different socio-economic impact on smallholders. We found that there is considerable variation in how smallholders produce oil palm, and developed a typology of these arrangements that can help policy makers and researchers to better track developments in an evolving sector. While globally, increasing capital concentration in the oil palm sector tends to shift power toward producers and retailers (Lee et al., 2013; Jelsma et al., 2017b), we found that under certain conditions, smallholders can hold meaningful power over production decisions, and can also benefit economically from oil palm. In particular, we find that having strong associations that are supported by public funds is associated with lower debt burdens. While the outcomes of newer company-community partnerships remain to be seen in detail, it is already clear that they tend to produce much higher debt burdens for smallholders, making them a less attractive economic proposition. Additionally, in contrast with findings from other studies in Southeast Asia for example, we see that state and/or agri-business may not be the only viable mode of incorporation of smallholders into value-chains (McCarthy, 2010). Instead, in Peru, international support has been an important mechanism for providing less costly finance to smallholders in the oil palm sector. These findings underscore the importance of disaggregating smallholder characteristics and relationships to production systems (Cramb and McCarthy, 2016; see also: Jelsma et al., 2017a).

Our analysis of the region’s political ecological history shows that different state programs, including some that involved private firms and others that were backed by international cooperation, have impacted agricultural production, spurred migration, and impacted smallholder livelihoods and political power over the past several decades. Additionally, the Peruvian government and international development agencies have consistently organized agricultural development policy and

¹²In this calculation we were generous in what we allowed to qualify as “correct” according to how broader issues are interpreted and communicated through local interpretations and responses. For example, “The price is set by international prices set in Malaysia” as correct, “limited availability of palm in the region and the mills pay more” to be correct “International stock market” and “competitive pricing from other countries” would be correct. Incorrect answers included “the president of the committee decides,” “it depends on the price of gold,” or “the new private company have meetings and the price for the year is set.”

assistance around rural farmers' organizations, which they have promoted since the Agrarian Reform at least. However, whilst the terms "association," "group," and "social organization" conjure images of inclusion, our paper finds that, like cases elsewhere (Brandão et al., 2018), social inclusion and empowerment of smallholders are still lacking despite positive local perceptions. Even with the UN's approach, which ensures that smallholder association members are shareholders in the mill company and receive a portion of the profits regardless of their annual production, smallholders did not always participate meaningfully in decision-making, nor did they always understand key aspects of their economic activities.

More concerning still, the new CCCP model has generated extremely high debt burdens for smallholders, who remain uncertain and unclear about what the future might hold. While it is too early to determine the economic impacts of production under CCCP's, these trends are concerning, and we urge researchers, policy makers, and development organizations to pay close attention to how these arrangements unfold over time. As it stands, our research reveals a red flag that policy makers should heed, and should quickly move to consider alternative approaches and to find ways to support smallholders with these new debt burdens.

Aside from these large programs that supported oil palm production, there were several smallholders that produced oil palm independently. They all had acquired capital through other means, and used it to invest in their own production systems on land that they owned. While there are advantages to producing oil palm in this way, in particular because these smallholders control a greater share of the means of palm production, our results do not support policies that advocate independent production for two reasons. First, most smallholders do not have capital to develop such systems, and policies that would transfer in-kind aid to less wealthy smallholders are the best approach to moving in the direction of more control. These policies are generally linked to association-building, as we showed in our historical analysis, and associations have benefits in terms of negotiating power and providing resilience to market shocks. Second, there are other risks associated with independent production, including the erosion of community governance and the Amazonian culture of collective action. These issues are outside the scope of this paper, but certainly merit attention from policy makers and scholars (Perreault, 2005; Gurven et al., 2015; Reyes-García et al., 2016).

Despite these issues, our results corroborate others' in Peru in that oil palm appears to be a good revenue source for Ucayali smallholders in general (Borasino, 2016; Zegarra and Vargas, 2016), especially as a supplement to other household income sources. Additionally, outside of the CCCP, smallholders in Ucayali have a range of options when it comes to modes of production, especially after they "graduate" from a project. This suggests that in-kind assistance for oil palm production from the United Nations, the Peruvian government and other organizations has, to a great extent, provided a pathway for economically viable smallholder oil palm production without burdensome debts. This has important implications for discussions about enclosure (Castellanos-Navarrete and Jansen, 2015), empowerment and ethical production in that it can

help those interested in investing in social or private oil palm enterprises that involve smallholder producers in defining the most appropriate modes of incorporation and production in a given socio-geographical space. Specifically, any organization interested in supporting sustainable oil palm production that improves local people's well-being should support models that give smallholders meaningful control over the means of production, through profit sharing, real land sovereignty, and limited debt obligations.

Our research shows that whilst some smallholders prefer to be in associations, others frequently choose to become independent after using projects as a springboard into the sector. Additionally, and contrary to reports about independent smallholders' disadvantageous position in the sector (Ismail et al., 2003; Lee et al., 2013), in Ucayali independent producers benefit economically from oil palm production. Whilst they lose out on some association benefits such as shareholding, they may balance this out with considerable autonomy in their production decisions, and they are not experiencing market exclusion since they are utilizing the road and mill infrastructure that is in place¹³. While independent smallholders cannot directly negotiate prices with buyers through the association, because associations continue to prevail in the region, prices are set through these collective negotiations and even independent producers enjoy them.

In international agricultural policy, discussions about oil palm and livelihoods usually focus on the need to increase yield for smallholders (Rhebergen et al., 2018). Our research complicates this framing. We suggest that in healthy mixed-crop farms, such as the traditional rotating crop systems found in Ucayali, there is space for traditional farming, forest regeneration *and* the incorporation of more lucrative cash crops such as oil palm. It is widely accepted that a heterogeneous production system is a preferential production strategy for rural people as it safeguards against commodity price shocks (Albertus, 2019), food insecurity (Rist et al., 2010), and the erosion of local cultural practices (Sears and Pinedo-Vasquez, 2011; Bennett et al., 2018c). Thus, focusing narrowly on yields ignores other benefits that smallholders derive from their agricultural activities, including revenues, subsistence, and maintaining sovereignty over their livelihoods. Although our economic analysis revealed that fluctuating markets, generally low incomes and fairly low yields make for what at first glance appears a rather precarious economic situation for Ucayali smallholders, it also clearly showed oil palm to be a lucrative *additional* source of income for smallholders in the region with yields *as they are*.

Thus, when approaching questions of rural livelihoods and the design of new economic development projects and schemes, it is important to consider the trade-offs (Cramb and McCarthy, 2016) with other important elements of economic wellbeing as well as differential trade-offs in different scenarios such as the contract terms (Rist et al., 2010; Gatto et al., 2017). Our results showed that while indeed the CCCP smallholders were likely to yield more oil palm per hectare than their independent and

¹³Although the need for their own capital to start their palm production could be viewed as exclusionary in itself.

supported counterparts, there are nevertheless clear trade-offs in terms of debt burdens, contractual enclosure, dependency on the company for market information and knowledge more broadly, and crop and livelihood diversity (Bennett et al., 2018b). In light of this, we encourage scholars and policy makers to clearly distinguish between increasing yield on smallholder farms in the pursuit of improving smallholder livelihoods, and increasing yield in order to serve a growing global demand for palm oil. We argue that merging these two concepts creates confusion around the goals of agricultural development policy, and advances narratives that encourage and justify new modes of production in areas where the modes of production in place, such as in our case study, may already be the most appropriate and viable for the goals of ethical smallholder oil palm production.

With relation to the functionality of association models of governance, on the one hand, smallholders spoke positively of their experiences with associations. They scored them highly for achieving their ostensible goals and fulfilling promises to the farmers while including them in decision-making. They said they felt included in decision making, and believed that they understood the workings of the oil palm market, and indeed their own financial circumstances. However, we found that their actual knowledge about these issues was poor. Although the government is making progress and adapting their approach based on what they have learned through its policies and project interventions over the past 20 years, state presence continues to be inadequate and smallholders remain undereducated about the economics of oil palm. This is true at all stages of the process from signing contracts to how to appropriately spend money as income increases to actually improve their economic wellbeing.

Overall, our findings suggest that some approaches to oil palm production can improve livelihoods and genuinely empower smallholders. In particular, programs that provide direct aid assistance to support oil palm production and then allow farmers to control the means of production themselves seem to generate the best livelihoods options. Moreover, given that many such farmers diversify their economic activities, we suggest that governments and researchers do not confine their measurements of success to yields and revenue (income), but also consider the full suite of activities that smallholders carry out in the context of their culture, allowing smallholders to participate in oil palm cultivation on locally relevant and preferential terms.

Finally, it is important to note that ecological considerations were largely left outside of this study. However, other research (see foundational research, and also Bennett et al., 2018b and Gutiérrez-Vélez et al., 2011) have raised concerns about the ecological impacts of some oil palm production models. Both

economic and ecological analyses raise serious questions about the desirability of CCCPs, which deserve sustained critical attention. Future research and policy discussions need to focus on the balance between environmental objectives and these livelihood opportunities. Moving away from a narrow focus on yield to a broader view of environmental management and land use activities that smallholders undertake will make these discussions more integrated and valuable.

AUTHOR CONTRIBUTIONS

AB conceptualized and designed the study including the methodology, undertook the fieldwork for data collection, analyzed the data and lead the writing of the manuscript and also sourced funding for the research. AR co-designed and co-wrote the manuscript in all iterations, he also assisted in presentation of the tables. CM and YM supervised the design of the research and made substantive comments and edits on all drafts of the manuscript.

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