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Partnership Regimes for the Production of Biofuels and Natural Rubber in Upland Palawan, Philippines

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WorldFish

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EXECUTIVE SUMMARY

Burgeoning global interest in biofuels and natural rubber has spurred initiatives to integrate marginalized communities into global commodity markets. Production partnership regimes, commonly in the form of contract farming involving upland communities, are now becoming prominent in developing countries. In the Philippines, the province of Palawan is becoming an active site for partnership regimes that endeavor to produce biofuels and natural rubber in the upland regions. These emerging trends signify the urgent need to understand how these partnerships are affecting upland communities, as well as how upland farmers become engaged in such regimes.

In this research, I endeavor to understand the economic and environmental perceptions of upland farmers in the context of biofuels and natural rubber production regimes in Palawan. I also endeavor to understand how these economic and environmental perceptions explain the behavioral intents of upland farmers, especially regarding intensification of production and cooperation in such partnership regimes. Research findings are drawn from seven months of field research in Metro Manila and Palawan, which included surveys, in-depth interviews, participant observations and acquisition of secondary materials. Quantitative data were statistically analyzed and modeled using non-parametric logistic regression models. On the other hand, qualitative data were analyzed by coding transcripts and field notes and identifying emergent themes. Theoretically, this research endeavors to contribute to the scholarship on contract farming and the Institutional Analysis and Development (IAD) framework.

Research findings reveal that biofuels and rubber production partnership regimes are established through government- and private-led initiatives, with varying involvement from local government units (LGUs) and financing institutions. Production contracts either allow individuals or groups to have greater involvement in the management and production operations or simply relegate relations to mere land lease agreements. In these production partnership regimes, upland farmers tend to equate high economic benefits with wage labor opportunities and maintenance support. This is primarily due to the perceived steady stream of income associated with the latter. However, there is a risk that these sources of income can make upland farmers dependent on the partnership, which may lead to debt accumulation when credit or income flows are interrupted. In addition, land tenure security, which ranks high in the concerns of upland farmers, is at risk of being undermined by unexpected contract arrangements, such as mid-course contract revisions. Evidence shows that contract farmers may be compelled to accept mid-course revisions — even if they feel these may compromise their land tenure security — due to their growing dependence on the perceived welfare benefits of such partnership regimes.

Research findings also show a relatively high regard for environmental quality (i.e., wildlife richness, soil productivity and landscape quality) in the upland regions, with the exception of perceptions on the remaining forest cover. Moreover, upland farmers attach environmental discourses to certain types of production partnership regimes, which together with evaluative beliefs and place satisfaction, may explain behavioral intentions of upland farmers. Using logistic regression models, certain economic and environmental variables are significantly associated with behavioral intents to intensify crop production and cooperate with new partnership regimes. The independent variables that have explanatory significance include the following: socio-economic satisfaction; preference for high revenues; evaluative beliefs on soil productivity and remaining forest; place satisfaction concerning forest; past experiences; age and education. These findings then suggest that apart from economic variables, environmental perceptions and social constructions of the environment may have significant effects on decision-making in production partnership regimes.

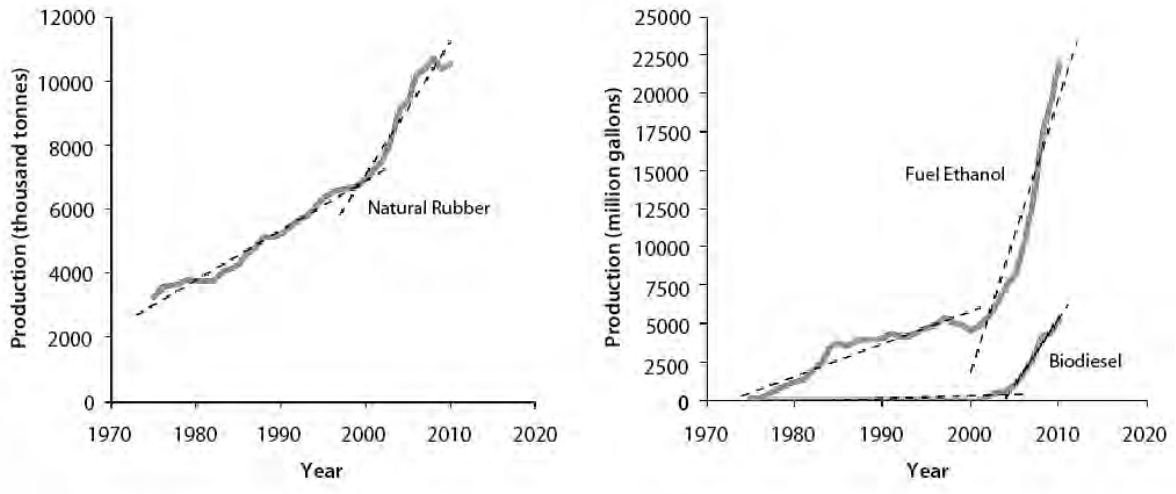
Three policy recommendations have been proposed to address some of the implications of the research. First, to address the issue of mid-course contract revisions, it is proposed that the capacity of

upland farmers be strengthened for them to fully understand the nature of contracts, learn how to anticipate mid-course revisions, and learn how to negotiate during such situations. It is also proposed that proactive interventions on the part of partner firms or direct interventions by government bodies be put in place to ensure that contract provisions internalize the land tenure concerns of upland communities. Second, it is proposed that income and credit provisions be balanced and flexible, allowing upland farmers to continue practicing intercropping and subsistence agriculture even when engaged in the production of biofuels and rubber. Lastly, it is proposed that environmental perceptions of upland communities be enriched (and not purposely altered) by giving them access to balanced information regarding the positive and negative impacts of production partnerships. This can be achieved by designing a system where multiple stakeholders can take part in contract negotiations in order for upland farmers to make better-informed decisions. This will ensure that upland farmers will not base their decisions solely on past experiences, word of mouth, or the potentially biased perspectives of prospective partner organizations.

1.0 INTRODUCTION

1.1 Biofuels and Rubber Production: Global Trends

In the past decade, biofuels and natural rubber production has become salient in development discourse. Advocates have promoted these crops as potential solutions to mitigate global climate change, curb the unsustainable production and use of fossil fuels, and revitalize the declining rural sector. Although there are a plethora of new energy sources proposed, biofuels have been surmised as an ideal "transitional" alternative energy because of its strategic role in displacing fossil fuels without drastically changing the present energy- and transport-related infrastructure and technologies (IEA 2011; IEA 2004; Pahl 2005, p. 5). Natural rubber, on the other hand, continues to have a significant share of the rubber market (about 40%) with the demand expected to escalate due to the fast growing economies of China and India and the uncertainties in the price of petroleum (van Beilen and Poirier 2007). The perceived burgeoning importance of biofuels and rubber in the age of global climate change is evident in the rapidly increasing production of these commodities in the last decade (Figure 1).



Notes: (1) Trend lines are added to emphasize change in production rates after 2000.
(2) Data from FAO 2011; EPI 2011

Figure 1. Global production trends for fuel ethanol, biodiesel, and natural rubber

However, the rise in popularity of these commodities has been accompanied by criticisms from various fronts. Biofuels have been criticized for issues such as the following: compromising food security (Boddiger 2007; McMichael 2009; Tenenbaum 2008; Rathman et al. 2010); emitting more greenhouse gases than fossil fuels and generating "carbon debt" (Fargione et al. 2008; Searchinger et al. 2008); having low net

energy production (Farrell et al. 2006); undermining biodiverse landscapes (Danielsen et al. 2008; Koh and Ghazoul 2008); displacing local populations through massive land acquisitions (Vermeulen and Cotula 2010); and violating workers' rights (Renner and McKeown 2010). On the other hand, natural rubber development, particularly those in the form of large-scale, monocrop plantations, has also been associated with issues such as the loss of biodiversity due to conversion of tropical forests (Li et al. 2007) and loss of ecosystem services (Hu, Liu and Cao 2008).

In recognition of the aforementioned issues, proponents of biofuels and natural rubber have created a sustainable image for these commodities, particularly to ensure that marginalized groups from the rural periphery are not disproportionately afflicted. More recently, there have been efforts at the national and supranational levels to establish novel governance systems that ensure sustainability of production of these commodities (e.g., Mol 2010; Gouyon 2003). Partnerships to link smallholder farmers with the global integrated biofuels network (e.g., contract farming and outgrower systems) have been proposed and increasingly initiated in a number of countries in Asia and Africa (Dubois 2008; Ejigu 2008; UN DESA 2007). Many natural rubber production sites, on the other hand, have been associated with smallholders and thus identified as socially and environmentally sustainable (Dove 1993; Gouyon, de Foresta and Levang 1993). However, maintaining smallholder systems remains a challenge, as evidenced by the domination of rubber monospecific plantations in places such as Peninsular Malaysia (Kathirithamby-Well 2011) and Sumatra (Feintrenie and Levang 2009).

1.2 The Philippine Case

The emerging trends in biofuels and natural rubber production are also evident in the Philippines. In 2006, the National Rubber Development Program was organized by the national government to increase rubber plantations and promote investments in the country's rubber industry (Galang et al. n.d.). Through this program, the government envisions that by 2020, the Philippines will become the fourth largest player in the global natural rubber industry (DA 2006). In 2007, the Philippine government passed into law the Biofuels Act (Republic Act No. 9367), which sets bold targets for the development and use of biodiesel and bioethanol in the ground transport sector of the country. These targets require enormous effort in order to develop plantations of biofuel crops domestically, so as not to rely on bioethanol and biodiesel imports. More recently, in 2011, the Philippine government initiated the National Greening Program (Executive Order No. 26), a bold effort to reforest 1.5 million hectares of land by 2016. The program envisions natural rubber as one of the species to be planted.

Related to crop production in the rural areas are the policy efforts of the government to empower local communities and the peasantry. In 1988, the government instituted the Comprehensive Agrarian Reform Program (CARP), a policy that aims to redistribute 10.3 hectares of land to four million peasants. Although currently criticized for its struggles to achieve its mandates, CARP, particularly in the 1990s, has been heralded as one of the more successful government land redistribution programmes in the world (Borras, Carranza, and Franco 2007). In the realm of natural resource management, devolution and decentralization policies became instituted in the 1990s with the passing of the National Integrated Protected Areas Systems Act (NIPAS or Republic Act No. 7586) in 1992 and the Indigenous People's Rights Act (IPRA or Republic Act No. 8371) in 1997 (Magno 2001). The NIPAS Act allows peoples' organizations to establish an agreement with the government to manage designated forestlands using a community-based approach for a period of 25 years. IPRA, on the other hand, recognizes indigenous peoples' special rights over ancestral lands and domains. Both legislations were pivotal in enabling indigenous and non-indigenous local communities to have direct involvement and influence in matters pertaining to the exploitation and conservation of natural resources. The confluence of these policies has provided opportunities for the early integration of upland local communities into the country's biofuels and natural rubber development.

The recent fuel-versus-food debates in the Philippines has complicated the relationship between production of non-food commodities (particularly biofuels) and the role of local communities. With the mounting concerns on the propensity of biofuels to undermine food security, for instance, finding appropriate lands for biofuels crop production has become the main concern of the government and private firms (Montefrio and Sonnenfeld 2011). In order to ensure the economic viability of biofuel crop production, plantations would need to be as large and as consolidated as possible. However, many of the lands disbursed to smallholder farmers through CARP are small (mostly less than 5 hectares) making it difficult for prospective biofuel developers to consolidate lands for plantations. Consolidating the land would then

require the cooperation of thousands of agrarian reform smallholder farmers. This challenge has made ancestral domains and community-based forest management agreement (CBFMA) lands in the upland regions relatively more attractive than agrarian reform lands for biofuels development (Montefrio and Sonnenfeld 2013). The presence of public and private organizations that begin to target ancestral and CBFMA lands as potential natural rubber production areas was also observed in my fieldwork.

1.3 Research Problem

A number of upland communities made the decision to partner with the state and private sector to grow certain types of biofuels and natural rubber in spite of past experiences with development aggression and failed government projects. This is of particular interest to upland communities located in biodiverse regions, such as the province of Palawan, where ensuring the development of biofuel and natural rubber programs could compromise the survival of these cultures and possibly result in destructive land use conversion. It is then important to know (1) how various forms of biofuels and rubber production partnerships contribute to the vulnerabilities of marginalized groups; and (2) how partnerships are formed and decisions made within these partnerships. Many of the links between local communities and the national and global biofuels and natural rubber markets are sustained by various partnership regimes that involve different levels of the government, local communities, and domestic and foreign private firms. These regimes have evolved to include marginalized groups in many different ways (e.g., contract farming, joint ventures, outgrower systems, sharecropping, coercion, etc.) but our current understanding of the decision-making processes within these regimes remains modest given the complexity and diversity of the stakeholder preferences, beliefs, and behaviors involved.

The study then endeavors to address the following research questions:

a) How do upland farmers perceive the economic costs and benefits of the production partnerships vis-à-vis their environmental perceptions (evaluative beliefs, place satisfaction and perceptions of environmental impacts of biofuels and rubber production)? What are the implications of these perceptions in regard to the welfare of upland farmers?

b) How do economic and environmental perceptions influence the intent and decisions of upland farmers to cooperate with or continue participation in prospective and existing production partnership regimes, respectively? How do the same independent variables influence the intent and decision of upland farmers to engage in intensive production of biofuels and rubber?

c) What discursive strategies and policy provisions are recommended to improve current and prospective production contracts and bolster the negotiating capacity and wellbeing of indigenous and non-indigenous upland farmers involved in such regimes?

1.4 Research Objectives

The overall objective of the study is to understand how institutional factors, and economic and environmental perceptions influence the behavioral intent of indigenous and non-indigenous farmers in regards to biofuels and rubber production in upland Palawan, Philippines. It is endeavored that this greater understanding will advance current theories and debates on production partnerships concerning biofuels and rubber, which can potentially inform policies that ensure the wellbeing of upland farmers in the ever-expanding global commodity markets.

The specific objectives are:

a) To determine the various production partnership regimes and contracts that are currently adopted and developed in the Philippines;

b) To determine the economic perceptions – perception of costs and benefits, and preferences for institutional and incentive structures (conditions) for contract formation – of production partners, particularly the upland farmers, in regard to biofuels and rubber production contract arrangements;

c) To comprehend the environmental perceptions – evaluative beliefs, place satisfaction, and perceptions of environmental impacts – of upland farmers in regard to biofuels and rubber production contract arrangements;

d) To determine how economic and environmental perceptions influence the behavioral intent of upland dwellers to cooperate in production partnerships and to engage in intensified biofuels and rubber production;

e) To recommend discursive strategies that will enhance the capacity of indigenous peoples to better negotiate their preferences with existing and potential biofuels and rubber production partners; and

f) To come up with policy recommendations to improve biofuels and rubber production partnerships and enhance the welfare of participating indigenous and non-indigenous upland farmers.

2.0 LITERATURE REVIEW

2.1 Production Partnerships

There is a plethora of studies on production partnerships in the agriculture and forest sector, but the literature that best relates to the case of rubber and biofuels production involving upland farmers in the Philippines is contract farming. Contract farming refers to oral or written agreements or arrangements between farmers and firms that specify conditions of production and marketing of an agricultural product (Roy 1972, p. 3). This involves the firm providing a degree of production support (i.e., credit, production inputs, and management and technical advice) and the farmer making a commitment to provide specified quantities and quality of agricultural commodities by a given time (Eaton and Shepherd 2001). Proponents conceived contract farming as a form of partnership in which firms and growers benefit "without sacrificing the rights and interests of either party" (Little and Watts 1994, p. 7). The purported benefits of contract farming to smallholders include assured market and fair price, increased household incomes, reduced production and price fluctuation risks, increased access to credit and inputs, and introduction of higher-value crops and new technologies (Key and Runsten 1999; Setboonsarng 2008). Contract farming is also perceived to create positive multiplier effects in the form of infrastructure and market development in the local economy (Key and Runsten 1999).

A number of scholars have argued, however, that in reality contract farming relationships exacerbate social and economic differentiation and inequality. More specifically, contract farming has been associated with, among others, poor extension services, inequitable distribution of risks, low commodity prices, favoring of large farmers, delayed payments (Glover and Kusterer 1990; Grosh 1994), loss of growers' autonomy (Clapp 1994), increased burden of work on women and children (White 1997), and environmental degradation (Siddiqui 1998). Moreover, according to Little and Watts (1994, pp. 222-224), regional differentiation tends to increase as the firms select areas where commercial and industrial agriculture is already entrenched for contracting. It is suggested that, in the end, contractors benefit more than farmers, and that the latter have a strong tendency to become dependent on purchasers for credit and other inputs (Fulton and Clark 1996).

Several scholars also underscore the propensity of contract farming to promote appropriationism (Little and Watts 1994, pp. 249-250; Singh 2002), a process of "persistent but discontinuous undermining of discrete operations and elements of the agricultural production process, their transformation into industrial activities, and their reincorporation into agriculture as inputs" (Goodman, Sorj and Wilkinson 1987, p.2). As evidenced by their case studies in Africa, Little and Watts reveal the obligatory use of agro-industrial inputs (e.g., chemical, biotechnological and mechanical) in contract farming regimes situated in "technologically underdeveloped" regions (p. 250).

2.2 Institutional Analysis and Development

In studying behavioral intents and decision-making in the context of institutions, such as production partnership regimes, it is important to refer to the literature on institutionalism and institutional economics.

Theoretical explorations in cooperation and collective action, including partnerships, in the context of natural resource management have been explored extensively by rational choice and institutional theories. One of the theoretical frameworks that emerged from preliminary explorations of collective action is the Institutional Analysis and Development (IAD) framework (Figure 2). Central to the IAD framework is the conceptual unit called an action situation, whis is a social space of interaction, exchange of goods and services, problem solving, and conflict among actors (Ostrom 2011). This conceptual unit is used to describe, analyze, predict, and explain behavior within institutional arrangements. Actors (individuals or groups) within an action situation take into consideration the resources they bring to a situation; the valuation they assign to states of the world and to actions; the way they acquire, process, and use knowledge and information; and the processes they use for making decisions on particular courses of action (Ostrom 2007). In addition, there are three clusters of variables affecting the structure of the action situation: the rules used by actors to order their relationships (Rules-In-Use); the attributes of states of the world that are acted upon in these arenas (Biophysical Conditions); and the structure of the more general community within which the particular arena is placed (Attributes of Community) (Ostrom 2007).

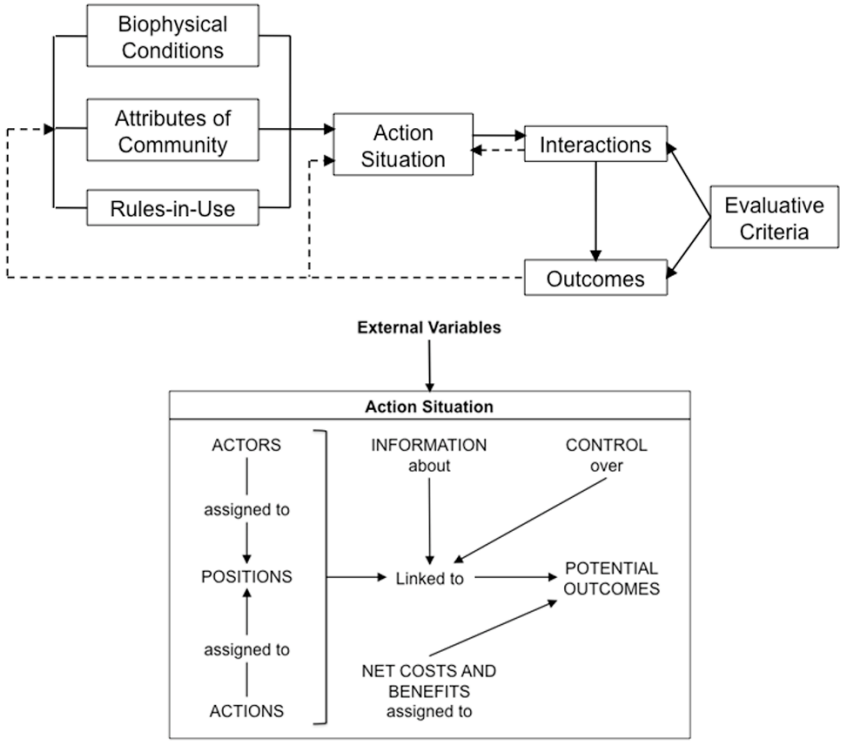


Figure 2. The Institutional Analysis and Development Framework
Source: Ostrom (2007, 2011)

In recent years, there have been renewed efforts to recognize the importance of knowledge and discourse in examining the processes of institutionalization. In the context of institutions in socio-ecological settings, Agrawal (2005) posits that it is important to know "how people understand the environment and relate to it, how new knowledge about the environment shapes such understandings… [and] how understandings of the environment change over time" (p. 215). The analysis of environmental discourses and perceptions has been developed in the 1980s. Since then, many scholars (Greider and Garkovitch 1994; Hannigan 1995; Williams 1998) have established that groups bestow different meanings on similar physical objects and conditions, thus constantly redefining the natural environment in the process. In this particular

research, I use Stedman's (2003) evaluative beliefs and place satisfaction as variables representing environmental discourses and perceptions.

While the scholarship on the social construction of the environment and environmental perceptions has become salient, its link to institutional analysis, particularly on the decision-making dynamics within partnership regimes, remains largely unexplored. As a form of rational choice institutionalism, the IAD framework does not include variables that explicitly pertain to environmental perceptions in the context of the embedded structures that Ostrom (2007, 2011) describes. My theoretical approach then is to enrich the IAD framework and explore how social constructions of the environment, in conjunction with perceptions of economic costs and benefits, influence regime decision-making.

3.0 RESEARCH METHODOLOGY

3.1 Research Site

Field research was conducted mainly in two locations: one month in Metro Manila and six months in Palawan province.

3.1.1 Field research in Metro Manila

Metro Manila is the capital of the Philippines and the seat of the national governance in the country. It is where most of the headquarters of central government agencies, private companies and non-government organizations (NGOs) involved in biofuels and natural rubber production are located. Most of the universities, libraries, archives and museums are located in the capital. I conducted one month of interviews and analysis of secondary data in Metro Manila.

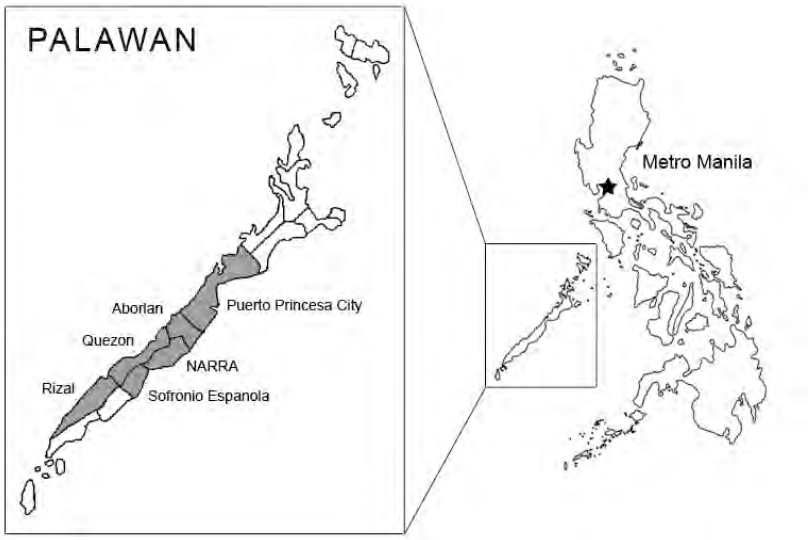
3.1.2 Field research in Palawan

Palawan is a province that remains heavily forested and abundantly endowed with natural resources relative to the rest of the Philippines. Recent analysis of vegetation cover reveals that the province's forests remain to be the largest in the Philippines (PCSD 2011). It is home to three main ethnolingustic groups – Pala'wan, Tagbanua and Batak – that are traditionally known for their practices of shifting cultivation, hunting and gathering in primary and secondary forests, and fishing.

Ancestral lands and domains in Palawan are inhabited by indigenous peoples and migrants of varying ratios. Migrants, on the other hand, are a group of indigenous or non-indigenous peoples who immigrate and occupy certain areas of ancestral lands and domains outside of their place of origin. Hence, an indigenous person can be a migrant in another indigenous group's ancestral land or domain.

I investigated a total of eight upland groups, in the form of peoples organizations, situated mostly within areas of community-based forest management agreement (CBFMAs) and certificates of ancestral domain claim (CADC) (Appendix 1). The seven groups are located in five municipalities in Southern Palawan, while one is situated in Puerto Princesa City, the capital of the province (Figure 3).[1] I employed convenience sampling in the selection of the groups, but also adopted the following criteria for selection: significant indigenous participation (at least 40%); previously, currently or about to be engaged in a partnership or contract arrangement with public or private entities for the production of biofuel-related crops (Jatropha, palm oil and coconut oil) and natural rubber; and willingness to participate in the research.

[1] I did not disclose the names and specific locations of these groups to ensure the safety and privacy of my research participants.



Note: Shaded areas on the Palawan map designate municipalities in which field research was conducted.

Figure 3. Research site location

I spent the majority of my field work in Palawan, collecting both quantitative and qualitative data. Appropriate research permits and the strategic environmental planning (SEP) clearance were secured prior to the conduct of the field research. Free and informed consent with upland groups was also secured prior to the conduct of field research in each of the eight communities.

3.2 Data Collection

I conducted qualitative and quantitative methods, comprising of surveys, in-depth interviews, participant observations, and document analysis, to measure the needed variables described in Section 1.4. Details about these methods are described in the succeeding sections.

3.2.1 Household survey

A total of 475 respondents were surveyed in the last four months. Respondents were selected randomly from existing lists of group members and were stratified proportionally according to gender (50-50), ethnicity (based on actual proportion in each community), and age, whenever possible. The survey instrument was designed to include a mix of Likert scale, selection and open-ended types of question and delivered in a questionnaire interview format by hired and trained survey assistants. Survey assistants comprised of recent college graduates who speak Tagalog and other local languages in a particular research site. Translators from the community were also hired whenever needed. Preliminary interviews were conducted with relevant experts (e.g., anthropologists and social foresters) and upland dwellers in September 2011 to inform the design of the survey instrument. The survey instrument was pretested with 30 indigenous and non-indigenous respondents in one upland community in Palawan in October 2011 and appropriate revisions were done prior to the administration of the actual survey. The administration of survey per respondent takes between 40 and 60 minutes, depending on the particular case being studied and the ability of the respondent to reply to questions.

3.2.2 In-depth interviews

In-depth interviews followed the responsive interviewing model, which allows exploration and flexibility while attempting to address initially designed questions. In-depth interviews were conducted with key informants in the groups visited which included, among others, indigenous leaders, selected indigenous farmers, company representatives, and local government officials. Snowball sampling was used in

identifying key informants. In addition, in-depth interviews were conducted to verify the results of the survey. This allowed me to elaborate further on the environment perceptions of the respondents, while understanding the underlying social norms and cultural practices associated with these social constructions. Furthermore, in-depth interviews were useful in elaborating the other variables that influence individual economic perceptions, behavioral intents and decision-making.

A total of 43 in-depth interviews were conducted: 3 from private firms; 14 from national and local government agencies and units; 22 from local communities; and 4 from NGOs.

3.2.3 Participant observation

The participant observation component of the research is necessary to help develop an understanding of social and cultural norms that define economic and environmental perceptions, as well as behavioral intents in the partnership regimes. This can be revealed in casual interactions with community members, most especially as they go about their everyday activities. Participant observation was conducted during site visits and in meetings and events attended by group members, partners, and other stakeholders. During this period, I carried out informal conversations and observations on how upland farmers interact with their natural environment and with other members of the community.

3.2.4 Secondary data

Secondary data (e.g., demographics, contracts, tenurial instruments, production data) were also acquired from relevant organizations whenever available. I have also conducted extensive document analysis of previous ethnographic studies and reports to assist in the design of the survey instrument and guide questions, as well as verify the results I obtained in the field.

3.3 Analysis of Data

Data from the survey were inputted and analyzed using statistical software (SPSS v.19 and Stata v.10). I conducted several statistical and econometric analyses with the results of the survey. Firstly, I conducted appropriate bivariate and multivariate parametric or non-parametric tests to determine significant differences in several of the variables among various categories of samples (e.g., means tests to determine significant differences in social constructions of the environment and willingness to cooperate between indigenous and non-indigenous populations). Prior to this I tested for certain parameters (i.e., normality and heteroscedasticity) to verify whether the data obtained meets the assumptions of the test. In most cases I conducted non-parametric tests (Kruskall-Wallis one way analysis of variance and Mann-Whitney U test). Secondly, I analyzed the preferences ranking component of the survey using ranked-ordered logistic regression, with the ranking as dependent variables and age, gender, ethnicity and group location as independent variables. Ranked-ordered logistic regression is an econometric tool that is best packaged in Stata. Thirdly, I obtained the bivariate correlations between economic perceptions, environmental perceptions and other independent variables. This is followed by a bivariate correlation analysis between the independent variables and the dependent variable (i.e., behavioral intent to intensify production and behavioral intent to cooperate).

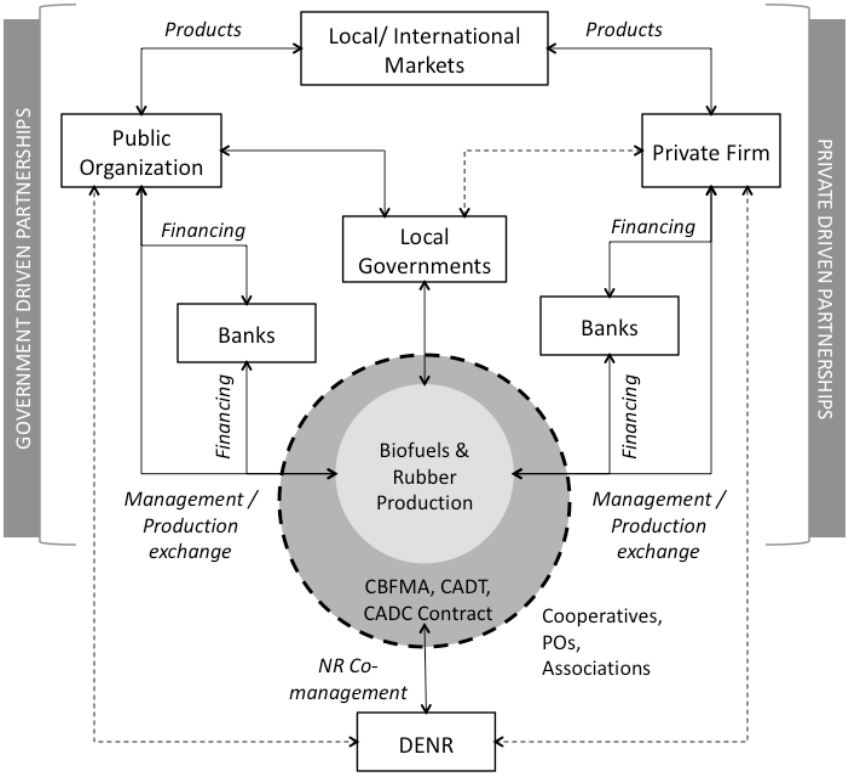
Lastly, I created multivariate regression models to further understand the interactions between independent variables and the behavioral intents of individuals in new and existing partnership regimes. The analysis of behavioral intent to intensify production is measured by the preference to intercrop/monocrop. Given that this is a dichotomous variable (0 or 1), I employed binary logistic regression in the analysis. In the analysis of behavioral intent to cooperate, since this is a Likert scale response, I first tested for the applicability of the data for a linear regression model. This entailed determining whether the residuals derived from the linear regression fit the assumption of normality. Given that the residuals of the preliminary linear regression models were not normally distributed, I attempted to conduct ordinal logistic regression as an alternative. However, the dataset did not meet the proportional odds assumption. Thus, I resorted to transforming the dependent variable from Likert to dichotomous and employed a binary logistic regression instead.

As for the qualitative data, transcripts and field notes were coded and main themes identified. Results from the statistical and qualitative analysis were triangulated with each other for verification. Qualitative data from the interviews and participant observation provided the context and social nuances to explain any causal links that emerge from the abovementioned statistical analyses.

4.0 PRODUCTION PARTNERSHIP REGIMES

4.1 Structure of Production Regimes

The structure of partnerships for the production of biofuels and natural rubber involving upland groups is depicted in Figure 4. Most of the upland groups I investigated are currently engaged in some form of co-management and tenure arrangement with the government, particularly with the Department of Environment and Natural Resources (DENR). These existing co-management and tenure arrangements include community-based forest management agreement (CBFMA), certificate of ancestral domain claim (CADC), and social industrial forest management agreement (SIFMA). In the case of CBFMA, prospective benefactors are required to organize and form a legitimate group (i.e., a people's organization for CBFMA), by either forming a 'cooperative' under the Cooperative Development Agency (CDA) or an 'association' under the Securities and Exchange Commission (SEC) or the Department of Labor and Employment (DOLE). Although not required in the application process, I have encountered several CADC benefactors who have established or have expressed desire to establish formalized cooperatives or associations.



Note: Dashed lines denote weak connection or interaction.

Figure 4. Structure of partnerships for the production of biofuel crops and natural rubber in Palawan

The government encourages local groups to apply for a cooperative status, in order for them to engage in market-based relations with external entities. The aforementioned tenure arrangement allows local groups to engage in contract farming agreements with public or private firms to take advantage of lands within their jurisdiction for crop production. However, this needs to be in line with the 'resource use

plans' (RUP) (in the case of CBFMA) or 'ancestral domain sustainable development and protection plan' (ADSDPP) (in the case of CADC) drafted by the local groups and approved by the concerned agencies, i.e., DENR or the National Commission for Indigenous Peoples (NCIP). Hence, any form of production contracts established within CBFMA and ancestral domain areas would need to be coordinated with DENR or NCIP to ensure that such regimes align with the local group's management plans.

There are two main production partnership regimes: a government- and a private-driven regime. For the government-driven regime, public organizations, for example a central agency or a government-owned and controlled corporation (GOCC), coordinates with local government units (or LGUs, which include provincial, municipal, city and barangays) to establish production partnerships. In Palawan, for instance, the production of Jatropha involved a centralized GOCC and the provincial government. The production of coconuts is being led by the central agency, Philippine Coconut Authority (PCA), through the provincial agricultural office and the satellite PCA unit in Palawan. The role of the LGUs in this type of partnership regime is more manifest. Local partners for Jatropha production, for instance, tend to interact more with the LGUs than the designated representatives of the GOCCs. In this case, the LGUs have more function than simply being a liaison office for the GOCC; they provide assistance in identifying potential sites and communities and in establishing initial contacts and are also involved in the administration of production inputs and distribution of compensation.

Local proponents, particularly the Palawan State University (PSU), are also active in engaging indigenous communities to set up natural rubber production sites throughout the province. Unlike the GOCCs, PSU engages the local communities directly, with limited coordination with the local government. If local governments are involved, these units usually function as liaison for site identification and/or setting up of initial contact between communities and the university.

The private-driven regimes are structured with relatively more limited LGU involvement. Private firms, at the outset, coordinate with the LGUs to set up and identify potential production sites. However, there is limited, if not completely absent, involvement of LGUs in the everyday management and production operations of the private firms. Palm oil production in Palawan, for example, is driven primarily by a partially foreign-owned private company. In this case, LGUs do not have direct involvement in the operations of the company, although the firm sits in a palm oil roundtable panel with the government and other stakeholders for strategic planning of palm oil production in Palawan.

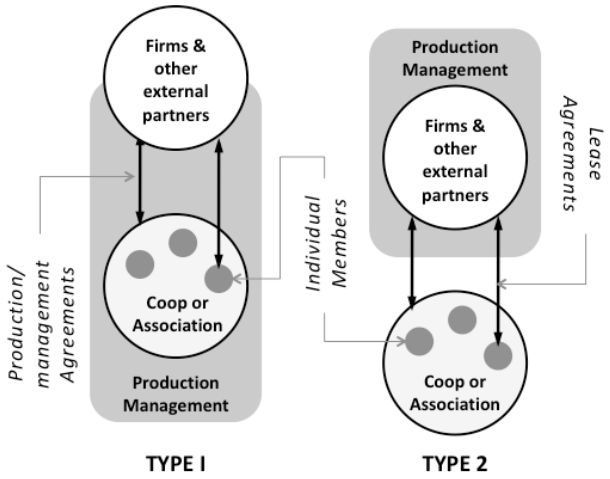
Lending institutions, primarily government owned and controlled banks, such as the Landbank and the Development Bank of the Philippines, function as primary financiers for some of these partnership regimes. Both GOCCs and private firm partners engage in obtaining loans to further the financing of the projects. Lending institutions usually have stringent loan requirements. Among these requirements are a cooperative status for the participating local group, a minimum capitalization, and, at times, the withholding of land titles and other tenure instruments. Private partners of government organizations then act as guarantors to support the loan application of the farmer cooperatives. In cases where the upland cooperatives are unable to produce the required equity (20% for palm oil) for the loan, the partner firms offer to loan them funds as well, with interest rates comparable to that imposed by lending institutions.

Products of the production partnership regimes are purchased directly by the partner firms. In the case of palm oil, the harvest is brought directly to the firm's processing facility located in Southern Palawan. For rubber and Jatropha, partner firms plan to purchase from local producers and then have them processed in facilities located in various parts of the country. As for coconuts, PCA assures participating farmers that the government will purchase the copra. However, farmers have the option to sell their copra to other buyers aside from the government. Derivative commodities (such as oil, methyl esters or natural rubber products) from these crops are consumed locally (especially in the case of coconuts and palm oil) or may be exported to international markets (as in the case of Jatropha and rubber).

4.2 Nature of Contracts

There is diversity in the types and nature of production contracts involving upland farmers. Here I categorize them into two main types, as depicted in Figure 5. In the first type of contract, members of cooperatives and associations produce the crops on their designated lands. In many cases, although the lands are considered common and regulated under CBFMA, CADC or SIFMA tenure arrangements, members

are allocated anywhere from one to five hectares, which they have the right to manage and exploit. Members' involvement is determined using criteria identified by the cooperative or association, but contracts are forged between at least the firm and the local community organization. This type of contract may include agreements on the land area to be planted, the production inputs to be provided, financing schemes, arrangements in management and technical assistance, expected production output, pricing, length of contract, and post-contract arrangements. Signatories in contracts include management representatives of partner firms, cooperative/association leaders, the financing/lending institution, and sometimes officials of LGUs. In Palawan, examples of this type of contract are the Jatropha, rubber and coconut production partnership regimes.



Note: The production management box represents the extent to which regime entities are engaged in management and production operations on the land.

Figure 5. Two general types of production contracts

This type of contract may also involve individual farmers and not cooperatives and associations. In this case, firms directly engage and forge contracts with individual farmers and the assumption is that the farmer is still involved, in varying degrees, in the management and decision-making concerning production on his/her own land. While contract provisions may include those described above, there may be slight variations depending on how negotiations turn out between the firm and the individual farmer. Individuals may also employ other members of the community as production laborers for their land, with compensation arrangements ranging from daily/periodic salaries to traditional forms of reciprocity. A number of rubber farmers in Palawan are involved in this kind of contract arrangement.

In the second type of contract, the local cooperative/association or individual partners no longer have control over production on their own lands. The production relations then become more of land lease, where management is solely the firm's responsibility. Here, firms have the right to do what they want with the land and adopt whatever production scheme (e.g., intercropping or intensive) they choose to. Compensation for the owner of the land is based on agreed price structures in the contract. This can be in two forms: first, farmers lease out their land to the partner firm, with agreed annual rents that increase incrementally; and second, farmers are involved in a profit sharing system where the partner firms share the revenues with the land owners. Upland farmers may prefer the first form if they have an aversion to the risks associated with loans and/or if they prefer receiving immediate benefits in the form of rents. On the other hand, farmers may prefer the second form if a) they want to get greater revenues from profit sharing, b) they are amenable to delayed benefits, and c) they are not averse to the risks associated with loans. Apart from rents and shares, firms usually employ locals in the community for any form of production labor. Land owners are usually given the priority to work as wage laborer on his/her own land. I have encountered a plethora of cases of individuals leasing out their land, in either rent or profit share form, for palm oil and rubber production.

For the first type, it is still arguable how much decision-making and management control farmers have over their own lands, as some may merely follow the dictates of the partner firms. However, as

observed in my fieldwork, farmers and cooperatives/associations do have some level of control with regards to the location of the production sites, intercropping options, application of production inputs, and amount of labor investment. On the other hand, it is clear that farmers immediately lose management control over their lands in the second type of contract.

5.0 ECONOMIC PERCEPTIONS IN PARTNERSHIP REGIMES

5.1 Perceived Benefits and Costs of Production Contracts

Perception of economic benefits is a measure that can approximate the welfare upland farmers derive or expect to derive from production partnership regimes. In this section, I determine whether participating upland farmers perceive these production partnerships as benefitting individual and household economies. Table 1 summarizes these perceptions in percent form, where '1' corresponds to the highest disagreement that the partnership regimes result in economic benefits and '5' corresponds to the highest agreement. It is apparent that partnerships for coconuts and palm oil production are associated with high frequency of individuals perceiving high economic benefits. On the contrary, the Jatropha production partnership is associated with a more distributed frequency of economic perception, while perceptions for rubber tend to be in the middle.

Table 1. Frequency of perceived economic benefits of crop production in upland Palawan

Crop	N	Scale of Economic Perception (percent)				
		1	2	3	4	5
Jatropha	164	21.95	22.56	1.83	35.37	18.29
Rubber	39	5.13	23.08	5.13	43.59	23.08
Palm Oil	54	9.26	5.56	1.85	40.74	42.59
Coconuts	67	1.49	8.96	2.99	37.31	49.25

Notes: (1) Data reflects the answer of the individuals who have experience growing Jatropha, rubber, palm oil and coconuts in a production partnership contract. This does not include the other individuals who have limited experience as production laborers or do not have any experience growing these crops in a production partnership.

(2) The question used to measure perceived economic benefits is, "How much do you agree that the crop and the production partnership has helped you and your family's economic status?" Likert scale: 1=highly disagree; 2=slightly disagree; 3=neutral; 4=slightly agree; 5=highly agree

The production partnership for palm oil is considered by many participating upland farmers as highly beneficial. At least 80 percent of the respondents currently engaged in palm oil production believe that this partnership regime offers significant economic benefits for their household. Although some farmers have not harvested yet, they still perceive the partnership regime to help them significantly because of the stable source of wage and income. As discussed earlier, participating farmers engaged in a Type 2 contract arrangement (see section 4.2) are entitled to act as wage laborers on their own land. Hence, even if there are no shares or revenues yet from the sale of palm fruits, farmers receive immediate economic benefits through wages.

The perceptions of rubber producers, on the other hand, lie in the middle (i.e., slightly disagree or slightly agree). This is primarily due to the fact that many of these farmers have just started their rubber production sites and that at least 25% of the respondents believe that they do not benefit yet while the trees are still immature (i.e., below the productive stage). The scheme for rubber production is different, as farmers who produce natural rubber trees on their own land do not receive any form of financial support from prospective partners. However, for schemes where the partner firm controls much of the management and production operations (Type 2 Contract), farmers are hired as wage laborers even if the production is done on their own lands. Many of these farmers have expressed that such partnership regimes confer immediate benefits because of the wage labor component. However, others accord favorable economic perceptions because of the promise of high economic returns in the future, even if they do not benefit from any immediate economic returns.

The perceived benefits of wage labor for rubber production should be treated with more nuance. Based on in-depth interviews, wage labor for clearing of underbrush or budding of rubber trees provide means for upland farmers to engage in the cash economy. This helps upland farmers, particularly the indigenous smallholders, to purchase commodities and services that require cash, such as school fees for their children and the purchase of foodstuff (e.g., rice, salt, and sugar). The issue, however, stems from the propensity of farmers to rely on wage labor. Some of the indigenous farmers I interviewed shared how they decided to interrupt their traditional shifting cultivation practices because of the perceived steady income they can get from engaging in wage labor. The salary from rubber production, however, gets delayed by at least a month. In order to cope with salary delays, households incur debt from community stores to be able to acquire foodstuff, such as rice and salt. For instance, out of the 22 farmers engaged in wage labor for rubber production that we interviewed in one community, 20 confirmed that they have incurred debt due to delays in salary. Standing debt ranged from as low as P100 to as high as P3000 (about 10 had debts ranging from P500 to P1000). Some claim that they were able to pay off their debt easily, while others tended to have more difficulty with the salary they get from the production sites. Many of the farmers I interviewed observed that the trend in debt accumulation in the community increased when the partner firm introduced wage labor for rubber production. This, they believe, is caused by the fact that there is anticipation that salary will still arrive to pay off debt. Aside from the individual farmers, store owners are also placed in a difficult position as the burgeoning number of farmers incurring debt affects the business's cash flow.

Although almost all the interview respondents engaged in rubber production labor incurred debt, many recognize that relying on wage labor puts their households in a precarious position. Thus, several of the interviews conducted underscore the importance of keeping traditional shifting cultivation practices while taking advantage of wage labor opportunities. As best explained by one indigenous farmer, "we won't get to eat if we just work [as wage laborers] … we won't be able to take care of our lands and [subsistence] crop … if the salary gets delayed, we'll end up borrowing money to buy food."[2]

For Jatropha production partnerships, the perceived economic benefits are more varied. Almost all respondents admit that there were immediate economic benefits accorded to them, primarily attributed to the compensation given for initial clearing and establishment of the Jatropha crops. The variations in economic perceptions become more evident when the longer-term experience of the farmers is considered. Based on the contract, an initial payment for plantation establishment is provided together with the Jatropha seedlings. Compensation ranging between P2000 and P4000 was given at the outset. It was also agreed that participating farmers would receive maintenance support amounting to P1000 every 45 days following plantation establishment for a period of 18 months. The concept behind maintenance support is to ensure that farmers will have the incentive to maintain the production fields through underbrush clearing and timely application of production inputs or fertilizers. The contract, however, did not follow through. Many farmers complained that the agreed maintenance support was delayed for several months and eventually halted mid-2011. Some received the maintenance support only twice in 18 months, while others did not receive any maintenance support at all. Even for those who received maintenance support, they claim that a number received only P500 instead of the agreed P1000.

The initial capitalization or compensation was seen by many as reason to perceive that the project still accorded some benefits. Some claimed that the money they received for planting and maintenance was used to buy food. Moreover, plant establishment and maintenance also allowed for clearing of areas for subsistence crops that were being intercropped with Jatropha. Those who had this reasoning tended to score high (slightly or highly agree) with respect to perceived benefits of Jatropha. In fact, proponents of the Jatropha partnership argue that the discontinuance of the partnership contract did not result in economic harm. They viewed the capitalization for the initial establishment and the few months of maintenance support as some form of 'dole out.' As one provincial government officer said in response to the case of the failed Jatropha project, "… it's already worth it for farmers to be able to plant the seedlings … the seedlings are theirs to keep!"[3]

The reality, however, is that while some participating farmers perceived the Jatropha program as a form of 'dole out,' there are those who hoped more from the partnership. Many scored Jatropha low, in spite of the initial benefits. From their perspective, since the project did not push through and the seeds were not sold to the market, they did not really gain any benefits. In fact, many farmers argue that they even

[2] In-depth interview, indigenous farmer, 26 November, 2011
[3] In-depth interview, provincial agriculturist of Palawan, 2 December, 2011

incurred losses. For several months, farmers tried maintaining the fields at their own expense (some up to more than a year while others continue until now) in anticipation that the promised maintenance support or a prospective buyer will soon come. This, they believe, created more expenses. As mentioned by one farmer who persevered in maintaining his Jatropha fields, "there were more expenses … our economic condition worsened."[4] Another indigenous farmer shared, "we incurred more expenses than the maintenance support we acquired."[5] Indeed, farmers who persevered continued to hire wage labor to clear their fields' underbrushes, which costs between P100 and P150 a day. The resources needed to continue maintaining the fields were diverted from other revenue sources (e.g., sale of other cash crops or from other forms of wage labor) or acquired from loans. "We borrowed money just to maintain [the Jatropha fields] … you need to hire workers to help you maintain … I incurred about P6000 in debt," said one indigenous farmer.[6]

Those who cannot afford to hire wage labor had to depend on their own efforts. A number of the farmers I interviewed emphasized how maintaining the Jatropha fields used up time that could have been devoted to tending other subsistence and cash crops. Others who cannot devote both time and resources decided early on not to continue maintaining the fields even though there was still looming hope in the community that the project and its proponents will deliver their promise.

5.2 Land Tenure Concerns

Although land tenure can be a component of perceptions of benefits and costs, this merits a separate section for discussion. The individuals and households I interviewed have, to a certain extent, secure land tenure as private titles or as part of communal land rights instruments, such as CBFMA, CADC and SIFMA. Certain production partnerships, however, have a propensity to undermine the tenure security of upland farmers.

In general, upland farmers have a particular concern in regard to the security of their land tenure (see Section 5.3 as an example). Decisions on whether or not to cooperate in a production partnership may very well be governed by perceptions on land tenure security. Partnership regimes for palm oil production is a case in point. Many of the farmers we interviewed expressed land tenure security as one of the main reasons why they did not wish to participate in palm oil production partnerships. They alleged that they have heard of cases in and outside of their community of farmers having to give up their land tenure instruments as collateral. Even in actual negotiations between upland groups and prospective partner firms, the issue of land being used as collateral always comes up in discussions and debates. Firms prefer to secure the land tenure instruments in order to ensure that participating farmers do not sell the land to outside entities when the crops are in their productive stage. Upland farmers, however, are hesitant to surrender their land tenure instruments as they fear that the firm might seize the land permanently, based on either past experiences or stories heard from other communities.

The issue that is more relevant to this section is the apparent existing contract arrangement issues that have direct implication on land tenure. In one palm oil production site, for example, participating farmers claim that the contract gets revised quite often and that these revisions cause confusion. But a greater concern is the mid-course contract revisions that require farmers to surrender the original copies of their tenure instruments as collateral. According to the affected farmers, the way that it was explained to them is that the firm requires the tenure instrument in order to obtain loans from lending institutions. Many farmers interpret this move as a tactic employed by these firms. They believe firms purposely avoid discussions on land tenure until contracts are signed by all concerned parties. These firms then bring up the land tenure issue when farmers have settled in the production relation. Other farmers, however, believe that their partner firm genuinely applied for loan mid-course, thus requiring original copies of the land tenure instruments only after the contract has been signed.

Although it is not my intention to investigate the motivations of partner firms, what needs greater scrutiny is the fact that many farmers agree to this mid-course contract revision even if they have some doubts. The usual answer I get from farmers is, "well [the partnership agreement] is already here." They would rather accommodate the late request to surrender their tenure instrument rather than risk ending the

[4] Structured interview, indigenous farmer, 10 December, 2011
[5] Structured interview, indigenous farmer, 11 December, 2011
[6] Structured interview, indigenous farmer, 6 October, 2011

partnership and all the economic benefits associated with it. There are a few cases though where farmers decided to terminate the contract because they disagreed with the new contract provisions.

5.3 Contract Preferences and Conditions

While it is important to understand the economic perceptions of upland dwellers, particularly in regard to how partnerships affect their welfare, I believe that it is equally valuable to study the preferences of upland dwellers when it comes to contract conditions. As part of the survey, I asked respondents to rank ten conditions which they believe are important to them in considering whether or not to cooperate in a production partnership regime. These conditions were pre-determined prior to the design of the survey instrument by means of in-depth interviews with key informants and upland farmers. Farmers were allowed to add other conditions not in the list which they feel are also important to them. In most cases, though, the survey respondents opted to focus on the ten pre-determined conditions. The conditions in the list are: a) selling of the product yields high revenues; b) there is support for maintenance of fields; c) the product derived from the crops is easy to sell; d) the crops being planted can be taken advantage of early; e) our land will not be taken away from us; f) our partners can be trusted; g) we have the freedom to make our own decisions regarding production and management; h) we are allowed to intercrop; i) the crop has multiple uses aside from just selling the product; and j) the environment will not be harmed by the partnership and the crop.

I used the rank-ordered logistic regression to analyze the preferences of upland farmers vis-à-vis their age, sex, ethnicity, education and socio-economic satisfaction. The analysis reveals that there are no significant differences in the way preferences were ranked based on age, sex, ethnicity (migrant, indigenous, mixed), highest educational attainment (no formal education, elementary, high school, vocational, college) and socio-economic satisfaction (1=highly unsatisfied, 3=neutral, 5=highly satisfied). Hence, I will present the ranked preferences for the entire upland population of Southern Palawan. Note that it is not prudent to represent preferences in terms of means, as distances between conditions are not the same (i.e., how much I prefer choice 1 over choice 2 is not the same as how much I prefer choice 2 over choice 3.) Hence, to simplify the results, I recoded the data by focusing only on the top 3 choices of each respondent. Figure 6 summarizes the recoded data to depict the frequency of individuals that included each of the conditions in their top three choices.

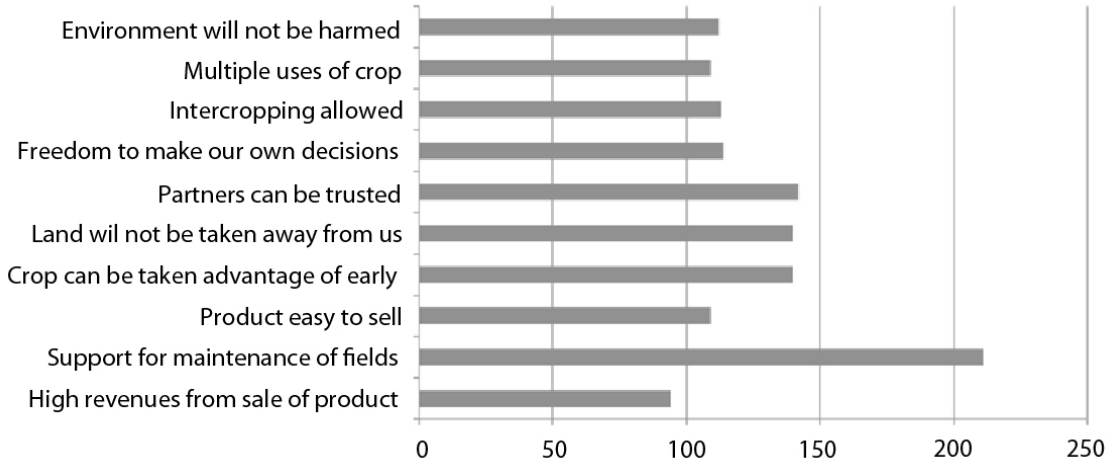


Figure 6. Frequency with which respondents ranked the contract conditions among their top three preferences

It is evident from Figure 6 that the condition that respondents preferred most is 'support for maintenance of fields.' According to upland farmers, maintenance support is critical to ensuring that participating farmers will accord the needed attention to growing the crops of concern. Upland farmers, particularly the indigenous populations, are still largely dependent on subsistence economic strategies. However, upland farmers are also integrated in the cash economy, thus necessitating means of acquiring money to purchase certain goods and services that subsistence economies cannot provide. This includes, among others, school tuition for children and foodstuff that can be obtained only from the lowlands (e.g.,

salt and sugar). Hence, smallholder upland households balance growing subsistence and cash crops, as well as engage in wage labor. Resources and time needed to grow new crops, particularly during unproductive periods, would need to be derived in relation to the existing subsistence and cash needs of upland households. An additional commitment to grow crops that do not confer immediate economic benefits might burden the household, and would then need to be negotiated with other commitments to acquire food and other goods and services.

Many upland farmers emphasize that the chances of having successful production partnerships might be slim without maintenance support, as there is no guarantee that farmers would be able to accord the needed time and effort to grow the crops of concern. As discussed in the case of Jatropha production in Section 5.1, maintaining fields takes much time and resources. Thus, if there is no maintenance support, it is common to hear these concerns from upland farmers: "we will just leave [the crops] because we need to find ways to get food,"[7] and "if we are the ones to spend on [maintenance], this is not possible as we need to get other means of livelihood … things are expensive these days."[8]

The other two important conditions relate to security of land tenure and trust. The result of the preference analysis substantiates the discussion in Section 5.2, which indicates that upland farmers are very concerned with the security of their tenure. This preference might be derived from the fact that many upland communities in the Philippines have had experiences of land grabs. This relates closely to trust as well. While trust in partners includes expectations regarding the delivery of agreements (what has been promised), a significant aspect of this is whether partners will respect the rights of upland farmers, including rights over land.

5.4 Section Summary

It is evident from the above analysis that upland farmers perceive crops that provide wage labor opportunities to provide high benefits as in the case of palm oil and rubber. This is because of the perceived steady stream of income that upland farmers can take advantage of in order to cope with the the demands of the cash economy. Jatropha production partnerships, in theory at least, provide that steady stream of income through maintenance support. This is supported by the result of the ranked preferences for contract conditions, which revealed the tendency of upland farmers to rank maintenance support high in their list of priorities. The perception of benefits from wage labor and maintenance support, however, is complicated by the fact that upland farmers create a certain dependence on the relatively stable income stream. This then leads to cases of debt accumulation when there are interruptions in the provision of salaries or maintenance support. These results relate closely to the issue of dependency on contract farming arrangements, discussed in Section 2.1.

Another important finding is the tendency of partnership regimes to undermine land tenure security. As evidenced by the ranking of contract conditions, upland farmers accord significant importance on land tenure and partnership trust. While upland farmers are sensitive to issues of land tenure security, mid-course revisions in the contract dampen this sensitivity presumably because of the growing dependence of upland farmers on the perceived welfare benefits of such partnership regimes. This has important implications on how contracts should be designed and how negotiations should take place so that upland farmers are not locked in partnerships that undermine their land tenure security.

The analysis of the economic preferences already reveal potential factors that may influence behavioral intents in a partnership regime. In the next section I detail the analysis of environmental perceptions, factors that may also influence behavioral intents.

[7] In-depth interview, indigenous farmer, 11 December, 2011
[8] In-depth interview, indigenous farmer, 14 October, 2011

6.0 ENVIRONMENTAL PERCEPTIONS

6.1 Evaluative Beliefs and Place Satisfaction

Like economic perceptions, environmental perceptions can also be important predictors of certain forms of behavioral intent. In my analysis, I focus specifically on evaluative beliefs and place satisfaction. Table 2 summarizes the different evaluative beliefs and place satisfaction measures used in analyzing environmental perceptions. The results show that upland dwellers generally perceive their environment as being rich in wildlife, having good soil quality, and having beautiful landscape scenery. This corresponds to high satisfaction levels as well. Evaluative beliefs in regard to remaining forest cover is not as high as expected. Although there is slight disagreement as to whether there is little forest left, the mean is still close to neutral (2.7 mean score in a 5-point Likert scale). As for population, there is a general perception in the uplands that their local environment is slighly overcrowded (3.53 mean score).

Table 2. Overall environmental perceptions (evaluative beliefs and place satisfaction) in upland Palawan

VAR	Measure of Environmental Perceptions	Mean	S.D.
EVAL1	My environment is rich in wildlife	4.24	1.116
EVAL2	My environment has good soil quality	4.24	1.015
EVAL3	My environment has beautiful landscape scenery	4.50	0.820
EVAL4	My environment has little forest left	2.70	1.501
EVAL5	There are too many people living in my environment	3.53	1.395
PSAT1	I am satisfied with the wildlife in my environment	4.03	1.253
PSAT2	I am satisfied with the quality of the soil	4.11	1.167
PSAT3	I am satisfied with the remaining forest	3.87	1.366
PSAT4	I am satisfied with the landscape scenery	4.35	0.993

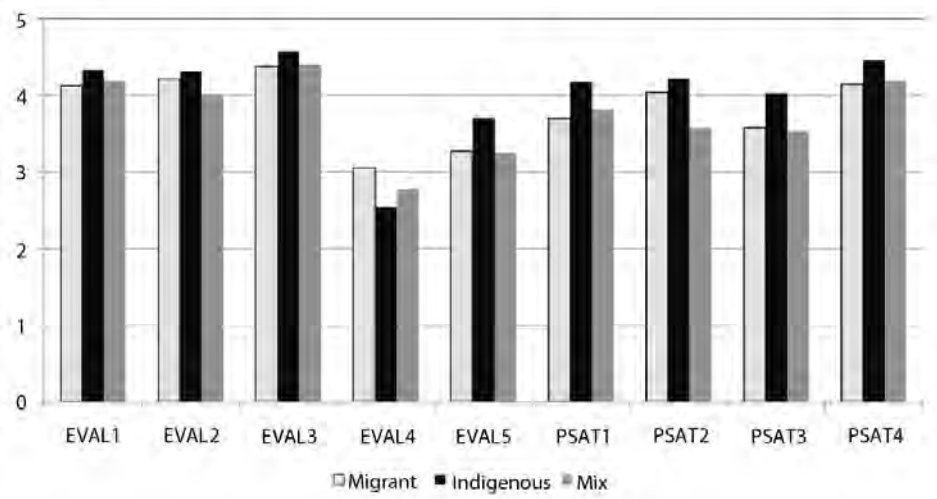
Note: Likert scale: 1=highly disagree; 2=slightly disagree; 3= neutral; 4=slightly agree; 5=highly agree

In analyzing for differences in environmental perceptions among groups, I used non-parametric tests (i.e., Kruskal-Wallis and Mann-Whitney) for two reasons: first, it is still highly debatable whether Likert scale responses can be considered as interval or ordinal; and second, these variables do not exhibit the normality expected in Likert scale responses. I tested specifically for differences in environmental perceptions between gender and ethnicity. Based on the Kruskal-Wallis test, there is no significant difference (at 95% confidence) in environmental perceptions between male and female. However, there are significant differences among ethnicities (pure migrant, pure indigenous, and mix) at 95% confidence. The Mann-Whitney test further reveals that the environmental perceptions of indigenous respondents tend to differ from those of migrants and mixed migrant-indigenous populations. For instance, evaluative beliefs and place satisfaction concerning richness of wildlife, quality of soil, and landscape scenery tend to be consistently higher for indigenous respondents. Likewise, indigenous populations tend to disagree more that there is little forest left and they tend to agree more that there are too many people residing in their local environments (Figure 7).

The difference in environmental perceptions among ethnicities can be explained by the location in which certain groups reside. Most of the pure indigenous respondents we interviewed reside in remote areas that still have relatively high primary and secondary forest cover. In contrast, migrants and mixed populations tend to reside on flatlands, foot of the mountains, or near access roads, where forest cover tends to be much less than in the remote upland regions.[9] In spite of possibly drastic differences in actual biophysical conditions, the difference in environmental perception is not stark. Most of the migrants originated from lowlands and cities, thus thay may have a different interpretation of secondary forests from that of indigenous peoples who have been exposed longer to highly biodiverse environments. Thus, even if

[9] This has not been confirmed by actual biophysical measurements or quantitative geospatial analysis. Several indigenous respondents were asked to describe their residences in reference to certain areas and landmarks of communities (e.g., places where we conducted interviews). This was then referenced in actual land cover maps (with information on forest cover) of the communities and verified by residents familiar with the spatial orientation of their communities. The geographic coordinates of the places we visited were also recorded and referenced in the most updated land cover map obtained from the Palawan Council for Sustainable Development on 27January, 2012.

migrants reside in areas with much lower forest cover, they might still perceive these areas as relatively "green" and "forested." This is evidenced by reports from some of the migrant respondents we interviewed, especially the newcomers, who admitted that they might not have a good point of reference in regard to their perception of environmental quality in the uplands.

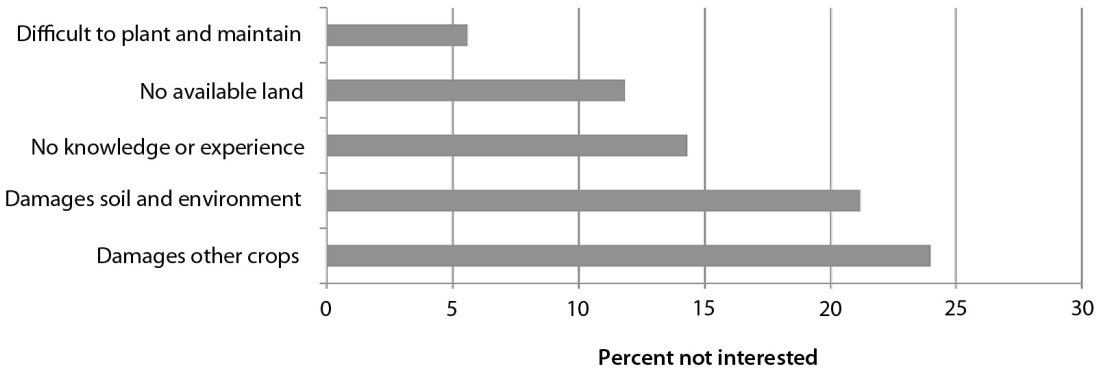


Note: Likert scale: 1=highly disagree; 2=slightly disagree; 3=neutral; 4=slightly agree; 5=highly agree.

Figure 7. Means corresponding to evaluative beliefs and place satisfaction by ethnicity

6.2 Perceptions on Environmental Impacts of Partnerships

Upland dwellers have different perceptions of how certain partnerships, crops and production schemes impact the environment. For example, I observed that in groups that have low willingness to adopt palm oil, respondents relate to certain environmental discourses to justify their preference. At least 20% of the respondents who signified ambivalence or no interest to participate in palm oil production partnerships were strongly against palm oil because they believe that the crop demands high amounts of nutrients and ultimately erodes soils. Moreover, at least another 20% referred to a type of pest (*Brontispa longgisima*) that attacks coconuts, which they believe was introduced because of palm oil (Figure 8). When asked how they obtained such information, some of them referred to NGOs giving seminars in their community, while others claim they heard about or observed it in other communities. A few claim they have direct experience with such impacts.



Note: Those not interested and unsure include respondents who scored willingness to cooperate in palm oil partnership regimes from 1 to 3 in the Likert scale (n=321).

Figure 8. Reasons why respondents were not interested in or are unsure about palm oil production

Other reasons given by respondents who are ambivalent and have no interest in participating are: palm oil is difficult to grow (~5%); they have no land available to plant palm oil (~12%); and they do not have knowledge or experience planting such crop (~14%). There were a few other non-environmental reasons given, such as disatisfaction with previous experience and issues with land tenure security, but these constitute less than 2% of the aforementioned respondents and are no longer reported in Figure 8. It is possible that the number of respondents who expressed concerns regarding the perceived effects of palm oil on land and other crops is greater than reported. Many respondents, particularly in groups currently engaged in palm oil production, refuse to disclose the reasons why they prefer not to participate in future palm oil production partnerships.

For crops such as Jatropha, coconut and rubber, there were few pejorative perceptions regarding environmental impacts. In fact, several respondents expressed that such crops bring in positive environmental impacts such as rehabilitation of degraded lands and sequestration of greenhouse gases. Such environmental perceptions may have been introduced by proponents that bring in projects with attached environmental or climate change discourses. For example, in following one particular company in their negotiations with upland communities, proponents usually refer to the potential of rubber to help solve climate change and reforest denuded areas. Some of them even contrast rubber with palm oil, by saying that the former is more environmental-friendly than the latter. Many respondents I interviewed believe that rubber trees are just like the trees in the forest, meaning that they function just like the other trees they see in their environment. Thus, they do not have negative images of expansive and intensified rubber plantations in the uplands yet.

6.3 Section Summary

The analysis of environmental perceptions underscore the relatively high regard for environmental quality (i.e., wildlife richness, soil productivity and landscape quality) in the upland regions. However, perception that there is little remaining forest left appear to be lower. Consistently, indigenous populations have differing environmental perceptions compared to migrants and mixed populations. The use of environmental discourses in reference to certain types of production partnership regimes may shed some light in understanding behavioral intentions of upland farmers. In the next section, I bring in some of the insights from the analyses of the economic and environmental perceptions to further understand the behavioral intents of upland farmers in the context of these partnership regimes and the potential implications of these intents.

7.0 BEHAVIORAL INTENTIONS IN PARTNERSHIP REGIMES

7.1 Behavioral Intent to Intensify Production

An important dynamic to understand in agricultural production relations in the upland regions is the tendency of farmers to adopt a more intensified production system. This has significant environmental implications, most especially in areas and regions of high and critical biodiversity such as Palawan. For Jatropha, coconuts and rubber,[10] I use the dichotomous variable pertaining to preferences to intercrop or monocrop as proxy for intensification, which means that the preference to monocrop is taken as a sign of desire to intensify production. A summary of the behavioral intents to intensify production is given in Table 3. Here, it is notable that there are more farmers intending to adopt monocrop production of Jatropha and rubber (51% and 61%, respectively) than those for coconuts (36%). It is important to note that while Jatropha is promoted as a crop that allows smallholder farmers to practice intercropping (Achten et al. 2010), close to a majority of upland farmers still prefer a monocrop production system. Similarly, rubber production offers potential to intercrop subsistence and cash crops while the rubber trees are still immature (Herath and Takeya 2003). However, majority of upland farmers still prefer a monocrop production of rubber because they do not want the growth of the Jatropha and rubber to be affected by the other cash crops and

[10] Palm oil was not included in this analysis, since farmers do not have the option to intercrop. Hence, farmers who decide to participate in palm oil production accept the fact that it would be a monocrop production system.

subsistence crops planted in between. This supports the results of the analysis of contract preferences and conditions, where the condition for intercropping does not rank highly in upland farmers contract preferences (Figure 6).

Table 3. Frequency of respondents with varying intents to adopt monocrop production

Crops	N	Intent to Practice Monocropping (percent)	
		Monocrop	Intercrop
Jatropha	276	51	49
Coconuts	432	36	64
Rubber	310	61	39

Note: N corresponds to number of respondents included in the analysis.

However, the case of coconut production is different. Given that almost all upland farmers have experience planting coconut, they are already accustomed to intercropping it with other subsistence and cash crops. Moreover, coconut is perceived as a hybrid of cash and subsistence crop, where produce can either be sold to the market or consumed in the household. Thus, coconut is not perceived purely as a cash crop that needs to be accorded with utmost attention and care.

I used binary logistic regression to relate economic and environmental perceptions as possible predictors of behavioral intents to intensify production. This model is used primarily because the dependent variable (i.e., intent to intensify production) is a dichotomous variable. Appendix 2 describes the independent and dependent variables, while Appendix 3 summarizes the results of the analysis for Jatropha, coconuts, and rubber. Economic variables do have some influence on preferences for intensification. For Jatropha contracts, ranking of 'high revenues' as one of the top three conditions for cooperation in contracts is significantly associated (at 95% confidence) with greater preference for monocrop production of Jatropha. This intuitively makes sense as desires to intensify through monocrop production may be associated with the commercial logic that intensification leads to maximization and greater production yields of the cash crop of concern. This is in contrast to intercropped systems, where the general perception is that production of the main cash crop is inhibited because of co-production with subsistence or lower-valued cash crops.

Perception of socio-economic satisfaction, a proxy for current socio-economic disposition, relates to preferences to intensify Jatropha and coconut production. This variable, however, appears to be significant only at 95% and 90% confidence for Jatropha and coconuts, respectively. The regression analysis suggests that a unit increase in socio-economic satisfaction, holding all other variables in the model constant, is associated with an increase in the log-odds for prefering intercropping. This relationship is less clear, but a possible explanation is that those who are satisfied with their current socio-economic disposition might already be satisfied with the yields their lands produce. There is an assumption that employing monocrop production relates to avoiding potential risks of achieving the desired growth and production of the cash crop being grown. For example, many of the farmers we interviewed mentioned that they want to avoid intercropping to ensure that the growth of the cash crop of concern will not be affected. This presumes that farmers accord some level of attention and care to ensure the growth of the cash crop which, in turn, leads to favorable economic returns. Those who prefer intercropping, on the other hand, are presumed to be more interested in taking advantage of available lands for subsistence crops and being less pressured to ensure that the cash crop performs well.

The place satisfaction pertaining to remaining forest cover has significant influence (at 95% confidence) on behavioral intents to intensify coconut and rubber production. The relationship is negative, suggesting that provided all other variables in the model are constant, an increase in the satisfaction for the remaining forest cover is associated with a decrease in log-odds to prefer intercropping. This is supported by the evaluative belief for the richness of wildlife, where respondents who tend to perceive wildlife in their environment as still prolific also prefer to monocrop. The result may be counterintuitive at first, but this may have significant implications. Intuitively, one would think that greater environmental satisfaction is associated with less desires to intensify production. That is, that those who see their environment as pristine see the need to keep the condition that way. However, it can also be argued that that perceptions of a pristine environment would imply that the environment can still handle pressures brought by intensification.

This result, however, is complicated by the evaluative belief for remaining forests. In the case of rubber production, there is a significant negative relationship at 95% confidence between the perception that there is little remaining forest cover and the desire to intercrop. For every unit of increase in the perception that indeed there is little forest remaining, there is an associated increase in the log-odds for the desire to adopt monocropping. This counters the earlier argument that perceptions of a pristine environment are associated with greater tendencies to monocrop. This complication could be related to the environmental identity of rubber as a potential tree crop for reforestation. As mentioned above, many of our respondents described rubber as a tree crop that complements forest environments. Hence, even if there is desire to produce rubber in a monocrop system, it is possible that farmers do not see any other environmental implication aside from the promise of rubber to reforest denuded lands or complement existing forestlands.

As for the other independent variables, there is a positive relationship between age and preference to intercrop in the case of coconuts and rubber. In the case of Jatropha, there is a negative relationship between level of formal education and preference to intercrop. Those who have higher educational attainment are associated with greater log-odds to prefer monocrop systems. The results for age and education suggest that older farmers may still value the importance of intercropping, while those who have higher educational attainment may tend to value monocrop systems as influenced by, perhaps, exposure to modern agronomic sciences.

Finally, those who have direct experience in producing Jatropha and rubber in production partnerships are associated with greater log-odds to prefer intercropping relative to those who do not have experience, holding other variables constant. This may be interpreted in various ways. One possibility is that the previous production partnerships have, in some ways, encouraged farmers to intercrop. Another possibility is that through the process of growing Jatropha or rubber, farmers gained the knowledge that it is plausible to intercrop subsistence and other cash crops without dramatically compromising the growth of Jatropha or rubber. Those who do not have direct experience may simply assume that intercropping might compromise the growth of the cash crop.

7.2 Behavioral Intent to Cooperate in Partnerships

Another important dynamic in agricultural production relations is the propensity of upland farmers to cooperate with production partnership regimes. It is equally important to understand the factors that influence intentions and decisions of farmers to take part in certain forms of partnership regimes. Table 4 summarizes the willingness of respondents to cooperate with partnership regimes for growing Jatropha, palm oil, coconut and rubber. It is evident that there is high willingness among respondents to cooperate with coconut (~95%) and rubber (~68%) production partnerships. Palm oil has the most number of respondents not willing to cooperate (~59%).

Table 4. Frequency of respondents with varying intents to cooperate

Crops	N	Willingness to Cooperate (percent)				
		1	2	3	4	5
Jatropha	470	23.6	11.3	5.7	18.1	41.3
Palm Oil	466	48.3	10.5	10.1	10.5	20.6
Coconuts	472	3.8	1.3	1.4	13.6	79.9
Rubber	465	19.1	6.9	6.5	13.3	54.2

Notes: (1) Likert scale: 1=highly disagree; 2=slightly disagree; 3= neutral; 4=slightly agree; 5=highly agree

(2) N corresponds to number of respondents included in the analysis

To determine the factors that influence the behavioral intents to participate in production partnerships, I first attempted to use an ordinal logit regression analysis given that the dataset does not satisfy the assumptions of parametric linear regression analysis. The dependent variable used was the willingness of farmers to engage in new production partnership regimes for growing Jatropha, palm oil and rubber, with Likert scale from '1' (high disagreement to cooperate) to '5' (high agreement). However, in the

course of using the ordinal logit regression model, the results did not satisfy the proportional odds or parallel regression assumption, thus requiring the use of another model or the transformation of the dataset. I then decided to transform my dependent variable from Likert scale to dichotomous, i.e., '1' and '2' transformed to 'no' (value=0), and '4' and '5' transformed to 'yes' (value=1). All those who answered '3' were removed from the dataset, given the small number of respondents. After transforming the dependent variable, a binary logistic regression was used.

Appendix 4 summarizes the results of the analysis for Jatropha, palm oil, and rubber. Similar to the case of behavioral intents to intensify production described in Section 7.1, economic variables influence willingness to cooperate in partnership regimes. This relationship seems to be evident for the case of palm oil and rubber. For palm oil and rubber, ranking of 'high revenues' as one of the top three conditions for cooperation in contracts is significantly associated (at 90% confidence) with greater log-odds to cooperate with production partnerships. This suggests that farmers associate palm oil and rubber production as cash crops that potentially offer high economic benefits. In our interviews and surveys, those who expressed interest to take part in rubber and palm oil production emphasized the potential livelihoods and economic benefits that such partnerships can bring to their households.

Previous experience with crop production appears to be a strong indicator of willingness to cooperate with new production partnerships, although the direction of relationship varies with the type of crop. In the case of Jatropha and palm oil production, experience with Jatropha production partnership are associated with a decrease in log-odds to cooperate, at 99% confidence. This seems to be accurate, as interviews with previous Jatropha and palm oil farmers indicate their low willingness to engage in new production partnerships, either because of unfavorable experiences or simply because farmers no longer have available land for production. The relationship is opposite in the case of rubber, where those with experience tend to have greater log-odds to engage in new partnerships, at 95% confidence. This could be because current rubber farmers directly engaged in production (and not just as wage laborers) have favorable (or lack of unfavorable) experiences with rubber partnerships. Also, in our interviews, many farmers who do not have experience with rubber opt not to engage in production partnerships for this crop because they do not know anything about rubber. The implication of the relationship between experience and willingness to cooperate is stark – if upland farmers had a bad experience with a previous partnership regime, it might be difficult to convince them to participate in a new, related one.

Similar to the analysis of behavioral intents to intensify production, environmental perceptions have significant influence over willingness to cooperate in new production partnership regimes. A variable that stands out refers to the evaluative belief in the productivity of soil. Based on the regression model, increasing agreement to good productivity of soil is significantly associated (at 95% confidence) with greater log-odds to cooperate in new palm oil and rubber regimes, holding all other variables in the model constant. A possible explanation is that farmers perceive palm oil and rubber to have high soil nutrition demands, and so they are more willing to cooperate if they also perceive their land to have productive soil. Another interpretation is that the perception for high productivity might lead them to think of the most valuable ways of taking advantage of such productivity, which in this case is growing high-value cash crops.

The evaluative belief pertaining to remaining forest cover has significant influence on intentions to cooperate when it comes to palm oil production. The relationship is positive holding all other variables constant. This suggests that greater agreement that there is little forest left in the local environment is associated with increase in log-odds to cooperate in palm oil production partnerships. Contrary to the case of intensification of coconuts and rubber described in Section 7.1, farmers who perceive low forest cover tend to be associated with greater willingness to cooperate to palm oil production. Again, there are several ways of interpreting this. An apparent interpretation is that upland farmers may think introducing palm oil would not significantly impact their environment, since there is little forest left to impact anyway. This suggests that given the state of forest cover, many upland farmers may accord little value on the remaining forests in their local environment, particularly if they are secondary forests. This could be very true for migrant populations who exhibit greater odds of being associated with palm oil production relative to indigenous populations, as evidenced by the higher significance (0.004 vs. 0.071) and odds ratio (3.480 vs. 2.010). It is evident in the interviews that migrant farmers tend to accord low value on secondary forests, especially when asked in the context of high-value crops production. As mentioned by one migrant farmer,

"before we have a lot of forest, we don't get to take advantage of it … now it is replaced by palm oil … it is now more *productive*."[11]

Another interesting variable to explore is age, which shows a negative relationship with willingness to cooperate in palm oil production partnerships. At 95% confidence, a unit increase in age is associated with a decrease in the log-odds to cooperate in palm oil partnerships, holding all other variables constant. This is consistent with the results in Section 7.1, where older farmers are associated with greater willingness to adopt intercropping. Given that intercropping is not allowed in palm oil production systems, the results then are complementary.

7.3 Section Summary

As expected, economic variables influence behavioral intents to intensify production and to cooperate with certain forms of production partnerships. This is particularly evident in the relationship between preference for high revenues and willingness to take part in palm oil and rubber production. Another expected result is the influence of experience on behavioral intents. In both cases of behavioral intents, previous experiences with production partnerships are associated with greater willingness to intercrop Jatropha and rubber; and lesser willingness to cooperate with new ventures in Jatropha and palm oil.

It is also evident in the above results that environmental perceptions influence behavioral intents. A strong evidence is the relationship between perception of soil productivity and willingness to cooperate in palm oil and rubber production. Another interesting relationship is between perception of remaining forest cover and willingness to cooperate in palm oil production. These relationships insinuate that socio-environmental constructions do play a role in institutional decision-making. Hence, there is scope to enrich the IAD framework described in Section 2.2 by introducing social construction of the environment as one of the variables.

8.0 CONCLUSIONS

I structured this section as a response to the research objectives stated in Section 1.4. For the first research objective regarding the structure of production partnership regimes, my research findings reveal the complexity involved in production partnerships and contracts. Partnership regimes generally can be categorized into government- and private-driven initiatives, with varying involvement of the LGUs and financing institutions. Moreover, contracts can be categorized into two types: one where individuals and groups have greater involvement in the management and production operations; and the other where the relation is more of a land lease agreement.

In addressing the research objective on economic perceptions of upland farmers, research findings reveal that farmers who perceive partnership regimes (in this case palm oil and rubber) as providers of wage labor opportunities and maintenance support also perceive such regimes to impart high economic benefits. The reason for this is the perceived steady stream of income, which can both be a benefit and a source of economic burden for farmers. Upland farmers tend to rank maintenance support as one of the top conditions for willingness to cooperate with production partnerships. There is a risk, however, that wage labor and maintenance support can make upland farmers dependent on the credit or income provided, which can lead to debt accumulation when credit or income flows are interrupted. There is also the perception of land tenure insecurity, which ranks highly in the concerns of upland farmers. Contract arrangements are at risk of undermining the land tenure security of upland farmers. Evidence shows that mid-course revisions in contracts compel upland farmers to accept new provisions due to growing dependence on the perceived welfare benefits of such partnership regimes. These findings contribute to the ongoing debates on contract farming, where such partnership regimes may accord greater risks on the part of upland farmers.

[11] Interview, migrant farmer, February 18, 2011

In regard to the research objective on environmental perceptions, the analysis above underscores the relatively high regard for environmental quality (i.e., wildlife richness, soil productivity and landscape quality) in the upland regions, with the exception of perceptions on the remaining forest cover. Moreover, upland farmers attach environmental discourses to certain types of production partnership regimes which, together with evaluative beliefs and place satisfaction, may explain behavioral intentions of upland farmers.

To address the research objective on the role of economic and environmental perceptions in explaining the intent and decisions of upland farmers, it is evident in the analysis how these sets of variables influence both behavioral intent to intensify crops and cooperate with new partnership regimes. The independent variables that have explanatory significance include the following: socio-economic satisfaction; preference for high revenues; evaluative beliefs on soil productivity and remaining forest; place satisfaction concerning forest; past experience; age; and education. Referring back to the literature on Institutional Analysis and Development, this research demonstrates that apart from economic variables, environmental perceptions and social constructions have significant effect on decision-making in the action situation.

The response to the last research objective is detailed in the next section. Given the findings outlined above, the following section discusses recommendations to improve production partnership regimes in favor of upland communities.

9.0 POLICY RECOMMENDATIONS

The conclusions of the study suggest that production partnerships and their associated contracts can undermine the welfare of upland farmers. Moreover, it is evident that certain economic and environmental perceptions influence the behavioral intent of upland farmers to adopt intensified forms of production and cooperate with prospective production partnerships. It is important to understand the drivers of behavioral intents, as the latter could further undermine the welfare of upland farmers. Discussed in the following sections are some policy recommendations that can be considered to improve production partnerships and circumvent tendencies to disproportionately afflict participating upland farmers.

9.1 Protection from Mid-course Contract Revisions

As discussed above, mid-course contract revisions could potentially undermine the land tenure security of upland farmers. The dependency formed between upland farmers' resource needs and the prospects for a steady income stream (through wage labor or maintenance support) from the production partnerships could affect the way upland farmers decide whether or not to agree to mid-course contract revisions. There are two possible recommendation to address this. First, upland groups should be empowered to exert their interests in the negotiation processes during contract formation. For example, upland farmers should have the capacity to preempt not just possible mid-course contract revisions but also all other possible contract provisions that could enhance their welfare. This way, farmers will not fall into the trap of negotiating mid-course surprises and increasing dependency on the partnership. Such capacity building may be provided by government or non-government organizations. Already, in recent meetings between CBFMA peoples organizations and DENR officials, the issue of capacity building on contract negotiations has been brought to the fore.

Second, lending institutions, most of which are government-owned and controlled, should design specific provisions in loan contracts that take into consideration the concerns of upland farmers regarding land tenure security. This includes devising creative ways of circumventing the possibility of upland farmers selling their land during the production contract, other than just seizing tenure instruments as collateral or protection. If the collateral/protection scheme cannot be avoided, lending institutions, including the partner firms, should device provisions in the contract that would assure and protect upland farmers from the possibility of land grabs and land acquisitions.

9.2 Balancing Income Provisions with Flexibility

Provision of maintenance support is a contract condition that upland farmers accord the highest priority. Indeed, it is crucial in ensuring that upland farmers give enough time, resources and attention to cash crop production. Likewise, wage labor is an opportunity that upland farmers can take advantage of in order to acquire resources needed for transactions in the cash economy. While these partnership provisions can be crucial in the success of production contracts and can potentially enhance the welfare of upland farmers, it should be noted that dependence on such provisions may undermine upland household economies. Thus, contracts should allow for flexibility and balance in regard to these provisions. For example, if the production system allows it, partner firms should introduce the value of intercropping together with maintenance support. While intercropping curtails production intensification, such production scheme can also lessen the dependence of upland farmers on the introduced flow of income. This creates diversity in household economies, thus encouraging farmers to continue working the field even if the flow of maintenance support is interrupted.

In regard to wage labor, upland farmers should be allowed the flexibility to work on the fields however it fits their livelihood strategies. Some production systems are rigid, employing only upland farmers who are able to commit full-time. Flexibility in employing wage laborers encourages diversity in livelihood strategies, as farmers are able to continue working on their own lands to grow subsistence and other cash crops.

9.3 Enrichment of Environmental Perceptions

As discussed in Section 7.1, perceptions on the remaining forest cover influence intentions to intensify and cooperate with certain production regimes. One way to address this issue is to enrich the environmental perceptions of upland farmers. I prefer to use the word enrich, rather than improve or change, for ethical reasons. I believe that policies that endeavor to directly alter perceptions and behaviors have ethical implications, particularly in the context of culturally sensitive groups, such as indigenous peoples. Enrichment in this case means presentation of balanced and comprehensive information about the possible environmental implications of biofuels and rubber production. Hence, not only should the negative social, economic and environmental impacts of certain production schemes (such as mono-specific cropping) be presented, but also the potential benefits of such systems. This empowers upland dwellers to choose what best fits their situation and with only limited direct influence from, for example, the normative interpretations of governments, NGOs, and private firms. A policy strategy is to design a system or process where there can be multistakeholder representation in contract negotiations, so as to have a more balanced presentation of all possible views and perceptions on the implications of the production partnership regime. This is possible, given that most current and prospective partnership regimes are embedded in existing co-management and tenure arrangements with the government. Policy enhancements to encourage multistakeholder representation can then be integrated into these existing arrangements. This policy recommendation, I emphasize, needs to be approached very carefully due to the potential ethical implications stated above.

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APPENDICES

Appendix 1. Upland organizations included in the study

Code	Members	Ethnicity make-up	N	Tenure Instrument and year	Crops Production Experience & Partners
ORG-A	75	97% Pala'wan, 3% Migrant	63	• CBFMA, 1672 hectares, awarded 2000 • Applying for CADT	• Jatropha production contract w/ GOCC, 2008-2011 • Rubber w/ DENR, 2008
ORG-B	70	70% Tagbanua, 27% Batak 3% Migrant	67	• CADC, 7530 hectares, awarded 1996 • Applying for CADT	• Rubber w/ Palawan State University (prospective)
ORG-C	113	63% Tagbanua, 37% Migrant	50	• CBFMA, 4463 hectares, awarded 2000	• Jatropha w/ GOCC, 2008-2011 • Palm Oil with private company, 2005 to present
ORG-D	75	60% Tagbanua, 40% Migrant	65	• CBFMA, 2175 hectares, awarded 2001	• Coconut w/ Philippine Coconut Authority
ORG-E			65	• SIFMA	• Rubber w/ Palawan State University
ORG-F	92	100% Pala'wan,	52	• CADC, 15000 (est.) hectares, awarded 1997 • Plans to apply for CADT	• Jatropha w/ GOCC, 2008-2011
ORG-G	72	82% Tagbanua, 18% Migrant	53	• CBFMA, 1800 hectares, awarded 2003	• Jatropha w/ GOCC, 2008-2011
ORG-H	160	40% Pala'wan, 30% Migrant, 30% Muslim	60	• CBFMA 1481 hectares, awarded 2001	• Jatropha w/ GOCC, 2008-2011 • Palm Oil w/ private company, 2007 to present

Notes: (1) For ORG-E, the exact number and composition of members is unknown. However, members of the community are engaged in social industrial forestry management agreement (SIFMA) through the auspices of the Palawan State University and the local government.

(2) N corresponds to number of respondents surveyed.

Appendix 2. Variable description

VAR	Description	Measure
AGE	Age of respondent	Scale from 18 – 78 years old
SEX	Sex of respondent	Male = 1; Female = 0
EDUC	Highest formal educational attainment	None = 0; Elementary = 1; High School = 2; College = 3
SES	Perceived socio-economic satisfaction	1 = highly dissatisfied; 3 = unsure; 5 = highly satisfied
EXP	Experience in crop production partnership	Yes = 1; No = 0
MIGR	Dummy variable for migrant respondents	Yes = 1; No = 0
INDI	Dummy variable for indigenous respondents	Yes = 1; No = 0
EVAL1	Evaluative belief: wildlife richness	1 = highly disagree; 3 = unsure; 5 = highly agree
EVAL2	Evaluative belief: productive soil	1 = highly disagree; 3 = unsure; 5 = highly agree
EVAL3	Evaluative belief: beautiful scenery	1 = highly disagree; 3 = unsure; 5 = highly agree
EVAL4	Evaluative belief: little forest left	1 = highly disagree; 3 = unsure; 5 = highly agree
EVAL5	Evaluative belief: too many people living	1 = highly disagree; 3 = unsure; 5 = highly agree
PSAT1	Place Satisfaction: Wildlife	1 = highly dissatisfied; 3 = unsure; 5 = highly satisfied
PSAT2	Place Satisfaction: Soil productivity	1 = highly dissatisfied; 3 = unsure; 5 = highly satisfied
PSAT3	Place Satisfaction: Remaining forest	1 = highly dissatisfied; 3 = unsure; 5 = highly satisfied
PSAT4	Place Satisfaction: Scenery	1 = highly dissatisfied; 3 = unsure; 5 = highly satisfied
REVP	Preference for high revenue in top 3	Yes = 1; No = 0
ENVP	Preference for environmental protection in top 3	Yes = 1; No = 0
MANP	Preference for maintenance support in top 3	Yes = 1; No = 0
USEP	Preference for early use of crop in top 3	Yes = 1; No = 0
LANP	Preference for land tenure security in top 3	Yes = 1; No = 0
TRUP	Preference for trustworthiness of partner in top 3	Yes = 1; No = 0

Appendix 3. Binary logistic regression model of behavioral intent to intensify production (mono-cropping vs. intercropping)

Variable	Description	Jatropha			Coconut			Rubber		
		B	Exp(B)	Pval	B	Exp(B)	Pval	B	Exp(B)	Pval
AGE	Age of respondent	.010	1.010	.326	**.021**	**1.021**	**.016**	**.017**	**1.017**	**.089**
SEX	Sex of respondent	.407	1.502	.141	**.485**	**1.624**	**.031**	**.637**	**1.891**	**.018**
EDUC	Highest formal educational attainment	**-.319**	**.727**	**.055**	**.256**	**1.292**	**.054**	-.112	.894	.466
SES	Perception of socio-economic satisfaction	**.168**	**1.183**	**.049**	**.115**	**1.122**	**.100**	.092	1.096	.273
EXP	Experience in crop production partnership	**.525**	**1.691**	**.082**				**1.588**	**4.896**	**.000**
MIGR	Dummy variable for migrant respondents	-.073	.929	.878	-.074	.929	.854	.657	1.929	.178
INDI	Dummy variable for indigenous respondents	.295	1.344	.483	.405	1.499	.249	.628	1.873	.138
EVAL1	Evaluative belief: wildlife richness	-.215	.807	.154	**-.275**	**.759**	**.025**	.084	1.087	.565
EVAL2	Evaluative belief: productive soil	-.011	.989	.949	-.012	.931	.989	-.047	.954	.765
EVAL4	Evaluative belief: little forest left	-.103	.902	.266	-.053	.948	.494	**-.193**	**.825**	**.042**
PSAT1	Place Satisfaction: Wildlife	-.144	.866	.283	-.073	.930	.502	.002	1.002	.989
PSAT2	Place Satisfaction: Soil productivity	.078	1.081	.618	.033	1.034	.783	-.019	.981	.896
PSAT3	Place Satisfaction: Remaining forest	-.093	.911	.418	**-.313**	**.731**	**.002**	**-.284**	**.753**	**.013**
REVP	Preference for high revenue in top 3	**-.631**	**.532**	**.054**	-.446	.640	.105	-.011	.989	.973
ENVP	Preference for envi protection in top 3	-.172	.848	.570	-.314	.731	.219	-.211	.810	.504
CONS	Model constant	1.019	2.770	.382	1.502	4.491	.118	-.801	.449	.467
X^2	Omnibus test	.023			.000			.000		
N	Number of cases included	266			417			301		

Note: Dependent variable is intent to adopt intercrop production: No = 0; Yes = 1.

Appendix 4. Binary logistic regression model of behavioral intent to cooperate in partnerships

Variable	Description	Jatropha			Palm Oil			Rubber		
		B	Exp(B)	Pval	B	Exp(B)	Pval	B	Exp(B)	Pval
AGE	Age of respondent	**-.025**	**.975**	**.003**	**-.018**	**.982**	**.046**	-.008	.992	.363
SEX	Sex of respondent	-.146	.864	.506	.075	1.078	.746	**.624**	**1.867**	**.009**
SES	Perception of socio-economic satisfaction	.016	1.016	.821	**.130**	**1.139**	**.072**	**.140**	**1.150**	**.061**
EXP	Experience in crop production partnership	**-.815**	**.443**	**.000**	**-1.391**	**.249**	**.000**	**1.221**	**3.391**	**.030**
MIGR	Dummy variable for migrant respondents	.032	1.033	.931	**1.247**	**3.480**	**.004**	**-.832**	**.435**	**.062**
INDI	Dummy variable for indigenous respondents	-.060	.851	.942	**.698**	**2.010**	**.071**	**-.730**	**.482**	**.062**
EVAL1	Evaluative belief: wildlife richness	-.041	.960	.707	-.112	.894	.334	.145	1.156	.241
EVAL2	Evaluative belief: productive soil	.107	1.113	.374	**.317**	**1.373**	**.027**	**.247**	**1.281**	**.070**
EVAL4	Evaluative belief: little forest left	.061	1.063	.425	**.199**	**1.220**	**.012**	-.094	.910	.252
PSAT1	Place Satisfaction: Wildlife	.017	1.017	.866	.045	1.046	.681	**-.213**	**.808**	**.079**
PSAT2	Place Satisfaction: Soil productivity	**.186**	**1.204**	**.083**	.151	1.163	.232	.043	1.044	.732
PSAT3	Place Satisfaction: Remaining forest	.128	1.137	.151	.154	1.166	.122	.053	1.055	.597
REVP	Preference for high revenue in top 3	.219	1.245	.448	**.524**	**1.689**	**.080**	**.632**	**1.882**	**.056**
MANP	Preference for maintenance support in top 3	.140	1.150	.528	**-.483**	**.617**	**.043**	.015	1.016	.950
USEP	Preference for early use of crop in top 3	.009	1.009	.970	-.207	.813	.437	-.288	.750	.276
LANP	Preference for land tenure security in top 3	**-.409**	**.664**	**.088**	.068	1.070	.787	-.138	.871	.595
TRUP	Preference for partner trustworthiness in top 3	.254	1.289	.309	.126	1.135	.624	-.498	1.646	.067
CONS	Model Constant	.260	1.297	.756	-1.201	.301	.270	.180	1.198	.841
X^2	Omnibus test	.000			.000			.002		
N	Number of cases included	430			408			422		

Note: Dependent variable is willingness to cooperate: No = 0; Yes = 1.

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