Governmentalization Beyond the Political Forest:

The Formalization of Smallholder Timber Production in Northern Central Java

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Abbreviations and Acronyms

AA – Access Analysis

BPS – Badan Pusat Statistik (Central Body of Statistics)

CIFOR – Center for International Forest Research

EU – European Union

FAO – Food and Agriculture Organization

FLEGT – Forest Law Enforcement, Governance and Trade

IPB – Institut Pertanian Bogor

IRp – Indonesian Rupiah

KBR – Kebun Binit Rakyat (Village Nursery Program)

LMDH – Lembaga Masyarakat Desa Hutan (Forest Village Institutions)

MoF – Ministry of Forestry (Indonesian)

MoU – Memorandum of Understanding

NGO – Non-Governmental Organization

PEN – Poverty and Environment Network

SME – Small and Medium Enterprise

SKAU – Surat Keterangan Asal Usul Kayu (Timber Certificate of Origin)

STP – Smallholder Timber Production

SVLK – Sisterm Verifikasi Legalitas Kayu (Timber Legality Verification System)

T4T – Trees 4 Trees

TLAS – Timber Legality Assurance System

VCA – Value Chain Analysis

VPA- Voluntary Partnership Agreement

WWF – World Wildlife Fund

Glossary

Indonesian words defined in the glossary appear in *italics* throughout the text.

Dinas Kehutanan
Local forestry offices under the jurisdiction of the Ministry of Forestry.

Institut Pertanian Bogor
The Agricultural University of Bogor, West Java.

Kayu Kampung
Village wood.

Kebun Binit Rakyat (KBR)
A program that began in 2010 to stimulate smallholder timber growth. KBR is implemented by local forestry offices (Dinas Kehutanan) and is under the jurisdiction of the Indonesian Ministry of Forestry.

Kementerian Kehutanan
The Indonesian Ministry of Forestry

Kepala Desa
Elected leader of the village.

Makelar Kayu
Timber middlemen who typically oversee the cutting and transportation of timber from smallholder land.

Perum Perhutani
The State Forest Company in Indonesia. Java is its main area of operation.

Transmigrasi
The state-based relocation program that transferred Javanese, Balinese, and Maduran citizens to the outer islands of Indonesia.

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Forward

Messenger
As I did stand my watch upon the hill,
I look'd toward Birnam, and anon, methought,
The wood began to move.

Macbeth
Liar and slave!

Messenger
Let me endure your wrath, if't be not so:
Within this three mile may you see it coming;
I say, a moving grove.

(Macbeth V.v. 32-37)

I first noticed the movement when I lived and taught in Tlogowungu, a village in Pati Regency, in northern Central Java. As I rode my motorbike across the village, the flicker of sunlight and prison-bar shadows from young teak trees growing along the road suddenly gave way to shade that blurred and clung to the edges of a state production forest. Along the road that bordered this state production forest there was no flicker of sunlight and shadow: only a deep, cool shade draped around the massive trunks, hanging from the tall canopies of state-owned teak and mahogany trees. The juxtaposition between the majesty of those state-owned trees and the rows of young, privately grown trees that snaked around roads, stood in rigid rows on smallholder plots, and delicately framed rice paddies and dry-crop fields opened my eyes to the difference between smallholder and state plantation timber in northern Central Java.

At first, I was captivated by the massive trunks and tall canopies of the state-owned trees; planted in orderly rows, numbered, regimented, extending into the horizon. However, I soon began to notice that the stoic trees, shrouded in shade, remained still. It was the motion of the trees along the roads, beside rice paddies, standing timidly in small plots along riverbeds and behind houses that drew my attention. I began to notice and watch the movements of these trees in the daily lives of my friends and co-teachers in Tlogowungu and throughout northern Central Java.

The small trees were marching. They marched down roads, around fields, and taking root in new plots throughout the regencies of Pati and Jepara. They advanced up Gunung Muria, the silenced volcano that dominates northern Central Java, where they fanned out to cover steep slopes and look across terraces of cassava. Then, they laid down in truck-beds, filed into screaming sawmills, leaned against walls in workshops waiting to emerge, metamorphosed into ornately carved furniture or the skeleton of a house. Thinking about this movement of the forest framed my time as a Master of Philosophy student at the School of Geography and Environment.

My prior interest in smallholder timber, combined with the skills and insight I gained during my first year at Oxford, compelled me to return and follow the march of the trees in Pati and Jepara through my fieldwork. Much like Macbeth's messenger, I have returned to report on "a moving grove." However, while the messenger's report signals the end of *Macbeth*, this thesis marks the beginning of a career dedicated to following the movements of the forest. I hope that reading this thesis proves informative and worthwhile for you; the process of researching and writing it has certainly opened my eyes.

> "Within . . . may you see it coming;
> I say, a moving grove."

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CHAPTER ONE

INTRODUCTION

This thesis contributes to the growing body of literature on, and interest in, smallholder timber production (STP) on Java. It considers why, how, and with what developmental benefit STP is formalizing throughout northern Central Java, and how this formalization relates to timber legality verification and source documentation. To articulate this work, I use political ecology as a theoretical foundation, and to support claims, I rely on relevant literature, policy analysis, and information generated from grower surveys, key-informant interviews, and field observations performed from October to December 2012 in the regencies of Jepara and Pati of northern Central Java. The synergy of the theoretical and methodological approach in this text seeks to elucidate trends within forest governance and STP in northern Central Java relevant to policy, development, and environmental discourses throughout Java, Indonesia, and the developing world.

First, I argue there is a transformation occurring within Javanese timber production. This transformation is in regards to a formalization of STP outside of the political forest that has existed on the island since the Dutch colonial state (Peluso 1992, Peluso and Vandergeest 2001, Singer 2008). Second, I propose this transformation is a result of the continued demand-supply gap for tropical hardwoods, the need to secure timber resources outside governmental forestlands, and the growing importance of timber legality verification. Third, I analyze how access is granted to timber resources throughout northern Central Java, and how this access is related to spaces of production and the furniture value chain (FVC) that dominates the timber market in northern Central Java. Finally, I posit the effect of these changes, their

import for development, domestic and international policy. Throughout the entirety of this thesis, I pursue the following research questions:

1. To what extent, how, and why is STP changing in northern Central Java?

2. How do social variables, networks, and ecological processes affect STP, and how does STP affect these phenomena?

3. How do international policy, domestic policy, and local practice inform and constitute one another?

With these questions in mind, I seek to contribute to the understanding of contemporary forest governance and timber production on Java. This introduction first details how my work fits within a general geographical and economic context (1.1). It continues to position this thesis within the field of political ecology based on the focus and objectives the study (1.2). The third sub-section considers how this text advances knowledge about forest governance in Indonesia (1.3), and it concludes with an outline of the four subsequent chapters (1.4).

1.1 The General Context

Indonesia stretches across 17,500 islands, spans 5,200 km and supports approximately 242 million people comprising 500 ethnic and 600 language groups (UN Population Division 2011). Amid this incredible diversity exists the world's second largest tropical forest estate, estimated to include between 94.4 and 98.5 million ha[1] and categorized into six different forest types (Blaser et al 2011, 182). The interrelationships between the forest estate and the people of Indonesia have far-reaching consequences for other nations, future generations, and development within the country. While this thesis focuses exclusively on STP in northern Central Java,

[1] There is considerable discrepancy concerning the total forest estate in Indonesia. This figure represents the most conservative estimate by the ITTO and the FAO. The Ministry of Foresry estimates

this human-forest relationship represents an economic, historical, and geographic importance that extends far beyond the coastal and regency boundaries of northern Central Java.

Indonesia's contribution to the tropical timber trade is significant domestically and internationally. In 2009, the timber industry in Indonesia was valued at $2.15 billion (Blaser *et al*. 2011, 190). Within the international arena, the Asia-Pacific region contributes the most, per volume, to the tropical timber trade. Figure One demonstrates the importance of the Asia-Pacific region to overall tropical timber production by compiling the volume of industrial roundwood or log production. Indonesia plays a particularly significant role within the Asia-Pacific region, particularly in log production. It is the most significant producer of tropical logs within the International Tropical Timber Organization (ITTO) member countries, a

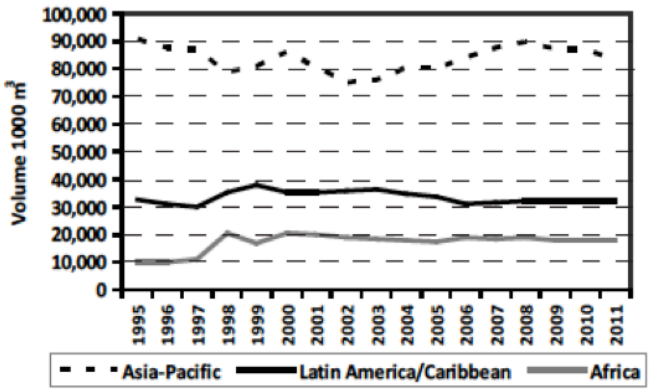

Figure One: Tropical log production by region, 1995-2011(Source: Blaser *et al.* 2011, v)

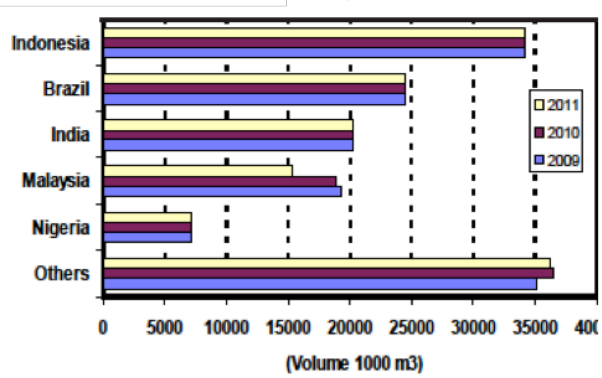

Figure Two: Major tropical log producers (Source: Blaser *et al.* 2011, 10)

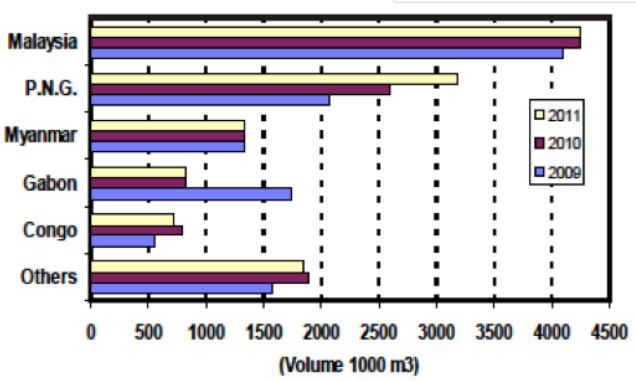

Figure Three: Major tropical log exporters (Blaser *et al.* 2011, 13).

trend that remained constant from 2008 to 2011 (Figure Two). These logs, however, are not typically shipped abroad, as Indonesia is not a leader in exporting roundwood (Figure Three). Rather, most of the roundwood accounted for by the ITTO is used within the archipelago, making Indonesia one of the primary exporters of secondary processed wood products (Blaser *et al.*2011, xi). This domestic use of Indonesian timber continues to add value within the country through employment opportunities and added value from manufactured products (Ewasehcko 2005, Irawati *et al.* 2009). Exports from northern Central Java in 2009 were valued at over $120 million (Purnomo *et al*. 2011a), and the production of furniture alone is supported by 15,271 enterprises in the Jepara regency (Roda *et al.* 2007).

Domestic timber is of particular importance in northern Central Java. Jepara, one of the two northernmost regencies in Central Java, has an international reputation for furniture production that dates to the 17th century (Purnomo *et al*. 2009). The furniture industry in this area "produces about one third of the furniture of central Java, with 177,000 workers (many of them women) processing 1.5 to 2.2 million cubic meters of wood per year from approximately 15,000 small to large companies" (CIFOR 2013). For this reason, the FVC project, an internationally funded project based at the Center for International Forest Research (CIFOR), has focused on the Jepara area to improve efficiency, organize producer groups, and create new linkages between distributors, furniture craftsmen, and timber producers. As a result, the FVC project has produced literature that focuses on the significance of timber production in northern Central Java (Irawati *et al.* 2009, Purnomo *et al.* 2009, Purnomo *et al.* 2011a, Purnomo *et al.* 2011b, Purnomo *et al.* 2011c, Purnomo *et al.* 2012). The economic significance of timber production in northern Central Java represents a domestically important industry that creates a variety of local, national, and international linkages.

Beyond the direct importance of the Javanese timber production to those who benefit from the production within and outside the island, the unique and widely distributed political and cultural position of the Javanese people throughout Indonesia reinforces the importance of understanding institutions and trends on Java. The trend of people and policies emanating from Java is sometimes referred to as the "Javanization" of Indonesia (Peluso 1992, 77). The political capital of Indonesia has been on Java, in contemporary Jakarta, since the early 1600s. This began the practice of policymaking on Java and implementation throughout the archipelago that continues today (Singer 2009, 26). Further, approximately 60% of the Indonesia's population and the ethnic majority hail from Java. There has been a policy of *transmigrasi*—state-based relocation—of Javanese, Maduran, and Balinese citizens to the outer islands, resulting in the relocation of several million Indonesians via government programs. However, "the impact of transmigration polices is not limited to a mere figure" (Singer 2009, 84); it is this history of relocation that has contributed to the dispersion of the Javanese across Indonesia. If forest management is part of the socio-cultural fabric of actors, then this history of relocation further imbues a study of Javanese forest management with particular relevance to the rest of Indonesia.

There is also reason to consider Javanization a geographical and demographical pattern in Indonesia. While the majority of Indonesia's forest resources are located on the outer islands of Sumatra, Borneo, and Papua, Java has the longest history of government run or approved forest management (Peluso 1992, Singer 2009) and the greatest number of people dependent on and in competition for forest resources within the country. Examining forest governance on Java provides insight into forest governance on a densely populated, rural island that may presage the challenges of forest management on the outer islands. If Sumatra, Kalimantan,

and Papua continue along the forest-transition arc toward development (Figure Four), lessons learned on Java could become increasingly important throughout Indonesia, as populations increase and large blocs of contiguous forest decrease in the outer islands (ITTO 2006, 150; Blaser *et al.* 2011, 182).

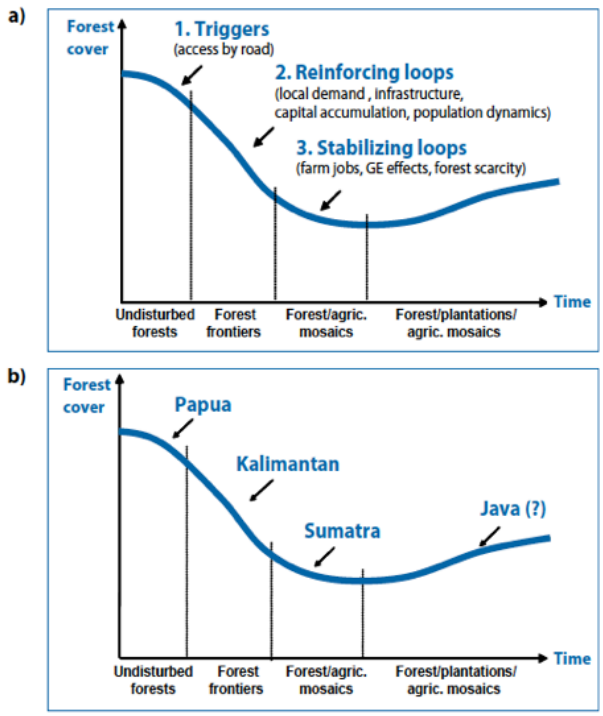

Figure Four:
a) "Forest transition indicating the dynamics of agriculture and forest rents over time, driven by demands of agricultural products and economic development" (Source: Angelson 2007 in Kanninen *et. al.* 2007, 11).
b) "Schematic presentation of forest transitions in different provinces of Indonesia (Source: Kanninen *et. al.* 2007, 11).

Despite the value of studying forest policy on Java, the vastness and diversity of Indonesia limit the direct applicability of case studies. However, the economic importance of the timber industry and its domestic significance within northern Central Java, the political and cultural prominence of the Javanese, and the demographic and geographical patterns of Javanization demonstrate the importance for understanding trends in forest governance on Java and point to the manner in which lessons learned from Javanese forest governance might produce current and/or future insights that are valuable throughout Indonesia. As a field dedicated to understanding the relationship between people, politics, and environment, political ecology provides a useful foundation for examining forest governance and timber production in northern Central Java.

1.2 Position within Political Ecology

[U]nity of purpose, agreement over definitions and boundaries, and a collective coherence in the same way some disciplines claim for themselves, are unlikely to be found in the self-proclaimed territory of PE as a whole . . . . Instead, tests of the quality of knowledge and political purpose are perhaps more relevantly applied on a case-to-case and individual basis (Blaikie 2008).

Political ecology is primarily concerned with the "metabolism" of socio-ecological relationships ("Political Ecology" 2009). It aims to determine how, why, and to what effect political and environmental phenomenon mutually constitute and inform one another. To understand the mutual constitution of politics and environment, researchers analyze politics, power, and socio-environmental realities. This thesis provides an original use of political ecology through the combination of its study location, Focualdian influence, and policy focus.

A rich political ecology literature exists for Java, but northern Central Java remains largely absent within this work. Scholarly work detailing human-forest relationships on Java includes histories of forest use (Ex. Departamen Kehutanan 1986, Bratamihardja *et al.* 2005, Peluso 1992, others), forest policy (McDermott *et al.* 2010, Singer 2008) and studies that directly engage political ecology (Dove 1984, Peluso 1992, Peluso & Vandergeest 2001,Dove & Hudayana 2008). Despite extensive scholarship on forests, people, and politics on Java, the literature reviewed for this work revealed that outside of the FVC literature, there is very little mention of timber production in northern Central Java. This omission provides a space to expand political ecology within an established tradition; political ecology has long been applied to the "developing" or "post-colonial" south (Stanley *et al*. 2006, Winkel 2012). The pattern and critique encourages consideration of whether or not a study generates new information applying political ecology to tropical forests.

While previous studies concerning Central Java are often rooted in a neo-Marxist (until the 1980s), or a post-structural political ecology (from the 1990s), the variety of political ecology within this thesis uses Foucauldian ideas to understand, analyze, and provide comment on contemporary forest governance, forest policy, and timber production. Thus, while **"**[p]ost structural political ecology borrows heavily

from Foucauldian methodology to reveal how natures and bodily behaviors are drawn into existence through the generation of knowledge, and why such practices should be theorized as exercises of power" (Baldwin 2003, 417), I analyze how STP is practiced within the context of national and international policy, and how smallholders are being subsumed by formalized timber production. These objectives are, indeed, preceded by and related to the Foucauldian concepts of power relations and governmentality. In short, this text employs Foucauldian concepts that have long been important in political ecology, but it uses these concepts to provide policy relevant analyses, insights, and recommendations.

The political ecology essential in this text has a methodological telos rooted in policy relevance. Political ecology in "the key of policy" is defined by:

1. Multiple methods, objectives, actors and audiences
    - Critical explanation
    - Practical Analysis and problem-solving
    - Testing and framing of policy
2. Integration of social and biophysical analysis of power relations and environment
    - Mixed methods
    - Integrated analysis
3. Multi-scale analysis:
    - International, national, regional, local, household;
    - Policy, practices, effects
4. Empirical observation and data gathering at household and local level
5. Chains of explanation combining structure and agency (Roucheleau 2008, 718)

In order to meet this definition of political ecology in the key of policy, I use two methodological heuristics to guide my fieldwork and analysis, and a mixed methods approach to data collection. These methodological considerations are the focus of the following chapter, but they warrant brief mention here.

To guide data collection and analyses, I use value chain analysis (Kaplinsky and Morris 2001, Irawati *et al*. 2009) and access analysis (Ribot and Peluso 2003). Both of these analytical heuristics fulfill the first and second definitions of political

ecology in the key of policy. Value chain analysis provides a further emphasis of the fifth component, while access analysis ensures an "integrated analysis" within the second definition. I gathered information using household surveys, key-informant interviews, and field observations. These hybrid methods represent a combination of qualitative and quantitative information used to frame and articulate information on smallholder timber production in northern Central Java.

The political ecology found within these pages lies somewhere between post-structuralist and so-called "practical" political ecologies. The interaction between political forces, local actors, and environmental change is of central concern, as is understanding power relationships that direct STP in northern Central Java and demonstrating how power relations contribute to the formalization of STP and access to grower resources in northern Central Java. This thesis expands political ecology into new geographical and methodological territory. As a work of political ecology, this text is submitted to assessment based on its "quality of knowledge and political purpose" (Blaikie, 2008). The next sub-section considers how this work contributes to literature on Javanese timber production and forest governance.

1.3 Contribution to Indonesian Forest Governance Literature

This thesis expands Indonesian forest governance literature by combining a conceptual focus framed by network governance and governmentality, a policy focus that examines STP within inter/national timber legality verification, and a geographical focus on northern Central Java. Sub-section 1.3.1 addresses how network governance and governmentality define and direct my work, while sub-section 1.3.2 shares the unique geographical perspective.

1.3.1 Network governance and governmentality

To frame and analyze STP in northern Central Java, I use concepts from network governance and Foucauldian governmentality. I articulate STP through the network governance, and I consider how STP networks function, and change, through governmentality.

The network that governs STP in northern Central Java extends beyond regional STP itself. STP directly includes the actors, linkages, and institutions[2] that perform or provide resources for the planting, growing, harvesting, and buying of private, small-scale timber. Beyond this definition, there are actors and institutions that indirectly affect the performance of STP. These actors and institutions that draft policy, and thus indirectly influence STP, also direct the manner in which timber flows from seedling to harvest. The actors, linkages, and institutions that produce smallholder timber, and the lawmakers that craft policy concerning STP, are included within the network that governs STP.

Admittedly, the above definition is a broad application of network governance to timber production. While the definition of network governance can been limited to actors with a shared interest in "public policymaking and implementation" (Rhodes 2007, 1244), I expand my focus to actors uninterested in making or implementing policy, but who are, directly, part of a timber production network that is subject to policy and regulation. I am interested in how timber producers ("growers") and related institutions affect STP and shape policy implementation. Describing how political systems are purported to change, Sørensen writes:

> political systems slowly and gradually change from hierarchically organized unitary systems of government that govern by means of law, rule and order to more horizontally organized and relatively fragmented systems of governance that govern through the regulation of self-regulating networks" (Sørensen 2002, 693).

[2] "Institution" in this text is used to indicate those social structures with an organization toward a social purpose in which individuals have specific roles for the production of social aims and outcomes (Harre 1979).

This concept of a "self-regulating network" promotes the consideration of how actors directly involved with timber production, and how actors and policies that are indirectly involved, govern supply networks. It demonstrates an explosion of "the people" and those who govern, as people govern directly through actions (Sørensen 2002) or indirectly through policy and/or regulation. The network that governs timber production is drawn together by a shared public purpose, (Sørensen and Torfing 2005) rather than a strict interest in policy. Thus, the network that governs STP in northern Central Java is an assemblage of smallholders, local administrators, NGO employees, and local, national, and international policymakers. Foucauldian governmentality provides an effective analytic to consider how this varied network functions and changes.

I employ Foucault's governmentality to understand the process and function of STP as it relates to official institutions. Governmentality, as defined by Foucault, is:

> 1. The ensemble formed by the institutions, procedures, analyses and reflections, the calculations and tactics that allow the exercise of this very specific, albeit complex form of power, which has as its target population, as its principal form of knowledge political economy, and as its essential technical means apparatuses of security
>
> 2. The tendency toward which, over a long period and throughout the West, has steadily led towards the pre-eminence over all other forms (sovereignty, discipline, etc.) of this type of power which may be termed government, resulting, on the one hand, in the formation of a whole series of specific governmental apparatuses, and, on the other, in the development of a whole complex of *saviors*.
>
> 3. The process, or rather the result of the process, through which the state of justice of the Middle Ages, transformed into the administrative state during the fifteenth and sixteenth centuries, gradually becomes 'governmentalized'" (Foucault 1991, 104-5).

The first part of this definition describes what governmentality is: a specific form of power that totalizes individuals into populations, uses political economy to understand

those populations, and provides security for its own propagation and as a benefit for governmentalized subjects. The second two definitions demonstrate that governmentality is practiced; it develops and is active. Actors, processes, and goods can all be governmentalized. The governmentalization of STP in northern Central Java is at the center of this thesis.

Formalization is the governmentalization of economic activities. When an economic activity is formalized, it comes into greater contact with official actors, procedures, and institutions (Guha-Khasnobis *et al.* 2006). These are the "institutions, procedures, analyses and reflections, the calculations and tactics" Foucault cites as essential to governmentality. In order to contribute to current Indonesian forest governance literature, I examine the formalization of STP, the potential economic and policy drivers of that formalization, and the result for smallholders themselves.

Framing STP in northern Central Java through networks of production and governance and examining them with attention to formalization is a unique approach to forest governance analysis in northern Central Java. The current interest in legality and legality verification within international forest policy and the manner in which this discourse is affecting Indonesian timber production make this work timely and relevant.

1.3.2 Legality Verification in Indonesia

A range of forestry programs and initiatives intended to promote sustainable forestry, "good forest governance," and new methods for valuing forestland have formed in the international arena, percolated through multiple levels of Indonesian bureaucracy, and produced a range of outcomes, many of which have been considered sub-optimal, throughout the past two decades (Wells *et al.* 1999, Linkie *et al*. 2008, Mulyani and Jepson 2013). Forest Law Enforcement, Governance and Trade

(FLEGT) is another installation of international forest policy seeking to affect Indonesian forest management.

Unlike many previous programs, FLEGT relies upon domestically defined (but internationally sanctioned) definitions to establish practice and protocol. International policies and instruments have often been non-binding and left open to interpretation (Dekker *et al*. 2007, Arts and Buizer 2009), but FLEGT voluntary partnership agreements (VPAs) require collaboration between tropical timber producing countries and the EU to provide definitions of timber legality and regulatory mechanisms that address and enforce these definitions (van Heeswijk and Turnhout 2012). The Indonesian VPA was approved in 2011 and seeks to implement V-Legal Certification, obtainable through *Sistem Verifikasi Legalitas Kayu* (SVLK) regulation (Minister of Forestry Reg. No P.38/MENHUT-II/2009), which requires third-party timber source verification for all timber products. While FLEGT promotes bilateral collaboration and focuses on strengthening domestic institutions, the implementation of SVLK remains complicated.

STP provides a unique and significant problem for SVLK regulation. In 2011, Javanese smallholders produced approximately 80% (Obidzinski *et al.* 2012) of the timber used for timber products. Due to the number of enterprises, the flexible chains of timber production they use, and the limited resources for certification, it will be a difficult, if not impossible, to certify all small and medium enterprises (SMEs) that use smallholder timber (McDermott and Lesniewska, 2012, Obidzinski *et al*. 2012, Nurrochmat and Yulianti, 2012). SVLK regulation is serving as a catalyst to formalize STP that previously operated as an informal economy regulated by local governmental offices or forestry administrators (Nurrochmat and Yulianti 2012). While recent attention has been given to the problem STP poses for SVLK, this thesis

delves deeper into the issue by providing a timely and local account of STP in northern Central Java.

This study considers why STP is formalizing, citing domestic and international pressures, it assesses the extent to which STP in northern Central Java has already become entangled with formal institutions prior to the mandate for SVLK, and it identifies patterns of access within the current production of smallholder timber in northern Central Java. Through a combination of policy analysis and field work, I contribute information about growers and their methods of production to articulate how formalization is changing production networks and affecting growers. In this way, my thesis extends current literature that identifies STP as a difficulty for SVLK regulation by indicating STP is practiced, how it is changing to become more formalized even before SVLK regulation takes full effect, and how growers are organized along lines of access when acquiring resources, selecting timber species to grow, and selling their crop.

1.4 Thesis Structure

As a whole, this thesis provides information on STP within northern Central Java, extending current literature that assesses how SVLK regulation and STP will interact. Individually, the five chapters introduce the focus and content of this thesis, present how it is performed and the rationale for such a performance, consider the shifting context of timber production in northern Central Java, promote a regional and local understanding of access to timber resources and timber production in northern Central Java, and consider the significance, shortcomings, and future directions, for this study.

The body of this thesis is composed of five chapters, including this chapter. Each chapter is written to stand alone with individualized "Works Cited" sections. The third and fourth chapters have been written for publication; because of this, key points are repeated between these chapters in order to make cogent arguments within the individual chapters. I ask that the reader please forgive these minor redundancies. This introduction concludes with the focus of each chapter.

Chapter One: Introduction

This chapter introduces the focus and content of the thesis. It informs the reader how this thesis is part of and advances political ecology and the literature of forest governance in Java. It concludes by setting out the structure of the thesis.

Chapter Two: Methodology

"Methodology" presents information and rationale on how data was generated and analyzed for this thesis. It focuses on the study area, and then introduces the mixed methods that formed the basis for fieldwork in northern Central Java and the approach to analysis used to generate information from the fieldwork. It also articulates the ethical considerations of this research.

Chapter Three: Security Beyond the Political Forest: Regulation, Formalization, and Smallholder Timber Production in Northern Central Java

The third chapter presents the contemporary political and environmental setting for smallholder timber production in northern Central Java, supporting the claim that networks of smallholder timber production are becoming increasingly formalized. This chapter provides an historical context for Javanese forest production and juxtaposes this context with increasing legitimization and need for smallholder

timber to bolster timber supply throughout Java. It examines STP in Jepara and it concludes with policy recommendations gleaned from the study of STP in Jepara.

This chapter has been prepared for submission to *Forest Economics and Policy*. Excepting certain editorial and format alterations, it is presented as it will be submitted to demonstrate the direct academic contribution this thesis hopes to make.

Chapter Four: Access Analysis of Smallholder Timber Production in Northern Central Java

"Chapter Four" presents an access analysis of STP in Jepara and Pati regencies. Specifically, it examines how socio-economic and land-ownership information, village affiliation, and association with the furniture value chain affect institutional support, amount of timber grown and species of tree selected. This access analysis aims to provide insight into how growers are granted access to institutional resources and, vice-versa, how institutions advance by means of specific types of growers. Additionally, it considers how the nature of tree species affects selection by growers. This chapter provides information on how STP in northern Central Java is being organized around networks that are becoming increasingly formalized.

This chapter has been prepared for submission to *Forest, Trees and Livelihoods*. It, also, is presented largely as it will be submitted.

Chapter Five: Conclusion

In concluding the thesis, "Chapter Five" revisits important findings, considers the limits of these findings and future directions of study. While the findings within this thesis point to a growing dependency on and increased formalization of STP, understanding the interplay of SVLK regulation and STP will require continued study.

1.5 Works Cited

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CHAPTER TWO

METHODOLOGY

This section contains five sub-sections that explain the theoretical methodology (2.1), fieldwork location and institutional affiliation (2.2), research design (2.3), ethics (2.4), and the conclusion (2.5). Together, these sub-sections detail the theoretical and practical methods used to focus, generate, and analyze information for this text.

2.1 Governmentality, Value Chain Analysis, and Access Analysis

There is no essential barrier to mixing ecological assessment with participant observation or oral history with quantitative survey, but the claims made in the interpretation of evidence hinge around difficult prior epistemological decisions about what differing forms of data represent, especially for diverse populations (Gomez & Jones 2010, 254)

In order to understand how the heterarchy of natural resource governance proceeds and is performed, this text generates information on a wide variety of institutions, human and biological resources, and processes. Considering power and access in Javanese timber production requires attention to public and private chains of production and relations between actors and institutions. To structure analysis of governance and governmentality, I use value chain analysis (VCA) and access analysis (AA) to guide information collection and analysis. Thus, network governance and governmentality comprise the overarching conceptual theory, while VCA and AA constitute the methodological theory that structures data generation and analysis.

Network governance, as an overarching theoretical approach provides a foundation for my theoretical methods. Governing is the "totality of interactions" in which all actors participate to address social problems or create social opportunity; governance is the "totality of theoretical conceptions on governing" (Kooiman 2003,

4). Network governance refers to a particular method for framing investigations into governing relationships. It conceptualizes governance as proceeding through autonomous actors that are connected and rely on one another to contribute to a public purpose through interactive negotiations that take place within frameworks (real or imaginary) within parameters set by external agencies (Sørensen and Torfing 2007). While this general conceptualization frames my approach to smallholder timber production (STP), it requires further theoretical equipment to elucidate the processes and relationships within the general production network. For this more specific theoretical work, I employ value chains and VCA.

Value Chain Analysis (VCA) is an analytical framework that seeks to understand how value is added to commodities as they progress through chains, or networks, of production. Value chains are defined as:

> the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use" (Kaplinsky & Morris 2001).

Analyzing value chains "provides researchers with a tool to ask important questions about the distribution of power and value across the chain and is therefore eminently capable of addressing the agency of workers and small producers (Coles & Mitchell 2011, 10). In this work, VCA guides the consideration, analysis, and organization of networks as they facilitate the flow of timber. In a related article on the network governance of the furniture value chain (FVC) in Jepara, Purnomo *et. al.* (2007) illustrate a network of teak production in northern Central Java in order to model teak production, sawmill value, and furniture production. This representation illustrates the many institutional actors that transform teak seed into furniture products. In a similar

manner, I use VCA to consider how seedlings are provided and selected and progress through the value chain until they are sold as timber. However, VCA in general does not provide a method to consider, organize, and analyze practices and relationships that function at each stage within the chain. To organize and analyze the performance of governance by and between actors, this text employs insights from governmentality.

Governmentality refers to how relationships are founded through the exercise of power, and it considers how the performance of these relationships forms subjects. Within governmentality, "analytics of power," "biopolitics," and "technologies of self" are particularly relevant to the literature on and analysis of natural resource governmentality (Rutherford 2007). These concepts (Table One) provide the analytical lens through which the practice of power within networks of timber production and forest governance is organized and performed. I use access theory to analyze the way in which analytics of power, biopolitics, and technologies of self contribute to timber production, and how the production of timber reflexively generates subjects and relationships.

AA draws upon a theory of access and considers what actors benefit from a resource, why they are able to do so, and how. Access, as defined by Ribot and Peluso, is:

> [T]he ability to benefit from things—including material objects, persons, institutions, and symbols. By focusing on *ability*, rather than *rights* as in property theory, this formulation brings attention to a wider range of social relationships that can constrain or enable people to benefit from resources without focusing on property relations alone (Ribot & Peluso 2003, 154).

Thus, access encompasses a range of benefits, or "bundles" of abilities (Ribot & Peluso 2003, 155-6.) Accounting for access helps determine how actors and institutions benefit from resources. In this case, AA helps determine how and why

Governmentality Strand	Definition	Application to STP
Analytics of Power	An analysis of how "power produces; it produces reality; it produces domains of objects and rituals of truth" and how "the individual and the knowledge that may be gained of him belong to this production" (Foucault 1995, 194)	1. To consider presuppositions and parameters within networks of timber production 2. To evaluate relationships between growers and patterns between grower and timber production variables
Biopower	The means by which regulation occurs through bodies, via the management of life (Foucault 1998). "[W]here concern for the conditions of the national population is subsumed under more intensified attempt to manage the planet's environment" (Darier 1999 in Rutherford 2007, 297).	1. To examine the methods and means by which grower populations are quantified 2. To understand the totalization and management of smallholder forests
Technologies of Self	How actors become certain types of subjects within the parameters of power relations (Foucault 1984)	1. To understand extent to which growers become regulated subjects through source documentation/timber legality verificaiton 2. To assess the manner in which growers seek to improve their position in the value chain through market knowledge

Table One: Strands of governmentality, definitions, and applications

certain actors and institutions are able to bring timber to market and how patterns of access might be shifting. Ribot and Peluso outline AA as:

> 1) identifying and mapping the flow of the particular benefit of interest; 2) identifying the mechanisms by which different actors involved gain, control, and maintain the benefit flow and its distribution; 3) an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived (Ribot & Peluso 2003, 161).

To this definition of AA, I add one more consideration in line with Ginger *et al*. (2012):

> 4) Assessing how biophysical preconditions direct benefit flow.

Mapping the flow of timber, identifying how smallholders benefit from this flow, and analyzing of power relations within timber production and forest governance guided my generation of primary. However, as Ribot and Peluso note:

> In using [AA] to guide empirically grounded analysis, it is important to concurrently examine the larger contexts of such political economic relations. Policies, markets, technologies, knowledge, and even identities constitute and are constituted by these broader social forces (Ribot & Peluso 173).

This thesis seeks to balance this localized focus of AA by attending to the broader relationships throughout the value chain, providing historical and national context to STP on Java, and assessing the importance of international and domestic policy. Thus, the nuanced and detailed information provided by AA is coupled with more general information from "broader social forces," to provide localized and applicable information.

Network governance and governmentality provide the overarching theoretical methodology for this text, while VCA and AA are the practical heuristics used to collect, organize, and analyze information. VCA organizes relationships of timber production in a vertical network or value chain. Different moments within the value chain are organized and analyzed through concepts of governmentality that consider the performance of actors and institutions that practice the art of forest governance. Both of these conceptual methodologies feed into AA, which is concerned with the flow of timber through different tiers of production as well as the horizontal organization of actors that compose those tiers. In order to gather the necessary empirical data, I brought the aforementioned theoretical methodology to bear upon particular data collection practices in northern Central Java.

2.2 The Field

[G]eographical difference is seen not to matter just for its own sake but also because it has constitutive effects on processes, rules and regulations that are 'stretched' over wide spans of space and time (Castree 2005, 541).

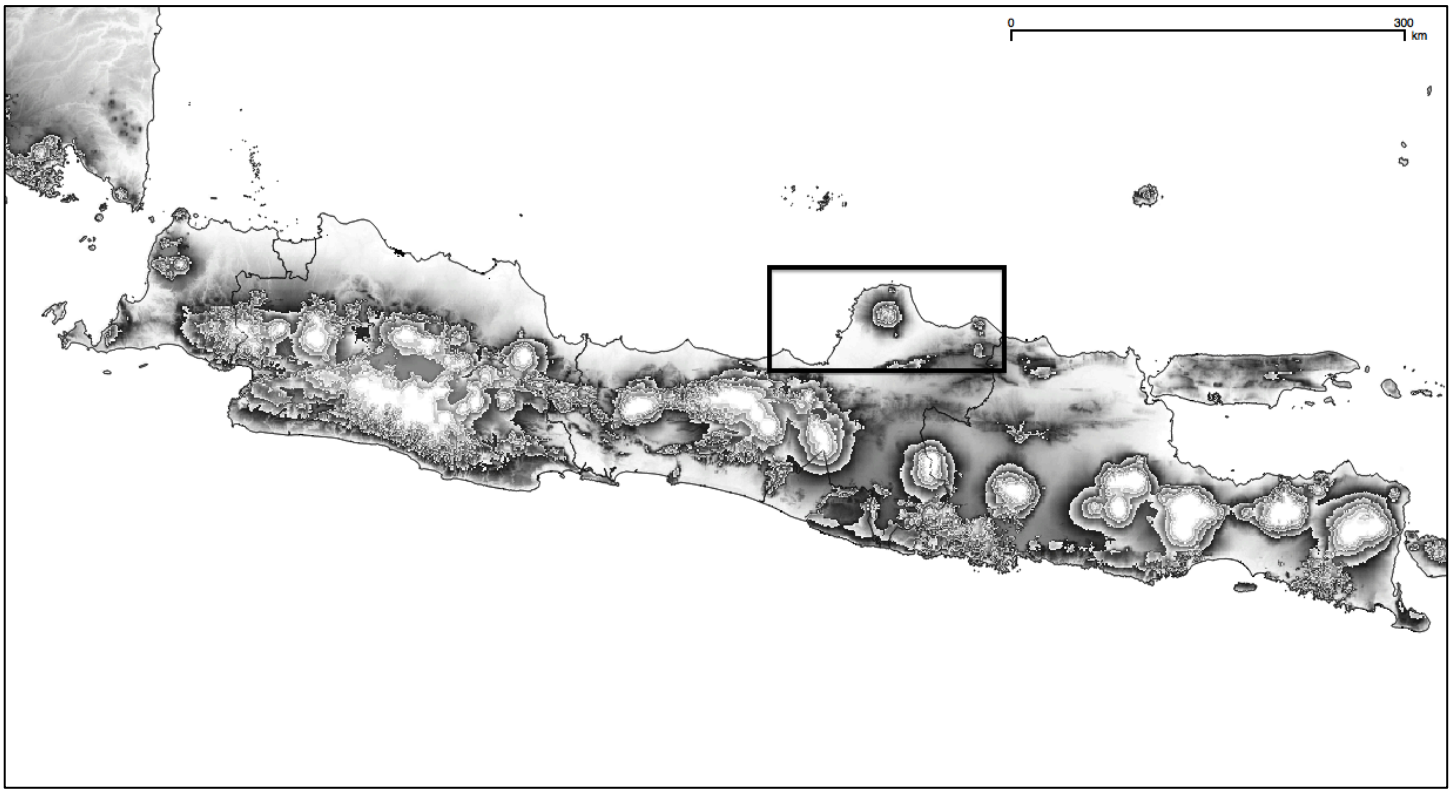

Figure One: The Muria peninsula within Java, elevation to 1400 m (Source: Author's own)

The field isn't simply a physical place apart. Rather, it represents a specific place and time where knowledge is "co-produced" amongst actors (Whatmore 2003), and it is a consistently recurring, conceptual entity that influences and comprises all parts of the research process via multiple "transformations" (Latour 1999). In this work, verbal exchanges and observations were translated to survey instruments, recording devices, statistics packages, and finally into the writing and analysis in this thesis. This sub-section details the locations where those original conversations and translations occurred and how location and time constituted research deliverables.

The Muria peninsula is the northernmost point of Central Java (Figure One), and is the geographical focus of my research. The Muria range dominates the peninsula and is composed of many minor peaks, the tallest of which is 1,602 m. The three regencies that compose the Muria peninsula have settlements from sea-level to approximately 1,300 m in elevation. I conducted fieldwork in Jepara and Pati, the two

northernmost regencies of the Muria peninsula, from October to December 2012. From October 5th to November 10th, I was based in Jepara, working from the village of Bugel. From November 11th to December 15th, I was based in Pati, working between the villages of Tlogowungu and Gunungwungkal. The time and place of these field sites are significant in how they structured my methodological approach.

In Jepara, I collected grower surveys, key-informant interviews, and field observations. To account for the diversity of production throughout Jepara, I collected 204 household surveys from 18 villages (Figure Two) with assistance from two enumerators employed by the Center for International Forest Research (CIFOR). In Jepara, I conducted twelve key-informant interviews with managers from the local forestry office (*Dinas Kehutanan*), *Perum Perhutani* (the state forestry company), NGO managers and employees, and village leaders. Field observations included private timber fellings with a timber middleman (*makelar kayu*); shadowing the regional *Perum Perhutani* office in Jepara; participating in a meeting held to assist furniture craftsman with certification procedures; and multiple trips to furniture production sites. The tradition of furniture production in Jepara, my association with and support from the CIFOR Furniture Value Chain (FVC) project, and the manner in which the furniture production drives demand for timber throughout Java shaped my research by highlighting tiers of production.

My fieldwork in Pati focused on conducting grower surveys in the sub-district of Gunungwungkal, and obtaining key-informant interviews and field observation in the regency capital (Pati) and in Gunungwungkal. Trees 4 Trees (T4T), a forestry NGO, supported my research in Pati through their Gunungwungkal office. In Gunungwungkal, I collected 100 household surveys in five villages (Figure Two) with

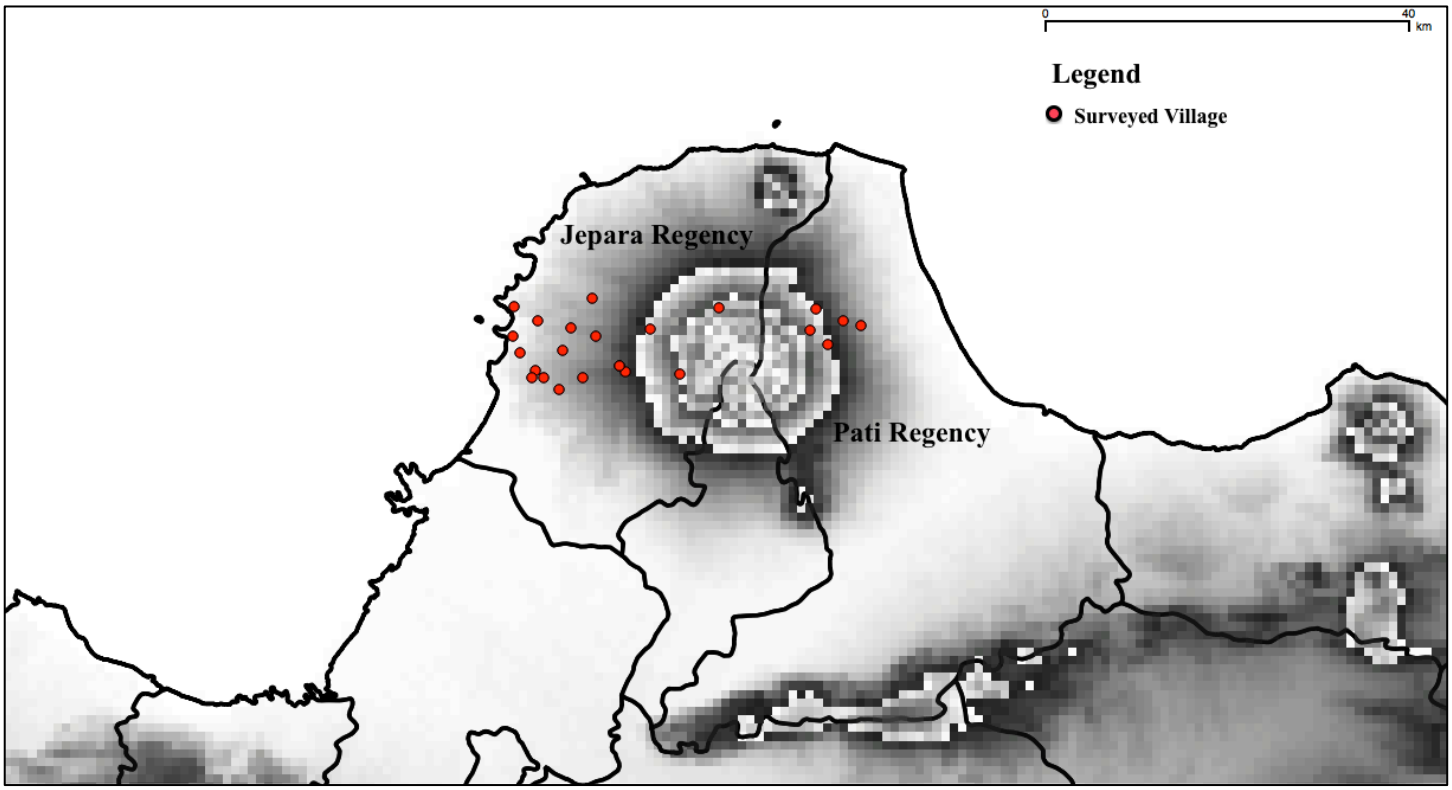

Figure Two: Villages surveyed in Jepara and Pati, elevation to 1400 m (Source: Author's own)

a team of two enumerators affiliated with T4T. In Gunungwungkal and Pati city, I collected nine additional key-informant interviews with managers from the local forestry office, *Perum Perhutani,* NGO managers and employees, and village leaders. My field observations included tree fellings with T4T staff and affiliated growers; farmer group meetings; *Perum Perhutani* office observations; and a patrol trip to a *Perum Perhutani* forest. As previously stated, this segment of my fieldwork was shaped by the different social groupings that form the basis for timber resource allocation and access to markets. I would drive by *Perum Perhutani* plantations, community forests, and private small-scale timber production daily. Keeping my methodology open to the field resulted in a focus on access to and associations between grower organization and timber production.

While my research remained open to the field, the methods through which I conducted household surveys, participated in field observations, and performed

interviews did not vary. The format and execution of these deliverables remained constant, permitting comparison across the two study sites.

2.3 Research Design

To generate data within my theoretical methodology, I used a variety of data generating techniques. The core inquiries with which I began my research include:

> 1. Organization: How are actors positioned in a network of timber production, if at all?
>
> 2. Access: How is this actor able to plant, grow, harvest, or otherwise benefit from timber or timber products?

In order to generate empirical information on these lines of interest, I employed a mixed methods that fuses intensive and extensive research.

"Mixed methods," in this text, refers to the combination of social and biophysical as well as extensive and intensive research. Combining extensive and intensive research methods provides qualitative and quantitative data within site-specific context. Extensive research pertains to methods, typically quantitative, that seek to identify trends in phenomenon of interest; intensive research identifies context dependent processes that nuance general trends or patterns (Gomez & Jones 2010, 67). In this thesis, extensive data collection refers to household-level grower surveys completed by small-scale, private timber growers. The purpose of this extensive data collection is to establish general tendencies within and among the study sites that can be used in further analyses or studies. Intensive research was conducted through key-informant interviews and field observations within case study sites. This intensive data collection provided direction, informed extensive data collection, and provided the nuance of location, culture, and time period. As stated in "Chapter One," this thesis finds its home within a practical political ecology. Thus, it falls into the general

category of political ecology studies that "apply results from household and community-based participant observation and formal surveys to address technical field practice by rural people, state and NGO actors, to inform policy and practice" (Roucheleau 2008, 718). Further information on the application of household surveys, key-informant interviews, and field observations complete this sub-section on research design.

2.3.1 Extensive Methods

I used grower surveys to generate quantitative information to categorize actors involved in timber production, to generate information on what timber they are producing, why, and how they gain market information. While totalizing data and analyzing it apart from context generates abstraction (Scott 1992), extensive information is valuable to this study for the patterns of timber production it produces and the ability for to be replicate it and include larger samples. This gives data from grower surveys particular relevance for considering policy objectives and potential outcomes.

2.3.1.1 Grower Surveys

The grower survey instrument was written and designed by consulting relevant literature, receiving input from numerous colleagues, and piloting the survey with enumerators. The general format for the grower survey in this study follows the CIFOR Poverty and Environment Network (PEN) instruments (PEN 2007). To answer the core question, "how are actors positioned in a network of timber production, if at all?" I generated information with growers on who they were within timber production networks (standard social variables, institutional affiliations, and yearly income recall), what they were growing (tree species, amount, and age), and why (value-based, market-knowledge, and constraint-focused questions). Appendix One provides a version of the survey instrument with translations. The overall format

and direction of the survey was a product of meetings with CIFOR scientists Herry Purnomo and Ramadhani Achdiawan and Dodik Nurrochmat from the *Institut Pertanian Bogor* (IPB). Further, survey instruments were field-tested and tweaked during two days of piloting with the four enumerators. When possible, we sought to elicit scaled variable responses. However, the instrument gathered a variety of variable types (scaled, ordinal, and nominal) that cover a wide range of categories.

The sampling method was based on the random selection of identified timber producers. This method provided the most efficient and direct means of collecting information on growers while permitting some randomization. I identified timber producers in Jepara and Pati using grower lists from the local forestry office (*Dinas Kehutanan*), *Perhutani*, and T4T. Villages were selected to represent a variety of elevations and land-cover types. In both sites, every third grower on the lists obtained from key-informants was selected as a participant. We reached the target for survey completion in Jepara (n=204) on November 15th, 2012, and the target for survey completion in Gunungwungkal (n=100) on December 15th, 2012.

I analyzed quantitative data using IBM's SPSS statistical package to run descriptive statistics, correlations, binary logistic regression, and one-way analysis of variance (ANOVA) with Tukey's post-hoc test. Each statistical analysis was selected depending on the types of variables being analyzed (nominal, ordinal, scaled), and the specific line of inquiry (Blalock 1981). Outputs for these statistical analyses comprise Annex One and Appendix Two. Their results are reported throughout the third and fourth chapters.

The surveys identified who is performing STP based on socio-economic indicators, what species of timber they are producing, what market knowledge they are pursuing and why. Data analysis provided measures of association between socio-

economic indicators, timber production, and market knowledge. Together, the extensive methods within this research provide patterns of STP within the sample of 304 growers surveyed throughout northern Central Java.

2.3.2 Intensive Methods

The intensive methods within my research made collecting grower surveys possible and informed the surveys with contextual information. Key-informant interviews provided access to grower lists, from which I randomly selected growers to survey. These interviews also provided valuable insight into STP and the production of timber products in northern Central Java.

2.3.2.1 Key-Informant Interviews

In order to gather information on where and how STP was being performed throughout northern Central Java, I conducted 21 semi-structured interviews from October 5th through December 15th, 2012. Key-informants served a dual purpose within my research: 1) They provided information on growers whom I was then able to randomly select for my grower surveys, and 2) They provided detailed information about the process of STP from a particular institutional perspective.

Key-informants served as gatekeepers (Hornsby-Smith 1993) for information on smallholder timber producers and other key-informants. While I began by selecting key-informants based on their position within specific institutions, the expansion of my informant base relied upon informants themselves. I gained access to all key-informants through mutual acquaintances; this act of snowballing promoted an atmosphere of trust with my interviewees (Silverman 2006). After explaining my research and objectives, I conducted a semi-structured interview and requested information on local timber producers and contact information for other knowledgeable informants.

My objective in conducting the semi-structured interviews was to understand the social construction and perceptions (MacNaughton and Urry 1998) of STP from specific institutional vantages. Semi-structured interviews promoted in-depth and contextual information generation with key-informants (Kvale 2007). I sought to interview a wide range of informants, based on their institutional affiliation (Table Two). These interviews provided information on what institutions were relevant to STP in northern Central Java and provided information about the institutions themselves.

Table Two: Key-informant by affiliation

Informant Affiliation	Number of Informants	Percentage
Academic	3	14%
NGO	7	33%
Local Forestry Office	3	14%
Perum Perhutani	3	14%
Village Leader	5	24%

All key-informant interviews were transferred to a single storage location, organized and tabulated by informant affiliation, and transcribed from audio file. However, because key-informant interviews were not used to draw out general patterns, they were not coded. Rather, they were used to nuance and inform the patterns observed from grower surveys.

Through key-informant interviews, I gained access to information on grower location and contact information for other informants while generating a more nuanced understanding STP in northern Central Java. While snowball sampling can result in potentially biased perspectives or information, I sought to counter this potential manipulation by pursuing a range of actors with different affiliations.

2.3.2.2 Field Observations

The field observations I formally completed between October 5th and December 15th varied depending on location. In Jepara, field observations revolved around different tiers within the furniture value chain. In Pati, field observations focused on grower technique, farmer associations, and NGO/grower relationships. In both locations, I was living with actors linked to timber production. In Jepara, I lived at the house of a furniture craftsman; in Pati, I stayed at a vocational farming school that grows timber and served as a meeting place for T4T meetings. These living arrangements provided daily opportunities to observe timber production. However, I use "field observations" to label those events when I made a concerted effort to record and document activities and practice using photographs, video, and notes.

Additionally, I use the term "field observation" to separate my observations from participant observation. The observations in this study were conducted in a short timeframe and captured specific events. In contrast, participant observation requires extended periods of observation that involve more than single, disparate events (Dewalt *et al.* 1998). Nevertheless, the field observations within my research promoted embodied and detailed information on practices within STP.

Field observations were transferred from notebooks and recording devices and compiled into single files. Much like the key-informant interviews, these observations were used to nuance patterns from grower surveys and relevant literature.

2.4 Ethics

Before entering the field, I gained clearance from the Central University Research Ethics Committee at Oxford University, and obtained permission to conduct research in Indonesia through the Ministry of Research and Technology (*Kementerian Riset dan Teknologi* – RISTEK). At the outset of each survey, interview, and

observation I explained my research and assured participants of full anonymity. My enumerators and I received informed consent—written or oral—from each participant in this research. While piloting and conducting surveys, conducting interviews, and record observations, I was aware of the issues Holloway (2002), Thrift (2003), and Whatmore (1997, 2003) discuss in relation to research conduct, identity, and the complex composition of the field.

2.5 Conclusion

The methods outlined in this chapter seek to obviate bias. However, implicating oneself in social research is considered unavoidable (Weber 1904). My research is constrained by the paradigms I have selected to guide my research (Guba and Lincoln 1994), my positionality within a different culture, my use of enumerators to assist with grower surveys, and by my understanding and usage of Bahasa Indonesia in generating information. While these limitations have influenced the information I directly or indirectly co-produced (Holstein and Gubrium 2004) with several hundred growers and over twenty key-informants, I employed mixed methods to provide well-rounded and informed data. Using grower surveys to establish general patterns within STP, and key-informant interviews and field observations to provide nuanced insight into the practices and institutions affiliated with STP, I provide a robust picture of the practices and patterns that direct, shape, and compose STP in northern Central Java. As a piece of social research, my thesis forms a reality (Law 2004), a reality I have labored to make as reliable as possible.

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CHAPTER THREE

SECURITY BEYOND THE POLITICAL FOREST: REGULATION, FORMALIZATION, AND SMALLHOLDER TIMBER PRODUCTION IN NORTHERN CENTRAL JAVA

James Erbaugh, Paul Jepson, Herry Purnomo, and Dodik Nurrochmat

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Abstract:

Forest Law Enforcement, Governance, and Trade (FLEGT) agreements between the EU and countries that grow tropical timber are set to complement, alter, or generate new regulatory mechanisms that seek to ensure the legality of timber products. These regulatory changes will affect specific policies and practices within timber production networks. Smallholder timber production (STP) in Indonesia will come under FLEGT regulation from January 2014. Using grower surveys conducted in the Jepara regency of Central Java (n=204), we generate information on who Jeparanese smallholders are, what they are growing, and why. We draw upon governmentality to understand how STP operates and how Sistem Verifikasi Legalitas Kayu (SVLK), the Indonesian method for timber legality verification, might further affect networks of STP. We find that current methods of resource provision, in addition to increased oversight of source documentation, are combining to increase formalization within STP to secure timber resources outside the political forests of Java. Attending to place-specific detail, we provide several insights for the optimizing implementation of SVLK regulation in Jepara.

3.1 Introduction

The changing nature of global forest governance is a dominant discourse in forest policy literature. While forest governance change is multifaceted, one component of the change in global forest governance is the shift toward "decentralized" and "devolved" forms of governance (Barr *et al.* 2006, Lemos & Agrawal 2006, Agrawal 2008, Colfer *et al.* 2008). This shift involves "lower level authorities and non-state actors such as market actors, communities, NGOs, and citizens . . . in order to increase the effectiveness, quality and legitimacy of decisions and guarantee sustainable development" (van Heeswijk & Turnhout 2012). Forest legality verification, as it combines with national and local institutions in Indonesia,

may be able to embrace a shift toward "decentralized" regulation while simultaneously promoting values from the international forest policy agenda.

Forest legality verification represents the most recent in a line of initiatives to promote the "good governance" of Indonesian production forests. Since the 1992 Rio Earth Summit, nations have sought to work together to formulate mechanisms and agreements to promote the sustainable management of international forests. In Indonesia, Reduced Impact Logging, the National Forest Programmes, and the Integrated Conservation and Development Project were implemented throughout the 1990s. Following these programs that are largely considered less than effective (Wells *et al.* 1999), non-state market driven (NSMD) certification schemes sought to use global markets to circumvent domestic institutions and implement concepts of "good forest governance," as defined by third party certifiers (McDermott 2012). A longstanding complaint of many NSMD certification schemes is that they inadequately bridge the gap between the global north and south; comprehensive standards and wide-ranging implementation occurs in the north but has not been as widespread in the south, restricting market access for tropical timber (Hihgman and Nussbaum 2002, Ebeling and Yasué 2009, Marx and Cuypers 2010). Forest Law Enforcement and Governance (FLEG) initiatives, developed through the EU but significant for compliance with the US Lacey Act, began with a focus on strengthening domestic institutions of tropical countries. However, without market incentives, the benefit of FLEG was unclear (McDermott and Lesniewska 2012). Thus, FLEGT— "T" standing for "trade"—seeks to incent internationally approved timber legality regulation proposed and implemented by timber producing countries in order to gain continued access to European and American markets (EU 2011). This combination of internationally approved voluntary partnership agreements (VPAs)

that specify regulatory mechanisms and institutional function within countries that produce tropical timber has garnered considerable international attention, legitimacy, and approval (Cashore and Stone 2012).

Recent literature concerning FLEGT in Indonesia has focused primarily on the policy instrument itself. This literature considers the method by which the Indonesian VPA has developed (van Heeswijk and Turnhout 2012), perceptions of the VPA (Wiersum and Elands 2012), and general difficulties it will face (McDermott and Lesniewska 2013, Obidzinski *et al*. 2012). While this literature is essential for understanding the development and articulation of the Indonesian VPA, it rarely considers local practices and networks that bring timber to market, and that will be affected by FLEGT. Implementing timber legality verification in Indonesia will occur amid active networks of timber production and pre-existing forest policies. Considering pre-existing and contemporary policy and timber production networks and paying attention to place-specific detail is important for understanding how a policy instrument might promote change (McDermott *et al.* 2009). In this chapter, we consider the interplay of domestic forestry institutions, timber regulations, and smallholder timber production (STP).

Specifically, we consider general trends of Javanese forest production alongside STP and FLEGT regulatory requirements. To provide regional understanding of STP, we use a grower survey disseminated in northern Central Java (n=204) to generate information on grower socio-economic status, institutional affiliations, and market knowledge. We then elucidate the current method of source verification for STP, and how this policy will combine with SVLK regulation. The thrust of current policy, the increased entanglement of STP and formal institutions, and the projected reach of SVLK regulation reveal a concerted turn toward seeding,

quantifying, and regulating STP by the Indonesian government.

This chapter contains six sections. In this section, we introduce FLEGT, STP, and the focus of our work. The second section provides background on forestry in Java, the importance of STP on the island, and the current status of the Indonesian VPA. In the third section, we describe our fieldwork methodology and our method for understanding the changing regulatory frameworks for private Javanese forests. The fourth section focuses on the results from our grower surveys and policy analysis. In the fifth section, we use strands of governmentality to discuss our findings. We conclude our study in the sixth section, focusing on the limits, further areas of inquiry, and findings of our work.

3.2 The Javanese Context

Examining the interplay of policy with local practice requires a regional focus. As our general region of interest, Java (Figure One) is of great political and economic importance within Indonesia. It contains approximately 60% of the Indonesian population (Singer 2009), and the production forests of Java contribute to the livelihoods of millions of Indonesians.

3.2.1 Javanese forestry and the rise of smallholder timber production

Legally sanctioned state control of Javanese forests began with political territorialization of land during the Dutch colonial period. The *Domeinverklaring* (Domain Declaration) within the Agrarian Law of 1870 stated that all "unused" land on Java and Madura was "under the direct proprietary jurisdiction of the colonial state," a claim which marks the beginning of political forests on Java (Peluso and Vandergeest 2001, 775). The claim over political forests was reaffirmed by the 1945 Indonesian Constitution (Article 33(3)); the Basic Agrarian law (5/1960) which

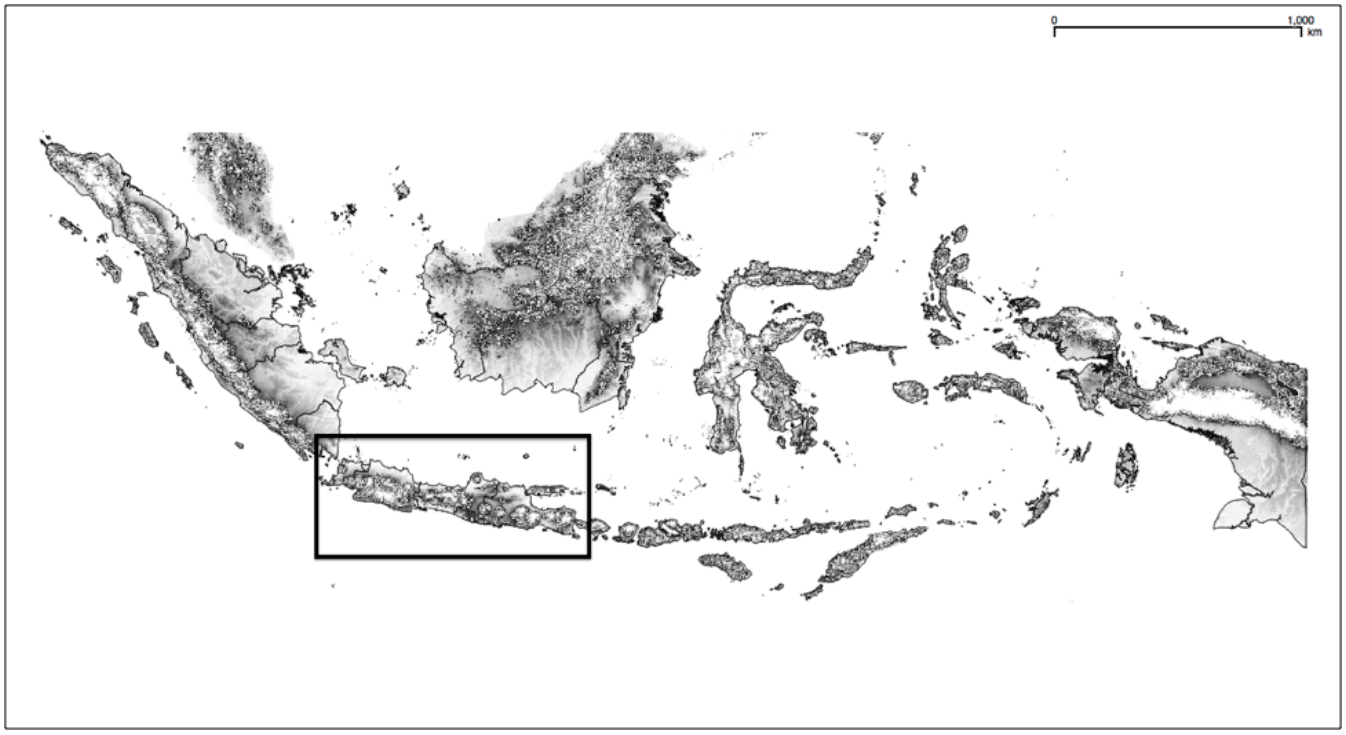


Figure One: Java's location in Indonesia (Source: Author's own)

provided a single framework for dealing with land issues; the 1967 Forestry Law which set up a parallel and vertically integrated set of legal and institutional arrangements for lands classified as 'forest areas' (Affif *et al.* 2005).

A state forest company, *Perum Perhutani*, was established to manage state forestlands (Ministry of Forestry Regulation No. 15/1972). The Ministry of Forestry (MoF) control over Indonesian forests was reestablished in 1999 (Law No. 42/1999), and *Perhutani*, in accordance with Regulation No. 72/2010, currently manages the production of Javanese political forests. *Perhutani* operates with the mission:

> To manage forest resources with the principles of sustainable management based on regional characteristics and the watershed carrying capacity, increasing the benefits of timber and non-timber product forests, ecotourism, ecosystem services, agroforestry and the potential for other forest-based business to ensure sustainable company growth" (Perum Perhutani 2011a).

Perhutani operates within the most economically significant areas of the Javanese political forest, an area approximately 19% (2.4 million hectares) of the land area of Java. The state forest company employs approximately 341,000 people throughout the

island (Perum Perhutani 2011b) and is surrounded by approximately 6,300 forest villages, settlements that are adjacent to and derive some economic benefit from timber and non-timber products (Susilawati and Esariti 2007 in Peluso 2011). It pursues this mission through the control of trees, labor, and territory of its Javanese land holdings (Peluso 1992). The political reality of forest on Java arises from the interaction between the practices and actions of *Perhutani* employees and activities of resistance by forest villagers to official forest lands. The interaction between modes of state forest management and resistance to state management has led to a significant decrease in timber available from Javanese political forests.

The large amount and high value of timber on the *Perhutani* estate, large populations of rural and often landless laborers on Java, and fissures of social unrest resulting in diminished state control over timber resources have led to repeated instances of theft and forest sabotage (e.g. Peluso 1992, Colchester 2002, Barr *et al.* 2006, Singer 2008). Theft and sabotage, coupled with a comparative increase in *Perhutani* timber harvest (Soedomo 2010), have resulted in an alarming depletion of SFC timber stock. Currently, the age and amount of standing stock available for harvest from SFC lands is not sufficient to meet the demand for timber on Java. Modeling the future of teak (*Tectona grandis*) supply on Java, Purnomo writes:

> At the model's beginning Perhutani's 450,000 m^3 of logs dominate the log market, followed by 400,000 m^3 of agroforest logs, 190,000 m3 of outer islands logs and 140,000 m^3 of illegal logs. Due to illegal logging, however, Perhutani's logs will contribute only 20,000 m^3 in the future[3], while logs from agroforest will dominate the market . . . . Under the current circumstance community agroforest will replace Perhutani in domination of teak log supply" (Purnomo *et al.* 2009, 1396).

Though this model represents only one possible outcome based on best available data,

[3] This research models 100 years, though the sharpest declines in SFC teak production occur within the first thirty years (Purnomo *et al.* 2009, 1397).

the forecast of decline in available *Perhutani* teak is becoming widely acknowledged (Affif *et al.* 2005, Astraatmaja 2008, Peluso *et al*. 2008, Purnomo 2009, Soedomo 2010). Given that teak represents 61% of the SFC's planted estate and accounts for approximately 50% of its revenue (Soedomo 2010), there is ample reason to assume that *Perhutani* will see a decrease in its timber production and profits. This compounds the demand-supply gap that has led to illegal logging and plagued forest governance in Indonesia. To combat illegal logging, illegal timber trade, corruption, legal uncertainty, and poor law enforcement that can be tied to this demand-supply asymmetry, there has been a focus on "stepping up forest law enforcement operations . . . listing illegal logging as a predicate crime under anti-money laundering legislature and signing bilateral coordination agreements" as well as promoting smallholder and large-scale plantations throughout the archipelago (Tacconi *et al*. 2004, Setiono and Hussein 2005, Jurgens 2006, in Obidzinski and Dermawan 2010). As a result of the growing demand-supply gap, STP on Java has become increasingly important.

In this text "smallholder" refers to growers who plant, manage, and/or harvest trees for personal benefit from non-state lands. Typically, smallholders plant production forests on a smaller scale than industrial forestry (Byron 2001). It is estimated that approximately half of the timber products exported to the EU come from small and medium enterprises (SMEs) that source timber from over a hundred thousand forest owners throughout the island (TFT 2012). In Central Java, STP is of utmost importance, generating more timber than the networks that begin in political forests managed by the SFC (Table One).

Table One: Smallholder Timber Significance in Central Java

	2009	2010	2011
Smallholders (m3)	1,244,641	824,897	1,355,599
% of Total	84.1%	74.0%	82.0%
SFC (m3)	211,738	289,462	301,215
%	14.5%	26.0%	18.2%
Total	1,456,379	1,114,359	1,656,814

(Source: Obidzinski 2012, 7)

However, unlike those channels that direct the flow of timber from the political forests on Java, STP networks are highly flexible, variable in time and place, and do not operate under the same regulations that *Perhutani* timber does (Irawati *et al.* 2009). Further, *kayu kampung*, literally "village wood," is often small and less mature than *Perhutani* wood, and is a cheaper alternative. While STP and state timber production differ widely, they are linked in multiple ways. First, illegal timber within STP networks is largely harvested from political forests. Second, securing timber resources outside political forests rests on continued and legally sourced STP. And third, the proposed system of regulation within the Indonesian VPA uses the same regulatory process for STP and industrial, state-managed timber production.

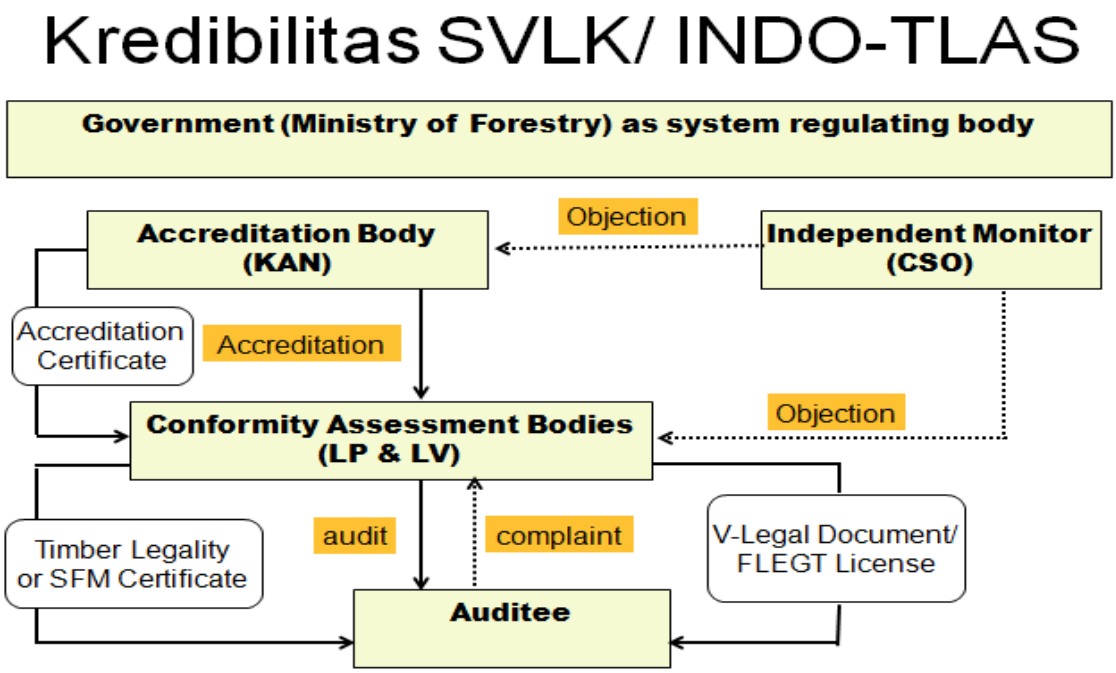
3.2.2 FLEGT, the Indonesian VPA, and looking ahead

The goal of the 2003 FLEGT Action Plan was to foster global sustainability and good governance by providing a means to stop illegal timber products from entering the EU market. Voluntary Partnership Agreements (VPAs) are bilateral agreements between the EU and producer states that export tropical timber and timber products to "ensure that the timber and timber products imported into the EU are produced in compliance with the laws and regulations of the partner country" (EU 2011, 1). VPAs ensure that exports from producer countries are not limited or stalled

by the EU Timber Regulation, effective since March 2013 (Obidzinksi *et al.* 2012). Producer nations must, according to the VPA, develop a timber legality verification system that both bodies—the EU and the producer country—agree upon by signing and ratifying of the VPA (EC 2008). Indonesia's verification system, the *Sistem Verifikasi Legalitas Kayu* (SVLK), was implemented through the Ministry of Forestry Regulation No. P38/Menhut-II/2009. At the time of writing this article, signing the VPA had been delayed twice in 2012 and several times in 2013, though the MoU for the VPA was signed in 2011 (Lubis 2013, 3). A team of four independent consultants is evaluating the extent to which the SVLK program meets VPA standards (EU FLEGT 2013). Thus, while capacity building for SVLK regulation has been active since 2009, the EU is yet to officially accept this method. Despite these difficulties, SVLK certification is scheduled to be mandatory for all producers in 2014 (MFP 2013, Obidzinski *et al.* 2012).

The Indonesian VPA aims to ensure timber legality and sustainable forest management by establishing a hierarchical auditing framework, overseen by the Ministry of Forestry (MoF). Accreditation bodies provide training and certification for Conformity Assessment Bodies, which in turn provide the required V-Legal certification for source documentation under SVLK, or a sustainable forest management (SFM) certificate, which automatically renders the business SVLK compliant (Figure Two). Independent monitors function as watchdogs, and consist of various institutions and actors within civil society, including NGOs, individuals, associations, and organizations. The price for V-Legal certification ranges from IDR 30 – 114 million ($3,000 – 11,000) depending on the type of business being certified, its size, and location (Ministry of Forestry 2010). Processes and time periods for re-audits and certification renewal are yet to be agreed upon (Obidzinski *et al.* 2012).

Figure 2: Pathway for SVLK Regulation (Source: Minangsari 2013, 9)



While the Indonesian VPA demonstrates a willingness to address legality within the timber sector and represents a hallmark of civil society participation in policy formation, SVLK regulation is most conducive to certifying big timber interests and provides significant certification barriers for SMEs that link STP and global markets (McDermott and Lesniewska 2012, Nurrochmat and Yulianti 2013). First, there is a considerable lack of knowledge about SVLK regulation amongst small and medium enterprise owners and smallholder timber producers. Even in areas that have experienced significant capacity building via test-projects for SVLK certification, those producers and consumers of domestic timber products have little interest in pursuing SVLK certification (Nurrochmat & Yulianti 2013, 20). Second, the comparative benefit of receiving SVLK certification seems minimal compared to the time and money such certification requires. While SMEs can band together and receive funding for SVLK certification, they must self-organize, trace supply routes, and find growers willing to become certified; if any one of the multiple enterprises is found to be non-compliant, all enterprises lose their certification (Kaye 2013). From

the growers' perspective, complying with the regulation may not be appealing, considering many smallholders use timber crops to supplement their income (Dharmawan *et al.* 2012 in Obidzinski *et al.* 2012). Finally, auditing resources are limited. While multiple organization—the MoF, WWF, and FAO among them—seek to establish more resources for smallholder certification, industrial timber plantations have received more attention and certification than SMEs, perhaps due to a more straightforward certification process and greater economies of scale for export and trade for these large operations (McDermott and Lesniewska 2012, Obidzinski *et al.* 2012, Wiersum and Eland 2012).

While SVLK regulation represents a variety of benefits for the Indonesian state, it remains to be seen how it will interact with STP. Curbing illegal timber production, ensuring continued access to foreign markets, and securing resources beyond the political forest demonstrate that domestic appeal of SVLK certification for the Indonesian state. However, the significance of STP and the difficulty in regulating the flexible networks on which it depends provides an interesting foil to the benefits of regulation through FLEGT requirements. To understand how STP is practiced, how it is changing, and what may continue to change, we consider localized timber production and policy realities.

3.3 Methods

Following Singer (2008, 2009), we understand policy and practice as co-constitutive. Therefore, we examine policies that affect STP and how practices of STP prompt policy. The two aspects of STP we examine here are: 1) The planting, growing, and harvesting timber crops, and 2) The source documentation, certification, and actions of regulation. To understand the iterative relationship between policy and

local practice within both of these steps, we garner data from grower surveys conducted in the Central Javanese regency of Jepara, and we consider domestic forest policy that regulates STP on Java. Through these methods, we provide information on how smallholder timber is produced and how it is—and is proposed to be—regulated.

3.3.1 Surveying local practice in Jepara

The regency (*kabupaten*) of Jepara is located in northern Central Java, on the eastern side of the Muria peninsula. It is the northernmost province of Central Java, and extends to the Karimunjawa Islands in the Java Sea. Comprised of sixteen sub-districts (*kecamatan*), Jepara is home to approximately 1,124,203 people (Kabupaten Jepara 2011). Within Jepara we surveyed growers from 18 villages (Figure 3)

We selected Jepara as the location to disseminate our grower surveys and conduct key-informant interviews because of the importance and prevalence of timber production within the regency (Roda *et al.* 2007, Purnomo *et al.* 2011a), its significance to the timber products industry throughout Central Java (FVC 2008, Purnomo *et al.* 2011b), and the availability of project staff to coordinate survey distribution.

We conducted surveys using a purposive, random sampling framework that relied upon grower lists obtained through key-informant interviews and field observations. We identified key-informants through local institutions, and conducted semi-structured interviews with district forestry managers (*Dinas Kehutanan*), *Perhutani* officials, and forestry focused NGO employees. Further, we made three field visits to observe the felling and transportation of smallholder timber. By conducting these interviews and field observations, we obtained information on STP and regulation while also determining which villages contained smallholder timber producers. We then obtained lists of smallholders from Village Heads (*kepala desa*),

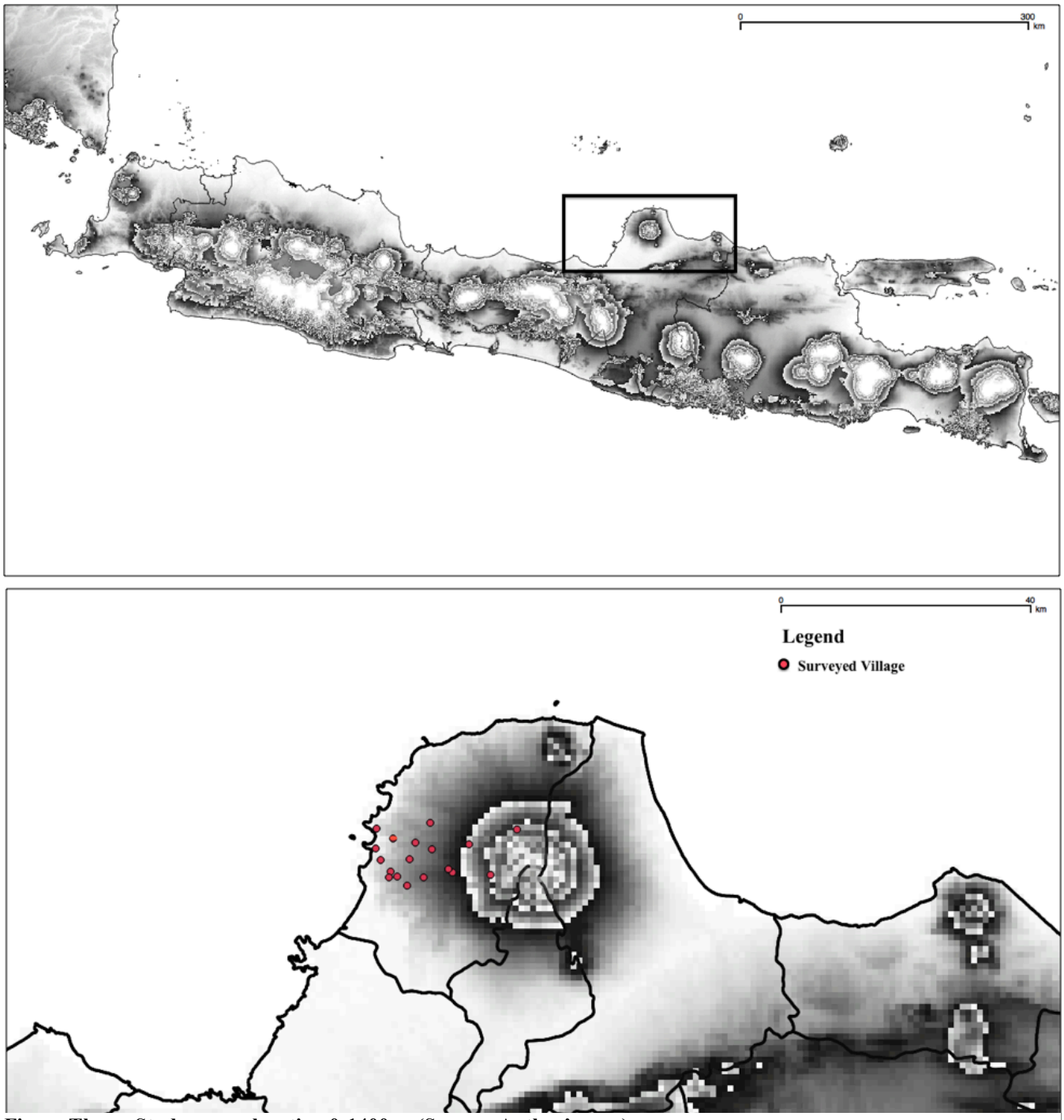


Figure Three: Study area, elevation 0-1400 m (Source: Author's own)

the NGO Trees for Trees (T4T), *Perhutani*, and the local forestry service. From these lists, we randomly selected individuals to survey.

Grower surveys were adapted from the Center for International Forest Research (CIFOR) Poverty and Environment Network survey method (PEN 2007) and elicited socioeconomic, institutional affiliation, timber holdings, and market knowledge information from growers. Sections included: "Location," "Social

Information," "Timber Crops," "Yearly Income Recall," and "Market Knowledge/Grower Values." All surveys were conducted in Javanese or Bahasa Indonesia by an author or one of two trained enumerators. Surveys were piloted for two days, reviewed by four academics (two Indonesian, one British, one American), and checked by three project managers at CIFOR.

To analyze grower data we used a combination of statistical tests. Descriptive and frequency statistics describe socioeconomic, institutional affiliation, timber production, and market knowledge data. We tested for significant association between scaled socioeconomic and timber production variables using Pearson binary correlations.

3.3.2 Regulation overview

Two shifts in the forest policy landscape signal changes for STP within Indonesia. The VPA between Indonesia and the EU commits Indonesia to a set of regulatory mechanisms and third party oversight aimed at source verification to combat illegal logging and prepare for a smooth transition to an EU market under the control of the EU Timber Regulation. However, this agreement is built upon a long history of forest policy. The current precedent for the regulation of STP seeks to enforce source documentation through transportation permits for all timber produced from private lands (Minister of Forestry Regulation No. P.30/MENHUT-II/2012). Thus, we consider the current regulations for source documentation in light of information gleaned from key-informant interviews, seeking to understand how these regulations currently affect, and will affect, smallholder timber producers.

3.4 Results

The following results are a product of 204 grower surveys from 18 villages in four sub-districts throughout Jepara regency and twelve key-informant interviews (Table Two).

Informant Affiliation	Number of Informants	Percentage
Academic	3	25%
NGO	3	25%
Local Forestry Office	2	17%
Perum Perhutani	1	8%
Village Leader	3	25%

Table 1: Key-informant affiliation

3.4.1 Socio-Economic Information

Respondents were predominantly male (88.2%), with an average age of 48.86 years, average household size of 4.42 persons, and 6.9118 years of education. 54.4% of respondents reported affiliation with a local farmer's group, and 33.3% of respondents reported that they had received training in growing timber crops.

The livelihood of respondents varied, with 28.4% of respondents listing agriculture (livestock and/or crop) as their primary occupation, 16.7% indicating they were salaried as teachers or government officials, 7.8% listing rented farm-labor as their major source of income, 32.8% listed private business or employment as their major source of income, and 13.4% indicated that they received the majority of their income from other sources. 47.5% of respondents were involved in the furniture value chain beyond producing or selling timber. 57.4% listed agricultural production as a secondary form of income, 1.5% listed salaried, 7.4% listed rented farm-labor, 5.9% listed private business, 1.5% listed a form of income not captured by the survey question, and 14.2% of respondents listed no secondary source of income.

The average yearly income for respondents was 46.89 million IRP ($4,735.45), with a standard deviation of 75.85 million IRP ($7,661.31). The median average yearly income was 26.83 million IRP ($2,709.33); data for annual income had a skewness of 6.119 (std error .170). Further detail for descriptive socioeconomic information is in Table Three.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	202	25	74	48.86	10.324
Size of Household	197	1	12	4.42	1.597
Years of Education	204	0.00	16.00	6.9118	3.30428
Total Land (m3)	204	83	80000	3730.57	6660.586
Total Trees	204	1.00	30000.00	754.8824	2823.39610
Total Teak	204	0.00	6000.00	130.5931	559.93461
Total Mahogany	204	0.00	6000.00	91.5000	493.20350
Total Sengon	204	0.00	30000.00	521.6324	2555.85643
Number of Known Purchasers	202	0	8	2.88	.955
Yearly Income (IRp)	204	2900000	728500000	46885644.61	75854734.026

Table Three: Socio-economic characteristics of Jeparanese growers

3.4.2 Resource Provision and Timber Production

Respondents account for 151,891 trees planted over 761,037 m^3, with an average plot size of 3,730 m^3 and a median plot size of 2,300 m^3. Timber aged one to five years accounted for 76.0% of the total crop represented in the sample. Timber six to ten years accounted for 22.5%, eleven to fifteen years 1.27%, and over sixteen years accounted for .25% of the total crop. 33.3% of respondents were growing teak (*Tectona grandis*), 35.2% were growing mahogany (*Swietenia macrophylla*) and 72.0% were growing sengon (*Paraserianthes falcataria*). These three species accounted for 80.0% of all trees within the sample.

While a variety of sources provide seedlings to growers (Table Four), the vast majority of growers self-finance their timber crops. 71.2% of growers had self-financed some of their timber crop, with 62.3% receiving seedlings from the local forestry office (*Dinas Kehutanan*) *Kebun Binit Rakyat* (KBR) programs, 36.9% purchasing seedlings from *Perhutani*, and 33.4% receiving resources from T4T.

Table Four: Affiliation frequencies of Jeparanese growers

Affiliation	Frequency	Percent	Valid Percent
T4T	6	2.9	2.9
KBR	4	2.0	2.0
Perhutani	2	1.0	1.0
Private Purchase	44	21.6	21.6
T4T, KBR	9	4.4	4.4
T4T, Perhutani	1	.5	.5
T4T, Private Purchase	22	10.8	10.8
KBR, Perhutani	30	14.7	14.7
KBR, Private Purchase	30	14.7	14.7
Perhutani, Private Purchase	2	1.0	1.0
T4T, KBR, Perhutani	5	2.5	2.5
KBR, Perhutani, Private Purchase	24	11.8	11.8
T4T, KBR, Private Purhase	14	6.9	6.9
T4T, KBR, Perhutani, Private Purchase	11	5.4	5.4
Total	204	100.0	100.0

Using Pearson correlation coefficients (Table Five), we tested for significant relationships between socioeconomic variables and timber production variables. We found significant positive relationships between total land owned and total trees planted (r=.778, p<.001, n=204) and sengon planted (r=.806, p< .001, n=204); years of education and tree total (r=.238, p<.01 , n=204), teak planted (r=.175, p<.05, n=204) mahogany planted (r=.204, p<.01 , n=204), and sengon planted (r=.188, p<.01, n=204); and yearly income and trees planted (r=.219, p<.01, n=204), teak (r=.421, p<.001 , n=68), and mahogany planted (r=.495, p<.001, n=204).

3.4.3 Market Knowledge and Grower Values

Survey respondents indicated that they largely sell to local timber middlemen (*makelar kayu*). 68.1% of respondents indicated that this is who they have sold and plan to sell their timber to, with 17.6% indicating that they plan to sell to a middleman from another village, 13.7% indicated that they were unsure or unwilling to say to whom they would sell their timber, and no respondents indicated that they do or plan

Table Five: Pearson correlations of Jeparanese growers

		Age	Years of Education	Total Land (m3)	Yearly Income (Irp)	Total Trees	Total Teak	Total Mahogany	Total Sengon
Age	Pearson Correlation	1	-.331**	.018	.021	-.034	.123	.133	-.093
	Sig. (2-tailed)		.000	.797	.764	.632	.082	.060	.189
	N	202	202	202	202	202	202	202	202
Years of Education	Pearson Correlation	-.331**	1	.178*	.137	.238**	.175*	.204**	.188**
	Sig. (2-tailed)	.000		.011	.051	.001	.012	.003	.007
	N	202	204	204	204	204	204	204	204
Total Land (m3)	Pearson Correlation	.018	.178*	1	.081	.778**	.122	.122	.806**
	Sig. (2-tailed)	.797	.011		.249	.000	.083	.082	.000
	N	202	204	204	204	204	204	204	204
Yearly Income (Irp)	Pearson Correlation	.021	.137	.081	1	.219**	.421**	.495**	.055
	Sig. (2-tailed)	.764	.051	.249		.002	.000	.000	.437
	N	202	204	204	204	204	204	204	204
Total Trees	Pearson Correlation	-.034	.238**	.778**	.219**	1	.406**	.415**	.933**
	Sig. (2-tailed)	.632	.001	.000	.002		.000	.000	.000
	N	202	204	204	204	204	204	204	204
Total Teak	Pearson Correlation	.123	.175*	.122	.421**	.406**	1	.820**	.067
	Sig. (2-tailed)	.082	.012	.083	.000	.000		.000	.340
	N	202	204	204	204	204	204	204	204
Total Mahogany	Pearson Correlation	.133	.204**	.122	.495**	.415**	.820**	1	.087
	Sig. (2-tailed)	.060	.003	.082	.000	.000	.000		.218
	N	202	204	204	204	204	204	204	204
Total Sengon	Pearson Correlation	-.093	.188**	.806**	.055	.933**	.067	.087	1
	Sig. (2-tailed)	.189	.007	.000	.437	.000	.340	.218	
	N	202	204	204	204	204	204	204	204

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

to sell to a middleman working for a factory. Growers indicated they knew multiple middlemen to whom they could sell their timber. The average number of middlemen growers knew was 2.66, with 50% of all growers knowing three or more middlemen. Respondents overwhelmingly replied that they are paid in cash for their timber, with 99.0% receiving monetary payment and 1% receiving payment through other goods or services.

Growers received information largely through the middlemen to whom they sold their timber. 49% of growers responded that the buyers were the main way in which they learned of normal prices. 38.7% responded that they would sell for whatever they wanted or needed at the time. 8.3% said that they discussed fair prices with other growers, and 2.0% indicated that they use their mobile phone to check or discuss current timber prices.

98.5% of growers responded that they were growing trees for profit, with 78.4% of respondents indicating that they were anticipating short-term (less than five years) and long-term (over five years) economic returns. 16.7% indicated they were

solely anticipating long-term returns, and 3.4% were only anticipating short-term benefits.

3.4.4 Current regulation of smallholder timber production

Networks for STP are governed largely at the village level. Village or community officials approve the sale of timber from their villages, verifying the legality of the transaction and the source of the felled trees. Most recently the Ministry of Forestry Regulation No. P.30/MENHUT–II/2012 sets out the required forms and appropriate transactions for selling from private or community forests. Key-informants indicated that this system is subject to alteration within the regency.

MoF Reg. No. P.30/MENHUT –II/2012, approved July 20th, 2012, requires different legality verifications depending on the timber product and its origin. This regulation streamlined legality verification by removing an additional barrier for smallholders producing mahogany and teak timber (the *Surat Keterangan Sahnya Kayu Bulat/SKSKB Cap Kayu Rakyat* or Log Validation Certificate for community timber) that was meant to distinguish *Perhutani* timber from non-*Perhutani* timber (Nurrochmat & Yulianti 2013). MoF Reg. No. P.30/MENHUT-II/2012 requires either a distribution note, a self-usage distribution note, or a timber origin certificate (*Surat Keterangan Asal Usul Kayu* - SKAU) accompany all timber produced outside *Perhutani* land. Distribution notes are used for certain kinds of low-value tropical timber, self-usage distribution notes are used for community rights forests or public facilities outside *Perhutani* territory, and timber origin certificates are required for the distribution of timber not defined within distribution of self-usage distribution notes (Table Six). Each note is subject to approval by the elected Village Head or, in lieu of a

Name of Verification	Species Based	Territory Based	Used For	Administrative Oversight
Distribution Note (INDO)	YES	NO	Timber From: Cempedak, dadap, duku, guava, jengkol, coconut, harp, walnuts, mango, mangosteen, melinjo, jackfruit, rambutan, randu, oil-palm, sapodilla, breadfruit, trembesi, waru, rubber, jabon, albizia, petai	Report to Village Head Self-Completed transportation document Six Copies for: timber transport, District/City Head, Forest Product Archives, Province Head, Council Head, and Archive Publishers
Self-Usage Distribution Note (INDO)	NO	YES	Public Facilities not including:	Self-completed transport document One copy to accompany sold timber
Timber Origin Certificate (Surat Keterangan Asal Usul Kayu –SKAU)	YES	YES	All timber not found within the Distribution Note and not found on public facilities noted in Self-Usage Distribution Note	Report to closest Village Head/Forest Official who has been certified for SKAU approval Must report total timber, pass physical examination of timber, and complete Location Verification form SKAU requires serial number upon publication Six Copies for: timber transport, District/City Head, Forest Product Archives, Province Head, Council Head, and Archive Publishers

Table Six: SKAU regulation requirements

Village Head certified in providing physical assessments of timber and lumber, a local forestry official.

While Regulation No. P.30/MENHUT –II/2012 lays out a method for providing source verification, transportation documentation, and proof of sale, it must be noted that a great deal of smallholders—whether they are growing, felling, or selling timber—operate outside the formal channels put forth in this regulation. Key-informant interviews with village leaders and NGO employees indicated that a variety of smallholder timber production operates within the *kecamatan*, or sub-district level, and is rarely accompanied by SKAU documentation. Two separate field observations of felling, transporting, and re-selling roundwood from smallholder plots add credence to this finding, as no permits accompanied timber sold directly to local

craftsmen, local sawyers, or timber middlemen. Further, 83% of key-informants indicated that the SKAU document procedure, when followed, is often accompanied by rent-seeking behavior, often in the form of monetary or goods-based (i.e. cigarettes) bribes.

3.5 Discussion

Our results demonstrate that STP in northern Central Java is formalizing and can be projected to continue formalizing through SVLK regulation. Formalization is the extension of official and regulated practices and technologies into new realms of production. It is a process that increases the entanglement of production with state institutions, actors, and processes. To discern where it falls within the continuum of informal to formal, an economic activity can be characterized along two dimensions:

> 1. The extent that it interacts with, or comes into the net of, the structures of official governance at the national or local levels.
> 2. The extent to which an activity and the interactions among its constituent individuals are structured according to a predictable, though not necessarily a codified, framework (Guha-Khasnobis *et al.* 2006, 6 and 16).

When an activity becomes increasingly formalized it comes into greater contact with ensembles of official governance structures and practices and/or increases in predictability and decreases in flexibility. Our results indicate that resource provision and SVLK regulation are two methods by which STP is being pulled along the continuum of economic practice toward formalization.

To understand how STP is becoming increasingly formalized, we answer Winkel's call to combine Foucauldian critique with quantitative data and policy analysis (2012). Specifically, Foucauldian governmentality provides a useful analytic to consider the formalization of STP. Governmentality is:

> The ensemble formed by institutions, procedures, analyses and reflections, the calculations and tactics that allow the exercise of this very specific albeit

> complex form of power, which has as its target population, as its principal form of knowledge political economy, and as its essential technical means apparatuses of security" (Foucault 1991, 102)

Thus, governmentalization is the process by which "the ensemble" manages to exercise that power which targets population through political economic knowledge in order to provide security and normalization. In other words, it is the way in which formalization occurs. We limit our focus to three components of governmentality relevant to environmental governance: analytics of power, biopower, and technologies of the self (Rutherford 2007). To understand how formalization is occurring within smallholder timber production, we consider the current practice of STP in Jepara and extrapolate to consider how SVLK regulation will affect this production.

3.5.1 The effects of scale and the analytics of power: Resource provision

Power constitutes what is possible and is ubiquitously exercised through innumerable practices, people, organizations, and discourses (Foucault 1990: 94-96). It must be understood as emanating "from below" through a web of interactions (Foucault 1990: 94). Additionally, resistance is not outside power; it is a fundamental part of it. Applying this definition of power to our work, the composition and organization of smallholder production networks, and the manner in in which they resist or comply with regulation, determines the extent to which STP formalizes. Our sample indicates that resource providing institutions are increasing formalization of STP while SKAU regulation is largely resisted.

Our results begin with growers who earn well above the defined rural poverty line of 2,683,464 IRp ($271.03) in Central Java (BPS Jawa Tengah 2012). These relatively privileged growers, on average, have more than a primary school education, and are involved in multiple income generating activities. Further, they invest in timber crops for both short- and long-term gain. While investments are largely self-

financed, there are several institutions that provide seed resources to growers. 78.4% of the Jeparanese growers we surveyed were affiliated with one or more resource providing institution. When distributing resources, T4T, the local forestry office, and *Perhutani* collect information on grower location, type and amount of seedling resources received, and land tenure status, thus enhancing the ability to totalize and quantify the population of growers, and possibly extrapolate to available timber resources. Resource provision has increased the entanglement of smallholders with official institutions; however, it has not necessarily increased the predictability with which smallholders interact with formal institutions.

While individual growers determine what timber they grow, purchasers dominate the selling of timber. Nearly half of all growers surveyed indicated they received market information exclusively from purchasers, with an additional 38.7% indicating they sell for whatever price they need. Thus, fewer than 15% of respondents indicated that they sought information on "normal" prices, much less were informed as to what premium prices may be. Given that growers exercise very little ownership over selling their timber crops, it is not surprising that they do not keep current on certification requirements; this is a task left to purchasers. However, when selling within the regency, timber middlemen rarely operate with SKAU certification. Given the vast demand for wood in Jepara regency, the lax enforcement of SKAU certification within regencies serves as a disincentive for purchasers, much less growers, to acquire proper certification. SKAU certification does not currently provide predictable behaviors within STP in our sample.

Case study respondents depict a STP network that is largely determined by household finance and is composed of flexible, informal networks of institutions that provide resources, growers, and purchasers. However, public (KBR), private (T4T),

and public-private (*Perhutani*) institutions are impacting resource provision in this area. They provide an increased ability to quantify, and thus formalize, STP in northern Central Java. While SKAU is intended to operate on a local level, it is not strictly adhered to and, within regencies, the transportation of smallholder timber seems highly unregulated. If SVLK regulation is to succeed, it needs to change the culture of unenforced SKAU certification within the regency or focus on another tier of production for certification. With the increase in prominence of resource providing institutions in our sample, verifying timber legality might best be transferred to the stage of seedling acquisition and planting. Studying the manner in which these affiliations can be mapped through socio-economic or spatial variables will be essential to understanding the manner in which formalization continues to affect STP.

3.5.2 Biopower and smallholder timber production: Forest composition and management

Biopower has been applied to forest governance, most notably through the way in which scientific forestry enabled and enables a particular definition of forests and control of timber (Scott 1991, Peluso 1992, Agrawal 2005). We consider biopower through the definition, totalizing, and management of smallholder timber forests. Our sample demonstrates that despite increasing formalization, Jeparanese smallholder forests differ markedly from political forests regarding management timescales and species composition.

While STP within the case study rests on economic gain, it is conducted on a much shorter timescale than other forms of timber production. 98.5% of all respondents grow timber for economic benefit, yet 76% of all the standing stock surveyed is between one to five years. It is clear that respondents manage their forests within much shorter time horizons than do timber plantations, which operate on multi-decade harvesting regiments set forth in ten year management plans (Perum Perhutani

2009). Further, the increase in seedling provision and focus on STP through public and private institutions gives credence to an increase in planting within the past half decade (Table 7). However, there remains little evidence to suggest a spike in smallholder timber demand in the region within the past five years. Thus, this might indicate that a greater number of smallholders are planting timber crops as a result of available resources; however, more research must be conducted to determine if this association exists and is significant.

Table Seven: Year institution began current program for resource provision

Institution	Year Provision Started in Jepara
Kebun Binit Rakyat (KBR) – Local Forestry Office	2011
Trees 4 Trees NGO	2008
Lembaga Masyarakat Desa Hutan (LMDH) - *Perum Perhutani*	2004

The shorter management timeframe is also reflected in smallholder species selection. With a majority of growers planting sengon, and an even greater majority wanting more sengon to plant, it is clearly the most attractive timber species for the smallholders we sampled. Growers typically harvest sengon within five years, which may account for the abundance of stock aged one to five years in the sample. Thus, sengon is, biologically, a more attractive option for STP.

The management of smallholder timber crop remains very informal, though the behavior that leads to species selection and harvesting is predictable. 33% of the smallholders we surveyed (n=146) indicated they had never received any formal forestry training or education. Further, the high volume of young timber crops indicates that management for mature timber is secondary to short-term (1-5 years)

demands. For SVLK regulation to effectively monitor STP in our sample, it will require short-term certification cycles or it must produce an incentive to grow timber species that are slower growing. A recently implemented regulation (Minister of Forestry Regulation No.P.7/Menhut-II/2009) determines that only when all "local needs" are fulfilled may smallholder timber be sold to other regions. Thus, the demand-supply gap, combined with the possibility of limited timber flowing in from other regions may generate a greater need for local production of the slow growing, luxury hardwoods. The formalization of STP provides multiple routes and points of application to incent smallholder production of specific timber species. Certain faster growing varieties of teak are already being distributed through CIFOR's FVC project. Economic and regulatory incentives, through legality verification and resource providing institutions, might further influence the composition of smallholder forests. At the moment, however, the composition and management of smallholder forests is still informal.

3.5.3 Subject formation and access: Technologies of the self, grower knowledge, and values

Technologies of the self refer to how actors become certain types of subjects within the parameters of power relations (Foucault 1984). Applying technologies of the self to smallholders, we consider what regulation presupposes and how individuals and networks within STP do or do not adhere to these parameters. Timber legality verification seeks to provide evidence for the source of lumber or a timber product. Projecting this form of regulation onto existing networks assumes that verification is possible and that actors will comply given certain positive or negative incentives.

SVLK regulation seeks to bolster the legitimacy of SKAU certified timber through third-party compliance assurance. However, third party regulation that only checks compliance assumes documented legal compliance is just that: legal.

Resistance to SKAU documentation and procedural verification is not only possible through non-compliance, but it is also possible by issuing false permits, creating false permits, and lax enforcement. As Nurrochmat and Yulianti write:

> SKAU is an example of documents which have strong legitimacy as the recognized document in community timber trade activities, but its legality as a legitimate document is often questioned by the security personnel in the community timber distribution. In these cases, there is a need for a stronger regulation for SKAU document or an improvement of SKAU form with attributes which can guarantee its legality, such as document originality holograms, regulation base that is collaborative with the SKAU document, or other methods which can strengthen the document legality attributes" (Nurrochmat & Yulianti 2013, 40).

While the flexibility of timber production within current legality verification regulation generates a varied market of timber products and methods of verification, it makes certification and due diligence a challenge.

SVLK regulation might ensure that smallholders comply with SKAU regulation, but unless it verifies the process and procedure of SKAU certification itself and generates behavioral change within growers and purchasers, it will not optimally regulate STP. Procedural compliance remains the domain of locally elected officials or local forestry employees. As has been noted in many different contexts, clienteleism or patronage democracy where political favors are traded for support (Nordholt 2012), can affect political institutions in Indonesia. Further study of the interaction between SKAU certification, SVLK regulation, and STP is important for determining what technologies of self and subject making behaviors are accompanying this shift toward legality verification.

Our case study suggests that because networks are based on social connections and because there is not a formal market economy backing STP in the form of premium prices and areas of sale, it might be difficult to replace un-certified timber. It is possible that un-certified timber continues to flow through informal or extra-legal

channels and still manages to reach producers and consumers throughout the archipelago and perhaps beyond if third-party verification only checks for compliance. Thus, it negative consequences may not not optimally affect behavioral change. Rather, providing timber resources in the form of seedlings and education, establishing payment plans for those farmers who seek short-term returns but grow long-term tree species, and otherwise rewarding those officials and communities that seek legitimate compliance with SKAU and SVLK regulations could provide enough incentive to compel smallholders, purchasers, and officials to pursue regulation.

3.6 Conclusion

The formalization of STP has started through policies and institutions that provide seed resources to smallholders; it will continue through increased regulation of STP. This formalization reveals a willingness of the Indonesian state to regulate and secure STP alongside timber production from political forests on Java. While smallholder timber regulation is by no means novel to recent policy, the combination of increased resource provision to smallholders, more regulatory requirements through SKAU documentation, and the addition of third party oversight indicate the importance of continued timber production through smallholder networks. However, the extent to which smallholders gain fair access to resources and are effectively regulated rests on a combination of local compliance and third-party oversight.

Our grower sample suggests that, currently, three formal institutions provide resources while simultaneously quantifying and totalizing grower populations; that growers are planting timber crops for largely short-term economic gain, that the shorter timer intervals result in a younger stand-age of the surveyed smallholder forests, and different species compositions than the Javanese political forest; and that

SKAU lacks the formality and consistency necessary to render compliance-only verification through SVLK certification a sufficient method for timber legality verification. From our findings, we posit the following options for effective STP regulation in Jepara:

1. Using resource providing institutions to assist third-party auditors in determining legal timber verification

2. Providing certification renewal cycles that reflect the average time to harvest for major timber species within specific villages.

3. Tackling the legitimacy of SKAU certification rather than relying exclusively on compliance verification.

4. Providing positive incentives for adhering to timber regulation standards, especially in the form of faster growing strains of luxury tropical hardwoods.

The large number of citizens involved in producing timber products within Jepara and outside it demonstrates the importance of timber resources within Java and to Indonesia as whole. Further, the extent to which STP provides timber resources highlights the importance of allocating resources outside the political forests of Java, and efficiently regulating these resources. FLEGT collaboration has provided an ideal moment for the Indonesian state to increase its legitimacy within global timber product markets. Context oriented studies that combine a consideration of local practice and national policy are essential to understanding the efficacy of SVLK regulation, the condition of smallholders, and how—if at all—STP is affected by the interlacing of local practice with global, national, and local policies and institutions.

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CHAPTER FOUR

ACCESS ANALYSIS OF SMALLHOLDER TIMBER PRODUCTION IN NORTHERN CENTRAL JAVA

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Abstract:

Smallholder timber production (STP) provides timber for products produced throughout Indonesia. Mandatory regulation, set to take effect in 2014, will alter the landscape of STP throughout Indonesia. These regulations will result in further formalization of timber production by smallholders. Formalization has the potential to shift patterns of access and forest management for private growers throughout Indonesia. In this text, we provide information on who practices STP and how access to STP is determined in northern Central Java. We use grower surveys (n=304) to generate information on smallholders, and use access analysis to understand different tiers within the timber value chain that involve timber smallholders. We assess the contemporary distribution of benefits for timber smallholders, as determined by their socioeconomic characteristics and use this information to inform consideration of STP formalization through timber legality verification.

4.1 Introduction

Forest governance regimes are becoming increasingly decentralized (Agrawal 2008). In countries such as Indonesia, decentralization has made visible the limits of state-based initiatives to implement forest policy (McCarthy 2000, Barr *et al.* 2006, McCarthy 2012). Additionally, non-state market driven (NSMD) certification schemes have been slow to impact tropical forests (Marx and Cuypers 2010, Cashore and Stone 2012). In response, international actors have created a new generation of state sanctioned market driven policy instruments to promote sustainability and the legality of timber (Cashore and Stone 2012, Cashore *et al*. 2010). The Forest Law Enforcement, Governance, and Trade (FLEGT) Action Plan is a state-based market-driven mechanism that seeks to ensure timber legality of all products entering the EU.

The FLEGT Action Plan seeks to eliminate the sale of illegal timber and timber products to the European Union (EU). The methods of timber legality

verification are determined and implemented by the timber producing country, in accordance to the FLEGT Action Plan, and verification techniques are accepted by the EU through the signing of a Voluntary Partnership Agreement or VPA (EU 2011). The Indonesian VPA requires all timber to receive timber legality assurance certification throguh *Sistem Verifikasi Legalitas Kayu* (SVLK) regulation, which was put in place in 2009 (Minister of Forestry Decree No. P. 38/Menhut-II/2009) and revised in 2011 (P68/Menhut-II/2011). It requires third party legality verification for all timber and timber products intended for domestic and international purchase. However, SVLK regulation poses multiple challenges for the certification of smallholder timber production (STP).

In many countries, including Indonesia, STP supplies domestic markets with timber alongside so called 'industrialized' timber production. Industrialized timber production in Indonesia begins in historical, state-owned territories, or "political forests" (Peluso & Vandergeest 2001). We use STP to refer to timber production outside state-owned or -leased forestlands. Often, smallholders bring timber to market through personal relationships, rather than relying on codified, regulated, and predictable paths that take timber from seed to sale within state forests (Irawati *et al*. 2009, Purnomo *et al.* 2009, Nurrochmat and Yulianti, 2013). Understanding how emerging FLEGT forest governance regimes and STP interact is important to assure that the policy instrument has productive, rather than undesired, impacts. We seek to assess how resource provision and legality verification are formalizing networks of STP in northern Central Java.

Ensuring the security and legality of smallholder timber and timber products through SVLK regulation requires increased formalization of STP. The formalization of an economic activity refers to an increase in interaction with official structures of

government and the extent to which interactions that generate the activity are conducted within a predictable format or framework (Guha-Khasnobis *et al.* 2006). While timber production networks established by state or industry already depend on formal channels of production and trade, STP does not and may not be immediately amenable to formalization. "Chapter Three" demonstrates how, in the regency of Jepara, the process of formalization proceeds through multiple programs that seek to seed and quantify smallholder forests. Formalization will continue via SVLK regulation. Recent literature on the Indonesian-EU VPA highlights the difficulty of certifying STP using a regulatory paradigm that traces and reinforces formal channels of timber production commonly associated with large timber industries and state forest enterprises (McDermott and Lesniweska 2012, Obidzinski *et al.* 2012, Wiersum and Elands 2012, Nurrochmat & Yulianti 2013). Regardless, SVLK regulation will take effect for STP throughout Indonesia at the scheduled signing of the VPA in 2014 (MFP 2013, Obidzinski et al 2012).

The process of formalization is set to affect STP, potentially shifting patterns of access and forest management for private growers throughout Indonesia. In this chapter, we provide information on who practices STP and how access to STP is determined in northern Central Java. We begin by introducing a theory of access and developing how access, formalization, and timber regulation are related. We then introduce our methods for generating information on STP in northern Central Java, discuss the results of these methods, and offer insight into the way in which access is presently organized, and how regulation may continue to affect access.

4.2 Formalizing Access

"Access" refers to the broad ability to gain a benefit—economic or otherwise—from a resource. It is:

> *"all* possible means by which a person is able to benefit from things . . . . Access may also be enabled indirectly through means that are not intended to impart property rights or that are not socially sanctioned in any domain of law, custom, or convention. Without allocating rights per se, ideological and discursive manipulations, as well as relations of production and exchange profoundly shape patterns of benefit distribution. Likewise, socially and legally forbidden acts can also shape who benefits from things" (Ribot & Peluso 2003, 156).

This definition of access goes beyond *de jure* rights to those patterns of power that enable actors to participate and benefit in certain chains of production, whether or not a benefit is socially accepted or legally condoned. It relies on a Foucauldian definition of power, where power is embedded within social relations, omnipresent, dynamic and enables the "social structuring of what we perceive to be real (Kelly 2006, 126 in Winkel 2012). However, patterns within power relations can ossify, creating specific, less flexible, modes of access. Foucault writes:

> [I]n most societies, organizations are created to freeze the relations of power, hold those relations in a state of asymmetry, so that a certain number of persons get an advantage, socially, economically, politically, institutionally, etc. And this totally freezes the situation. That's what one calls power in the strict sense of the term: it's a specific type of power relation that has been institutionalized, frozen, immobilized, to the profit of some and to the detriment of others (Foucualt 1988, 1).

This embodied and relational notion of power makes access analysis, the process of mapping access, a varied and dynamic process that seeks to understand patterns within actors' ability to benefit from a commodity, product, service, or situation.

2.1 Access Analysis

Access analysis requires:

> 1) identifying and mapping the flow of the particular benefit of interest; 2) identifying the mechanisms by which different actors involved gain, control, and maintain the benefit flow and its distribution; and

3) an analysis of the power relations underlying the mechanisms of access involved in instances where benefits are derived (Ribot & Peluso 2003, 161).

While this framework provides structure for identifying embodied and socially constructed aspects of access, it neglects to consider how biophysical variables might precede or co-constitute power structures (Ginger *et al.* 2012). Thus, we offer an additional analytical reference:

4) Assessing how biophysical preconditions direct benefit flow.

The following section relates how we use access analysis and value chain analysis to consider STP in northern Central Java.

4.2.2 Access and the formalization of STP

We conceptualize networks of timber production vertically, through value chains, thus "mapping the flow" of timber and timber production. Within each tier of production, we consider how socio-economic, timber, and market variables organize, explain or are irrelevant to grower access. Through the use of value chain and access analysis, we generate information about and analyze STP in Central Java.

Value chain analysis (VCA) seeks to understand where and how commodities gain value as they progress through different steps of production. "Value chain" refers to the manner in which a product or services progresses from conception, through different production phases, to consumers, and ends in disposal (Kaplinsky and Morris 2001). For our purposes, we are concerned with initial phases of production within the timber product value chains. Analyzing value chains "provides researchers with a tool to ask important questions about the distribution of power and value across the chain and is therefore eminently capable of addressing the agency of workers and small producers" (Mitchell *et al*., 10). The following tiers of production are relevant for our purposes:

1. Seed or seedling acquisition
2. Growing and maintaining timber crops
3. Selling/Buying timber crops

Within each of these steps, access is navigated by power relations between actors. A variety of categories can organize access mechanisms, including "technology, capital, markets, labor, knowledge, authority, identities, and social relations" (Ribot and Peluso 2003, 162). Regarding STP, we understand each of these categories—which are not comprehensive but cover a wide variety of access mechanisms—to be determined between actors, biophysical characteristics of timber species and land quality, and spatial factors including elevation and proximity to major wood markets.

Equipped with this understanding of the early stages of the timber value chain, and the mechanisms and categories of access that shape and compose this value chain, we generate knowledge in northern Central Java, working with institutions, growers, timber middlemen, and lumber sellers.

4.3 Methods

We conducted grower surveys, key-informant interviews, and field observations in the provinces of Jepara and Pati, from October 2012 to January 2013.

4.3.1 Study Area

The two northernmost regencies (*kabupaten*) of the Central Java province are Jepara and Pati. These two regencies lie across the majority of the Muria peninsula, an area on the northern coast of Java that is dominated by the Muria Range. Specifically within these areas, we conducted fieldwork in five villages in Pati, and eighteen villages in Jepara. These villages were selected based on their differing elevation, land-type, and proximity to the center of furniture production.

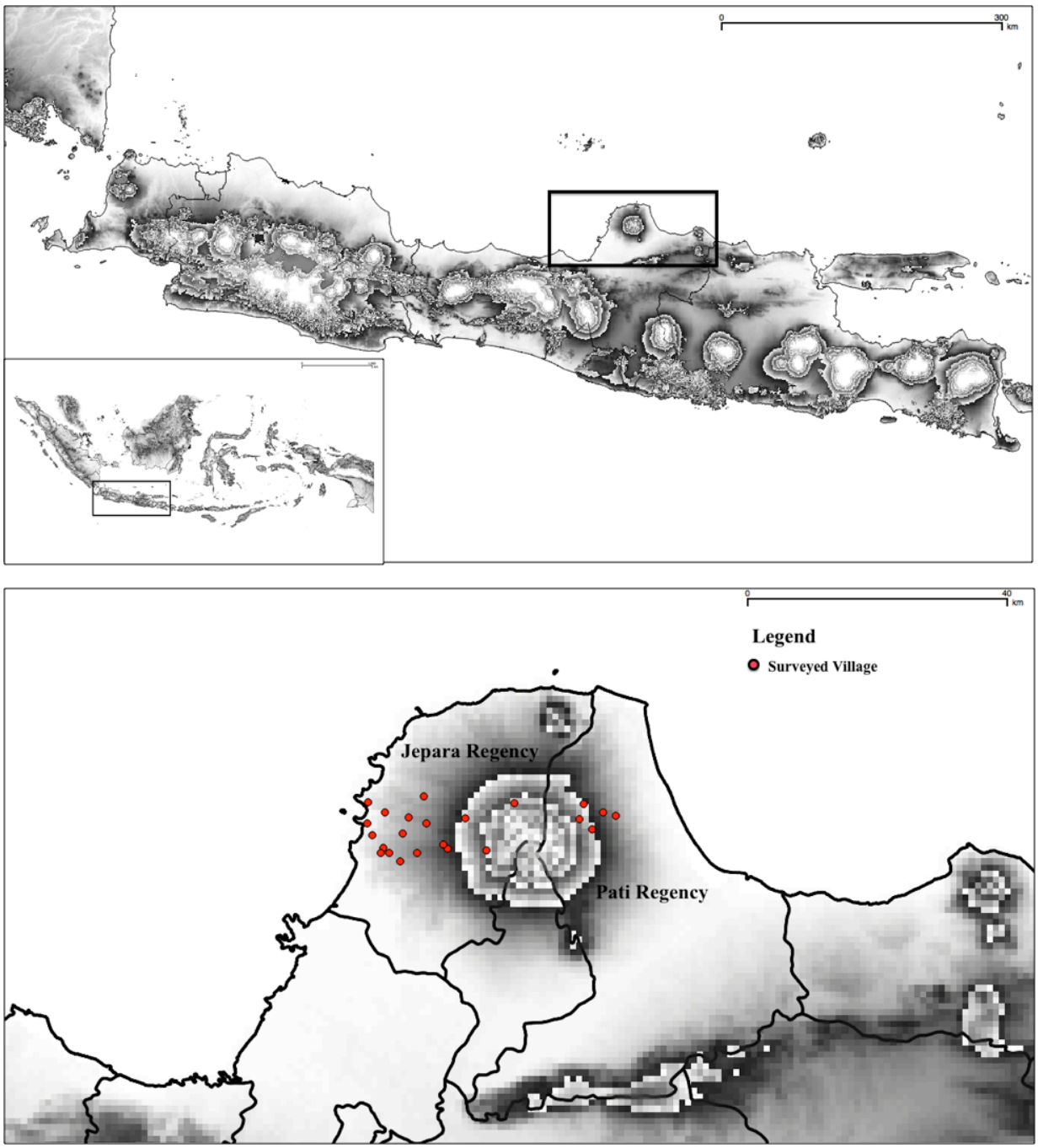


Figure One: Study Area and Villages Surveyed: Elevation 0-1400 m (Source: Author's own)

Jepara and Pati lie to the north of the "teak belt" (Geertz 1963, Peluso 1992), a swath land running through the mountainous middle of Java, known for the contemporary and historical teak plantations largely owned and operated by *Perum Perhutani*, the state forest company. However, Jepara and Pati are of great importance to the timber industry, as Jepara is one of the most significant areas of furniture production in all of Java, and as such it pulls timber from nearby Pati, and from

around the island and the archipelago, to fill the demand of this industry. Further, "local needs" for timber resources must be filled before smallholder timber can be sold to other regions (Minister's Reg. No P.7/Menhut-II/2009). Thus, the high demands of the timber products industry in Jepara may begin to provide a greater incentive for growers to produce tropical hardwood species used in furniture production.

Finally, we selected this area for study because of the number of people involved in timber production within these regencies. It has been estimated that 27% of the total income in Jepara comes from the furniture industry, that this industry employs 177,000 people, and that 92% of the existing business units are small scale (Irawati *et al*. 2009) and operate within—directly or indirectly—networks of STP. We use the sub-district of Gunungwungkal—a sub-district located on the slopes of Mt. Muria, further removed from the center of timber production—as a comparative study site to understand how proximity may affect access and formalization within STP.

4.3.2 Research Design

To generate knowledge about STP in northern Central Java, we used grower surveys for quantitative data collection, and key-informant interviews and field observations for qualitative data collection..

4.3.2.1 Key-Informant Interviews

Key-informant interviews served two functions within our research. They provided access to grower samples and provided in-depth information on STP regarding seedling provision, growers' institutional affiliations, grower methods, and methods of sale. We selected key-informants within local forestry institutions including *Perhutani*, a local forestry NGO named Trees 4 Trees (T4T), academics affiliated with the Center for International Forestry Research (CIFOR), and the local forestry offices (*Dinas Kehutanan*), as well as selecting village leaders within Jepara

and Pati. We found further important actors within these organizations through snowball sampling. With each key-informant we conducted semi-structured interviews, using a core set of questions about STP and individualized questions according to the informants position and employ. We conducted all interviews personally, in either Bahasa Indonesia or English.

4.3.2.2 Grower Surveys

Our survey instrument was adapted from CIFOR's Poverty and Environment Network surveys (PEN 2007) and included sections on location, grower's personal information (age, education, household size), grower's land (total land, land used for farming, land rented), timber production (species, age, amount), and livelihood information (yearly income recall, major and minor sources of income). Using information gleaned from key-informant interviews, we obtained lists of timber smallholders from Village Heads, NGOs, *Perhutani*, and the local forestry service. From these lists, we randomly selected individuals to survey. We did not target study locations and sample populations to be representative of greater populations. Rather, they were selected to provide case study insight into how formalization is occurring within STP around an area highly involved in timber production and timber production value chains.

The survey and sampling methods were constant across growers and regions. A team of four enumerators assisted in conducting surveys. All enumerators had previous survey training, and we piloted the survey instrument with them for two days. All surveys were conducted in Bahasa Indonesia or Javanese.

4.3.2.3 Field Observations

Field observations were used to gain general perspective on STP in Jepara and Pati. Field observations were of two specific varieties: 1) accompanying timber

middlemen (*makelar kayu*) or growers to observe timber felling and transport practices, and 2) observing group meetings for farmer, craftsmen, or NGO associations. All field observations were recorded through a combination of notes, audio recording, photographs, and videos.

4.3.3 Data Analysis

After quantifying all methods of data collection, we transcribed and re-assessed key-informant interviews and field observations, and used SPSS to organize and analyze grower survey information.

Statistical analyses include descriptive statistics for socio-economic and timber production variables, bivariate correlations between socio-economic and timber production variables, and independent sample t-tests and analysis of variance (ANOVA) for grower affiliations, livelihood information, and timber production information, and binomial logistic regressions to determine the predictability of institutional affiliation based on socioeconomic characteristics. Particular methods of data analysis are organized according to stages of the value chain: resource provision, timber growing and maintenance, and selling/purchasing timber.

To assess access and resource provision, we determine whether grower age, years of education, land total, and yearly income can predict the binary variables of institutional affiliation (0=non-member, 1=member). Then, we use independent sample t-tests to determine whether and with what significance member and non-member growers differ in total tree, teak, mahogany, and sengon production.

We provide insight into the growth and maintenance of the surveyed, standing timber crop by providing descriptive statistics of the timber associated with our sample and a one-way ANOVA based on wealth quartiles within the sample. We use Pearson's correlation to determine whether socio-economic variables are associated

with total trees, teak, mahogany, and sengon production, and we assess the reasons surveyed growers are planting timber crops based on their responses.

To explore who—based on affiliation and socio-economic variables—has access to the greatest number of buyers and uses different types of market knowledge, we use independent sample t-tests to determine if socio-economic variables, timber production variables, and number of known buyers vary by affiliation ("member" or "non-member"). Then, we use a one-way ANOVA to compare the mean number of purchasers known and grower affiliations differ significantly based on if and what techniques growers use to gain market information on timber prices.

We performed binomial logistic regressions to determine how predictive socioeconomic variables are for institutional affiliation within the grower sample. Models included years of education, total land, and yearly income.

While these methods consider early stages of the timber value chain separately, we recognize that this network of production is highly interconnected. To pull these disparate analyses together, we use key-informant interviews and field observations to provide insight into the way in which resource provision, growing and maintaining timber, and purchasing/selling timber relate to one another.

4.4 Results

In total, we conducted 21 key-informant interviews, eight field observations, and 304 grower surveys. Key-informant interviews, supported by findings within grower surveys, revealed four methods by which growers receive or purchase seedlings. Growers receive seedlings through the Kebun Bibit Rakyat (KBR – "community nursery") program run through local forestry offices (*Dinas kehutanan*), and the NGO Trees 4 Trees (T4T). Growers purchase seedlings from *Perum*

Perhutani, the state forest company, or from local markets or traveling salesmen. The frequency of grower affiliation within these categories is noted in Table One.

Socioeconomic and timber production variables demonstrate our sample of growers were between 25 to 79 years old, with an average household size of 4.21 people and an average of 6.95 total years of education. The total grower sample earned, on average, more than the minimum wage of $76.00/month (9,792,000 IRp, about $911.00/year) in Central Java (Gubernur Jateng Nomor: 561.4/58 Tahun 2012), with a median yearly income of 26,.44 million IRp ($2,644) for the total sample, 26.83 million IRp ($2,825) for Jeparanese growers, and 25.20 million IRp ($2,520) for Pati growers. Table Two presents mean values and Annex 1 provides comprehensive descriptive information.

Timber production is dominated by teak (*Tectona grandis*), mahogany (*Swietenia macrophylla*), and sengon (*Paraserianthes falcataria*), accounting for 86.0% of all timber grown within the total sample. Young trees dominate the sampled timber crop with crop aged zero to five years accounting for 77%, six to fifteen years for 20%, sixteen to twenty five years 2%, and over twenty five years less than 1%. Further, teak accounts for 18% of all timber surveyed, mahogany for 10%, sengon for 71%, and other tree species less than 1%.

Table One: Affiliation frequency

T4T

	Frequency	Percent
Non-Member	204	67.1
Member	100	32.9
Total	304	100.0

Perhutani

	Frequency	Percent
Non-Member	222	73.0
Member	82	27.0
Total	304	100.0

KBR

	Frequency	Percent
Non-Member	136	44.7
Member	168	55.3
Total	304	100.0

Private Purchase

	Frequency	Percent
Non-Member	77	25.3
Member	227	74.7
Total	304	100.0

Pearson correlations between socio-economic (age, years of education, land total, and yearly income) and timber production variables (total trees, total teak, total mahogany, total sengon) for the total sample and the two sub-samples are provided in Annex 1. The strongest significant associations within the total sample include years of education and total trees (r=.196, p=.001, n=304); total land and total sengon (r=.391, p<.001, n=304; yearly income and total teak (r=.373, p<.001, n=304) and total mahogany (r=.431, p<.001, n=304). Within the Jepara subset, the strongest significant associations include years of education and total trees (r=.238, p=.001, n=204); total land and total trees (r=.778, p<.001, n=204) and total sengon (r=.806, p<.001, n=204); yearly income and total teak (r=.421, p<.001, n=204) and mahogany (r=.495, p<.001, n=204). Within the Pati subset, the strongest significant associations include years of education and total trees (r=.210, p<.05, n=100), and total sengon (r=.216, p<.05, n=100); total land and yearly income (r=.447, p<.001, n=100), total trees (r=.409, p<.001, n=100) and total sengon (r=.380, p<.001, n=100).

Standardized independent sample t-tests between grower affiliations (T4T, KBR, SFC, Private Purchasing, Local Farmer Association, and Furniture Value Chain Involvement), number of resource providing affiliations ("more than one affiliation," "one affiliation") and socio-economic and timber production variables found

Table Two: Grower socioeconomic characteristics

	Jepara (N=204)	Pati (N=100)	Total Sample (N=304)
Variable	Mean (std)	Mean (std)	Mean (std)
Age (years)	48.86 (10.32)	48.25 (10.10)	48.66 (10.24)
Size of Household (people)	4.42 (1.58)	3.73 (1.28)	4.21 (1.54)
Total Land (m3)	3730.57 (6660.59)	16563.00 (14639.19)	7951.77 (11671.01)
Years of Education	6.91 (3.30)	7.05 (4.05)	6.96 (3.56)
Total Trees	754.88 (2823.40)	489.78 (549.70)	667.68 (2335.59)
Total Teak	130.59 (559.93)	105.25 (144.44)	122.26 (465.85)
Total Mahogany	91.5 (493.20)	7.96 (18.21)	64.02 (405.74)
Total Sengon	521.63 (2555.86)	368.06 (483.24)	471.12 (2111.40)
Number of Known Purchasers	2.88 (.96)	4.66 (2.75	3.47 (1.95)
Yearly Income (millions IRp)	46.89 (75.85)	45.45 (60.21)	46.41 (70.99)

significant differences for KBR affiliation and total land; *Perhutani* affiliation, buyer choice number, and total land; number of resource providing affiliations and buyer choice number, total land, and total teak; furniture value chain involvement, buyer choice number, yearly income, total trees, and total land.

The one-way ANOVA and a Tukey's post-hoc test demonstrated significant differences exist between the means for buyer choice number (df=4, F=9.720, p<.001) and total number of affiliations (df=4, F=6.002, p<.001) within categories of how growers seek information for timber prices. The categories included: grower does not seek information (n=84), grower receives information from buyers (n=131), grower receives information from other farmers (n=58), grower uses a cell phone, internet, or an official office to check market prices (n=7), and grower uses two or more of the above methods (n=24). Growers who seek information from two or more sources had an average buyer choice number of 5.38, while those growers who did not seek information had an average of 2.71, and those who only received information from growers had an average of 3.07. The number of resource providing affiliations varied significantly by growers' method for gaining market knowledge, with those growers who did not seek information on timber prices having the greatest number of affiliations (2.24) and those that use two or more methods had the fewest affiliations (1.50).

Binary logistic regression models with predictors were more effective than regression models with a constant for KBR affiliation and down-stream furniture value chain (FVC) involvement. A test of the full model against the constant model was statistically significant for KBR affiliation (chi square = 17.55, p<.001, df = 3) and FVC affiliation (chi square =73.18 , p<.001, df = 3). While the KBR model had an overall prediction success of 61.8% with a 6.5% increase over the constant model

and the furniture chain affiliation model had an overall prediction success rate of 71.1%, up 3.7% from the constant, both models demonstrated a weak relationship between prediction and grouping through Nagelkerke's R values (KBR = .08; furniture chain affiliation = .298). In these models, for KBR affiliation, years of education ($p<.05$) and total land ($p<.01$) were the significant predictor variables, while for FVC affiliation, total land ($p<.001$) and yearly income ($p<.01$) were the significant predictor variables. While binary logistic regression for *Perhutani* affiliation did not produce a more successful model, total land ($p<.01$) remained a significant predictor variable. T4T, private purchasing, and farm association affiliations did not produce more successful models, nor were any of the socio-economic variables significant predictors.

4.5 Discussion

The descriptive socio-economic statistics demonstrate that, as a whole, our sample earns well above the minimum wage in Central Java, has land on which to plant trees, and access to an average of 6.96 years of education. These findings corroborate previous work, which indicates that timber smallholders have the income, required material technology (Hyman 1983, Byron 2001, Kallio *et al.* 2012b), and enough land (Salam *et al*. 2000, Simmons 2004, Kallio *et al.* 2012b) to support tree planting, maintenance, and harvest. Considering how these growers gain access to seedlings, grow and maintain timber crops, and pursue market knowledge provides insight into how land-owning smallholders benefit from timber production and are affected by increased formalization of production networks. We discuss our results in four sub-sections, three of which reflect the tiers within STP value chains and one which considers the ability to benefit from multiple tiers within the value chain.

4.5.1 Access to Seedling Acquisition

By providing seed resources to growers and, in turn, documenting and quantifying grower information, institutions are formalizing STP in northern Central Java. While key-informant interviews indicate that the resource providing institutions have similar goals—to promote environmentally and economically sustainably livelihoods and increase timber production—they are associated with different types of grower access. Our results indicate that public and public-private institutional affiliation operates more along lines of socio-economic position, particularly land ownership, than private purchasing, NGO, and farmer group associations. In general, institutional resource provision is increasing formalization through the quantification of grower population and timber resources. This quantification provides information that can be used to inform institutional performance, regulation, and incentives, among other possibilities.

For the majority of growers within our sample, seedlings represent a personal economic investment that is expected to produce short-term and long-term returns; however, institutions that provide seedling resources account for considerable timber crops in the area. Private purchasing was the most common method used for resource acquisition (74.7% members), a testament to the long history of STP on Java (Kallio 2012a). Private purchasing is followed by resource provision from KBR (55.3%), T4T (32.9%), and *Perhutani* (27%). Further, 77% of respondents indicated that they grow trees for both short term (within four years) and long term (five years or more) economic gain, and 88.4% of growers did not inherit any trees on their property. Those growers that are able to benefit from the KBR program or T4T resources receive seedlings free of charge, while those growers who are affiliated with *Perhutani* received discounted seedlings; all of these institutions provide a reduction

in overhead cost and an increase in profit for the grower. However, access to certain programs is organized, at least partially, around socio-economic lines.

Growers affiliated with the public and public-private institutions (KBR and *Perhutani*) had significantly more land resources than growers unaffiliated with these institutions. Independent sample t-tests demonstrate a significantly higher average of total land owned for growers affiliated with KBR and *Perhutani*, and a higher average number of known buyers for growers affiliated with *Perhutani* resources. T4T and private purchasing did not demonstrate any significant difference between members and non-members. Additionally, It is interesting to note that there is a significant level of difference for land total between members and non-members of KBR and *Perhutani* affiliation, but that income is not significantly different. Pearson correlations demonstrate that for the Pati subset, land total and yearly income are significantly correlated ($r= 447$, $p<.001$, $n=100$), but that land total and yearly income are not correlated for the Jepara subset. We suggest this is because agriculture dominates the major source of income for Pati growers, and thus owning more land yields the ability to reap greater profit. Within the entire sample, land total served as the best predictor of public and public-private affiliation. While public sources for resource provision fall along land ownership, land total in combination with years of education and yearly income provide a model with 61.8% success rate of predicting member and non-members. This demonstrates that socio-economic variables provide only a slight improvement in predicting what growers can be expected to receive resources from KBR programs. Binomial logistic regression for *Perhutani* affiliation was not more predictive than the constant regression model. However, for both of these affiliation types, land total was the most significant predictor. Thus, while the

socio-economic variables together failed to accurately predict grower affiliation, land owned plays a central part in establishing access to public resource provision.

We suggest that relationships between government and growers with more land has been constructed and reinforced over time and is perhaps a vestige of privilege that accompanied previous forms of local government. Some scholars consider local politics in Indonesia to function via "patronage democracy" (Nordholt 2012) whereby local elites gain political power by granting access to governmental resources within personal networks (Barker and van Klinken 2009, van Klinken 2009). Beyond this potential explanation, public institutions seeking to disseminate a large number of seedling resources to promote timber production would do well to draw on growers with the largest amount of land, and thereby reduce seedling dissemination costs. Regardless of how or why this mechanism of access has developed, it is reasonable to classify the ownership of land—a capital access mechanism—as an important method by which growers receive, or receive more, benefits from public or public-private resources.

While NGO affiliation and farmer associations demonstrate no association with socio-economic variables, just like the public and public-private affiliations, they enable quantification of grower population and timber resources. This quantification manifests itself in government databases—*Perhutani* growers and KBR affiliated villages are all recorded within agro-forestry and local forestry service offices, respectively. T4T compiles individual, geo-located, grower data ranging from socio-economic information to timber crop details. Additionally, farmer groups keep track of their members, hold regular meetings, and serve as a networking tool through which growers can gain access to all three aforementioned institutions, especially the KBR program and T4T resources. Grower quantification, which does not occur

through private purchasing, represents 71% of our total sample. The majority of growers are accounted for by one of the formal institutions that provide resources. While the extent of quantification varies across the organizations, and there seem to be little, if any, information sharing between institutions, increased quantification represents increased formalization. This information is a valuable asset for overseeing STP, but needs to be carefully managed and used.

The increase in formalization ought to be concomitant with oversight and reflexive practice to ensure that grower populations are receiving fair access, as determined by institutional missions and visions, and so that institutions are wisely incenting behavior based on their goals. STP data can help inform institutions fulfill their objectives; further studies of access can help administrators, employees, growers, and the general public how well these institutions are fulfilling their mission and objectives. Additionally, these data can inform new regulation mechanisms set to take effect in the near future. Understanding who grows what and where can provide direct linkages throughout the timber value chain. However, it is also possible that this data is used to incent growers to plant species that do not benefit them, sell for sub-premium prices, or otherwise work against growers. Perhaps it is the duty of growers themselves to further collect, package, and offer this information to interested institutions. While growers and institutions both benefit from the current exchange of seedlings for grower information, this relationship should be considered over time to understand what additional patterns emerge.

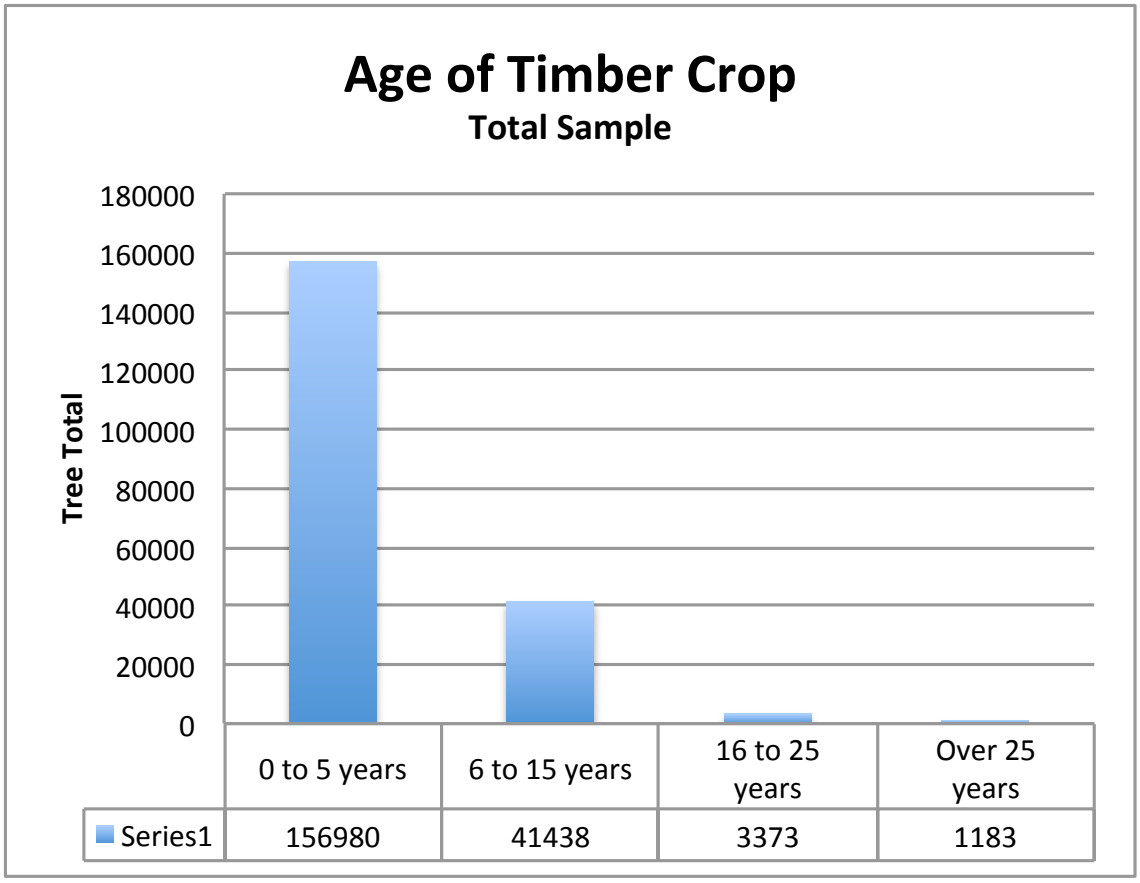
4.5.2 Growing and Maintaining Timber Crops

The surveyed, standing timber crop is dominated by young timber, and the total timber, teak, and mahogany are positively correlated with a grower owning more land and earning a larger yearly income, while sengon production is only positively

correlated with land total. From this information, we believe that STP is increasing, that the growing cycle of sengon makes it a more preferential and widespread timber crop within our sample, but that teak and mahogany are a preferred timber crops for wealthier and more well-resourced growers. The age and species composition of our sample indicate that mostly wealthy growers are able to benefit from older timber and luxury tropical hardwoods, but that sengon is a timber species that benefits the majority of surveyed growers.

The predominance of young timber crop within our sample may be a result of the dominance of sengon production within our grower sample and/or the timeframe of KBR and T4T projects. Figure Two shows the age of the surveyed timber crop. Interviews and grower surveys indicated that sengon is typically harvested between four to five years. We suggest that the dominance of sengon within the total sample (71%) is largely responsible for the predominance of young timber. However, the impact of resource providing institutions is also important in understanding this phenomenon. The KBR program began in 2010 and has been operational in Jepara and Pati from 2011 (Kementerian Kehutanan 2011). T4T began providing resources to growers in 2007 (T4T 2008). Both of these organizations provide timber crop that, at the time of sampling, would be under or at five years of age. There is a strong possibility that, because of increased resource provision, STP is increasing within our sample, and that more growers are able to benefit from timber production. However, the shorter growth cycle of smallholders, a trend documented in other literature on agroforestry and smallholder timber (Kallio 2012b, Nurrochmat and Yulianti 2013), may provide a worrying trend for regulation and the demand-supply gap for wood in northern Central Java.

Figure 2: Age of Timber Crop



Within the total sample, access to a teak, mahogany, and total trees is associated with more land and a higher yearly income. Teak takes approximately twenty years to reach marketable maturity, and mahogany requires ten to fifteen years (Kallio 2012b). Those growers able to invest in these "luxury" tropical hardwoods are able to make investments that will not generate return for many years; growers unable to wait may not be able to grow teak and mahogany, as their land must be used for short-term crops. In key-informant interviews and grower surveys, sengon was cited as the most popular tree for private growers due to its shorter growing cycle. Some growers responded that they did not grow more sengon because it grew too fast and required too much work. Within our sample, teak and mahogany benefits are distributed to wealthier growers who can afford long-term investments, while sengon benefits are distributed across socioeconomic lines.

The ANOVA based on wealth quartiles demonstrates that yearly income is associated with significant differences for land total, tree total, teak total, and mahogany total. Tukey's post-hoc test indicates that for land total and teak total, the 50th percentile of income earners have significantly more land and teak trees; for total tree and mahogany total, only the first quartile has significantly more holdings than the fourth quartile. Those growers in the wealthier half of our sample have significantly more land and teak trees, further demonstrating the association between total land ownership and prosperity as well as further indicating teak is cultivated primarily by wealthier growers. Further, the wealthiest 25% of growers within our total sample had significantly more trees and mahogany trees than the bottom 25%, indicating that wealthier growers have significantly more trees in general and specifically more mahogany trees.

Access to timber is not only predicated upon land and income, but also on what timber species fill specific needs. Our sample demonstrates an affinity for sengon production across all socio-economic quartiles, while luxury tropical hardwoods are associated with wealthier growers. Previous studies have noted that poorer farmers view the waiting period for timber to mature as a disincentive for growing (Dewees and Saxena 1997) and that an extended period of payback is tenable only for growers that have other resources (Arnold and Dewees 1997, Kallio 2012a). Regardless of species, 98% of all timber we surveyed is between zero to fifteen years old, while 77% of all timber crop is between zero to five years old.

A shorter growing cycle and a preference for sengon production within smallholder timber may conflict with the length of time and resources SVLK regulation will require. Several factories which purchase sengon have pursued Forest Stewardship Council (FSC) certification and/or SVLK certification (Prijono 2013).

T4T is pursuing FSC certification for sengon growers, as well. FSC certification may serve as an avenue appealing to sengon producers, as it is currently expanding through institutions willing to spend the required time and money for certification. However, certification for sengon production alone does not benefit the timber products industries in northern Central Java that depend upon mature teak and mahogany. If growers are unable to benefit from growing and selling this type of timber resource, they may not be filling local demand. While it may be possible to incent growers to harvest their crops at longer time intervals through partial payment plans or intercropping fast-growing timber with slower growing crops, such programs were not uncovered by our review of literature and research in northern Central Java. Growers and certifiers alike, at the time of our research, were more interested in sustainable sengon production.

4.5.3 Selling/Purchasing timber crops

Amongst our sample, there was lack of interest in premium timber prices, and several interesting relationships between resource providing affiliations, market knowledge outlets, and the number of buyers sampled growers know. First, we find that most growers depend on buyers to set prices. Second, we find that affiliation with *Perhutani* and the growers most active in researching premium timber prices are associated with knowing more buyers. And third, we find that growers in our sample that do not seek information on premium timber prices are associated with knowing fewer buyers, but these growers have more affiliations with resource providing institutions. This illustrates a significant association between *Perhutani* affiliation and the number of known buyers, a negative association between an increased number of resource providing affiliations and number of known buyers, and significant variance between growers' categorized by the ways in which they seek market information.

Taken together, this information reveals the need for greater access to information on premium timber prices.

Perhutani affiliation is the only affiliation found to be significantly associated with number of known buyers. However, even this significance is limited (Equal variance assumed: p=.071; equal variances not assumed: p=.025). Thus, sample growers affiliated with *Perhutani* resource provision know a greater number of buyers for their timber, perhaps because the formalized channels within the state forestry networks can also be leveraged for STP. While this may not be formally acceptable, interviews and grower surveys indicated that formal and informal networks for timber production intermix. Generally, however, resource providing affiliations do not provide greater access to downstream value chain benefits.

A one-way ANOVA and Tukey's post-hoc test assessing significant variance amongst growers grouped by how they seek market information revealed associations between market knowledge, resource provision affiliations, and the number of buyers growers know. Growers who do not seek any market information have more resource providing affiliations but know fewer buyers; those growers who use multiple methods to track local and national timber prices know more buyers but had fewer resource providing affiliations. From interviews and grower surveys, we found that growers were often hesitant to speak about the value of timber crops, and that this subject is particularly taboo to discuss with other growers. We suggest that this taboo might help explain why those growers who do not pursue market knowledge were able to foster more resource providing affiliations. By observing cultural norms, these growers may be able to maintain a greater variety of networks that have lead to resource provision. However, it also might be the case that growers with more affiliations have been working with particular buyers for longer and do not feel it

necessary to know a larger number, or are otherwise insulated from buyers because the resource providing affiliations come with some sort of conditional for selling timber.

Those growers who use two or more methods when seeking market knowledge knew significantly more buyers (avg. = 5.39) than all growers categorized by market knowledge source. While growers who only received information from discussion with other growers were within the same homogenous subset within the post-hoc test (avg. = 4.0), this category was still significantly less. It seems reasonable to believe that those growers most concerned with trends in timber prices would seek a greater variety of buyers to benefit from competition; further, these growers are perhaps less bound by rules of propriety regarding price discussion than are other growers.

Perhaps the most telling finding from our research on selling and purchasing timber within STP is that, for growers to receive fair value of their crop, there needs to be greater access to premium timber prices within local and national markets. 70.7% of surveyed growers responding that they do nothing to find out what the premium price is for the timber they are selling, or that they exclusively speak with the growers they know. Key-informant interviews with NGO and local forestry staff indicated that growers often do not receive fair prices for their timber due to a lack of information, access, or desire to bargain for higher timber prices. Those growers least likely to seek information on timber prices are those growers who have the greatest number of resource providing affiliations. Whether this tendency is due to obeying and benefiting from rules of propriety, as we suggest, or the product of some other explanatory cause remains to be determined. Regardless, number of known buyers is significantly higher for those growers who use multiple methods to gain market

knowledge, and the growers who do not search for information on timber prices have a significantly higher number of resource affiliations. While all T4T interviewees indicated that promoting fair prices and leveraging bargaining power through farmer groups is a priority, other interviewees did not indicate that this was a top priority for their institution. However, if growers are unable to access the extent of the monetary benefit they could receive for their crop, they may be disinclined to continue growing timber, they may not be able to grow as much timber as they otherwise could, and other actors downstream of timber production may be receiving artificially high benefits.

4.5.4 Multiple points of access within timber value chains

Growers with multiple roles within the FVC demonstrated a variety of strong affiliations when compared to other growers. A binomial logistic regression model demonstrated improved prediction for growers affiliated with the FVC over a constant model, with total land and yearly income as significant predictor variables; FVC affiliated growers also knew a significantly higher number of buyers and grew more sengon. It is clear that multiple entry points into the timber value chain provide smallholder timber producers with a variety of benefits; however, this benefit is largely a product of agglomeration and is geographically constituted.

The binary regression model using years of education, total land, and yearly income has a 71.1% success rate of correctly predicting growers' affiliation with the furniture value chain, a 3.7% improvement over the constant model. Further, an independent sample t-test reveals that growers affiliated with the furniture value chain grow more sengon (assumed equal variance: $p=.071$; equal variance not assumed: $p=.012$) and know more buyers ($p<.001$). Thus, growers with down-stream connections to furniture production enjoy growing and selling benefits.

The importance of the FVC in northern Central Java may help explain the association between yearly income and furniture value chain participation. Further, those growers involved with down-stream stages of the FVC may have larger and more interested networks with which to trade their crop. Within our sample, 98% of growers with down-stream involvement in the FVC lived in Jepara regency. The compounding benefits of production sites located in one area, or the agglomeration of production (Malmberg 1996, Scott and Storper 2003), generates multiple advantages for smallholders. The way in which increased formalization—either through resource provision or regulation—affects benefits accrued from further involvement in the FVC remains to be seen. However, it is evident that grower involvement at multiple levels within the furniture value chain results in multiple benefits for growers.

4.6 Conclusion

Though our work compartmentalized timber production into tiers of the value chain, we recognize the interrelatedness of the different tiers of timber production. Further, our sampling methods focused exclusively on growers with land, as these growers were recorded within the lists to which we gained access. There remain a number of smallholders who do not officially own land, but grow timber on land to which they have *de facto* access (Peluso 1992, Peluso 2011). Our work does not attend to these growers. This chapter provides insight into how benefits of timber production are allocated amongst landed growers within different tiers of timber production.

Obtaining seedling resources from public our public-private institutions is associated with total land holdings while private purchase and NGO resource provision is not associated with any socioeconomic indicators. Though private

purchasing represents the most common method of obtaining seedlings, formal institutions, which gather information on growers while providing seedlings, are making considerable inroads in northern Central Java. Growers affiliated with public and public-private institutions own significantly more land than other growers. We hypothesize that this may be due to longstanding relationships between growers and public administrators, as land is handed down through families and Java has a history of "patronage democracy" where community support from wealthy members has been rewarded through public goods (Nordholt 2012). T4T affiliation, representing the newest and only non-governmental institution that provides seed resources, is not associated with any socioeconomic indicator. Regardless of institutional affiliation, land total is associated with the amount of timber growers can plant, and is also associated with public resource providing institutions.

The ability to derive benefits from particular timber species is predicated upon time horizons for timber harvest and the grower's relative wealth within the sample. With the majority of timber between zero to five years old and sengon representing approximately 70% of the total timber crop, it is clear that growers benefit most from this fast-growing tree species. Further, a significant correlation between yearly income and teak and mahogany indicate that an increase in the number of luxury hardwoods is associated with an increase in yearly income. While there is a demand for sengon throughout Central Java, northern Central Java—especially in the Jepara regency—has a pointed demand-supply gap for mahogany and teak. Thus, if institutions are seeking to alleviate this demand-supply gap through STP, our sample indicates that further incentives are required that allow growers to continually benefit from growing luxury hardwoods. Our research did not find any incentive programs to promote teak and mahogany growth among smallholders. Benefits from sengon

production, however, are shared amongst almost all growers within our total sample, and there is a strong push for certification by sengon-related institutions including T4T and several factories within Central Java.

Few growers benefit from information on premium timber prices. Data on how growers pursue information on premium timber prices indicate a lack of interest and/or information on premium timber prices amongst our sample. More than any other method, growers in our sample indicated they receive information on timber prices only from local buyers. The second most prevalent category for receiving information on timber prices is not pursuing price information at all. Further, key-informant interviews and significant variance between the acquisition of timber price information with the number of buyers growers know and the number of affiliations with resource providing institutions indicate that within our sample, discussing timber prices is considered impolite. Providing open information about premium timber prices—either through local forestry offices, text messaging, or other methods—might obviate this taboo and provide growers information on appropriate prices. Providing information on fair timber prices remains a focus of T4T, though it is not a priority for other resource providing institutions.

The benefit of multiple access points within the furniture value chain is one of the most pronounced patterns within this research. Growers who are also involved in buying and selling timber and/or the production or selling of timber products were associated with a greater number of trees and knew more buyers. However, being able to derive benefit from production agglomeration seems to be a geographical precondition rather than a benefit that can be shared across distance. Growers in the Jepara subset were almost exclusively the benefactors of multiple access points within timber product value chain; growers in Pati, located further from the hub of timber

production, rarely were involved in the production of timber products beyond selling their crop. Being able to derive multiple benefits from the timber value chain, beyond harvesting and selling logs, is a function of location and local industry.

The process of STP is a complex interweaving of social and environmental variables. While the patterns and associations in our work are salient only for our case study sample, they provide insight into how STP operates on a local level, and how formalization and access combine to distribute the ability to derive benefits from timber production. As local, national, and international forces continue to influence STP and smallholders in Java and throughout Indonesia, it will be important to continue studying access in order to thoughtfully allocate resource, implement policy, and regulate STP.

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4.8 Annex One

Table Three: Grower socioeconomic characteristics continued

Descriptive Statistics: Total Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Age	301	25	79	48.66	10.236
Size of Household	287	1	12	4.21	1.538
Total Land (m3)	304	83	100000	7951.77	11671.008
Years of Education	304	0.00	16.00	6.9572	3.56016
Total Trees	304	1.00	30000.00	667.6776	2335.58973
Total Teak	304	0.00	6000.00	122.2566	465.84515
Total Mahogany	304	0.00	6000.00	64.0197	405.73791
Total Sengon	304	0.00	30000.00	471.1151	2111.40167
Number of Known Purchasers	302	0	20	3.47	1.951
Yearly Income	304	1000000	728500000	46412735.20	70991241.433

Descriptive Statistics: Jepara Subset

	N	Minimum	Maximum	Mean	Std. Deviation
Age	202	25	74	48.86	10.324
Size of Household	197	1	12	4.42	1.597
Years of Education	204	0.00	16.00	6.9118	3.30428
Total Land (m3)	204	83	80000	3730.57	6660.586
Total Trees	204	1.00	30000.00	754.8824	2823.39610
Total Teak	204	0.00	6000.00	130.5931	559.93461
Total Mahogany	204	0.00	6000.00	91.5000	493.20350
Total Sengon	204	0.00	30000.00	521.6324	2555.85643
Number of Known Purchasers	202	0	8	2.88	.955
Yearly Income	204	2900000	728500000	46885644.61	75854734.026

Descriptive Statistics: Pati Subset

	N	Minimum	Maximum	Mean	Std. Deviation
Age	99	27	79	48.25	10.096
Size of Household	90	1	6	3.73	1.288
Years of Education	100	0.00	16.00	7.0500	4.04863
Total Land (m3)	100	500	100000	16563.00	14639.194
Total Trees	100	10.00	3220.00	489.7800	549.70002
Total Teak	100	0.00	500.00	105.2500	144.44295
Total Mahogany	100	0.00	100.00	7.9600	18.21195
Total Sengon	100	0.00	3000.00	368.0600	483.24339
Number of Known Purchasers	100	0	20	4.66	2.753
Yearly Income	100	1000000	354000000	45448000.00	60206507.052

Table Four: Socioeconomic and timber production Pearson Correlations

Correlations: Total Sample

		Age	Years of Education	Total Land (m3)	Yearly Income (Irp)	Total Trees	Total Teak	Total Mahogany	Total Sengon
Age	Pearson Correlation	1	-.339**	.016	-.020	-.034	.116*	.112	-.087
	Sig. (2-tailed)		.000	.780	.730	.559	.045	.052	.134
	N	301	301	301	301	301	301	301	301
Years of Education	Pearson Correlation	-.339**	1	.198**	.206**	.196**	.134*	.155**	.159**
	Sig. (2-tailed)	.000		.001	.000	.001	.019	.007	.006
	N	301	304	304	304	304	304	304	304
Total Land (m3)	Pearson Correlation	.016	.198**	1	.184**	.372**	.075	.010	.391**
	Sig. (2-tailed)	.780	.001		.001	.000	.190	.866	.000
	N	301	304	304	304	304	304	304	304
Yearly Income (Irp)	Pearson Correlation	-.020	.206**	.184**	1	.201**	.373**	.431**	.058
	Sig. (2-tailed)	.730	.000	.001		.000	.000	.000	.314
	N	301	304	304	304	304	304	304	304
Total Trees	Pearson Correlation	-.034	.196**	.372**	.201**	1	.410**	.414**	.933**
	Sig. (2-tailed)	.559	.001	.000	.000		.000	.000	.000
	N	301	304	304	304	304	304	304	304
Total Teak	Pearson Correlation	.116*	.134*	.075	.373**	.410**	1	.806**	.074
	Sig. (2-tailed)	.045	.019	.190	.000	.000		.000	.199
	N	301	304	304	304	304	304	304	304
Total Mahogany	Pearson Correlation	.112	.155**	.010	.431**	.414**	.806**	1	.089
	Sig. (2-tailed)	.052	.007	.866	.000	.000	.000		.122
	N	301	304	304	304	304	304	304	304
Total Sengon	Pearson Correlation	-.087	.159**	.391**	.058	.933**	.074	.089	1
	Sig. (2-tailed)	.134	.006	.000	.314	.000	.199	.122	
	N	301	304	304	304	304	304	304	304

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations: Jepara Subset

		Age	Years of Education	Total Land (m3)	Yearly Income (Irp)	Total Trees	Total Teak	Total Mahogany	Total Sengon
Age	Pearson Correlation	1	-.331**	.018	.021	-.034	.123	.133	-.093
	Sig. (2-tailed)		.000	.797	.764	.632	.082	.060	.189
	N	202	202	202	202	202	202	202	202
Years of Education	Pearson Correlation	-.331**	1	.178*	.137	.238**	.175*	.204**	.188**
	Sig. (2-tailed)	.000		.011	.051	.001	.012	.003	.007
	N	202	204	204	204	204	204	204	204
Total Land (m3)	Pearson Correlation	.018	.178*	1	.081	.778**	.122	.122	.806**
	Sig. (2-tailed)	.797	.011		.249	.000	.083	.082	.000
	N	202	204	204	204	204	204	204	204
Yearly Income (Irp)	Pearson Correlation	.021	.137	.081	1	.219**	.421**	.495**	.055
	Sig. (2-tailed)	.764	.051	.249		.002	.000	.000	.437
	N	202	204	204	204	204	204	204	204
Total Trees	Pearson Correlation	-.034	.238**	.778**	.219**	1	.406**	.415**	.933**
	Sig. (2-tailed)	.632	.001	.000	.002		.000	.000	.000
	N	202	204	204	204	204	204	204	204
Total Teak	Pearson Correlation	.123	.175*	.122	.421**	.406**	1	.820**	.067
	Sig. (2-tailed)	.082	.012	.083	.000	.000		.000	.340
	N	202	204	204	204	204	204	204	204
Total Mahogany	Pearson Correlation	.133	.204**	.122	.495**	.415**	.820**	1	.087
	Sig. (2-tailed)	.060	.003	.082	.000	.000	.000		.218
	N	202	204	204	204	204	204	204	204
Total Sengon	Pearson Correlation	-.093	.188**	.806**	.055	.933**	.067	.087	1
	Sig. (2-tailed)	.189	.007	.000	.437	.000	.340	.218	
	N	202	204	204	204	204	204	204	204

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations: Pati Subset

		Age	Years of Education	Total Land (m3)	Yearly Income (Irp)	Total Trees	Total Teak	Total Mahogany	Total Sengon
Age	Pearson Correlation	1	-.355**	.059	-.130	-.101	.151	.023	-.156
	Sig. (2-tailed)		.000	.565	.199	.322	.136	.819	.122
	N	99	99	99	99	99	99	99	99
Years of Education	Pearson Correlation	-.355**	1	.270**	.367**	.210*	.035	.143	.216*
	Sig. (2-tailed)	.000		.007	.000	.036	.730	.156	.031
	N	99	100	100	100	100	100	100	100
Total Land (m3)	Pearson Correlation	.059	.270**	1	.447**	.409**	.258**	.164	.380**
	Sig. (2-tailed)	.565	.007		.000	.000	.010	.103	.000
	N	99	100	100	100	100	100	100	100
Yearly Income (Irp)	Pearson Correlation	-.130	.367**	.447**	1	.174	.123	-.038	.163
	Sig. (2-tailed)	.199	.000	.000		.084	.222	.709	.105
	N	99	100	100	100	100	100	100	100
Total Trees	Pearson Correlation	-.101	.210*	.409**	.174	1	.554**	.164	.967**
	Sig. (2-tailed)	.322	.036	.000	.084		.000	.103	.000
	N	99	100	100	100	100	100	100	100
Total Teak	Pearson Correlation	.151	.035	.258**	.123	.554**	1	.261**	.329**
	Sig. (2-tailed)	.136	.730	.010	.222	.000		.009	.001
	N	99	100	100	100	100	100	100	100
Total Mahogany	Pearson Correlation	.023	.143	.164	-.038	.164	.261**	1	.075
	Sig. (2-tailed)	.819	.156	.103	.709	.103	.009		.456
	N	99	100	100	100	100	100	100	100
Total Sengon	Pearson Correlation	-.156	.216*	.380**	.163	.967**	.329**	.075	1
	Sig. (2-tailed)	.122	.031	.000	.105	.000	.001	.456	
	N	99	100	100	100	100	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

CHAPTER FIVE

CONCLUSION

This chapter includes three sub-sections that re-examine the questions central to this research. Each sub-section corresponds to a question that guided the project from planning to writing, discusses the findings and limitations of this study as it pertains to that central question, and considers avenues for further exploration. Together, these sub-sections provide the overall findings for this work and how they can be taken forward.

5.1 To what extent, how, and why is STP changing in northern Central Java?

The initial question that undergirds this research, "To what extent, how, and why is STP changing in northern Central Java?" will become increasingly important to consider throughout the next several years. This research indicates that smallholder timber production (STP) is formalizing as a result of resource provision that seeks to seed smallholder production forests in order to secure timber resources outside the political forests of Java; it also indicates that, due to *Sistem Verifikasi Legalitas Kayu* (SVLK) regulation being mandatory and relying on third party oversight, STP will undergo further formalization in the next several years. Understanding trends within this formalization process will be important in order to conscientiously direct access and direction of timber production.

The decline of political forest productivity throughout Java has garnered significant attention (Soedomo 2010, Purnomo *et al*. 2009, Astraatmaja 2008, Peluso *et al.* 2008, Affif *et al.* 2005). Combined with the demand-supply gap for timber in northern Central Java (Obidzinski *et al.* 2012), new timber resources are required.

This thesis suggests that STP provides significant alternative timber resources, and that timber legality verification, as required by Forest Law Enforcement, Governance and Trade (FLEGT) and implemented in Indonesia through SVLK are the means by which the state is turning its eye toward STP. This turning toward STP through SVLK regulation provides multiple benefits for the state: international legitimacy, continued access to timber product markets, further protection for political forests, the ability to regulate and track STP, and the security of timber resources beyond state forestlands. While this regulation is of great benefit to the state, it is yet unclear how it will affect STP. Research from this study indicates that in northern Central Java, STP is formalizing even before SVLK has taken full effect.

Resource providing institutions and growers participate in an exchange of seedlings for information. The local forestry offices (*Dinas Kehutanan*) have provided seedling resources through the *Kebun Binit Rakyat* (KBR) program since 2010 (Kementerian Kehutanan 2011), *Perum Perhutani* has provided discounted seedlings to growers through community forest initiatives beginning in 2001 and taking effect in Jepara in roughly 2004 (Direktur Perum Perhutani No SK 136/Kpts/Dir/2001), and Trees 4 Trees (T4T) since 2008 (T4T 2008). While growers within our sample remain dependent on local markets and traveling sellers for seedlings, these resource providing institutions are increasing the entanglement of growers with formal organizations. This entanglement is set to increase via mandatory SVLK regulation in January 2014 (MFP 2013, Obidzinski *et al*. 2012).

While current regulation of STP occurs locally through source documentation, SVLK regulation requires increased oversight and involvement with official certifiers. The *Surat Keterangan Asal Usul* (SKAU) documents that are mandatory for selling private timber are loosely enforced within regency borders. Further, they depend on

local administrators for approval and verification. SVLK regulation will, theoretically, demand a more rigorous oversight of this documentation process, one that can link purchasers to growers and remove the flexibility of timber sale. Though smallholder knowledge and enthusiasm for the upcoming regulation is minimal, it is set to have a large impact on the way in which private producers bring their timber to market.

Another trend uncovered by this research is the young profile of surveyed smallholder timber. Of the over 200,000 trees surveyed in this work, approximately 77% are aged zero to five years. While STP harvest cycles are often shorter (Kallio 2012, Nurrochmat and Yulianti 2013), and the predominant timber species, sengon (*Paraserianthes falcataria*), reaches harvestable maturity in approximately five years, there is reason to believe that this finding indicates an increase in timber production from the grower sample. The increase in resource providing institutions within the past five years coupled with the preponderance of young timber indicate an increase in STP within northern Central Java.

While the trends for STP identified in this study come from 304 grower surveys and 21 key-informant interviews, they remain representative of the sample alone. These trends must be applied with caution to inform other areas in Central Java, the rest of the island, or Indonesia. The merit of case studies is that they provide place-specific information and context (Flyvberg 2006). The way in which STP proceeds in northern Central Java may not reflect the rest of the island, much less the rest of the country. Further information on STP, resource providing institutions, and timber regulation collected in various locations across Indonesia would valuable information about how smallholders across the country operate.

STP in northern Central Java is formalizing as a result of resource provision and timber regulation. Formalization is propelled by increased entanglement with

formal organizations that provide resources or seek to verify source documentation for smallholder timber. The Indonesian state receives multiple benefits from this formalization, namely the securitization of timber resources outside the political forest. Further, smallholder timber seems to be increasing in amount resulting in young smallholder forests that will provide short- and long-term benefits. While it seems that STP is posed to continue formalizing, continued monitoring of STP in northern Central Java combined with STP case-studies from across Indonesia would produce information valuable to policymakers, academics, and smallholders themselves. This study provides an initial contribution to this task.

5.2 How do social variables, networks, and ecological processes affect STP, and how does STP affect these phenomena?

To provide insight into how social variables, networks, ecological processes, and STP affect one another, this study employs value-chain analysis (VCA) and access analysis (AA). These heuristics enable consideration of STP at different tiers, and how those tiers are composed of actors based on a variety of variables. We found that increased total land and yearly income are associated with public and public-private institutional affiliation, that multiple entry points within the furniture value-chain (FVC) are associated with several benefits for growers, and that short-term harvest cycles (approximately five years) largely determine the profile of smallholder timber.

Among the set of socioeconomic variables we examined, total land and yearly income were the most strongly associated with institutional affiliation and timber production. While all growers within our sample claimed they owned land on which they grew their crop, those growers with more land were more likely to be affiliated

with *Perhutani* and the local forestry office. We suggest that this trend is a product of economies of scale, as institutions can save time and money disseminating a large amount of seedling resources to fewer growers with large land allotments. Also, we suggest that "patronage democracy" provides insight into how the more landed growers may have established relationships with administrators and employees within the local forestry offices and *Perhutani*. Land ownership on Java is often predicated upon family ties (Peluso 1992), and so the most landed families might establish long-term, mutually beneficial relationships with actors in resource providing institutions. While the programs through which seedlings are disseminated are recent developments, the institutions from which they come are nearly 50 years old and have historical ties to institutions the predate Indonesia's independence. "Patronage democracy" refers to the manner in which political hopefuls will dole out benefits to certain, often more privileged, village leaders in return for their support within the community (Nordholt 2012). While further information needs to be gathered on this particular relationship between the most landed growers and public institutions, we begin to support this hypothesis through the predictive ability of total land in KBR and *Perhutani* affiliation, and the lack of predictive ability total land plays in T4T affiliation, as well as the significant differences in total land owned between KBR and *Perhutani* members and non-members.

One of the most pronounced access patterns we identified is that growers involved in down-stream activities of the furniture value chain (FVC) t receive multiple benefits in timber production. These growers with multiple entry points into The FVC in northern Central Java are generally wealthier, have more land and years of education. Further, they know significantly more growers and produce significantly more sengon than do growers without further involvement in the FVC. These findings

indicate that furniture production is a major driver of development within our sample. However, these benefits are geographically distributed; 98% of these FVC involved growers are within the Jepara subset. The benefits of furniture production agglomeration for local growers in the Jepara regency is an exciting avenue for further research, one which might have particular interest for researchers at the Center for International Forest Research (CIFOR) who have conducted significant studies on the FVC in northern Central Java.

The affect income plays in timber species selection provides interesting commentary on the socio-environmental metabolism of northern Central Java. Multiple statistical analyses determined an association between higher income and total teak and mahogany holdings. We find that those growers able to use the luxury tropical hardwoods toward future profits do so, but that many growers within our sample require returns on their timber crop within five years. Thus, the composition of the smallholder forest within our sample is dominated by sengon production. While local industry depends much more on luxury tropical hardwoods (Irawati *et al.* 2009, Purnomo *et al.* 2009) smallholders are using their resources to fill the demand-supply gap for other timber products and industries. Our research did not uncover any payment plans for growers to benefit from timber species that require longer to mature, but which are needed more desperately by local industry; providing smallholders with financial incentives to plant local teak and mahogany could help relieve the pressure on political forests and generate completely local products.

The production of timber is intertwined with the lives of growers, the formation and organization of networks, and the general environment. Assessing how these phenomenon influence one another in northern Central Java and elsewhere requires consistent study over time. Our work provides a snapshot of STP in northern

Central Java. Conducting a longitudinal study on growers in northern Central Java would provide greater insight into how STP is developing in relation to growers' socioeconomic characteristics, networks of timber production, and the material production forest.

5.3 How do international policy, domestic policy, and local practice inform and constitute one another?

Examining STP in northern Central Java can provide a close examination of how an international agenda is translated into local action. The process is by no means top-down; rather, we understand the different scales of policy to be co-constitutive (Singer 2008). The language of "legality" and the opportunities provided by FLEGT negotiations created a moment for the governmentalization of STP. Such a moment was made possible because of sub-optimal implementation of previous international forest policies (Wells *et al.* 1999, Linkie *et al*. 2008, Mulyani and Jepson 2013) and the inability for non-state market driven instruments to strengthen domestic institutions (Cashore and Stone 2012). This moment is filled with myriad potential benefits for the state, benefits that exist because of how local practice depleted political forests and simultaneously led to a demand for timber throughout Central Java and the rest of the island. Whether or not these multiple benefits come to fruition depends on how the certification of STP proceeds at a local level.

SVLK regulation will need to go further than assuring compliance at a local level. SKAU certification is not yet a "legitimate" source of regulation (Nurrochmat and Yulianti 2013). Improving this regulatory technique to go beyond assessing compliance with SKAU regulations can take many forms. We suggest:

1. Using resource providing institutions to assist third-party auditors in determining legal timber verification

2. Providing certification renewal cycles that reflect the average time to harvest for major timber species within specific villages.

3. Tackling the legitimacy of SKAU certification rather than relying exclusively on compliance verification.

4. Providing positive incentives for adhering to timber regulation standards, especially in the form of faster growing strains of luxury tropical hardwoods.

While these policy suggestions are by no means comprehensive, they provide a manner in which to begin considering SVLK regulation at a local level in northern Central Java. Policy recommendations must attend the multiple scales at which policy works, paying close attention to the institutions and networks that shape local practice and implementation of regulatory technologies.

Smallholder timber, which accounts for the majority of the timber used for timber products in Central Java in 2011 (Obidzinski *et al.* 2012), is vital to the livelihoods of millions of people throughout the Indonesian archipelago and beyond. Continued examination of how regulation, institutional resource provision, and smallholder practice affect and co-produce STP is vital. As it increases in formalization, STP will simultaneously increase in importance within northern Central Java and beyond. It remains to be seen exactly how international agendas, domestic institutions, and local practice will combine to affect the legitimacy and legality of smallholder timber and the livelihoods millions of growers. It is my hope that thesis contributes to a better understanding and appreciation of STP in northern Central Java, and that it provides researchers, policymakers, growers, and interested citizens with useful information and insights.

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Appendix One

Grower survey with translations (note: original grower surveys did not have English translations)

Daftar Pertanyaan Biologi dan Produksi untuk Pengelolaan Kehutanan di Kabupaten Jepara dan Pati *(Biological and Production Questionnaire for Forest Management in Jepara and Pati Regencies)*

Pewawancara: *Perkenalkan diri anda dan menjelaskan tujuan survey ini, yang mengumpulkan informasi tentang orang yang menanam dan jual pohon-pohon dan kayu. Tolong jelaskan informasi hanya untuk penelitian aja. Ingat, ijinkan petani/responden menjawab pertanyaan berikut. Tidak ada jawaban benar atau salah.*

Interviewer*: Introduce yourself and explain that the purpose of this survey is to collect information about the people who grow and sell trees and wood. Please explain the information collected is only for this study. Remember, allow farmers / respondents to answer the questions that follow. There are no right or wrong answers.*

1. Informasi Dasar *(Basic Information)*

Tanggal survey ini (hr/bln/thn)
(Date of survey)

Nama enumerator: _____
(Enumerator Name)
Kabupaten (lingkar satu): Jepara / Pati
(Regency [circle one])
Kecamatan:
_____
(Sub-district)
Desa:
_____
(Village)
Lokasi (jika ada): Garis Lintang: _____ *(Longitude)* Garis Bujur: _____ (*Latitude)*
(Location [if geo-locating]) Elevasi: _____*(Elevation)* Akurasi: _____ *(Accuracy)*
atau (jika tidak ada)
Or (if not geo-locating)

RT:
_____
(Address)

2. Data Pribadi Petani *(Grower Information)*

a) Apakah anda telah . . . (lingkar 'Ya' atau 'Tidak')
(Do you [circle 'yes' or 'no'])

1. Menanam pohon-pohon untuk dijual sebagai log/material? (Ya / Tidak)
(Grow trees to sell as logs)
2. Menerima bibit / semaian bibit dari Trees 4 Trees? (Ya / Tidak)
(Receive seed/seedlings from Trees 4 Trees)
3. Menerima bibit / semaian bibit dari Kebun Benih Rakyat (progam pemerintah daerah) (Ya / Tidak)
(Receive seed/seedlings from Village Nursery [local government program])
4. Menerima bibit/ semaian bibit dari Perum Perhutani atau bekerja untuk Perum Perhutani? (Ya / Tidak)
(Receive seeds/seedlings from Perum Perhutani or work for Perum Perhutani?)
5. Menerima bibit / semain bibit dari sumber lain (Ya / Tidak)
(Receive seeds/seedlings from another source)
_____ (sebutkan)
(specify)

(Jika semua jawaban "tidak," JANGAN MELANJUTKAN WAWANCARA)
(If all answers are 'no,' DO NOT CONTINUE INTERVIEW)
b) Apakah anda kepala keluarga? _____
(Are you the head of house?)
c) Jika tidak, sebagai apakah anda dalam keluarga?
(If not, how are you related to the head of house?)

1. Istri: _____ 2. Anak ke: _____ 3. Lain: _____ (sebutkan)
(Wife) *(Child)* *(Other)* *(Specify)*

d) Nama petani: _____
(Name of grower)
e) Jenis: 1. Pria: _____ 2. Wanita: _____
(Sex) *(Male)* *(Female)*
f) Umur: _____
(Age)
g) Berapa orang yang tinggal di rumah anda/petani (termasuk anda sendiri)? _____
(How many people stay in the household [including you]?)
h) Pendidikan terakhir petani:
(Highest level of schooling for grower)

1. Tidak Sekolah: _____ 2. SD: _____ 3. SMP: _____ 4. SMK: _____
(No School)
5. SMA _____ 6. Universitas _____ (nama)
(University)

i) Apakah anda sudah mendapat pendidikan untuk menanam pohon? (Ya / Tidak)
(Have you received training for growing trees?)

1. SMK _____ 2. University _____ 3. Swasta _____ 4. Pemerintah/Perhutani ____ *(Private)*
5. Lain: _____(sebutkan)
(Other)
(Specify)

j) Apakah anda sebagai anggota suatu kelompok / organisasi petani? (Ya / Tidak)
(Are you part of a farmer group?)

Nama kelompok/organisasi petani: _____
(Name of farmer group)

3. Informasi Tanah *(Land Information)*

a. Jumlah tanah yang dimiliki: _____ m^2
(Total land owned)
b. Jumlah tanah yang disewa/disewakan: _____ m^2
(Total land rented)
c. Jumlah tanah yang digarap: _____ m^2
(Total land farmed)
d. Jumlah tanah yang (dimiliki + disewakan): _____ m^2
(Total land [owned+rented])
e. Memetakan tanah (jika bisa)
(Map our your land [if able])

4. Informasi Pohon-Pohon *(Tree Information)*

a. Pohon apa saja yang anda tanam?

Jenis Pohon *(Species of Tree)*	Berapa Pohon yang jenis ini? *(How many trees of this species?)*	Apakah anda menanam pohon-pohon itu di Tanah anda sendiri (M), Tanah Sewaan (S), atau Tanah pemerintah (P)? *(Do these trees grow on land you own, rent, or government land?)*	1. Berapa harga pohon /m3 yang anda jual satu tahun lalu? 2. Berapa kira-kira harga normal kayu / m3 menarut anda? *(1. What price for tree or m3 did you sell for last? 2. What do you believe is a normal price for this wood/m3)*
1. Jati *(Teak)*			
2. Jati jun *(Jun Teak)*			
3. Jati mas *(Mas Teak)*			
4. Mahoni *(Mahogany)*			
5. Pinus *(Pine)*			
6. Sonokeling *(No Translation)*			
7. Suren *(No translation)*			
8. Mindi *(No translation)*			
9. Sengon *(No translation)*			
10. Sengon Laut			

(Sea Sengon)			
11. Mangga *(Mango)*			
Sebutkan pohon-pohon berbuah yang anda tanam ? *(What fruit trees do you grow?)*			

b) Apakah anda menggunakan pupuk untuk pohon-pohon anda? (Ya / Tidak)
(Do you use fertilizer for your trees?)

Jika ya, menggunakan pupuk apa? _____
(If yes, what fertilizer do you use?)

c) Berapa usia pohon-pohon anda . . .
(How many of your trees are

1. 0 – 5 tahun: _____ *(0-5 years)*
2. 6 – 15 tahun: _____ *(6-15 years)*
3. 15 – 25 tahun: _____ *(15-25 years)*
4. Lebih tua dari 25 tahun: _____ *(Older than 25 years)*

d) Apa alasan anda menanam pohon (pilih semua yang sesuai)?
(Why do you grow trees [select all that apply]?)

1. Untuk mendapatkan hasil/dana saat ini: _____ *(To make money in the short-term)*
2. Menabung untuk masa depan: _____ *(To save for the future)*
3. Memanfaatkan tanah yang tidak terpakai: _____ *(To use land without another use)*
4. Meningatkan keindahan tanah: _____ *(To beautify the land)*
5. Untuk pertimbangan keagamaan atau kebudayaan: _____ *(For my culture or religion)*
6. Melindungi atau membantu tanaman lainnya: _____ *(To help my other crops grow)*
7. Saya menerima warisan/pemberian pohon-pohon yang saya miliki: _____ *(I inherited the trees I own)*
8. Karena saya menerima bantuan dari organisasi atau orang lain: _____ *(Because I received help from an organization or person)*

e) Pohon jenis apa yang akan anda tanam?
_____
(What species of tree do you want to grow or grow more of?)

i. Kenapa anda belum manaman pohon-pohon ini?
(Why don't you grow/grow more of this tree?)

1. Kurang/Tidak punya tanah atau lahan _____ *(Not enough land)*
2. Benih terlalu mahal _____ *(Seeds are too expensive)*
3. Harga kayu/log terlalu rendah _____ *(Selling price is too cheap)*

4. Tidak ada waktu atau orang yang mengerjakan_____ *(There is not enough time or human resources)*
5. Lain (sebutkan) _____
(Other [specify])

f) Siapa yang membeli atau siapa yang akan membeli pohon-pohon anda?
(Who buys or who will buy your trees?)

1. Pengepul / makelar dari Penduduk Lokal _____ *(Local middle-man)*
2. Pengepul / makelar dari Pabrik_____ *(Factory middle-man)*
3. Pengepul / makelar dari Penduduk Lain _____ *(Middle-man from another village)*
4. Belum tahu karena belum pernah jual _____ *(I do not know who will buy my wood)*

g) Dengan apa Pengepul / makelar membayar anda ?
(With what will the purchaser pay you?)

1. Uang _____ 2. Barang-barang _____ 3. Jasa _____
(Money) *(Goods)* *(Services)*

h) Dapatkah anda memilih lebih dari satu pembeli kayu dari seluruh pembeli kayu anda? (Ya / Tidak)
(Do you know more than one purchaser?)

Jika ya, berapa pembeli? _____
(If yes, how many purchasers?)

i) Bagaimana anda tahu tentang harga normal kayu (pilih semua yang sesuai)?
(How do you find out about normal wood prices [select all that apply?])

1. Kata pengepul/makelar _____ *(From the purchaser)*
2. Hasil diskusi dengan petani lain _____ *(Discussion with other growers)*
3. Informasi atau diskusi di HP _____ *(Information or discussion with my cell phone)*
4. Informasi di internet _____ *(Information from the internet)*
5. Informasi dari Dinas atau pemerintah yang berhubungan _____
(Information from Dinas or other government communication)
6. Saya jual sesuka saya _____ *(I sell without knowing the normal price)*

j) Kayu anda dikirim ke mana?
(Where is your wood sent?)

1. Jepara _____ 2. Semarang _____ 3. Lain_____ (sebutkan)

4. Belum tahu_____
(I do not know)

5. Informasi Mata Pencarian *(Livelihood Information)*

a) Informasi tempat tinggal
(House information)

i. Jenis rumah petani: *(Type of house)*

1. Tetap _____ 2. Sementara _____ 3. Kayu_____4. Tembok_____

(Permanent) *(Cement)* *(Wood)* *(Brick)*

ii. Listrik: *(Electricity)*

1. PLN ____2. Generator _____ 3. Tidak ada _____ 4. Lain _____
(No electricity) *(Other)*

iii. Apakah anda memeliki hp? (Ya / Tidak) *(Do you own a cell phone?)*

1. Nomor hp: _____
(Cell phone number)

b) Informasi ekonomi
(Economic Information)

i. Pada rumah tangga anda . . . *In the household*

	Sumber pendapatan utama (pilih satu aja) *(Primary source of income)* *(Choose only one)*	Sumber tambahan lain (pilih semua yang berlaku) *(Other income sources)* *(Choose all that apply)*
Pertanian (ternak, tanaman panenan, kayu) *(Agriculture [livestock, crop, wood])*		
Gaji (Perum Perhutani, guru, lain) *(Salary [Perum Perhutani, teacher, other])*		
Bekerja menyewakan (sebutkan) *(Rented labor [specify])*		
Produksi/pekerjaan lain (warung, bisnis konstruksi, lain-lain sebutkan) *(Other production [food-stall, construction business, other])*		
Lain (sebutkan) *(Other [specify])*		

ii. Jumlah nomor dan jenis ternak yang anda miliki sekarang dan yang terjual di tahun kemarin: *(Total number and species of livestock you own now and that you sold in the past year)*

Ternak *(Livestock)*	Berapa dimiliki sekarang *(Number owned)*	Berapa terjual di tahun kemarin *(Number sold in the last year)*	Berapa harganya per jenis ternak *(Selling price per animal)*
Sapi *(Cow)*			
Ayam *(Chicken)*			
Kambing *(Goat)*			
Bebek *(Duck)*			

iii. Jumlah per kubik dan jenis tanaman yang dimiliki dan yang terjual di tahun kemarin: *Total amount of land and the species of crop you own and sold last year*

Tanaman *(Crop)*	Luas lahan (m^2) *(Land area)*	1. Kubik (m3) dijual di tahun kemarin 2. Berapa kali anda menjual tahun kemarin *(1. Amount sold last year* *2. How many times did you sell last year?)*	1. Harga per kubik 2. Harga per kali *(1. Price per cubic* *2. Price per harvest)*
Padi *(Rice)*			
Singkong *(Cassava)*			
Tebu *(Sugarcane)*			
Jagong *(Corn)*			

iv. Berapa gaji per bulan (jika pekerja) *(What is your salary per month [if applicable])*

Pekerjaan *(Job title)*	Gaji per bulan *(Salary/month)*

v. Berapa jumlah pendapatan yang dihasilkan dari menyewakan *(What is the total you have owned from rented labor?)*

Pekerjaan (*Job)*	Uang yang terkumpul tahun kemarin *(Money earned in the last year)*

vi. Sumber pendapatan lain (jika ada) *(Other sourcesof income [if applicable])*

Sumber Lain *(Resource)*	Uang yang terkumpul tahun kemarin *(Money earned in the last year)*

Pewawancara: Tolong ucapkan, "terima kasih untuk waktu anda."
*(**Interviewer:** Please say, "thank you for your time.")*

Pertanyaan di bawah ini, tidak perlu ditanyakan.

(Do not ask the question below)

Estimasi jumlah pendapatan per tahun:

Rp _____

(Estimate of total income for the year)

Appendix Two

Binomial Regression: KBR Affiliation (0,1) as Predicted by Education, Total Land, and Yearly Income
Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted KBR 0	Predicted KBR 1	Percentage Correct
Step 0	KBR	0	0	136	0.0
		1	0	168	100.0
	Overall Percentage				55.3

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.211	.115	3.356	1	.067	1.235

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	Education_Yrs	7.050	1	.008
		land_total	8.230	1	.004
		yearlyincome	.982	1	.322

a. Residual Chi-Squares are not computed because of redundancies.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	17.651	3	.001
	Block	17.651	3	.001
	Model	17.651	3	.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	400.408[a]	.056	.075

a. Estimation terminated at iteration number 3

Classification Table[a]

Observed			Predicted KBR 0	Predicted KBR 1	Percentage Correct
Step 1	KBR	0	51	85	37.5
		1	31	137	81.5
	Overall Percentage				61.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Education_Yrs	-.089	.035	6.252	1	.012	.915
	land_total	.000	.000	6.824	1	.009	1.000
	yearlyincome	.000	.000	3.266	1	.071	1.000
	Constant	.878	.271	10.540	1	.001	2.407

a. Variable(s) entered on step 1: Education_Yrs, land_total, yearlyincome.

Binomial Regression: Perum Perhutani Affiliation (0,1) as Predicted by Education, Total Land, and Yearly Income
Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted PP 0	Predicted PP 1	Percentage Correct
Step 0	PP	0	222	0	100.0
		1	82	0	0.0
	Overall Percentage				73.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.996	.129	59.398	1	.000	.369

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	Education_Yrs	.074	1	.785
		land_total	9.538	1	.002
		yearlyincome	.468	1	.494

a. Residual Chi-Squares are not computed because of redundancies.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	14.737	3	.002
	Block	14.737	3	.002
	Model	14.737	3	.002

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	339.725[a]	.047	.069

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a]

Observed			Predicted PP 0	Predicted PP 1	Percentage Correct
Step 1	PP	0	222	0	100.0
		1	82	0	0.0
	Overall Percentage				73.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Education_Yr	.038	.039	.953	1	.329	1.039
	land_total	.000	.000	9.522	1	.002	1.000
	yearlyincome	.000	.000	.161	1	.688	1.000
	Constant	-.820	.304	7.250	1	.007	.441

a. Variable(s) entered on step 1: Education_Yrs, land_total, yearlyincome.

Binomial Regression: FVC Affiliation (0,1) as Predicted by Education, Total Land, and Yearly Income

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted: Is the grower involved No	Yes	Percentage Correct
Step 0	Is the grower	No	205	0	100.0
		Yes	99	0	0.0
	Overall Percentage				67.4

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.728	.122	35.371	1	.000	.483

Variables not in the Equation[a]

			Score	df	Sig.
Step 0	Variables	Education_Yrs	.006	1	.939
		land_total	28.396	1	.000
		yearlyincome	6.859	1	.009

a. Residual Chi-Squares are not computed because of redundancies.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	73.180	3	.000
	Block	73.180	3	.000
	Model	73.180	3	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	310.505[a]	.214	.298

a. Estimation terminated at iteration number 6

Classification Table[a]

Observed			Predicted: Is the grower involved No	Yes	Percentage Correct
Step 1	Is the grower	No	185	20	90.2
		Yes	68	31	31.3
	Overall Percentage				71.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Education_Yrs	.021	.042	.256	1	.613	1.022
	land_total	.000	.000	26.858	1	.000	1.000
	yearlyincome	.000	.000	9.704	1	.002	1.000
	Constant	-.244	.329	.548	1	.459	.784

a. Variable(s) entered on step 1: Education_Yrs, land_total, yearlyincome.

Independent Samples Test: T4T Affiliation - Total Sample

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Land (m3)	Equal variances assumed	.447	.504	-.297	302	.767	-423.102	1426.871	-3230.970	2384.767
	Equal variances not assumed			-.276	164.290	.783	-423.102	1533.782	-3451.568	2605.364
Total Trees	Equal variances assumed	.947	.331	.387	302	.699	110.50941	285.51466	-451.34068	672.35951
	Equal variances not assumed			.446	280.284	.656	110.50941	247.52236	-376.72940	597.74822
Total Teak	Equal variances assumed	7.955	.005	-1.936	302	.054	-109.57922	56.61138	-220.98192	1.82349
	Equal variances not assumed			-1.468	110.816	.145	-109.57922	74.65790	-257.52154	38.36311
Total Mahogany	Equal variances assumed	2.147	.144	-.729	302	.467	-36.13765	49.56822	-133.68048	61.40518
	Equal variances not assumed			-.573	117.452	.567	-36.13765	63.01451	-160.92956	88.65427
Total Sengon	Equal variances assumed	3.860	.050	1.066	302	.287	274.71039	257.68835	-232.38169	781.80247
	Equal variances not assumed			1.480	233.854	.140	274.71039	185.59709	-90.94559	640.36637
Known Buyers	Equal variances assumed	3.550	.061	.950	300	.343	.228	.240	-.244	.700
	Equal variances not assumed			1.115	282.085	.266	.228	.204	-.175	.630
Yearly Income	Equal variances assumed	.012	.914	.518	302	.605	4496637.157	8676634.243	-12577679.512	21570953.826
	Equal variances not assumed			.508	186.507	.612	4496637.157	8858646.618	-12979390.938	21972665.252

Independent Samples Test: KBR Affiliation - Total Sample

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Land (m3)	Equal variances assumed	18.553	.000	2.899	302	.004	3855.826	1330.083	1238.421	6473.231
	Equal variances not assumed			2.728	193.176	.007	3855.826	1413.300	1068.347	6643.305
Total Trees	Equal variances assumed	2.777	.097	.722	302	.471	194.61485	269.62043	-335.95778	725.18747
	Equal variances not assumed			.675	183.019	.501	194.61485	288.42271	-374.44621	763.67590
Total Teak	Equal variances assumed	9.680	.002	-1.747	302	.082	-93.53501	53.55373	-198.92073	11.85071
	Equal variances not assumed			-1.922	188.119	.056	-93.53501	48.67788	-189.55966	2.48963
Total Mahogany	Equal variances assumed	6.650	.010	-1.516	302	.131	-70.80672	46.70136	-162.70800	21.09456
	Equal variances not assumed			-1.678	175.771	.095	-70.80672	42.19334	-154.07748	12.46403
Total Sengon	Equal variances assumed	9.398	.002	1.525	302	.128	370.70413	243.01589	-107.51474	848.92301
	Equal variances not assumed			1.380	141.316	.170	370.70413	268.58894	-160.26752	901.67578
Known Buyers	Equal variances assumed	7.751	.006	1.130	300	.259	.255	.225	-.189	.699
	Equal variances not assumed			1.082	217.483	.280	.255	.236	-.209	.719
Yearly Income	Equal variances assumed	2.167	.142	-.989	302	.323	-8100579.307	8189037.638	-24215378.885	8014220.272
	Equal variances not assumed			-1.040	279.890	.299	-8100579.307	7790927.819	-23436832.679	7235674.066

Independent Samples Test: Perum Perhutani Affiliation - Total Sample

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Land (m3)	Equal variances assumed	10.911	.001	3.128	302	.002	4650.242	1486.817	1724.410	7576.075
	Equal variances not assumed			3.987	252.790	.000	4650.242	1166.241	2353.456	6947.028
Total Trees	Equal variances assumed	.369	.544	.161	302	.872	48.57196	302.30771	-546.32433	643.46825
	Equal variances not assumed			.225	297.893	.822	48.57196	215.83496	-376.18247	473.32640
Total Teak	Equal variances assumed	5.526	.019	-1.193	302	.234	-71.79103	60.15770	-190.17237	46.59030
	Equal variances not assumed			-1.053	117.194	.294	-71.79103	68.16587	-206.78762	63.20555
Total Mahogany	Equal variances assumed	1.394	.239	-.812	302	.418	-42.59042	52.46183	-145.82744	60.64660
	Equal variances not assumed			-.822	148.105	.413	-42.59042	51.83067	-145.01357	59.83273
Total Sengon	Equal variances assumed	1.765	.185	.673	302	.502	183.77005	273.09688	-353.64371	721.18381
	Equal variances not assumed			1.048	272.698	.296	183.77005	175.39099	-161.52242	529.06252
Known Buyers	Equal variances assumed	11.769	.001	1.810	300	.071	.457	.252	-.040	.954
	Equal variances not assumed			2.260	236.278	.025	.457	.202	.059	.855
Yearly Income	Equal variances assumed	3.148	.077	.682	302	.496	6265404.032	9182088.353	-11803570.622	24334378.686
	Equal variances not assumed			.905	275.096	.366	6265404.032	6923536.001	-7364440.780	19895248.844

Independent Samples Test: Number of Affiliations (1, more than 1) - Total Sample

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Land (m3)	Equal variances assumed	12.967	.000	-3.064	302	.002	-4194.705	1368.844	-6888.385	-1501.024
	Equal variances not assumed			-2.850	185.138	.005	-4194.705	1471.838	-7098.436	-1290.973
Total Trees	Equal variances assumed	5.277	.022	-.969	302	.333	-269.08333	277.72670	-815.60789	277.44123
	Equal variances not assumed			-.800	132.556	.425	-269.08333	336.53182	-934.75072	396.58406
Total Teak	Equal variances assumed	9.104	.003	1.680	302	.094	92.74851	55.22271	-15.92151	201.41854
	Equal variances not assumed			2.145	220.904	.033	92.74851	43.23963	7.53354	177.96349
Total Mahogany	Equal variances assumed	4.725	.030	1.282	302	.201	61.79539	48.19051	-33.03631	156.62708
	Equal variances not assumed			1.658	206.698	.099	61.79539	37.27897	-11.70038	135.29116
Total Sengon	Equal variances assumed	13.119	.000	-1.731	302	.085	-433.04315	250.22050	-925.43962	59.35331
	Equal variances not assumed			-1.337	114.031	.184	-433.04315	323.79083	-1074.46842	208.38211
Known Buyers	Equal variances assumed	12.969	.000	-2.359	300	.019	-.544	.231	-.998	-.090
	Equal variances not assumed			-2.068	154.742	.040	-.544	.263	-1.064	-.024
Yearly Income	Equal variances assumed	3.348	.068	1.072	302	.285	9047503.720	8438685.958	-7558566.360	25653573.801
	Equal variances not assumed			1.242	300.280	.215	9047503.720	7287215.480	-5292975.319	23387982.759

Independent Samples Test: Further FVC Affiliation - Total Sample

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total Land (m3)	Equal variances assumed	55.116	.000	5.578	302	.000	7599.099	1362.306	4918.286	10279.913
	Equal variances not assumed			7.785	236.994	.000	7599.099	976.087	5676.185	9522.014
Total Trees	Equal variances assumed	2.326	.128	1.228	302	.220	350.82582	285.61071	-211.21328	912.86492
	Equal variances not assumed			1.426	279.828	.155	350.82582	246.05503	-133.52804	835.17967
Total Teak	Equal variances assumed	5.055	.025	-1.358	302	.176	-77.30091	56.93513	-189.34071	34.73889
	Equal variances not assumed			-1.027	110.080	.307	-77.30091	75.24810	-226.42379	71.82197
Total Mahogany	Equal variances assumed	2.419	.121	-1.028	302	.305	-51.04932	49.65317	-148.75933	46.66068
	Equal variances not assumed			-.804	115.754	.423	-51.04932	63.50990	-176.84151	74.74286
Total Sengon	Equal variances assumed	6.143	.014	1.803	302	.072	464.25193	257.45745	-42.38577	970.88964
	Equal variances not assumed			2.539	227.733	.012	464.25193	182.81802	104.02081	824.48306
Known Buyers	Equal variances assumed	27.224	.000	4.509	300	.000	1.045	.232	.589	1.501
	Equal variances not assumed			5.876	287.022	.000	1.045	.178	.695	1.395
Yearly Income	Equal variances assumed	10.895	.001	-2.640	302	.009	-22717588.445	8604177.673	-39649321.436	-5785855.455
	Equal variances not assumed			-2.093	118.423	.038	-22717588.445	10851548.546	-44205813.053	-1229363.838

ANOVA: Income Quartiles - Total Sample

		Sum of Squares	df	Mean Square	F	Sig.
Total Land (m3)	Between Groups	1825004929.694	3	608334976.565	4.626	.004
	Within Groups	39447360910.724	300	131491203.036		
	Total	41272365840.418	303			
Total Trees	Between Groups	58881292.224	3	19627097.408	3.694	.012
	Within Groups	1593977466.184	300	5313258.221		
	Total	1652858758.408	303			
Total Teak	Between Groups	2315434.145	3	771811.382	3.650	.013
	Within Groups	63439111.842	300	211463.706		
	Total	65754545.987	303			
Total Mahogany	Between Groups	1583274.987	3	527758.329	3.278	.021
	Within Groups	48297570.895	300	160991.903		
	Total	49880845.882	303			
Total Sengon	Between Groups	27659627.141	3	9219875.714	2.090	.102
	Within Groups	1323119529.829	300	4410398.433		
	Total	1350779156.970	303			
Known Buyers	Between Groups	2.754	3	.918	.239	.869
	Within Groups	1142.478	298	3.834		
	Total	1145.232	301			

Total Land (m3)

Tukey HSD[a]

Income Category	N	Subset for alpha = 0.05	
		1	2
1.00	76	5582.50	
2.00	76	6164.25	
3.00	76	8218.37	8218.37
4.00	76		11841.95
Sig.		.490	.210

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 76.000.

b. Category 1.00 = Less than first quartile of income
c. Category 2.00 =Between first and second quartiles of income
d. Category 2.00 = Between second and third quartiles of income
e. Category 2.00 = Greater than third quartile of income

Total Teak

Tukey HSD[a]

Income Category	N	Subset for alpha = 0.05	
		1	2
1.00	76	33.2895	
2.00	76	56.7368	
3.00	76	143.2632	143.2632
4.00	76		255.7368
Sig.		.454	.434

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 76.000.

b. Category 1.00 = Less than first quartile of income
c. Category 2.00 =Between first and second quartiles of income
d. Category 2.00 = Between second and third quartiles of income
e. Category 2.00 = Greater than third quartile of income

ANOVA: Method for Obtaining Market Knowedge - Total Sample

		Sum of Squares	df	Mean Square	F	Sig.
Number of Affiliations	Between Groups	16.105	4	4.026	6.101	.000
	Within Groups	197.313	299	.660		
	Total	213.418	303			
Known Buyers	Between Groups	128.143	4	32.036	9.355	.000
	Within Groups	1017.088	297	3.425		
	Total	1145.232	301			

Number of Affiliations

Tukey HSD$_{a,b}$

Market Knowledge Category	N	Subset for alpha = 0.05	
		1	2
Uses two or more methods	23	1.4783	
From other growers	58	1.7586	1.7586
From the purchaser	131	1.8015	1.8015
Uses phone/internet	8	1.8750	1.8750
Does not use seek information on price	84		2.2381
Sig.		.433	.240

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 24.360.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Known Buyers

Tukey HSD$_{a,b}$

Market Knowledge Category	N	Subset for alpha = 0.05	
		1	2
Uses phone/internet	8	3.00	
From the purchaser	129	3.07	
Does not use seek information on price	84	3.24	
From other growers	58	4.00	4.00
Uses two or more methods	23		5.39
Sig.		.327	.069

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 24.346.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.