

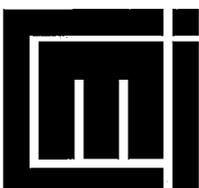
# **The Evolution of Private Property Rights in Traditional Agriculture:**

Theories and a Study from Indonesia

Arild Angelsen

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**Summary:**

The starting point of this paper is a universally observed tendency of common property to be replaced by private property in traditional agriculture. The paper seeks to explore the forces behind such a development. Four different theoretical approaches are discussed: neo-institutional economics, which focuses on increasing land value; Marxian, class-based explanations; a state-local perspective, focusing on predatory state intervention and lack of respect for customary law; and a cultural explanation based on a "commoditization of land" hypothesis. These approaches are discussed in relation to the development in the study area in Sumatra. A framework which integrates elements of all approaches is outlined, using a "demand and supply for institutional change" metaphor. In particular, the neo-institutional and the state-local approaches are found to be relevant to explain the evolution of private property rights. The paper also develops a formal analytical model which endogenizes farmers' decisions about tenure security.

**Indexing terms:**

Property rights  
Institutional analysis  
Economic models  
Agriculture  
Indonesia

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# 1 Introduction: The Evolution of Private Property Rights (EPPR) hypothesis<sup>1</sup>

"In the long course of historical development, economic societies can be viewed as moving in a general way from C [common property] to P [private property]" (Cohen and Weitzman, 1975: 310).

The starting point for this paper is a general observation of the replacement of common property by private property rights to natural resources. This seems to be valid both as a generalisation throughout history, as well as a description of processes taking place in many developing countries today. There exists a number of examples of successful management of resources held in common (e.g., Ostrom, 1990). My purpose is not to question these studies, indeed this paper should be complementary as it explores the forces that could lead to the weakening or disappearance of common property regimes.

A general proposition on the evolution of private property rights (EPPR) raises a number of relevant research questions:

1. To what extent is this proposition universally valid?
2. What are the forces behind such a development?
3. What are the effects on particularly economic efficiency (economic growth) and equity?
4. How can governments influence this development, either to limit, redirect, or promote and facilitate it depending on the governments' objectives?

This paper will mainly address the second question, but touch upon the three others, particularly the fourth one in relation to the case study. The first question relates to a more fundamental one: is common property just a temporary stage in a more or less natural and optimizing evolution towards private property rights over natural resources? If yes, trying to preserve common property regimes may have negative consequences on both the productivity and the environment, as argued by Ault and Rutman (1979) in the context of land rights in Africa.<sup>2</sup> While this paper does not pursue the question on the universal validity of the EPPR hypothesis, our tentative answer would be a conditional "yes" for resources where exclusion is possible (i.e., has relative low costs). For resources with high exclusion costs, it may *not* be the case.

The discussion of the EPPR will focus on traditional agricultural societies, where typically some form of communal management of common property land is gradually moving towards a system of more individualized and well defined property rights. Compared to many natural resources, land is generally *not* a public good (non-rivalry in consumption), and the exclusion costs may be manageable (unlike for resources like fish, air, etc.). There is rivalry in land use, and exclusion is possible at reasonable costs.

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<sup>1</sup> An early version of this paper was presented at the *Fifth Common Property Conference: Reinventing the Commons*, the International Association for the Study of Common Property, 24-28 May 1995, Bodø, Norway. I am grateful for discussions with and/or comments to the paper made by Turid Bøe, Rögnvaldur Hannesson, Lars Gule, Are Knudsen, Ottar Mæstad, Karl R. Pedersen, Ussif Rashid Sumaila, and Arne Tostensen.

<sup>2</sup> This view will be discussed further in section 3.3.

How can the EPPR hypothesis be formulated more precisely? In this paper we argue that the EPPR implies a development characterized first and foremost by *individualization*: more rights are moved from the community to individuals (or households). Related to this are three other phenomena: there is a *specification* of the rights in the way that they become more explicit and detailed; there is a *formalization* in the way that the rights are increasingly embedded in the statutory law, not (only) customary law; and there is a *securing* of the rights for the rightholder. The latter could be made operational in the way that the risk (probability) of losing the land is reduced, but this would not always be the case as increased scarcity is associated with increased competition and claims from others. Rather it is the rightholder's *efforts* to protect the land that increase.

The evolution of private property rights is a central theme in the classical work on agricultural evolution by Boserup (1965). Her focus was on the role of population growth in inducing agricultural intensification and the accompanying changes in the property regime. However, "there has been little systematic empirical research on the development of property rights arrangement" (Alston *et al.*, 1995: 90).

The structure of the paper is as follows. Section two provides a discussion of the meaning of property rights, and of different property rights regimes. In section three I present four different views or positions on the EPPR: the neo-institutional economics (NIE) approach, where land value is a key explanatory factor; a Marxian, class-based explanation; a state - local perspective, including the tension between customary and statutory land law; and a cultural (ideological) explanation. These are not separate analytical approaches, nor are they mutually exclusive. The classification, however, relates to different positions and approaches in the debate on EPPR, and may be a useful clarification as such.

Section four provides a case study from a shifting cultivation (rice and rubber) based economy in a lowland rainforest area in Seberida district, Sumatra, Indonesia. First, we discuss Indonesian customary and statutory law, with a particular focus on the conflict between these two types of law. Next we describe the changes towards individualization and more secure land rights in the study area, and discuss various secular factors which may explain this development. More external land claims, population growth, and higher profitability of rubber have resulted in increased forest clearing and encroachment in primary forest, and securing of rights through rubber planting.

Section five tries to integrate the discussion of the previous sections, that is to see how the various elements from the four approaches in section three can be drawn together in a framework which can be used to explain the development described in section four. This framework is mainly rooted within the NIE approach, but also includes the customary law - statutory law dichotomy in the model. It is argued that increased land value provides the main driving force towards individualization of the rights, and this force combined with the increase in external claims make farmers increasingly secure their claims in statutory law.

Section six summarizes the main conclusions of an agricultural household model with endogenous tenure security. The formal model is presented in the appendix. Tenure security is determined by the number of external claims, as well as decision made by the

farmer about intensity of production and enforcement of property rights. An increase in external claims, which makes the rights more insecure, could result in a strategy of rubber planting, *increased* intensification, and increased efforts on enforcement (e.g., land certificates). Section seven concludes.

## 2 Property rights and property rights regimes

"Property rights of individual assets consists of the rights, or the powers, to consume, obtain income from, and alienate these assets" (Barzel, 1989: 2).<sup>3</sup>

The property rights regime is a key institution in an economy. Property rights shape the incentives of individual resource users, and are therefore critical for economic efficiency (growth) and environmental conservation. The term "institutions" are in the literature used both in the meaning of "the rules of the game" as well as for "the teams playing the game". Following North (1990) we shall use it in the first sense, that is, to use institutions in the meaning of *rules, not organizations*. North (1981, chap. 15) distinguish between institutions at three levels:

1. *Constitutional rules*, or "the rules for making rules".<sup>4</sup>
2. *Operating rules*, or *institutional arrangements* created within the constitutional rules. The property rights arrangements are key rules here.
3. *Moral behavioural codes*, alternatively labelled ideology, culture, or cultural endowments.

Most analyses of property rights change (e.g., Feeny, 1993) take 1 and 3 as exogenously given, and study changes in the institutional arrangements. This may be justified by the much higher stability of the constitutional and cultural rules, something which also contributes to the stability of the operating rules. Another justification is simply that in order to build a theory, some variables must be kept exogenous.

The right to an asset should be understood as a bundle of rights. Three types of property rights are generally distinguished between in the literature (Barzel, 1989; Eggertsson, 1990: 34).<sup>5</sup>

1. *Use rights*: the rights which define the potential uses of land that are legitimate for an individual, including the right to transform it physically, e.g., through different agricultural crops and growing techniques.
2. *Income rights*: the rights to the income, and contract over the terms with other individuals.
3. *Transfer rights*: the rights to transfer the asset to another party.

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<sup>3</sup> Looking at the Chinese symbols for the content of a concept may sometimes be enlightening. The term "rights" or *quanli*, introduced into the Chinese language in the mid 19th century, was made up of two symbols; power (*quan*) and benefit or profit (*li*). Thus the term rights was taken to mean the power to enjoy the benefits from something. Note, however, that the Chinese word for land rights is to be translated to ownership, where the possibility to sell and buy land is central.

<sup>4</sup> Feeny (1993: 172)

<sup>5</sup> Bromley (1989: 187-190), based on earlier work by Honoré, distinguishes between eleven different categories of rights.

A property institution consists of a set of *rights* and a set of *duties* or *obligations*. Statutory rights are never unlimited, for example, the kind of uses permitted by the law is often restricted (e.g., not growing marijuana, or taxation of income). Restrictions of the rights that shrink the set of permissible uses will lower the economic value of the land.

Property rights will never be fully delineated because of *transaction costs*. Transaction costs can be defined as "the costs associated with the transfer, capture, and protection of rights" (Barzel, 1989: 2), or "the costs that arise when individuals exchange ownership rights to economic assets and enforce their exclusive rights" (Eggertsson, 1990: 14). One may distinguish between transaction costs related to three different activities (cf. Eggertsson, 1990: 15):

1. *Information*: costs associated with the search for information about the price, quality, and sometimes also quantity of economic goods.
2. *Contracts*: costs related to bargaining, making, monitoring and enforcement of contracts.
3. *Enforcement of property rights*: costs incurred by the rightholders efforts to protect the rights.

Unlike conventional economic analysis which regards such rights as absolute, the inclusion of *transaction costs* in the analysis of property rights gives that "rights are never complete, because people will never find it worthwhile to gain the entire potential of "their" assets" (Barzel 1989: 2). According to Barzel, the (security of) rights people have over an asset is a function of three factors: the rightholder's protection efforts (costs), other people's capture attempts, and the government protection.

Property arrangements are *social relationships* among individuals, "they link not merely a person to an object, but rather a person to an object against other persons" (Bromley, 1989: 202). The key element of this triadic relationship is the right of the owner to exclude others from the benefits related to the asset (use, income, and transfer rights). In short, property rights give a person the legal right to exclude others within the limits set by the law; to what extent these rights are protected is, *inter alia*, determined by the person's own enforcement of the rights. The latter will, as discussed later, be based on a calculus of the benefits and costs of better protection through his/her own enforcement.

The above is related to another key aspect of property rights, that is, the *residual right of control*, or the owner being the *residual claimant* (Grossman and Hart, 1986). The residual right of control refers to the right to make any decisions within the restrictions set by law and contracts with others. The residual claim or return is the net income from the asset, for example, the land rent (profit) from owning a piece of land. "Tying together residual returns and residual control is the key to the incentive effect of ownership" (Milgrom and Roberts, 1992: 291), because the decision maker (owner) bears the full consequences of the choices made.

Property rights exist along a number of dimensions, thus any classification represents a simplification of a complex reality. The most common distinction is according to the

economic agent holding the rights. Based on this, one may distinguish between four different property rights regimes.<sup>6</sup>

1. *Private property*; an individual, a household or a *de jure* person (e.g., a company) hold the rights.
2. *Common (or communal) property*; a group of individuals, for example, a community, holds the rights. This can be further subdivided into:
  - 2a. *Unregulated* common property, which only limits the access to the resource; and
  - 2b: *Regulated* common property, which both limits the access, and impose and enforce rules for resource use.
3. *State property*; the state holds the property rights, which in some respects could be regarded as an extended form of 2.
4. *Open access*; no property rights exist (either *de facto* or *de jure*).<sup>7</sup>

The main distinction here is between situations *with* property rights (where the agent with the rights is either the state, the community, or an individual), and situations where *no one* has property rights, i.e., open access.

Whereas these four categories may help clarify the discussion on property rights regimes, real life regimes are likely to be a combination of these four. In describing actual property regimes a number of dimensions should be added:

- ♦ Which rights are included? The agent may not have all the three types of rights listed above, and within each of the three types of right the agent may only have some of all possible rights (for example, only certain uses are allowed). This is the case under customary land law throughout Indonesia (section four). Related to this is the fact that the agent may not be well defined; for example, individual households may use land in a particular way after consultations with the leaders of the community.
- ♦ Land may have different regimes governing different uses; for example, agricultural use may resemble a private property regime, whereas collection of forest products from the same land is governed by a communal management regime. Certain rights rest with the individual, whereas others rest with the community and therefore implies certain duties or obligations for the individuals.
- ♦ Property rights to land are normally based on either written, statutory law, or unwritten, customary (traditional) law. It is generally more difficult (costly) to enforce informal than formal rights through the legal system. Customary rights may also receive less respect from potential users outside the community, where the customary law has evolved and can be enforced, e.g., through social sanctions. Thus, the *enforcement* costs may be higher for customary rights, whereas the *contract* costs are lower.

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<sup>6</sup> See, for example, Libecap (1986) and Bromley (1991).

<sup>7</sup> *Homesteading* could also be considered a separate regime, which is particularly relevant in frontier areas: land clearing/preparation gives private property rights to cleared land. Under this regime land is transferred from an open access resource (regime 4) to a private property resource (regime 1). See Angelsen (1994; 1996).

- ♦ The security of the rights will also differ. In the most stylized form (as often has been the practice in conventional economic texts), the three first categories assume 100 percent security for the agent against third party intervention, whereas the open access case assumes no security. As noted above the security of the rights depends on a number of factors, including the owners enforcement efforts, and the protection given to these rights by the state, and its enforcement ability.

Classification of property regimes is complex because of the number of rights (and duties) in question, and the fact that different rights are held by different agents. Typically for some traditional societies (cf. section four), a farmer may have some use and income rights, but not the right to sell the land to outsiders. The formal ownership may rest with the village, whereas the most valuable rights, that is the use and income rights, are held by individuals or households. Should such a system be grouped as communal management or as private property? Too often in the literature it is grouped as the former, which means that the classification is based on just the third type of right (the transfer right). One could argue that it would be more logical to base the classification on the most important rights, which in this case rest with the individual.<sup>8</sup>

### 3 Theoretical approaches for explaining the EPPR

"The common reason for the establishment of private property in land are deduced from the necessity of offering to individuals sufficient motives for cultivating the ground, and of preventing the wasteful destruction of immature products of the earth" (William Foster Lloyd, 1833).<sup>9</sup>

The purpose of this section is to provide a critical review of four different approaches to institutional change in general, and the EPPR hypothesis in particular. The approaches and the key element in each of them are:

1. Neo-institutional economics (NIE): Increased land value.
2. Marxian theories: Class struggle.
3. State v. local community approaches: Predatory state intervention.
4. Cultural changes: Commoditization of land.

These four approaches are not mutually exclusive. On the contrary, the purpose of section five is to integrate the elements of the different approaches that are relevant to explain the recent development in the study area. The approaches represent, however, four distinct views on what is the main driving force behind the EPPR, and the distinction is useful as such.<sup>10</sup>

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<sup>8</sup> One common observation is that when transfer rights are given to farmers, they are very rarely used, that is land markets do frequently *not* develop when private property rights are introduced (e.g., Platteau, 1995). This indicates that the most important rights to the farmers are the use and income rights.

<sup>9</sup> Quoted in Hardin and Baden (1977).

<sup>10</sup> The division into four categories is to some extent based on subjective judgements. Bardhan (1989), for example, distinguish between the Marxist school, the property rights, transaction costs or Coase-Demsetz-Alchian- Williamson-North (CDAWN) school, and the imperfect information school. Further, the neo-institutional economics (NIE) school can be divided in several categories, as will be discussed below.

### 3.1 Neo-institutional economics (NIE): Increased land value

Neo-institutional economics (NIE) represents an extension of the neo-classical economic research programme to include institutions in the analysis. Neo-classical economics here refers to the methodology of individual rational choice, that is, individuals act as if they maximize certain objectives subject to certain constraints. The approach implies methodological individualism, and rational behaviour in the sense of consistency between actions/behaviour and goals/preferences (ends-means consistency). The preferences are assumed to be exogenous (and normally also constant) in the model. The emphasis is on how changes in the constraints (choice set) affect behaviour and equilibrium outcomes. When we in this paper refer to "conventional neo-classical economics", it is the *practice* rather than the methodology we have in mind.

NIE is both concerned with how institutions influence behaviour by modifying the choice set, and how institutions change over time (North, 1986; Eggertsson, 1990: 29-30). In the first set of analysis institutions are exogenous, in the second they are made endogenous. The more difficult research question, which is also the topic of this paper, is the latter one. Modelling the evolution of property rights, or institutional change more generally, is still among the least developed areas within NIE (Eggertsson, 1990: 248).

Conventional neo-classical economic theory has assumed costless exchange and perfect information. NIE adds the concept of *transaction costs* in order to understand and explain institutions and their change. Or in the words of North (1990: 27): "My theory of institutions is constructed from a theory of human behaviour combined with a theory of the costs of transacting." The rational choice framework for the study of human behaviour is maintained from neo-classical economics. As such, NIE is but another extension of a more than a century long neo-classical research programme.

NIE is an umbrella for several quite different schools of thought. Bromley (1989, chap. 1) distinguishes between three distinct approaches: (1) The property rights school, represented by, among others, Coase (1960) and Demsetz (1967); (2) the induced institutional innovation theory (Ruttan and Hayami, 1984; Hayami and Ruttan, 1985); (3) the North (1981; 1990) approach, which has inspired much of the present paper. Eggertsson (1990, chap. 8) divides NIE into "the naive model" and "the interest group theory of property rights", which partly corresponds with Bromley's first and third category, respectively.

"The naive theory of property rights" refers to some of the earlier attempts in the 1960s to model and explain the emergence of property rights without including social and political institutions in the analysis (Eggertsson, 1990: 250). Demsetz (1967) is the classical paper on this theory: "Property rights develop to internalize externalities when the gains of internalization become larger than the costs of internalization. ... the emergence of new private or state-owned property rights will be in response to changes in technology and relative prices". Institutions are formed and modified in order to minimize transaction costs. Demsetz and others members of the property rights school only looked at the individual demand for property rights, and did not include coordination (free rider) problems, the role of conflicting interest between groups, or the

role of the state in supplying institutions. In the tradition following Coase (1960), the analysis in these early writings was an harmonious and optimistic one with regard to the free market's ability to develop efficient institutions, in the sense that social welfare (often equated with economic growth) is maximized. It also provided an input to a theoretical justification for the free market economy.

Later work in the NIE tradition, particularly by Douglass North, has broadened and extended the analysis to include these initially overlooked factors. The importance of the individual demand for institutional change is maintained in the model, but there may be a large gap between individual demand for change on the one hand, and the actual outcome on the other. *First*, because institutions have important collective good characteristics, well known problems of free (easy) riding, collective rationality and group behaviour and become critical. *Second*, the state, which has a potential role in solving this dilemma, has its own interests. Socially inefficient institutions may be created or maintained by the rulers because the existing institutions serve their interests. *Third*, existing institutions, which are critical in determining both the individual demand for institutional change as well as in solving collective action problems, may prevent socially desirable changes. Thus, a society may be caught in a *low efficiency institutional trap*. Indeed, very few would still hold the view that a free or unrestricted evolution of institutions would ensure economic efficiency. "It is absurd to argue that processes of institutional evolution 'optimize'" (Nelson, 1995: 83).

Ruttan and Hayami (1984) represent a noteworthy application of the NIE approach to developing countries, mainly within the property rights school. Their "induced institutional innovation" approach focuses on changes in resource endowments, technical change, and growth in product demand. These factors shape the demand for institutional innovation. While they are certainly aware of the importance of supply of institutional arrangements, these are not well integrated in their analysis. Feeny (1993) represents a further extension of this work, and focus more explicitly on the supply factors within a demand and supply framework of institutional change. We will return to this in more details in section five.

The engine of change in NIE is new economic opportunities. "It is the possibility of profits that cannot be captured within the existing arrangemental structure that leads to the formation of new (or the mutation of old) institutional arrangements" (Davis and North, 1971: 39). The sources of this creation of uncaptured profit under existing arrangements can be due to changes in several parameters (Ruttan and Hayami; 1984; Libecap, 1989: 16; North 1981, 1986; Eggertsson, 1990; Feder and Feeny, 1993: 243). Changes in relative prices is the most common explanation, for example, as a result of changes in relative resource endowments (including population growth). Technologies, both for production and enforcement, are also referred to as a source of change, even though technological change itself should be endogenous. Some writers also note that changes in preferences (sometimes included in the term "ideology") can initiate institutional changes (see further discussion below).

Related to the EPPR hypothesis, the main proposition by the NIE is that (private) property rights evolve when an asset becomes more scarce and therefore more valuable, as reflected in relative prices. When the value increase, competition for the resource will

make it worthwhile to spend more resources to create and protect the property rights to that asset. Problems related to free or easy riding (moral hazard) will also direct this specification and securing of rights towards increased privatization.

### 3.2 Marxian theories: Class struggle

It is difficult to pin down *the* Marxian model since the interpretations of Marx' work seem innumerable, partly a reflection of the ambiguity or richness -- depending on your personal faith -- in Marx' own writings. In discussing Marxism in the context of our paper, one should remember that Marx wrote about the evolution of private property rights in feudal Europe, particularly England, and not in the much less class-divided agrarian societies which are our point of reference. Nevertheless, Marxists have an established theory of endogenous institutional change, which is worth examining.

At a certain stage of their development, the material productive forces of society enter into contradiction with the existing relations of production, or - what is but a legal expression for the same thing - with the property relations within which they have been at work hitherto. From forms of development of the productive forces these relations turn into their fetter. Then begins an epoch of social revolution" (Marx, 1859).<sup>11</sup>

In other words, changes in the productive forces (means of production and technology) leads to a tension between the existing structure (including property rights arrangements) and the productive potential. This tension is solved through class struggle, and the result is new institutions.

Except for the notion of class struggle, we see the obvious similarities between the NIE and the Marxian approaches to institutional change. The idea of class struggle is, however, a key one in Marxian theories, and cannot simply be skipped. Further, Marxists' emphasis is on *technology* as the primary engine of change (technological determinism), whereas the NIE's main focus has been on population growth, but also other factors, including technology. This preoccupation with technology as a dominating force of change, and the subsequent neglect of other factors, is indeed one of the main points of critique by writers within the NIE, e.g., North (1981: 60-63) and Ruttan and Hayami (1984: 216-217).

Parts of the Marx inspired analysis on the evolution of private property rights during the enclosure movement in Western Europe from the late Middle Age and onwards focus on the importance of class structure and class power for the different outcomes in different countries. Brenner (1976: 31) holds that "class structures tend to be highly resilient in relation to the impact of economic forces; as a rule, they are not shaped by, or alterable in terms of, changes in demographic or commercial trends".

Others would tend to view class structure as the outcome rather than the driving force of the process. Enclosures were a precondition for a capitalistic development. First, it gave rise to landlessness, and then a proletariat in the form of a landless labour force (Lazonick, 1974). Second, the profit of landowners served as "a primary source of primitive capital accumulation and formed a basis for the capitalist mode of production" (Cohen and Weitzman, 1975: 289). Cohen and Weitzman, which basically is a

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<sup>11</sup> Preface to *A Contribution to the Critique of the Political Economy*, quoted in Bardhan (1989: 4).

formalization of the Marxian arguments on the consequences in terms of increased inequality of the enclosure movement, do not ascribe the class relations any major role in initiating the change. Instead their explanation can more appropriately be grouped under the cultural view as discussed below.

Private property rights seem to emerge in traditional agrarian societies even in cases where there is no distinct class structure initially. In traditional agrarian societies land is normally relatively abundant, which means that one of the preconditions for the conventional landlord-landless or bourgeoisie-proletariat class formation is not in place. Marx and most of his followers recognized this fact, even though they pointed out the possibility of other types of class division. We find it, however, difficult to assign any central position to class analysis in *explaining* EPPR in our context.

The usefulness in Marxian analysis in relation to EPPR seems to be in particularly two areas: First, it gives important contributions to the analysis of the consequences of such a development, not at least on the question of efficiency *v.* equity (question 3 asked in the introduction of the paper).<sup>12</sup> Second, as pointed to by North (1981: 61), the Marxian framework "includes all of the elements left out of the neo-classical framework: institutions, property rights, the state, and ideology". It draws our attention to commonly overlooked factors in conventional economic analysis. Furthermore, both the state-local and the cultural approaches presented below have been inspired by Marxian analysis.<sup>13</sup>

We would, however, argue that the methodology and theoretical framework for studying these elements are better provided by other approaches than the Marxian. In particular the NIE seems able to capture several elements of the Marxian analysis, while differing on certain key aspects: (1) methodological individualism *v.* the more questionable class as a the primary unit of analysis and action, and (2) the focus on supply and demand, and relative prices *v.* the labour theory of value, which does not seem to have much explanatory power. Thus, our views are in line with the conclusion of one of the leading neo-Marxian economists (Roemer, 1986: 191):

"With respect to method, I think Marxian economics has much to learn form neo-classical economics. With respect to substantive research, I think it is the other way around, in many instances."

### *3.3 State v. local community approaches: Predatory state intervention*

At the core of this approach are several related conflicts: the centre *v.* the periphery, the state *v.* the local community, and statutory *v.* customary law. Compared with the two previous positions, this approach is to a much lesser extent a coherent theoretical framework. This political economy approach is, however, a common explanation of why a regime of private property is replacing regimes involving some form of communal management.

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<sup>12</sup> The Cohen and Weitzman (1975) paper is an example of this, which also shows how Marxian analysis and neo-classical methodology can be merged.

<sup>13</sup> The generous acknowledgement of Marxian theory by Douglass North (1981: chap. 6) should be noted. Indeed, Bardhan (1989: 13) holds that "North (1981) significantly differs from other members of the latter group of economists [neo-classical institutional economists], and is nearer the position of Marxists, in assigning a theory of ideology and the state a central place in his theory of history and institutional change".

The behaviour of the state should be understood in light of its dual role: the state is both a social planner (welfare maximizer), and an instrument for powerful groups, or in Marx' terms "the executive committee of the bourgeoisie". This corresponds to what is known as the *contract* origin *v.* the *predatory* origin of the state. Decisions by the state should be understood in the intersection between these two roles. Conventional neo-classical economics, often implicitly, assumes the former, whereas Marxists and writers applying the state-local community perspective emphasize the predatory role of the state.<sup>14</sup>

The dichotomy between the developmental and the predatory state can be illustrated by a simple model and typology. Let  $X$  be total output in the society, and  $t$  the proportion of the output extracted by the state (an indicator of the degree of state intervention).  $X$  is a function of  $t$  in an inverted U-shaped relationship; some intervention will increase  $X$ , but beyond a certain point it lowers  $X$  (cf. the Laffer curve). The objective of the state can generally be formulated as:

$$\underset{t}{Max} \quad T = \alpha X(t) + (1 - \alpha)tX(t); \quad \alpha, t \in [0, 1]$$

$\alpha = 0$ : the predatory state (maximizing own revenue).

$\alpha = 1$ : the developmental state (maximizing overall output).

In the first case the objective of the state is to extract as much as possible out of the economy, in the second the aim of state intervention is to maximize the overall output of the economy. Most states would have values of  $\alpha$  between zero and one, that is, the state both tries to serve its own interest and the overall social interests. Obviously, the greater  $\alpha$  is the larger the optimal  $t$ . In the social planner case the optimal  $t$  will be when  $X' = 0$ , whereas the predatory state solution is given by  $X' + X/t = 0$ .

The conflict about the distribution of resources is often expressed in tensions between statutory and customary law. National (statutory) law can be used to extract resources traditionally held by local communities. We believe this can be a useful approach, for example, as applied in the case of Indonesia by SKEPHI and Kiddell-Monroe (1993). The same authors also portray this as a conflict between a Western ideology and a local one, an approach which in many cases would be incorrect. In parts of Africa the customary tenure system was actually "invented" and institutionalized by the colonial rulers (Berry, 1993). Customary rules are ambiguous and subject to ongoing reinterpretation. Customary claims can be used to mask individual accumulation, and local elites can insert their own definitions to make them serve their interests (Berry, 1993: 120). As such, both customary and statutory law may be formulated and used to serve the interests of powerful individuals and groups.

The discussion in the literature on "the village against the center" (Bromley and Chapagain, 1984) is also occupied with resource degradation as a result of misguided and unsuccessful attempts by the state to replace communal management by a private property rights regime. Bromley (1991, chap. 6) states that the *real* tragedy of the

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<sup>14</sup> Public choice theory, which is neo-classical economics applied to politics and as such is within the neo-classical economic theory, does certainly not assume the state to be a perfect social planner. On the contrary, it comes close to viewing the state as a predator.

commons is (1) the breakdown of indigenous property rights structure, and (2) the failure of the state to replace this with an effective regime with tenure security, which is necessary -- although not sufficient -- to make economic actors to include long-term effects in their decision-making. The combination of these two factors may result in a *de facto* open access regime, even though it is *de jure* private or state property. The institutional vacuum makes the environment more susceptible to overexploitation.

The state-local dichotomy could also explain changes in local property regimes. Using examples from India, Nepal, Indonesia, Nigeria and other countries, Bromley (1991, chap. 6) argues for the existence of a general disrespect of local management systems by the state, and the introduction of private property rights as a vehicle for wealth appropriation by powerful groups controlling the state.

This argument is challenged by Ault and Rutman (1979). They argue, in line with the property rights school, that individualized ownership is a natural evolution as land becomes more scarce. However, after independence the new governments in Africa viewed individual property system as a colonial heritage, and wanted to maintain or even reinstall communal tenure regimes. Even though indigenous systems were reasonable efficient under the conditions under which they evolved, the governments' attempts to preserve these systems prevented a natural evolution towards more individual rights. The result, Ault and Rutman argue, is an inappropriate property regime with tenure insecurity, with subsequent productivity and environmental losses.

"Failure to recognise the relationship between land availability and individual property rights within the land tenure system has led to the creation of land tenure systems in the postindependence period that do not present incentives for the optimal use and development of agricultural land" (page 179).

The differing views of Bromley and Ault and Rutman can be seen in the light of the two above perspectives on the state. Bromley and others emphasise the predatory role of the state. In the Ault and Rutman description, the policy by African leaders was, at least in part, based on a social planners view. The intentions where good, but the outcome bad. Such unintended consequences could be attributed to lack of knowledge, or ideological blindness.

These two works illustrate the need to look at the state from both its potential predatory and contractarian roles, and within these two also consider misguided or misinformed policies which yield consequences contrary to their intentions. The state is normally playing both roles at the same time: the Indonesian government is creating plantations and issuing logging concessions to powerful individuals, which may conflict with local and environmental interests. At the same time, protection forests and national reserves are established, and large programmes for rural poverty alleviation and improving local infrastructure and services are implemented. Ignoring this dualism, and focus on only *one* of the roles played by the state, would limit the understanding of state behaviour.

To summarize, within the state-local perspective a driving force is a state in the hands of the national elite, ignoring customary and community based tenure rights to serve their interests. The state only recognises the statutory law, which is based on private property

rights. This forces local farmers to obtain formal rights based on statutory law in order to protect their land against external claimants.

### 3.4 Cultural changes: Commoditization of land

The rational choice model underlying the NIE has as one of its key assumptions that the preferences are constant, or at least exogenous. This is one of the limitations of the model if one wants to study economic change, particularly over a longer period of time. Conventional neo-classical economics seeks to explain changes in behaviour by changes in the choice set, in particular relative prices, rather than changes in preferences, a case forcefully argued by Stigler and Becker (1977). Others, including economists such as North (1981, chap. 3), argue that this is insufficient to explain change.

Preferences are related to culture. There is no generally accepted definition of culture, and the term is used in a number of ways depending on the topic discussed. Often, the concept is taken to be so wide that it is difficult to handle analytically. A delineation is therefore necessary. In the institutional literature it often refers to *informal rules or moral codes of behaviour*. On the other hand, the concept of *preferences* in the rational choice model overlaps with "culture" as used in social anthropological literature.

Culture both used in the sense of *informal rules* and of *preferences* has a bearing on the EPPR hypothesis. First, several authors attribute the evolution of private property rights to changes in the perceptions or preferences related to land. In the discussion of the enclosure movement in England, Cohen and Weitzman (1975: 321) hold that the main force was a "fundamental change in attitudes and ideas" or more specifically "an urge to maximize profits from the land". This change is attributed to many factors:

"There is some consensus that the relative increase in internal stability (even if only temporary) caused by the rise of a centralized authority, the long term influence of trade expansion, innovations in military technology, secularization of religious doctrine, the growth of new opportunities and new consumption desires, each in some fashion supported the development of a profit-oriented society."

During the enclosure movement land (and labour) emerged as economic commodities. Land became a source of individual income rather than a means for obtaining prestige and power and something to be used for the common benefits. Ellen (1993: 131) describes a similar development in Seram, Indonesia:

"<By the early 1970s> land <was> becoming a truly exchangeable commodity. ... individualism with respect to land is the cumulative ideological product of structural shifts resulting from resettlement, confrontation, and participation in a new political and economic order."

Both in a historical context and to describe changes in traditional agrarian societies in developing countries today one could describe this phenomenon as a *commoditization of land*.

Changes in preferences can create the demand for individualized and more secure property rights. Alternatively, this cultural change can be viewed as a change in informal rules which make it more acceptable for members of the community to take more individual control of the land. This points to the problems of a clear distinction within

the rational choice model between preferences and informal constraints. As Elster (1979; 1983) argues forcefully, men are sometimes free to choose their own constraints (*Ulysses and the Sirens*), and conversely, preferences may be shaped by the constraints (*Sour Grapes*).

This issue also reflects a long standing debate in social sciences: are preferences and moral behavioural codes the reflection of economic forces, or do they have a life on their own? Popular debates sometimes tend to view culture as a constraint to rational behaviour, as reflected in the "maximizing man" v. the "social man" debate. Peters (1993: 1072) considers this to be a false dichotomy; "interests and opportunities are always culturally coded". North (1977), taking issue with the work of Karl Polanyi (1944) on non-economic transactional modes, argues that these modes can be understood within a rational choice framework with transaction costs. Thus, culture (or at least parts of it) becomes an expression of economic rationality.

Summarizing, the introduction of "culture" challenges NIE's rational choice framework at three levels:

1. It will modify the choice set (constraints) by including the social cost when informal rules are violated, for example, in the form of social sanctions for free riding.
2. It can also be analyzed as a change in preferences whereby, for example, more emphasis is put on (individual) consumption of commodities. Another example would be changes in the extent of which the well being of other members of the community is included into your own utility function (altruism in the Becker sense).
3. It may challenge the idea of rational choice as an approximation to actual behaviour. The alternative may, for example, be a theory of behaviour guided by norms, customs, search for identity and belonging to a group (see Peters, 1993).

A critical question here is to what extent this critique can be incorporated in the rational choice framework by modifying the preferences and the constraints. We suggest that one can go further than most of those criticising NIE seem to think, and that rational choice, as a conceptual model, is more flexible than commonly thought of. The anthropological critique (point 3 above) is not necessarily in conflict with the rational choice approach, which main idea is ends-means consistency. It should rather be interpreted as a critique against the narrow set of objectives (and constraints) normally included in economic models.

The NIE tries to incorporate the first two points, but there are some problems involved. Social costs are easy to integrate in conceptual models, but difficult to quantify. Related to the second point, changes in preferences could be treated as an exogenous change, even though there is some resistance against resorting to this kind of explanation. One of Nobel Laureate Gary Becker's three cardinal principles is that "'changes in taste' is the economist's admission of defeat" (Fuchs, 1994: 184).

Moreover, a complete theory of institutional change requires a theory of ideology, including endogenous changes in preferences (North, 1981; 1990). No coherent theory is yet at hand, to a large extent a reflection of the complexity of the issue. Ruttan (1989)

notes that also the early development economists stressed that "culture matters". Scholars and practitioners of development are, however, still dealing with "cultural endowments at an intuitive level rather than in analytical terms" (page 1385).

Summarizing this approach, the main focus is on changes in the perceptions of land: land is increasingly regarded as a economic commodity, which can be used by individuals to extract as much surplus as possible. The initiation of such a development can be due to several factors; many writers emphasize the effect on the local economy of the integration into a larger national (or even global) economy. Related to this is the Marxian inspired explanation: when money is introduced and a monetarized economy replaces a traditional subsistence and barter economy, we have the seed of capitalism and the creation and stimulation of a profit motive guiding economic behaviour ("money as the seed of greed"). An anthropological elaboration of this view is given by Kopytoff (1986: 72):

"One perceives in this a drive inherent in every exchange system towards optimum commoditization - the drive to extend the fundamentally seductive idea of exchange to as many items as the existing exchange technology will comfortably allow. Hence the universal acceptance of money whenever it has been introduced into non-monetized societies and its inexorable conquest of the internal economy of these societies, regardless of initial rejection and of individual unhappiness about it."

A change in preferences will normally be accompanied by a weakening of informal rules which would constrain exploitive behaviour, or by the sanctions necessary to enforce such rules. More open communities, increased mobility, etc. could contribute to a weakening of social enforcement mechanisms.

The four approaches outlined below are not separate boxes of analysis -- they can indeed be quite overlapping. Each of them focus, however, on certain *main* forces behind the change in the property rights institutions, as summarized in Table 1.

<i>Theory/approach</i>	<i>Main driving force behind EPPR</i>
Neo-institutional economics (NIE)	Relative prices, reflecting resource scarcity; higher land value.
Marxian class analysis	Technology, with subsequent class struggle.
State-periphery approaches	Predatory state intervention, disrespect of customary law by the state.
Cultural or ideological explanations	Views/attitudes towards land; commoditization of land.

*Table 1. Summary of different approaches to the emerging private property rights (EPPR).*

## 4 Empirical evidence from Indonesia

"Land and water, and the natural resources contained therein, shall be controlled by the state and used for the maximum benefit of the people" (The Indonesian constitution of 1945).<sup>15</sup>

Much of the debate on land rights in Indonesia centres around the tension between customary and statutory land rights, i.e., within the third perspective presented in section 3. This section presents a discussion of customary (*adat*) law, followed by a brief description and discussion of the statutory law and its practice in relation to land use. The third part gives a description of (recent changes in) the study area of Seberida, Sumatra.

### 4.1 Customary (*adat*) land rights<sup>16</sup>

Customary (*adat*) law obviously varies throughout Indonesia, and some 16 broad forms of *adat* law have been identified (SKEPHI and Kiddell-Monroe, 1993: 232). There is, however, also a great degree of similarity, which indeed also would resemble traditional tenure regimes found in other agrarian societies in the developing world (among the best discussions of this is still Boserup, 1965). The *adat* (literally custom or tradition) in Indonesia covers a number of other aspects of human life and interaction than just land use and tenure. We shall use it here in the meaning of the set of informal, customary rules that regulate the rights (access and permissible uses) to land and forest among members of the local community.

Land is under *adat* law regarded as the property of the community, in the sense that the transfer right belongs to the community. Communal land cannot be bought, sold or leased. This right is known as *hak ulayat* (literally area rights). When it comes to the use and income rights two general patterns are present, and was also observed in our study district of Seberida.

1. *Common use and income rights*: This will typically cover the collection of many *forest products*, where every member of the community is free to collect from the forest under *hak ulayat*.
2. *Individual (household) usufructuary rights*: The individual use and income rights apply in particular to two areas. First, forest may be cleared and used for swidden cultivation by the household, and the household has the right to the income derived from agricultural production. Second, for some valuable forest products, where demarcation is possible, individuals may get rights to harvest these. This was the case in Seberida for, among others, honey trees and wild growing rubber (*jelutung*).

Of particular interest is the rights related to swidden cultivation. Income and use rights are acquired by clearance of forest and working on the land. Thus the output from swidden rests with the person or household who works on the swidden. There is a widespread "myth ... that swidden agriculturists own their own land communally (or not at all), work it communally, and consume it yields communally" (Dove, 1983: 85).

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<sup>15</sup> Article 33 (1), quoted in SKEPHI and Kiddell-Monroe (1993: 236)

<sup>16</sup> Besides my own fieldwork, this section draws on particularly Dove (1983), SKEPHI and Kiddell-Monroe (1993), and Østergaard (1994).

In Seberida the household or lineage who cleared the forest initially has a priority right for later cultivation. This is a widespread way of acquiring rights: "Throughout Southeast Asia, rights to secondary forest are usually held by specific, individual households; these rights being initially acquired by virtue of opening of the primary forest on that land, and then extending to the secondary reforestation which follows each subsequent cropping there" (Dove, 1983: 86-87). Moreover, anthropologists have for long recognized that in traditional societies people commonly have "possessive rights" (Basu, 1995: 21); whoever first gets to possess an asset has the right to it.

A number of modifications of this "first come first served" rule exist in *adat* system in Seberida. A rightholder cannot refuse others to open swidden on "her" land, provided she is not going to use it in the near future. The person borrowing the land can normally only plant rice and other annual crops, not any perennials. Further, the strength of rights a person has to the land depends on how many times the land has been reopened, the number of years since it was opened last time, as well as the distance from the village, partly because a remote location of the field makes enforcement more costly. The *adat* law is therefore ambiguous, and open to interpretations and local adaptations. Indeed, one could find marked differences within the Seberida district.

Planting of rubber or other perennials would extend the usufructory rights a person has over land, and "in practice such usufruct amounts more or less to a permanent right to the land" (Østergaard, 1994: 76). Planting of perennials is therefore the most efficient way to get more permanent individual rights to land within the *adat* system.

What would be the appropriate classification of the *adat* land tenure system, taking up the discussion from section 2? Dove (1983: 88), with reference to a similar shifting cultivation system in Kalimantan, holds that "it is clearly misleading to label such systems of land use as 'communal'". First, there is a large variation in households' access to land though rights accumulated over time. Second, as is clearly seen in Seberida, the most important of the property rights -- that is use and income rights to land for agricultural purposes as well as to some of the most valuable forest products -- are individualized. This makes it important to distinguish between common property and community based rules of *mainly individual property rights*, i.e., the most important of these -- the use and income rights.

#### 4.2 Statutory law and practice related to land use in Indonesia<sup>17</sup>

The *Agrarian Act of 1870* passed by the Dutch colonial government gave full protection to the farmers of land kept under *constant* cultivation. Fallow land used under the shifting cultivation system was grouped as "virgin or waste land", and designated as state dominions. Thus there was no protection given to traditional rights under the shifting cultivation system.<sup>18</sup>

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<sup>17</sup> This section is based on Dove (1987) and SKEPHI and Kiddell-Monroe (1993).

<sup>18</sup> The use of "waste" land and the provisions given by this law spurred a development of private cash-crop estates. Traditional swiddening was excluded rather than included in the new economy. This dualism is still very present in provinces like Riau and Jambi in Sumatra.

The *Basic Agrarian Law of 1960* aimed at "the abolition of Western-*adat* dualism by basing agrarian law on *adat* land law" (SKEPHI and Kiddell-Monroe, 1993: 236). The law states that:

"The agrarian law over the earth, water, and space is a *hukum adat* (traditional law) so long as it still exists and does not hamper the national and state needs."<sup>19</sup>

Even though the Basic Agrarian Law recognizes the traditional law, the reservation made that it should be in accord with national interests, and that it cannot conflict with any higher laws and regulations (article 3) has preserved the dualism and ambiguity it intended to remove.

Furthermore, the law distinguishes between two types of land rights: the customary rights of avail (*hak ulayat*) and rights of ownership (*hak milik*). Even though the law states that also customary rights must be recognized except when in conflict with national interests, in practice, the burden of proof is reversed:

"All development officials know the wording of this article by heart, and they take it to mean -- and they in fact employ it as meaning -- that whenever and wherever rights of avail conflict with their projects, these rights can automatically be ignored or overridden. This failure to either prove or contest these claims of national interest obviously raises the possibility that such claims are sometimes used to override rights of avail for purposes other than the national interest or even contrary to national interest" (Dove, 1987: 266)

Sometimes traditional rights are dismissed on the basis of being undocumented, ignoring the fact that documentary proof is irrelevant in traditional law (SKEPHI and Kiddell-Monroe, 1993: 237). Further, the 1960 law states that:

"every person and every corporate body having a certain right on agricultural land is in principle obliged to cultivate or to exploit it actively by himself while avoiding extortionate methods".<sup>20</sup>

This opens up for charging traditional swidden practices with violations of the law, based on both the burning of forest (extortionate) and the long fallow periods (not active exploitation).

A final area which opens up for vested interests in the practice of the law is the distinction between *hak ulayat* and *hak milik*, where the farmers rights to land classified under the former will be very weak in any conflict with the state. By classifying land rights as rights of avail it may be appropriated by the state without compensation.

The *Basic Act of Forestry of 1967* states that all forest is to be considered state property, and traditional rights should not interfere with forestry operations. Compared to the agrarian law, this law represents a *de jure* weakening of the *adat* rights, and is as such more in line with actual practice. A *Forestry Agreement of 1975* mandates that logging companies "observe the rights of local people, for example to trees and products".<sup>21</sup> In practice, however, this agreement has had little effect, including in our study area in Seberida.

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<sup>19</sup> Article 5, quoted in SKEPHI and Kiddell-Monroe (1993: 236)

<sup>20</sup> Article 10, quoted in SKEPHI and Kiddell-Monroe (1993: 237)

<sup>21</sup> SKEPHI and Kiddell-Monroe (1993: 240).

Another area of relevance is the strong emphasis on centralization (often justified by "national unity") in Indonesian law and politics. Of particular relevance is the Act no. 5 of 1979 on village administration.<sup>22</sup> Until 1979 village administration on the outer islands of Indonesia (all islands except Java and Bali) was mainly based on *adat* law. While both the Agrarian and Forestry laws made some recognition of traditional rights, "the 1979 Village Government Act formally removed this potent link between individual and communal resource management based on traditional law and a village level political entity also based on such law" (Sandbukt, 1995: 62). This was replaced by a Javanese inspired, national model of village administration.

According to this Act a village headman (*kepala desa*) is elected by his constituents for a period of eight years, but the election has to be confirmed -- and may be dismissed -- by the district head. A village council (LMD) is not an elected body, but consisting of prominent community members and sub-village leaders, appointed by the village headman. Neither the LMD or the Village Development Organization (LKMD) are generally functioning well, and attract little interest, partly because of their unrepresentative nature and lack of rooting in traditional law. Thus, a *potentially* viable local resource management system based on traditional law has been replaced by a more or less non-functioning centrally imposed village administration.

In conclusion, statutory law recognises traditional *adat* rights, but its ambiguity and the priority given to national interests in the day-to-day interpretation of the law have made this recognition of limited value to the farmers in any conflict with external claimants. Furthermore, the recognition of such rights in statutory law has been weakened over time since Independence in 1945. The various rights related to different types of land uses under the customary and statutory laws are summarized in Table 2.

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<sup>22</sup> The following on the Village Administration Act draws on Sandbukt (1995).

Land use (increasing intensity)	Customary ( <i>adat</i> ) law (i.e., rights in relation to other members of community)			National (statutory) law (i.e., security of rights in relation to external claims)
	Use and income rights		Transfer rights	
	Agricultural production	Collection of forest products		
<i>Primary forest</i>	All members of community free to open forest for swidden and plant perennials	All members of the community has rights, except for some individually marked products (trees)	Vested with the community	State forest
<i>Long fallow forest</i>	Rights belong to the initial clearer of primary forest; others may temporary use it for swiddening			Defined as waste land, and under state domains
<i>Short fallow forest</i>				More secure rights than above, but still very weak
<i>Traditional rubber gardens</i>	Belong to the family that planted rubber	As above, but less relevant	Unclear, may be used as collateral and transferred	Some, but still small chances for compensation if land expropriated.
<i>Intensive rubber gardens</i>				Relatively good, particularly if planted under an intensification programme

Table 2: Overview of land rights according to customary (*adat*) and statutory law.

#### 4.3 Recent changes in Seberida district, Sumatra

The case study draws on fieldwork conducted in 1991-1992 in the district (*kecamatan*) of Seberida in the regency (*kabupaten*) Indragiri Hulu in Riau province, Sumatra, Indonesia. I have discussed the shifting cultivation economy and the recent changes at some length in Angelsen (1995a; 1995b), and intend only to give a very brief summary here. Seberida is 2 800 km<sup>2</sup> in extent. A hill massif in the south, the Tigapuluh Hills, consists mainly of primary forest, even though large areas have been logged. The north and east parts are covered by flat, swampy land, whereas the western part is dominated by the low undulating country of the Cinaku valley. The natural vegetation consists of

lowland rain forest and swamp forest. Along the roads and rivers, the vegetation is a mosaic of secondary forest, swiddens, and traditional rubber forests.

Traditional subsistence has been based on shifting cultivation and collection of forest products, but during this century forest collecting has increasingly been replaced by swidden-based rubber planting. Permanent cultivation is found in the transmigration settlements (Government sponsored migrants from Java and Bali) along the Cinaku valley. The population density has been relatively stable throughout most of this century. The censuses of 1930 and 1961 show a density of slightly above 3 persons/km<sup>2</sup>, the ratio increasing to 4 in 1980, and 5.5 in 1991, which is still not very high (14.3 including the transmigration settlements).<sup>23</sup> There are at present more than 41 500 inhabitants in Seberida. An extremely high annual population growth rate of 13.1 percent during the 1980s was mainly due to a massive inflow of transmigrants, which now comprise more than 60 percent of the total population.

Most of the shifting cultivation practice (*padi ladang*) in Seberida can be defined as a *bush-fallow system* (fallow period from 5 to 10 years), but also with a significant share of *forest-fallow* (fallow length of more than 10 years, see Rutenberg, 1980). This demonstrates that the shifting cultivation system in Seberida is at a relatively early stage in its evolution, implying that the "degradation syndrome" (soil and nutrient mining through short fallow periods) has not yet occurred. 7 out of 10 households cleared forest for swidden cultivation at least one of the last two years (1990-1991). The average rice output per swidden is very low, only around 480 kg per swidden or 400 kg per ha in 1991 (average swidden size is 1.2 ha), and with huge variations (high yield risk), which is only about one fifth of the national average for dryland rice. This is sufficient for only 4-5 months consumption on average. The low yield is a reflection of the poor soil quality (acidity) in the area, as well as problems related to pests, particularly wild boar (forest pig).

8 out of 10 households have rubber gardens (*Hevea brasiliensis*), more than 97 percent being planted with traditional, low yielding trees (*karet rakyat*). The number having mature rubber gardens that can be tapped is much lower, reflecting a sharp increase in rubber planting from the mid-1980s. In addition 11 percent had immature, high yielding rubber planted through the World Bank and Government funded Smallholder Rubber Development Programme (SRDP). The area of rubber holdings by the non-transmigrant population is about 12 000 ha, which is about a quarter of the secondary forest and 4.3 percent of the total area of these villages. The average annual income from one ha of tappable rubber garden (Rp 340 000 or USD 170) exceeds the income from the annual crops (mainly rice) planted on the first year on the swidden (Rp 250 000). Moreover, traditional rubber can be tapped continuously for 30-40 years after an initial maturation period of 10-12 years, whereas rice presently is harvested in only one out of about every nine years.

Whereas some of the basic features of the swidden-rubber system have been more or less constant over several decades, since the early 1980s there has been a number of significant changes in the exogenous environment of the shifting cultivators:

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<sup>23</sup> See Østergaard (1994) for a discussion of the history of the district.

1. Increased land claims from external users, mainly government sponsored projects in the form of *logging*; *transmigration*, where partly fallow forest and rubber gardens were appropriated to the transmigration development; and *plantations* (oil palm), which is of more recent date, but may become the most important external land claim in the future.
2. Changes in relative prices, in particular due to improved infrastructure (roads) and market access following the logging and transmigration projects. Better market access means higher prices for cash crops, whereas consumption commodities become cheaper. Thus, it will be more profitable, *ceteris paribus*, to move from production for household consumption toward cash crops and more specialized production. Moreover, world market rubber prices increased steadily from 1985 to mid 1988, after which they levelled off and stabilized at the 1985-86 level.
3. Declining profitability of non-timber forest products, as a result of overexploitation, and lower farm gate price of the main product -- rattan.
4. Population growth. The population in the 20 traditional (non-transmigrant) villages grew from 11 413 in 1980 to 15 406 in 1991; an annual growth rate of 2.8 percent.
5. "Commercialization" of village life. As part of a general national drive for development in then conventional sense, increasing emphasis is being put on individual consumption, which creates increased "needs" for cash. In microeconomic terms, this suggests that preferences have changed in favour of income and consumption relative to leisure.
6. Changes in the village administration, as discussed above.

These changes can be summarized as augmented land rent (or land value) due to internal and external land claims, higher rubber price, and lower transport or travel costs. The opportunity cost of labour has also decreased, because of the declining profitability of forest produce, and population growth not absorbed in the off-farm economy. Further, as a result of both internal and external factors, the customary land tenure system has eroded.

The changes described above have resulted in significant modifications in the shifting cultivators' adaptations. There has been a transition from a relatively stable rice based shifting cultivation system to a smallholder rubber system which encroaches on previously unused old-growth forest. The most significant changes over the period 1985-1991, which the household survey covered, are:

1. *Increasing share of households opening swidden.* About 42 percent of the households opened swidden in 1985; this share increased to 61 percent in 1991.
2. *Increased rubber planting.* During 1985-1986 about one third of the swiddens were planted with rubber. This has increased steadily to more than 90 percent in 1991.
3. *Increased primary forest clearance.* The share of primary forest clearance has almost doubled from 7 percent in 1989 to 13 percent in 1991. Data about the farmers plans for 1992 confirm the trend of increased clearing of primary forest.

Total forest area cleared by shifting cultivators from about 1 400 ha in 1985 to 2 400 ha in 1991, whereas the annual primary forest clearing has increased from 160 to 420 ha over the same time period.<sup>24</sup>

The sharp increase in the share of households engaged in shifting cultivation, in forest clearing, and in rubber planting could be viewed and explained from at least three perspectives, as elaborated in Angelsen (1995a). First, it can be viewed as a rational response to increased profitability of rubber, following a conventional economic logic. Second, increased land scarcity is generally seen as a major driving force for agricultural intensification (Boserup, 1965; Ruthenberg, 1980). Whereas both these approaches are useful to understand the changes in Seberida, this paper will concentrate on a third perspective which view the switch to rubber and increased land clearance as a strategy for obtaining and securing land rights. The next section develops a conceptual model based on the theories in section three to explain and understand the changes just described.

## 5 Discussion and an integrated framework

"The supply of institutional change is important; trends in the demand, although necessary, are not sufficient for understanding the path of change. Elements of political economy analysis are crucial; the political and economic costs and benefits to the ruling elites are a key to explain the nature and scope of change" (Feeny, 1993: 168).

The development in the study area can be summarized as increased land scarcity (implying higher land value or land rent), partly because of an increase in the number of external claims to what is considered community land according to customary law (*hak ulayat*). This development is not unique to the Seberida district, in fact, the forces of change and the subsequent response by local farmers are common throughout Southeast Asia.

From a property rights perspective, the response by the farmers has been twofold:

1. A strengthening of the individual usufructuary rights to land under the *adat* law through rubber planting and expansion of the swidden cultivation area (opening of land which no one previously has claims to). This development represents a strengthening of the individual use and income rights relative to the common rights (cf. Table 2. When land is used intensively the usufructuary rights evolve into more permanent rights under the customary law.
2. The individual rights are increasingly, though still on a relatively small scale, formalized by acquiring protection in statutory law, i.e., through obtaining land certificates. In addition to use and income rights, this also gives the person transfer rights.

A general increase in land scarcity combined with the high profitability of rubber, have increased the benefits from securing the rights to a particular piece of land. Moreover, because rubber itself gives usufructuary rights to land, there is no extra cost of establishing and strengthening the customary rights to the land. The limitation of such

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<sup>24</sup> As discussed in some detail in Angelsen (1995a), these figures should *not* be taken as a measure of deforestation.

rights is, as discussed above, that *adat* mainly gives protection against claims from members of the community, whereas it is of limited value in conflicts with external claimants.<sup>25</sup>

Statutory law and title deeds provide better protection against external claims, but depends also on a number of other factors. Rubber planting increases the possibilities for the land being accepted as the property of the planter in a possible conflict with the state or with private companies, for example, if plantations are established and the question of compensation arise. This would be the case even without a formal title. Higher intensity of production, for example, planting of high yielding rubber varieties, high density of rubber trees, and a well maintained rubber garden also enhance the tenure security.

Formal land titles can be obtained at various levels, generally with increasing security and higher costs the higher the level of authority issuing the title; village (*desa*), district (*kecamatan*), regency (*kabupaten*), and national level. So far the farmers in Seberida have not been rushing for formal registration of the land which they have rights to according to *adat* law. Yet, the village headmen have encouraged formal land titling, which over time will undermine the customary law.

Why this reluctance to obtain titles? The main answer lies in the high costs involved. A certificate would be very expensive for the average farmer, when both official and unofficial dues have to be paid. The area a household has rights to according to customary law could well be 10 - 15 hectare (ha), and the costs of titling all land would be well beyond the reach of most farmers. Deeds provided by the National Land Agency (BPN) at the district and provincial level are limited to two ha per person. Larger properties must be approved by the Jakarta office, with the extra expenses involved (Sandbukt, 1995: 57). Thus, title deeds are mainly relevant for the most intensively cultivated land. Plots planted with high yielding rubber under the Smallholder Rubber Development Programme (SRDP) get titled, and is -- if well tended -- regarded as secure property. Another kind of costs of land titling is related to the fact that people would consider this to be in conflict with, or at least not recognised by the *adat* law.

Even though formal land registration has been limited so far, we believe this will be more frequent in the future for several reasons. First, the external claims may continue increasing, making the securing of rights in statutory law more important. As elaborated in Angelsen (1995a), farmers' *expectations* about future external claims and land scarcity is the important factor here. The household survey showed that most farmers expect increasing difficulties to find land for swidden cultivation. Second, as shown formally in section six, increased intensification would make it more attractive to also secure the land through titling. Third, some of the initial hesitation because it represents a break with the *adat* law may be weakened over time. A documentation of the latter from Lampung, Sumatra is found in Michon *et al.* (1995): a traditional prohibition of

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<sup>25</sup> It is not only in conflicts with the state that local users may lose, but also against potential users from outside the community. Michon *et al.* (1995: 5) discuss such a case from Lampung Sumatra, where "communal control did not appear able to protect the interest of legitimate owners against external unauthorized tappers <of resins>".

planting perennials was removed, and individual appropriation of land through planting of profitable resins became acceptable also according to customary law.

Returning to the four approaches outlined in section three, which one are the most useful or have the most explanatory power to explain the development? A definite test would obviously be impossible to undertake; rather "the ability to tell a consistent story is an important test of the analytical framework" (Feeny, 1993: 174). We would argue that neo-institutional economics (NIE) provides the most consistent framework, which at the same time is sufficiently flexible to include elements from the other approaches. In particular, the state - local dichotomy, and the related tension between customary and statutory law should be incorporated in the analysis.

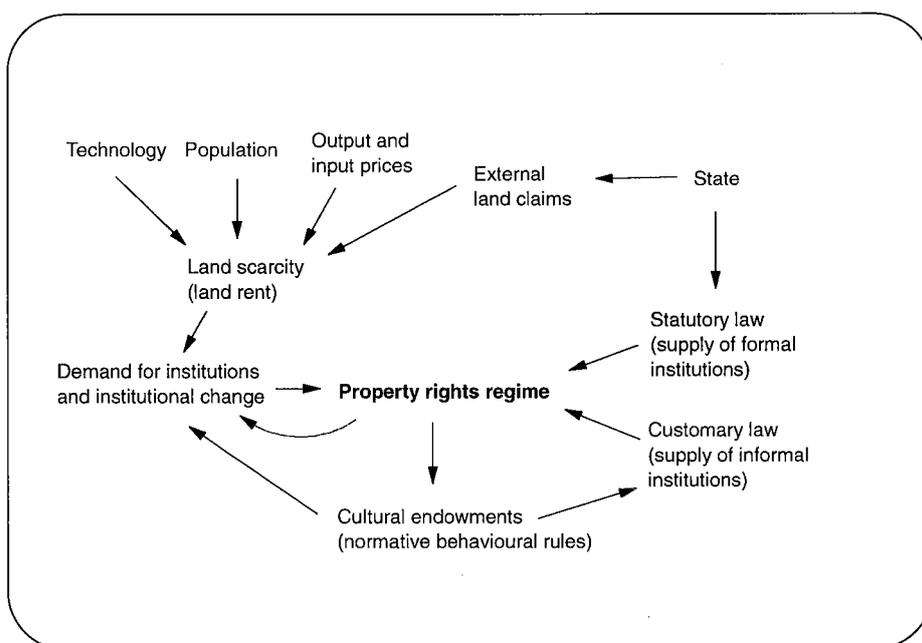


Figure 1: Main forces determining changes in the property rights regime.<sup>26</sup>

Figure 1 sketches a conceptual framework which can explain the changes in the property rights regime. We apply a "demand and supply for institutional change" metaphor, which should not be taken too literally or stretched too far (Feeny, 1993: 198).<sup>27</sup> It may, however, be useful to think of the demand (left side in the figure) as representing the resource users' benefits from different institutional arrangements. The benefits would be a function of, *inter alia*, the protection given against external claims. The supply (right side in the figure) is given in terms of the costs of providing various degrees and types of protection against third party interference.

<sup>26</sup> One could, obviously, add more elements and arrows to the figure. We have limited to the main variables and the main connections. A framework which relates everything to everything, as done in Ruttan and Hayami (1984), is not very helpful to understand the main mechanisms at work.

<sup>27</sup> The market analogy is far from perfect: there is no clear commodity, nor a single price, as in a market. The metaphor applies to a variety of market structures, with often discrete and multidimensional goods. See Lin and Nugent (1995) for a broad based discussion of demand and supply of institutions and institutional change.

The main strength of NIE is on the demand side of the figure. The key variable here is land scarcity, which will be reflected in the land rent or land value. A number of factors can contribute to increased land scarcity. In the Seberida district higher rubber prices, population growth, and external land claims have been the most important. In addition to total land scarcity, the *composition* of land demand between internal (within the community) and external claimants is important for the demand for institutional change.

Higher land value creates a demand for institutional change. First, as a simple but important fact, when land rent increases, higher transaction costs can be incurred while still retaining a positive profit. Second, higher land value goes in tandem with more investments in land.<sup>28</sup> However, farmers are only able to pick the fruits, sometimes literally, of their investments if the tenure is secure. Thus, the increased potential value of land could only be captured by the individual farmers by securing their land rights.

On the supply side, we distinguish between two sets of institutions which can provide tenure security: statutory and customary law. These are examples of (1) institutions provided from *above* by the state, and (2) institutions provided from *below* by collective action by a group of individuals. Within these laws, there are various degrees of protection against third party intervention. Generally, increased protection can only be obtained by incurring higher transaction costs (contract and enforcement costs), but this need not always be the case: the Seberida case study provides an example where the most profitable crop alternative (rubber) is also the one which gives highest tenure security.

The state has two roles, according to the framework of Figure 1. First, government sponsored projects such as transmigration, logging, plantation, mining, etc. have been the main source of external land claims. Second, the state has a role to play as a supplier of formal rules and legal protection of property rights through the laws and acts which regulate land use, and the enforcement of these. As discussed in section 4.2, there are interactions between these two sets of institutions. First, the statutory law recognises the customary law formally, although not much in practice. Second, some variables, such as intensity of production, affect the tenure security under both systems.

A final element included in the figure is the cultural endowments (Ruttan and Hayami, 1984), or normative behavioural rules or moral behavioural codes (North, 1981). These are important for the stability of the system. As discussed in section 3.4, their influence within our framework would be twofold. Cultural endowments have an impact on the demand for institutional change: changing norms towards regarding land as an economic commodity, or changes in preference towards material consumption can strengthen the pressure on land, and thereby the demand for change in the property rights regime. Second, the moral behavioural codes are important in shaping the customary land law, and its practice and efficiency.

The cultural endowments are more fundamental institutions, but would also change over time, even though at a slower pace. They would be influenced by, *inter alia*, the actual

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<sup>28</sup> For example, in a subsistence economy higher population density leads to less land per family and higher land value. In order to produce sufficient for the family's consumption, the inputs and investments in land must increase.

property rights regime (operating rules, or secondary institutional arrangements). This process is put clearly by North and Thomas (1971: 786):

"The forces of change ... will first induce pressure to change contractual forms - that is to alter secondary institutional arrangements. The cumulative forces of such changes which violate, modify, or otherwise bypass existing fundamental institutional arrangements will induce growing pressure for more basic - and more costly - modifications in primary institutional arrangements."

The modifications in the property rights regime would take place in the interplay between the demand and supply factors. In simple terms, the increased land value creates a demand for higher tenure security. The supply side gives a menu of varying degrees of protection, generally with higher costs the higher the protection is.

Increased land scarcity provides the main driving force towards individualization of the property rights. The increase in external claims (which relates to the *composition* of the increased demand) strengthen this tendency, and also makes farmers increasingly secure their rights in statutory law. Thus the evolution of private property rights is reflected in both the fact that within the customary land tenure system individual rights are strengthened relative to rights held in common, and by an increased reliance on statutory law -- which only recognize individual rights -- relative to the customary law.

Does increased land scarcity lead to a move from informal to formal property rights institutions, from customary to statutory law? The answer depends critically on the amount of external claims, and to what extent there exist effective local management institutions which give protection against claimants. The latter is a key issue in the debate on communal resource management: can village institutions (1) provide security against internal, and possibly also external, claimants, and (2) regulate the resource use when the pressure on these resources increase, both by limiting the access by outsiders, and constraining the exploitation by the community members. The demand put on such institutions would clearly be much less in situations of land abundance.<sup>29</sup>

The existence and viability of such resource management institutions vary considerably. In the case of Seberida, the minority Talang Mamak group do have an *adat* system that in some respects remain a potent institution for resource management. The Malay ethnic group, which constitutes more than 90 percent of the traditional (non-transmigrant) population of Seberida, lack a corporate organization for resource management apart from the traditional village organization (Sandbukt, 1995: 63). Thus the two groups to some extent resemble the distinction made between regulated and unregulated common property regimes in section 2. However, uncertainty related to village boundaries arising from the 1979 village administration reform makes it difficult for the villages to exercise any jurisdiction. Thus, it remains an open question in our case to what extent the traditional tenure system could have provided an efficient management tool, even in a case when the demand on land only came from within the community.

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<sup>29</sup> See Baland and Platteau (1996) for a further discussion.

## 6 Endogenous tenure (in)security in a farm household model

There has, generally, been a marked lack of formal modelling of institutional change, which in part reflects the complexity of the issue, the many factors involved, and the difficulties of capturing these variables and their dynamic interrelations in a model.<sup>30</sup> It may also be a reflection of the institutional critique of conventional positions in economic theory, failing to distinguish between a critique of substance and a critique of methodology and level of formalism. We believe that much can be gained by formal modelling by clarifying the theory, sharpening the arguments, and ensuring consistency between the assumptions and conclusions.

The appendix presents an formal economic model which captures some of the main arguments in section five, and also can be applied to explain the development in the Seberida district (section 4.3). The main results of that model are presented and discussed in this section. The model focuses on tenure (in)security. Unlike most agricultural household models, including the ones presented in Angelsen (1994; 1996), tenure security is an endogenous variable; farmers choose the optimal level of security. How does this extension modify or change the results of conventional economic models?

By tenure security is meant the probability of keeping the land. In addition to being crop specific (rice and rubber), tenure security depends on three variables in the model (cf. Barzel, 1989: 2):

1. *Intensity of production.* Under both customary and statutory laws is a function of the labour efforts and other investments in the cultivation of the land. Much of the literature in the property rights school focus on the reverse link, i.e., higher tenure security leading to higher investments. In actual fact, the causality runs both ways, as it does in the model developed in the appendix.
2. *Enforcement efforts.* These include the process of obtaining land certificates (title deeds) at different levels of security and costs.
3. *External land claims.* These are claims to the land by users outside the community, against which customary law provides little protection.

The first two variables are chosen by the farmer, whereas the extent of external claims must be taken as given. In choosing the optimal level of intensity in production, a farmer not only looks at the *output-enhancing* effect of higher intensity, but also the *security-enhancing* effect. A model with *exogenous* tenure insecurity gives lower intensity compared to a full-security model. In the present model with *endogenous* tenure insecurity, however, the level of intensity might be higher than in a full-security model due to the reduced tenure-risk resulting from higher intensity.

The appendix analyzes the effects of more external land claims. The farmers' response could well be to *increase* the intensity of production and the enforcement efforts; higher "external" risk gives incentives for higher intensity and enforcement efforts to augment tenure security. This *could* outweigh the conventional economic effect of higher risk reducing the intensity of production.

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<sup>30</sup> One exception is Feder and Feeny (1991; 1993).

An increase in intensity is more likely to be the outcome if land with low intensity of cultivation becomes relatively more probable to be lost to external claimants than high-intensity land. This is likely to be the case in many empirical settings; increased intensity then becomes a strategy to secure land rights.

More external land claims could also affect the crop choice. We have argued that perennials (rubber) gives higher protection against external claims than annuals (rice). Consider a situation with no external claims, where rice is the most profitable crop. Introducing tenure insecurity in the form of external claims could make rubber yielding a higher *expected* profit than rice due to its higher tenure security. Thus other factors than changes in relative prices might be important in explaining crop choice changes.

The response to the tenure insecurity incurred by external claimants predicted by the model could, therefore, be a threefold strategy: rubber, intensification, and land certificates. This result is in line with empirical observations in our study area of Seberida (section 4.3 and Angelsen, 1995a; 1995b).

Another result which goes beyond the results of conventional economic models relates to the effect of land titling programmes, which could be considered a means to reduce the costs of enforcing property rights. It is generally argued that such programmes will increase the intensity of agricultural production by providing more secure land rights. The effect of lower enforcement costs is, however, ambiguous in the model. We have made the fair assumption that high intensity and enforcement are alternative means of securing land rights. Higher enforcement efforts (land titling) will therefore reduce the incentives for farmers to choose a high level of intensity due to its security-augmenting effect.

The possibility that the tenure security function is not globally concave in intensity and enforcement could result in discontinuities in farmers' adaptation. Both under customary and statutory law, it may well be that intensity and/or enforcement efforts must be beyond a certain level to have any significant impact on tenure security. This might result in large jumps in the optimal intensity and enforcement following small changes in prices, technology or external claims.

## 7 Conclusions

This paper has examined and tried to integrate various approaches to the study of the evolution of private property rights (EPPR) in traditional agrarian societies in general, and the shifting cultivation system in Seberida, Sumatra in particular. We have argued that neo-institutional economics (NIE) provides the most consistent and richest framework, which also can integrate elements from the three other approaches. The focus in NIE is on the demand for land or land scarcity, which again create increased competition and higher land value. The boost in land value was caused by the increase in the external claims for land, population growth, and improved profitability of rubber. This is one of two key factors to explain the development over the last decade in our study area, and represents the demand side in the "demand and supply for institutional change" metaphor.

The second main factor of empirical relevance to our case study is the tension between customary (*adat*) and statutory law, which is to a large extent overlapping with the conflict between state supported external claimants (logging, transmigration, plantation, and mining projects) and traditional, local farmers. This factor needs to be integrated in the NIE framework. As shown in section five, it could be done by regarding the customary and statutory law as two different institutions, providing the farmers with different degrees and forms of protection against third party interference. This gives the supply side in the demand-supply metaphor. The customary law gives one set of rules on how rights are obtained and secured, basically against claims from other members within the community. The statutory law, though it on paper recognizes customary law, has a different set of rules. Land certificates and intensive production are two major strategies to improve tenure security according to statutory law.

Increased land scarcity provides the main driving force towards individualization of the property rights. The increase in external claims strengthen this tendency, and also makes farmers increasingly secure their land claims in statutory law. Thus the evolution of private property rights is reflected in both the fact that within the customary land tenure system the individual rights are strengthened relative to common rights, and by an increased reliance on statutory law -- which only recognize individual rights -- relative to the customary law.

These tendencies express themselves on the ground by changes in the shifting cultivators' adaptation: an expansion of the area used by shifting cultivation, a sharp increase in rubber planting -- which also represents an intensification of the system, and an incipient tendency of obtaining land certificates. These observations are in line with the conclusions in the formal farm household model, which indicates that the farmers act according to basic economic logic. One needs, however, to extend conventional economic models to include how farmers' decisions influence tenure security to understand and explain the behaviour.

There are several reasons as to why one could expect the land value to increase in the future, both in our study area and in other areas of traditional agriculture: population growth, improvements in infrastructure which improves accessibility, and environmental problems in intensive agriculture which may lead to higher food prices. According to the NIE theory, we should therefore expect to see an increasing individualization of land rights. To what degree this mainly takes place within the customary law, or if customary law is replaced by statutory law, is more of a policy issue. It depends particularly on the state's protection of rights based on customary law and its support to external claimants.

## Appendix: An analytical farm model with endogenous tenure security

The model analyzes farmers' decisions in a situation where their choices affect their land tenure security. We consider a plot of land, where two crops can be grown: rice ( $C$ ) or rubber ( $B$ ).<sup>31</sup> Tenure security, that is, the probability of keeping the land ( $q$ ), is determined by three factors: the intensity of production ( $I$ ), the enforcement efforts ( $T$ ), for example, buying land titles<sup>32</sup>, and the external land claims ( $E$ ), cf. the discussion in section 6. Unlike  $I$  and  $T$ ,  $E$  is not a decision variable to the farmer, and therefore exogenous in the model.

Intensity of production is used as a proxy for labour inputs, but can also incorporate other factors. If rice is selected,  $I$  could also reflect the frequency of cropping (as measured by years of cropping divided by the years of fallow). If rubber is selected,  $I$  could reflect the density of rubber trees (trees per ha) and the type of trees (high yielding *v.* traditional low yielding varieties).

(1)

$$q^i = q^i(I^i, T^i, E); \quad q^i \in [0, 1]; \quad q^i_I, q^i_T > 0; \quad q^i_E < 0; \quad q^i_{II}, q^i_{TT}, q^i_{IT} < 0; \quad q^i_{IE}, q^i_{TE} > 0; \quad i = B, C$$

We assume that intensity of production and enforcement are alternative means of augmenting tenure security, i.e.,  $q^i_{IT} = q^i_{TI} < 0$ . Whereas more external claims reduce tenure security ( $q^i_E < 0$ ), it increases the marginal effect on tenure security of both intensity and enforcement ( $q^i_{IE}, q^i_{TE} > 0$ ). For given values of  $I$ ,  $T$  and  $E$ , rubber is assumed to give higher tenure security than rice ( $q^B > q^C$ ), which is in line with empirical observations.

Output is a concave function of the intensity of production,  $f^i(I^i)$ . The expected net income ( $V^i$ ) for a particular crop from the plot can be written as;

$$(2) \quad V^i(I^i, T^i; E, p^i, w) = q^i(I^i, T^i, E)p^if^i(I^i) - wI^i - vT^i; \quad i = B, C$$

$p^i$  is the output price,  $w$  is the unit cost of intensity, for example, the opportunity costs of labour (nominal wage rate), and  $v$  is the unit cost of enforcement, reflecting, for example, the costs of obtaining a land certificate. This corresponds to a small, open economy assumption (all prices are exogenous), cf. Angelsen (1996). For simplicity the unit costs of both intensity and enforcement are assumed to be the same in both rice and rubber production; any differences are reflected in the production functions. Whereas the costs occur for certain, the value of the output ( $p^if^i$ ) must be multiplied by the probability of keeping the land. We assume that farmers are risk neutral, i.e., they maximize the expected income, which is another simplification that helps to concentrate

<sup>31</sup> To simplify the model we ignore time, including the fact that rice is an annual crop, grown at certain time intervals (rotation period) in a shifting cultivation system, whereas rubber is a perennial crop which after a lead period of some 6-12 years (depending on the type) can be tapped for several decades. We also abstract from the fact that rice is commonly grown the first year on the plot after clearance, before rubber is planted. Even if time is not modelled explicitly, the model is, in fact, equivalent to a two-period model *without discounting*, where the costs occur in the first period and the income in the second (cf. the somewhat different two period model in Feder and Feeny, 1993).

<sup>32</sup> In reality this would obviously be a discontinuous variable, a fact we abstract from in this model.

on the main points of the model.<sup>33</sup> Finally, we assume that  $V^i$  is concave in  $T$  and  $I$ , although this is relaxed later.

The choices for the farmers would then be:

- Which crop to select: rice or rubber?
- What should be the intensity of production?
- How much should be spent on obtaining a land certificate and other efforts in enforcing the property rights?

The solution to these problems is partly recursive; the farmer's problem is first to maximize (2) with respect to  $I$  and  $T$  for both rice and rubber, and then to select the crop which gives the highest net income.

***The case with tenure based on customary law only (no external claims)***

We consider first an isolated community (village) in the sense that there are no external land claims ( $E = 0$ ). The tenure system is based on customary law; we then presume that there is no need to buy land certificates ( $T = 0$ ). The optimal level of intensity ( $I$ ) is characterized by;

$$(3) \quad q^i(I^i, 0, 0)f_I^i + q_I^i(I^i, 0, 0)f^i(I^i) = \frac{w}{p^i}$$

Compared to a situation with full tenure security ( $q^i = 1$ ), uncertainty introduces two new elements in the optimality condition. First, the fact that production is risky ( $q^i < 1$ ) reduces the (expected) marginal output, and therefore also the optimal intensity and output level. Second, higher intensity augments tenure security, which pulls the level of intensity in the other direction. Unlike in a model with *exogenous* tenure insecurity ( $q^i = \bar{q} < 1$ ), we *cannot* in the present model generally conclude that the level of intensity will be lower than in a model with full tenure security.

The effect of an increase in the real wage is;<sup>34</sup>

$$(4) \quad \frac{dI^i}{d(w/p^i)} = [2q^i f_I^i + q_I^i f_{II}^i + q_{II}^i f^i(I^i)]^{-1} < 0$$

The effect of, for example, an output price increase is to augment intensity of production, as would be the case in a model with full tenure security.<sup>35</sup> This conclusion may, however, be modified when we also taken into account crop choice. Assume the initial adaptation is to produce rice. The rubber price increases, and if the increase is sufficiently large, it may induce a shift from rice to rubber production. The switch in crops could reduce the intensity, particularly since rubber provides higher tenure

<sup>33</sup> Note that higher risk (lower  $q$ ) in our model implies lower expected yield. Higher risk in terms of higher variance ("mean preserving risk") is not important as only expected values matter in the model.

<sup>34</sup> This result follows from the concavity assumption for  $V^i$ :  $V_{II}^i < 0$  (second order conditions for maximum).

<sup>35</sup> As already noted, this model does not include time, and therefore not the rotation aspect of rice production in a shifting cultivation system. We know, however, that a forest multi-rotation model for shifting cultivation (with exogenous tenure security) also would give that higher output price results in intensification of the production system, both in terms of higher labour inputs and shorter fallow periods (Angelsen, 1994).

security than rice, and therefore may reduce the incentives for choosing a high level of intensity due to its security-enhancing effect.

### ***The case with external claims***

In the case when there are external claims to the land ( $E > 0$ ), the farmers have an incentive to make some enforcement to protect the land and increase tenure security. Assuming an interior solution ( $T > 0$ ), the optimality conditions are (superscripts for crops are omitted to simplify notation);

$$(5) \quad qf_I + q_I f(I) = \frac{w}{p}$$

$$(6) \quad q_T f(I) = \frac{v}{p}$$

(5) is similar to (3), whereas (6) gives that the optimal level of enforcement is characterized by the last rupee spend on enforcement being equal to the gain in terms of the production value of the increase in tenure security.

Differentiation of (5) and (6) gives;

$$(7) \quad \begin{bmatrix} 2q_I f_I + q_{II} + q_{II} f(I) & q_{TI} f(I) + q_T f_I \\ q_T f_I + q_{TI} f(I) & q_{TT} f(I) \end{bmatrix} \begin{bmatrix} dI \\ dT \end{bmatrix} \\ = \begin{bmatrix} -q_E f_I - q_{IE} f(I) & 1 & 0 \\ -q_{TE} f(I) & 0 & 1 \end{bmatrix} \begin{bmatrix} dE \\ \frac{dw}{p} \\ \frac{dv}{p} \end{bmatrix}$$

The determinant of the Hessian is assumed to be positive;

$$(8) \quad D = \begin{vmatrix} 2q_I f_I + q_{II} + q_{II} f(I) & q_{TI} f(I) + q_T f_I \\ q_T f_I + q_{TI} f(I) & q_{TT} f(I) \end{vmatrix} > 0$$

Together with the assumption of  $q_{TT} < 0$ , this gives the second order sufficient conditions for maximum.

### ***Effects of more external claims***

Using Cramer's rule, the effect an increase in external claims on the level of intensity can now be written as;

$$(9) \quad \frac{dI}{dE} = -\frac{1}{D} \{q_{TT} f(I)[q_E f_I + q_{IE} f(I)] - q_{TE} f(I)[q_{TI} f(I) + q_T f_I]\} \geq 0$$

There are three different effects to consider. First, higher  $E$  increases the tenure risk, which reduces the expected marginal productivity of intensity. This is a standard effect in the theory of the firm: reduced expected value of output (i.e., higher risk in our model) makes the firm reduce the production. The risk is, however, also affected by the level of intensity. More external claims *increases* the risk-reducing effect of high intensity ( $q_{IE} > 0$ ), and this provides an incentive to *increase* intensity of production. These effects are similar to those discussed in relation to (4). A third effect concerns the effect on  $I$  of changes in  $T$ . As discussed below,  $T$  is likely to increase. As a high level of

intensity and enforcement are assumed to be alternative means of securing land rights ( $q_{TI} < 0$ ), this effect will then pull in the direction of reduced intensity. The net effect on intensity is therefore ambiguous.

The effect on the enforcement efforts of more external land claims is given by;

$$(10) \quad \frac{dT}{dE} = -\frac{1}{D} \{ q_{TE}f(I)[2q_{IfI} + q_{fII} + q_{If}(I)] - [q_{TI}fI + q_{TI}f(I)][q_{EfI} + q_{IE}f(I)] \} \gtrless 0$$

The direct effect of higher competition for land in the form of more external claims is to increase the effect on tenure security of property rights enforcement ( $q_{TE} > 0$ ). There is, further, an indirect effect due to changes in  $I$ . If  $I$  is reduced (conventional case), this provides an additional incentive to increase  $T$ . If  $I$  increases, this effect will be the opposite of the direct effect. Hence in the case when  $I$  decreases, we can conclude that  $T$  will increase, whereas the net effect is ambiguous in the case when  $I$  increases following an increase in  $E$ .

Figure 2 provides an illustration of how intensity of production may depend on the level of external claims. We still consider only one crop. The figure assumes that  $T$  is chosen optimally given the different levels of  $I$ . The effect of an increase in external claims ( $E$ ) depends critically on the way it affects  $q$  at different levels of intensity. If the reduction in  $q$  is the same for all levels of intensity, the effect of an increase in external claims is equivalent to an output price reduction. The result is *reduced* intensity of production.

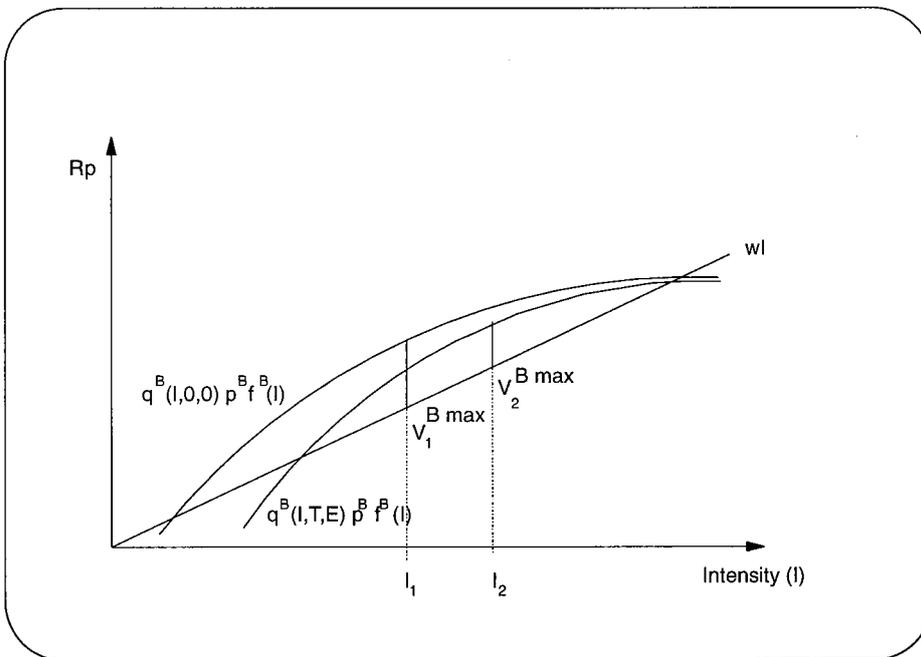


Figure 2. The effect of external land claims on intensity of rubber production.

A more realistic description would be that the effect on tenure security of external claims is highest at low intensity levels, as we have assumed in the model ( $q_{EI} = q_{IE} > 0$ ). In Figure 2 we compare two situations; without (1) and with (2) external land claims. Assume, for example, that without external claimants farmers have full security at all levels of intensity. When external claimants enter the scene, low intensity land is more

likely to be lost to external claimants compared to land under intensive production. Intensification has on the margin become more beneficial because it increases tenure security more than it did in the first place. The effect of more external claims may now be to *increase* the intensity of production, contrary to conventional economic logic which suggests that lower expected yield (higher risk) will reduce the scale of the activity.

### ***Effects of price changes***

The effects of changes in the real price of intensity are;

$$(11) \quad \frac{dI}{d\frac{w}{p}} = \frac{1}{D} q_{TT} f(I) < 0$$

$$(12) \quad \frac{dT}{d\frac{w}{p}} = -\frac{1}{D} [q_{TI} f_I + q_{TT} f(I)] \geq 0$$

As in the case with no external land claims, one can unambiguously conclude that higher real costs of intensity (e.g., real wage) will reduce the level of intensity, as intuitively expected. The effect on enforcement efforts is ambiguous. The fact that  $I$  is reduced and production declines implies a smaller harvest to protect. This reduces the incentives to undertake enforcement of property rights. Reduced intensity, however, also implies higher marginal gains in terms of improved tenure security of the enforcement efforts ( $q_{TI} < 0$ ). Intuitively, one could expect the first effect to dominate such that a real wage increase will lower the enforcement.

The effects of changes in the costs of enforcement are;

$$(13) \quad \frac{dT}{d\frac{v}{p}} = \frac{1}{D} [2q_{TI} f_I + q_{TI} f(I)] < 0$$

$$(14) \quad \frac{dI}{d\frac{v}{p}} = -\frac{1}{D} [q_{TI} f(I) + q_{TI} f_I] \geq 0$$

Higher real costs of property rights enforcement will, as expected, reduce the enforcement efforts. A reduction in  $T$  has two opposite effects on the optimal level of intensity. Again, since intensity and enforcement are alternative ways of improving tenure security, lower  $T$  provides an incentive for higher  $I$ . Lower  $T$ , however, also reduces the absolute level of tenure security, which means that production is more risky, which pulls in the direction in lower intensity.

Land titling programmes to provide cheaper (and more secure) titles to farmers could be viewed as reduction in  $v$ . One argument for such programmes is that more secure property rights will increase the incentives for more intensive cultivation as well as better management of the resources. Whereas this certainly is an important effect in our model, the net effect is ambiguous; lower costs of enforcement could *reduce* the intensity of production because the role of high intensity in protection land rights has become less important.

### ***Rice-rubber choice***

So far we have looked at only one crop. Figure 3 illustrates the choice between rice and rubber, and how this choice may be affected by external claims. We assume an initial

situation with no external claim, and where rice cultivation gives the highest income; the curve for the expected value of rice is higher than the corresponding curve for rubber when  $E = 0$ . In drawing the curves we have assumed that  $I$  and  $T$  are optimally chosen for each level of  $E$ .

When introducing external claims, the expected rice-income curve will fall more rapidly than the expected rubber-income curve, because the fields growing rice, for example, in a shifting cultivation system, will have their tenure security reduced more than the rubber fields, i.e.,  $|q_E^C| > |q_E^B|$ . When the amount of external claims reaches a certain level,  $E^*$ , it will be beneficial for the farmer to switch from rice to rubber. The tenure insecurity under rice cultivation has become so high that it has more than outweighed the initial superior profitability of rice cultivation.<sup>36</sup>

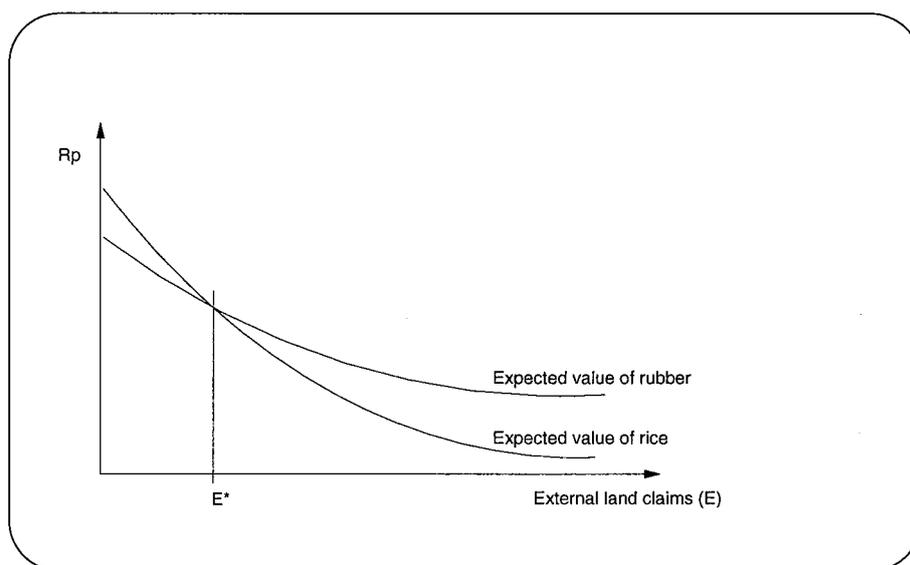


Figure 3. The effect of external land claims on crop selection.

This illustrates that other factors than relative prices may be important in determining farmers' choices. The shift from rice to rubber which has taken place in the Seberida, Sumatra could in part be explained by such tenure security considerations (Angelsen, 1995a; 1995b).

### **Discontinuities**

So far we have assumed that the tenure security function is concave in intensity ( $q_{II} < 0$ ). An alternative formulation is that  $q(\cdot)$  is concave for small values of  $I$ , then convex for intermediate values, before it turns concave for high values of  $I$ . One argument for this shape would be that there exists a kind of threshold level when it comes to the effect of intensification on tenure security; for low intensities small intensity changes do not affect the tenure security significantly. Related to the discussion in section 4.2, land is still considered under *hak ulayat* and receives almost no legal protection in conflicts with "national interests". Beyond a certain level of intensity, the farmer could expect the land to be under *hak milik* with much better legal protection. Such a shape of  $q(\cdot)$  could

<sup>36</sup> Note that the effect of a price increase discussed in the previous sub-section is easily illustrated in this figure, by moving up/down the expected value curves.

make also the  $V^i$ -function have a convex segment for medium values of intensity, as illustrated in Figure 4.

Suppose we initially are in situation 1, where intensity of production is relatively low. Then the output price increase or the costs of intensity ( $w$ ) decrease. It is then possible to get a large jump in intensity, as we move from the low intensity concave segment to the high intensity concave segment of the curve for the expected value of output. Small changes in the prices of output or intensity may therefore cause large shifts in the intensity, even if the same crop is produced in situation 1 and 2.

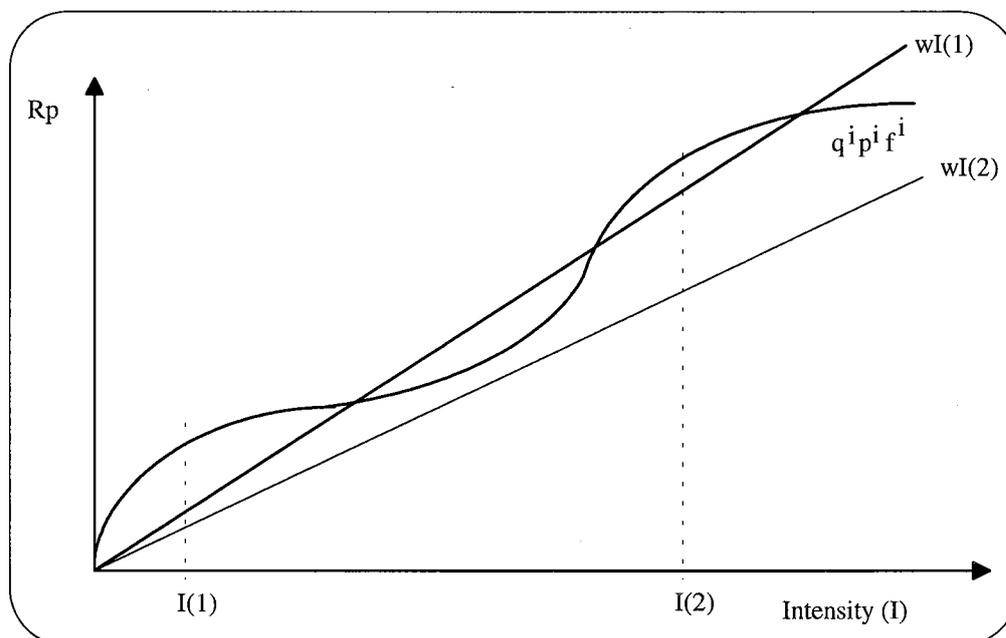


Figure 4. The case when the  $V^i$ -function has a convex segment for medium levels of intensity.

Similarly, one could argue for the possibility that the  $q$ -function is convex in  $T$  for intermediate values, which may cause large jumps in enforcement efforts following small changes in, for example, the costs of enforcement ( $v$ ).

#### **Possible extensions**

The above model is based on a number of simplifying assumptions, which could be modified. The small open economy approach (all prices exogenous) could be replaced by a situation where the households are quantity constrained in the labour market, cf. Angelsen (1996). In that case the households' objective should be to maximize utility rather than income. This will introduce income effects in the comparative statics, which could modify or even turn around some of the results. The (expected) utility approach also allows for a discussion of risk aversion.

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