

ASB Lecture Note 12

Policy research for sustainable upland management

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Suseno Budidarsono, Thomas P. Tomich, Suyanto, Chip Fay, David Thomas

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Towards integrated natural resource management in forest margins of the humid tropics: local action and global concerns

Meine van Noordwijk, Sandy Williams and Bruno Verbist (Editors)

Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can - in a global partnership for sustainable development. (Preamble to the United Nations' Agenda21 on Sustainable Development; <http://www.un.org/esa/sustdev/agenda21chapter1.htm>).

Background to this series of lecture notes

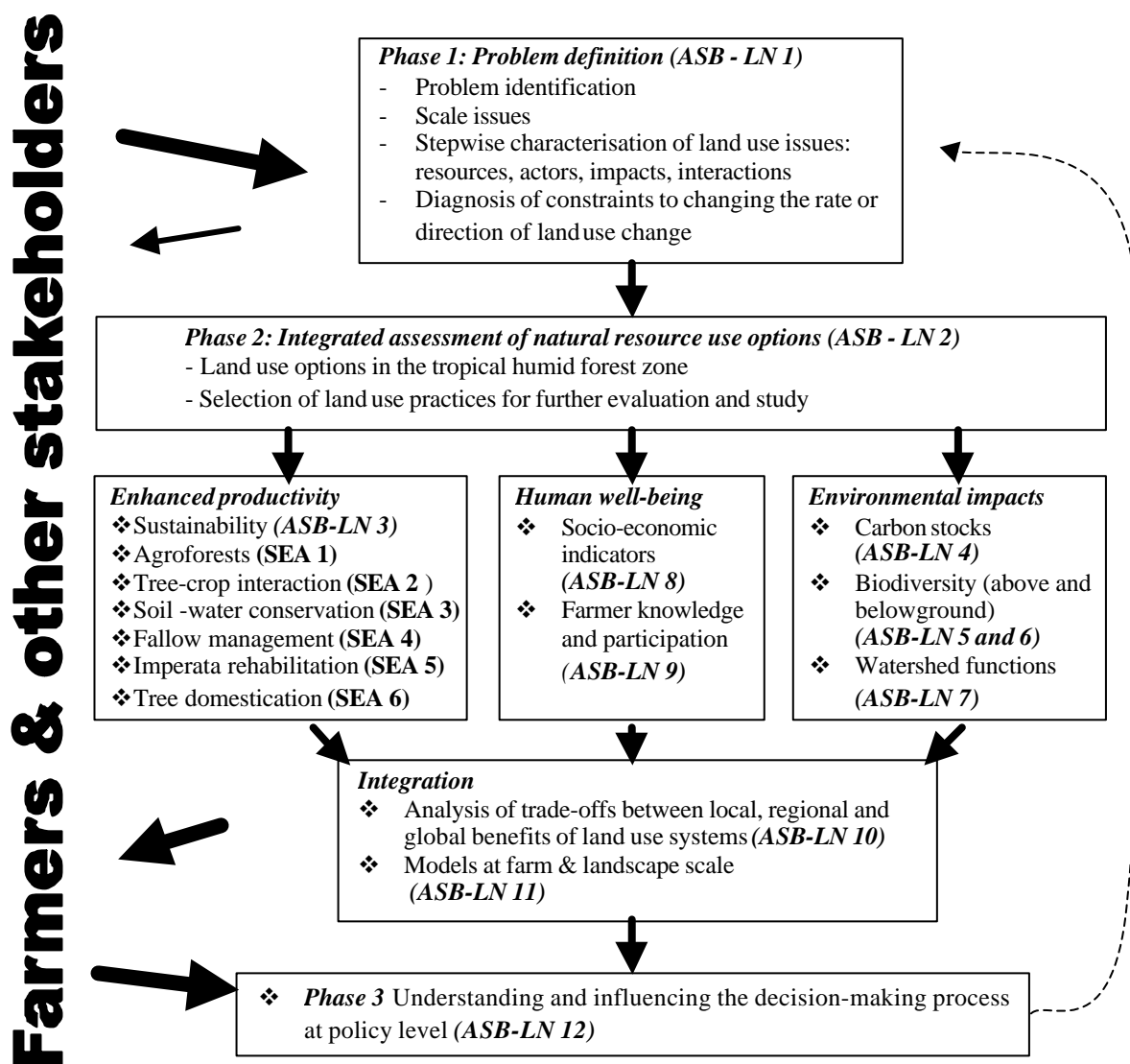
Much of the international debate on natural resource management in the humid tropics revolves around forests, deforestation or forest conversion, the consequences it has and the way the process of change can be managed. These issues involve many actors and aspects, and thus can benefit from many disciplinary perspectives. Yet, no single discipline can provide all the insights necessary to fully understand the problem as a first step towards finding solutions that can work in the real world. Professional and academic education is still largely based on disciplines – and a solid background in the intellectual capital accumulated in any of the disciplines is of great value. If one wants to make a real contribution to natural resource management issues, however, one should at least have some basic understanding of the contributions other disciplines can make as well. Increasingly, universities are recognising the need for the next generation of scientists and policymakers to be prepared for interdisciplinary approaches. Thus, this series of lecture notes on integrated natural resource management in the humid tropics was developed.

The lecture notes were developed on the basis of the experiences of the Alternatives to Slash and Burn (ASB) consortium. This consortium was set up to gain a better understanding of the current land use decisions that lead to *rapid* conversion of tropical forests, shifting the forest margin, and of the *slow* process of rehabilitation and development of sustainable land use practices on lands deforested in the past. The consortium aims to relate local activities as they currently exist to the global concerns that they raise, and to explore ways by which these global concerns can be more effectively reflected in attempts to modify local activities that stabilise forest margins.

The Rio de Janeiro Environment Conference of 1992 identified deforestation, desertification, ozone depletion, atmospheric CO₂ emissions and biodiversity as the major global environmental issues of concern. In response to these concerns, the ASB consortium was formed as a system-wide initiative of the Consultative Group on International Agricultural Research (CGIAR), involving national and international research institutes. ASB's objectives are the development of improved land-use systems and policy recommendations capable of alleviating the pressures on forest resources that are associated with slash-and-burn agricultural techniques. Research has been mainly concentrated on the western Amazon (Brazil and Peru), the humid dipterocarp forests of Sumatra in Indonesia, the drier dipterocarp forests of northern Thailand in mainland

Southeast Asia, the formerly forested island of Mindanao (the Philippines) and the Atlantic Congolese forests of southern Cameroon.

The general structure of this series is



This latest series of ASB Lecture Notes (**ASB-LN 1 to 12**) enlarges the scope and embeds the earlier developed ICRAF-SEA lecture notes (**SEA 1-6**) in a larger framework. These lecture notes are already accessible on the website of ICRAF in Southeast Asia: <http://www.icraf.cgiar.org/sea>

In this series of lecture notes we want to help young researchers and students, via the lecturers and professors that facilitate their education and training, to grasp natural resource management issues as complex as that of land use change in the margins of tropical forests. We believe that the issues, approaches, concepts and methods of the ASB program will be relevant to a wider audience. We have tried to repackage our research results in the form of these lecture notes, including non-ASB material where we thought this might be relevant. The series of lecture notes can be used as a basis for a full course, but the various parts can also 'stand alone' in the context of more specialised courses.

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ASB-consortium members

Details of the ASB consortium members and partner organisations can be found at:
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Lecture Note 12

POLICY RESEARCH FOR SUSTAINABLE UPLAND MANAGEMENT

By Martua Sirait, Sandy Williams, Meine van Noordwijk, Achmad Kusworo, Suseno Budidarsono, Thomas P. Tomich, Suyanto, Chip Fay and David Thomas

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I. Objectives

- To provide an understanding of policy research and how it is done,
- To give an overview of the tools and approaches that may be used, on the basis of actual examples in the context of the Alternatives to Slash and Burn programme.

II. Lecture

1. Introduction: how do policies influence farmer decisions?

In the first lecture note, a conceptual figure referred to the potential role of ‘policy’ in modifying farmers’ decision making, by affecting their access to resources, the constraints which affect their choice of land use systems and also the profitability of these systems (Figure 1). The figure suggests that some farmer choices can lead to unsustainable practices that degrade the resource base, whilst others can lead to increased and sustained production. The main issue in this lecture note is to clarify how ‘policy’ can influence the decisions made by farmers, and how research on the ways policies ‘work’ can help to adjust and improve these policies. The latter point is very important, as land use change is dynamic, and thus a ‘moving target’.

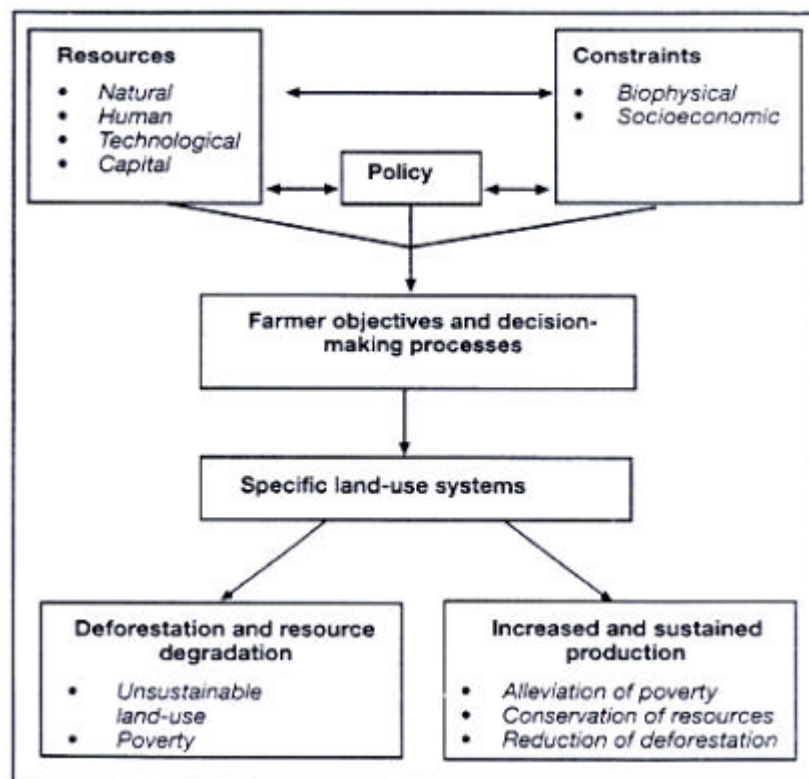


Figure 1. Conceptual scheme of farmer decision making and its consequences for either degrading or sustainable production systems.

The way in which ‘policies’ in a broad sense actually influence farmer decisions is complex, and often indirect. Policies developed for a specific purpose, for example to control the use of forest resources, often have impacts on farmer decisions elsewhere as well, for example causing administrative or financial burdens on farmers planting their own trees for future harvests. In **policy research** we thus have to go beyond the initial purpose or objective of measures and start from the actual impacts as farmers experience them. Policies can facilitate or complicate the access of farmers to resources such as land, capital, inputs, labour and knowledge and can reduce or increase constraints posed by the biophysical and socio-economic environment. Usually, different aspects of existing policies have opposite effects, and it takes some effort to disentangle all the strands that together set the boundary conditions for farmer decisions.

2. What is policy research?

- Policy research employs scientific and empirical methods to help clarify which policies can ‘work’, from which perspective and under what circumstances, as an aid to more effective policy development.
- Policy research is not limited to accumulation of ‘facts’ that are likely to vary with social, political or economic change.
- Policy research also includes process-based research aimed at improving policy making and policy implementation.

Policy research starts with clear definition of a policy research problem and includes the following steps:

- Assessment of *policy objectives* and the *impact* of existing policies
- Identification of relevant *policy instruments* (such as laws, regulations, taxes, quotas, permits or incentives)
- Establishing working relationships with *policy makers* who have influence over those policy instruments.

In this section, we will introduce the different ‘levels’ of decision-making, with examples, then consider some basic questions that we should remember to ask ourselves when conducting policy research, and conclude with an example of a framework used in a relevant research programme.

2.1 Horizontal and vertical ‘levels’ relevant to policy research

People making decisions about land use and land management units for smallholders are not just active at the national government level, but also at many other levels. These range from the levels of the household, the village community, and local government, up to global/international level. Seven levels of social units with potential policy influence on land-use decisions are presented in Figure 2: these are **vertical levels**.

Within each vertical level, we also find units which interact (these can be social units, economic units or environmental/biophysical units). We say interactions such as these occur at the **horizontal level**. The horizontal levels can also include government agencies from various sectors. The tension between agencies can often result in farmers receiving confusing messages, especially if the policies released by the different agencies contradict each other.

Some examples of the relationships and influences that occur within and among vertical and horizontal levels can be found in Box 1.

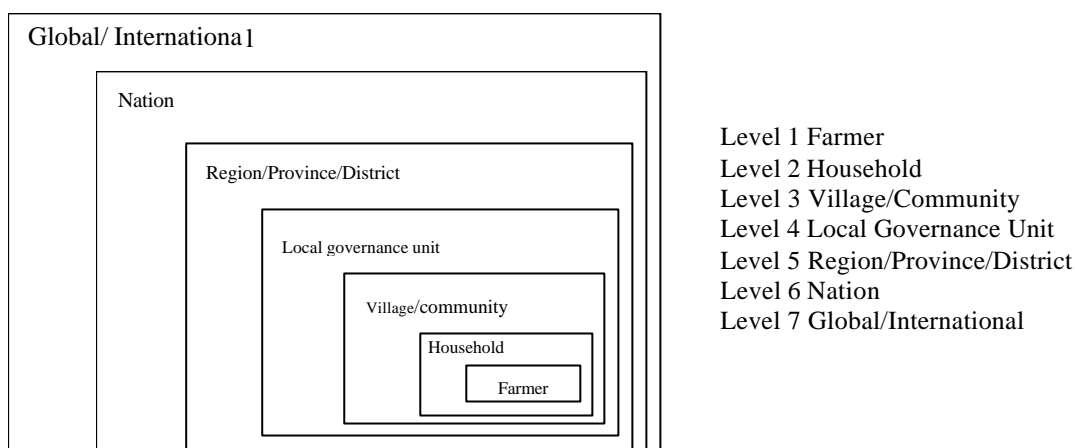


Figure 2. Various vertical levels of the decision making process within resource management. Source: FAO and IIRR (1995).

Box 1 Examples of relationships and influences within and among vertical and horizontal levels

- The market economy
 - Basis of exchange: cash, barter, loans and reciprocal gifts, or
 - Type of goods or services: inputs, labor, capital and outputs, or
 - Substitutes: other goods, other services, other employment opportunities.
- Regulations and laws
 - Market transactions including taxes and subsidies, interest rates and exchange rates, or
 - Land access and use: access/tenure rights, land-use zoning, hunting restrictions on certain species or regulations for conserving wildlife, and harvest limits, or
 - Cultural rules: values of regulations, taboos and preferences.

The horizontal and vertical levels in the decision making process can be illustrated by the case of a farmer who would like to cut down a damar tree (*Shorea javanica*) in his damar agroforest in Krui, Lampung Province, Sumatra.

One farmer from Krui (we'll call him Mr Ramad) plans to cut down one of his old damar trees, because the tree is too old to produce any more damar resin, and he expects to be able to sell the tree as timber. His decision to cut the tree will affect his household, especially because his wife gets fruit from the Duku tree (*Lansium domesticum*) that grows under the damar trees. So Mr Ramad should discuss his plan with his wife, as cutting the damar tree may alter their household food security situation. Old damar trees are very large: 30-40 meters high, with a canopy diameter of approximately 15 meters. If Mr Ramad cuts his old damar tree, it may not just have an impact on neighbouring farms/plots but also may affect the village trail/path. The decision to cut the tree should therefore involve the owners of neighbouring farm, the owners of several fruit trees surrounding the damar tree and also the village community, regarding the village trail that several people use to get to their farm. Maybe the cutting of the tree should be postponed until after the fruit season or maybe extra care will be needed to avoid the village pathway.

Besides the community level, the decision of cutting the trees will involve the local government. The local government may demand that tax be paid for the "forest product" or "farm product". Mr Ramad will have to obtain and fill in several forms to declare his

tax before he cuts the tree. However, the Provincial Government will ask him to pay extra value added tax because he cut up the log and made planks from it. Furthermore, the National Government will tax Mr Ramad even more because the tree was growing in the State Forest Zone. He will need to argue that he could not carry the log out of his farm, and he needed to cut it into planks so that he could carry these on his bicycle. He could also argue that the tree was located in his farm, and he inherited the farm from his grandfather, who planted the damar tree, long before the State Forest Zone was classified as such. What is certain, however, is that Mr Ramad has already spent a lot of money just getting his tree out of his farm. If he wants to sell the planks, a prospective buyer may ask him whether his plank is certified with an Eco-label and whether the tree was cut from the National Park close to his farm (Bukit Barisan Selatan National Park) because the global consumers are concerned about these things and only want to buy wood that derives from 'sustainably managed forests'.

The decision of a farmer to cut one damar tree is therefore affected by the whole spectrum of vertical levels, in addition to the horizontal levels of various sectors such as forestry, local government tax offices, traders, etc. This complex set of relationships means that a decision made by Mr Ramad is not dependent only on his preferences or choices, but is affected by the whole complex system.

2.2. Four basic questions in policy research

- *Who cares?*

Consultation at various levels is needed to obtain key insights for **policy makers** (people who have influence in policy formulation). The consultation should be about people's as well as policy makers' perceptions of problems, opportunities and constraints; this is necessary to guide the iterative process of research which is aimed at identifying and developing workable policy options.

- *So what?*

Policy research always aims to enhance options for meeting specific **policy objectives** in the "real world". For agricultural development, core policy objectives now usually include: (a) growth with poverty alleviation, (b) food security, (c) environmental resilience i.e. sustainable agricultural practices (see Lecture Note 3) and (d) social equity.

- *What can we do about it?*

In developing policy options, policy research must also consider specific **policy instruments**, the means of effecting policy objectives in the "real world". Examples relevant to agricultural development include:

- Exchange rates and interest rates
- Price, trade and marketing policies
- Content of the laws and regulations affecting access to and transfer of land and other assets including the culture of the law (how the political apparatus implements the policy and how the law is enforced)
- Public expenditure for infrastructure, research and extension.

- *How do you know this will work?*

Direct involvement by researchers in **policy development** and **policy implementation** are essential elements of policy research.

Policy research spans the research-development spectrum:

- Early phases may be weighted more towards basic research questions? ('So what?', 'What can be done?', 'Who cares?')
- But attention must be given from the outset to questions of policy implementation since the ability to "do something" (whatever it is) is a necessary element of policy research.

Thus policy research includes involvement in policy development and ongoing attention to gaining strategic insights from the practical details of implementation.

2.3 Example of a framework for policy research

As an example of policy research, we will briefly describe ICRAF's policy research in S.E. Asia that is part of the Alternatives to Slash and Burn (ASB) project (Lecture Note 1). The policy environment necessary for increased productivity of agroforestry systems to reduce poverty, improve upland resource management, *and* reduce deforestation is not well understood. The key hypothesis underlying the ASB research project in Southeast Asia can be summarized as:

Intensifying land use as an alternative to slash-and-burn can reduce deforestation and reduce poverty.

Thus, a major question for policy research is:

Under which conditions is intensification a reasonable approach; and under which ones is it not ?

There are at least three necessary conditions for validity of the intensification hypothesis; each forms a component of this project and is discussed below. The overall program is designed to determine whether intensification of agroforestry production in specific upland settings can help S.E. Asian countries and donor agencies balance environmental objectives with economic development and poverty reduction. The research questions are nested (as in Figure 3): each topic corresponds to a necessary condition for the intensification hypothesis. None of these conditions is sufficient alone. Indeed, they may not even be sufficient together. Synthesis of these results is intended to yield policy lessons relevant for the region.

The major research components of ICRAF policy research are:

- a. Impacts of agroforestry and other upland systems at field and landscape levels

Intensification of land use needs to be:

- Ecologically and agronomically sound
- Socially acceptable
- Financially profitable for smallholders

Thus, do alternatives offer more advantages and/or less trade-offs than current systems across these economic and environmental objectives?

- b. Land use and tree tenure institutions at community level.

Do tenure institutions and regulations (formal and informal) establish and enforce clear resource access and property rights? **If not**, what (if anything) can government and/or other social units do to better support improved functioning of these institutions?

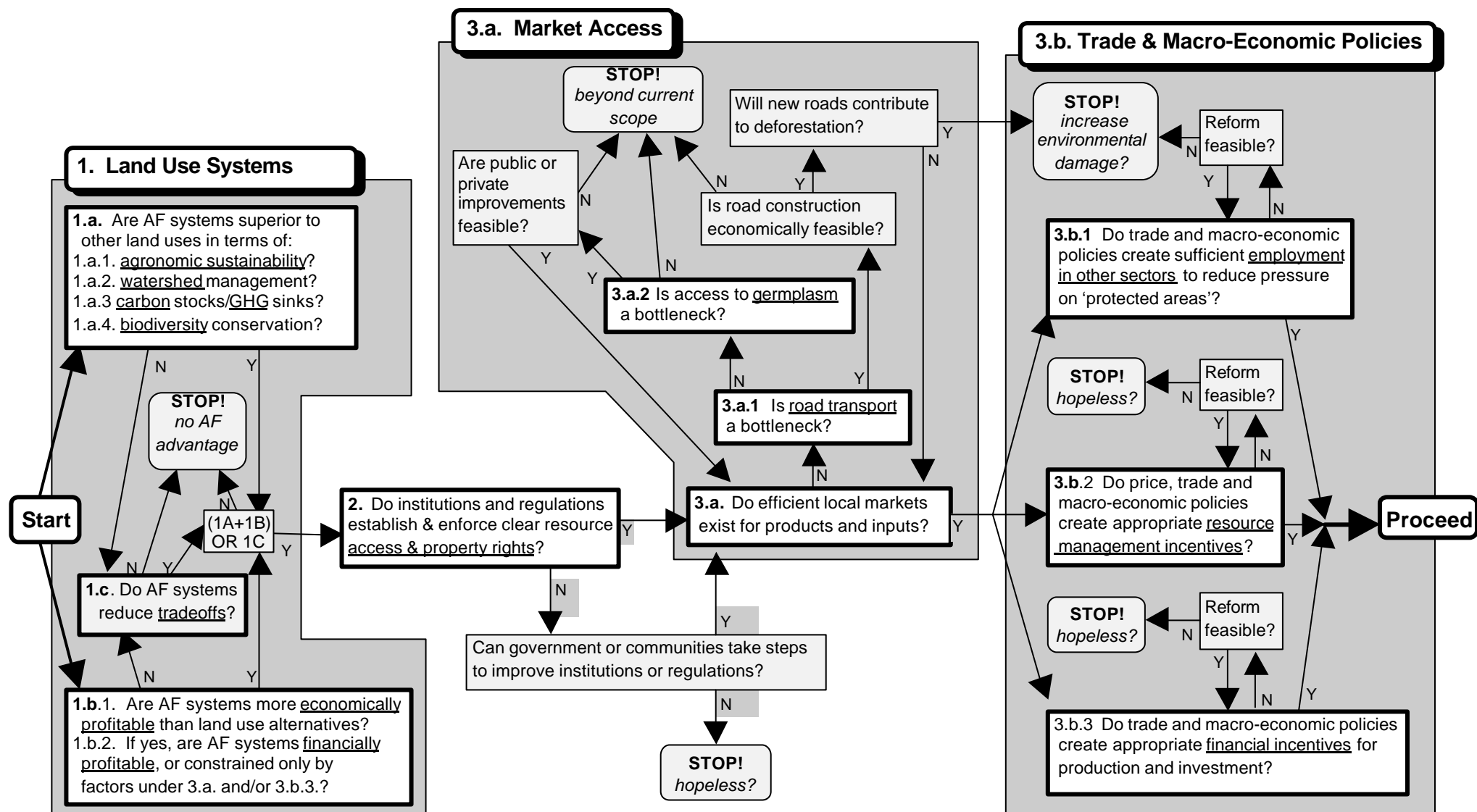


Figure 3. Research framework: decision tree for smallholder agroforestry systems for upland resource management.

c. National policies and land use change

- Market access

The key questions are:

- Do efficient local markets exist for products and inputs? Is that relevant to the agroforestry or other land use activities? **If not**, is transport infrastructure a bottleneck? **If it is**, is road construction feasible, and how would it change land use?
- Is access to germplasm a bottleneck? Do people have access to improved planting materials? **If not**, are improved public or private distribution systems feasible?
- Are there other critical bottlenecks e.g. availability of credits etc.?

- Trade and macro-economic policies

The questions are:

- Are current policies compatible with sustainable natural resource management by households?
- Is there expanding employment in other sectors that will be likely to reduce pressure on protected forest? For example, in the forest margins, if there are no other alternatives, people may destroy protected forest.
- If there is no expanding employment in other sectors, are there policy reform options?

3. Policy research tools and approaches for understanding and influencing the decision-making process at a national level

The first tool in our policy research toolbox that we shall consider here is the Policy Analysis Matrix (PAM) which is basically a tool for macro-economic analysis. Secondly, at the community level, we will look at a number of participatory tools that can be used to gather the valuable qualitative information that we need if we wish to engage in policy dialog and negotiations. Thirdly we will introduce 'Critical Legal Studies' which are also an important part of the policy dialog and negotiations process, and involve examining the laws and regulations that affect a community's situation. Fourthly, we will give an example of how these tools complement each other and how they can be used together within the policy research framework for negotiations about natural resource management issues.

3.1 The Policy Analysis Matrix (PAM)

A policy analysis matrix (PAM) is an analytical tool that was introduced in Lecture Note 8, and is described fully in Monke and Pearson (1989). It consists of a **matrix of information** about policies on agriculture and natural resources, and information on factor market imperfections, that is created by comparing land use system budgets that are calculated using:

1. financial prices (reflecting actual market conditions) and
2. economic prices (reflecting efficiency).

It is composed of two sets of accounting identities and these are described below.

One set considers *profitability* as the difference between revenues and costs. When this difference is calculated using private-financial prices, this gives us the 'private' or 'financial' profitability. When the difference is calculated using social-economic prices, we obtain the 'social' profitability.

- *Private profitability* refers to the observed market prices received or paid by farmers, merchants, or processors in the agricultural system. Private profitability shows the competitiveness of agricultural systems at given current technologies, output values, import cost and policy transfer.
- *Social profitability* is calculated using economic-shadow prices that reflect scarcity or social opportunity cost, and it therefore measures comparative advantages or efficiency in the agricultural commodity system.

The other set of accounting identities considers the effect of divergence. This is the difference between the private and the social prices of revenues, costs and profits. Any divergence between the observed private prices and the estimated social prices must be explained by the effect of policy or by the existence of market failure. Examples of these divergences, for the case of each of the different columns in Table 1 (below), and what these tell us about the effect of policies, are described below.

- *Output transfer* (the divergence of two measures of **revenues**) and *input transfer* (the divergence of two measures of **tradable inputs**) arise from two kinds of policy that cause divergence between observed market prices and world product prices. Those two kinds of policies are often commodity-specific, and include a wide range of taxes and subsidies and trade policies, and also exchange rate policy.
- *Factor transfer* (the divergence of two measures of **domestic factors**) shows how policies on factors of production and the factor market imperfection had been taking place. Positive entries in two cost categories (tradable inputs and domestic factors) represent negative transfer because they reduce private profit, whereas negative entries in those two cost categories represent positive transfer. Finally,
- the *Net transfer (profit)* caused by policy and market failure is the sum of the separate effect from product and factor market.

Technically, PAM calculations consider farm budgets, comparing the overall profitability (revenue minus costs) measured at observed market prices and the profitability measured at comparable economic-shadow (social) prices that would evaluate the inputs and outputs of farming with ‘social’ prices that reflect the costs and benefits to society.

The difference or divergence between the two measures of profitability indicates the degree to which the overall impacts of taxes, subsidies, constraints and stimulants is experienced at farm level. The divergence can be interpreted in different ways, depending on the degree to which all costs and benefits to society, including those via environmental and social impacts, are included.

As an ‘economic’ evaluation, PAM can not be expected to include all environmental and social costs and benefits, as many of these are difficult to predict and quantify at the relevant scale. Therefore, the divergence cannot be interpreted in an absolute sense, but still provides a valuable means of comparison for different land use options.

The three principal issues that can be investigated with the PAM approach are:

- a. the impact of policy on competitiveness and farm-level profits,
- b. the influence of investment policy, economic efficiency and comparative advantage, and
- c. the effects of agricultural research policy on changing technologies

As an example, Table 1 shows the results of PAM calculation of palm oil plantation in Sumatra, Indonesia.

Table 1. An example of how the net present value (= NPV) of an oil palm plantation, in Sumatra (Indonesia) can be analysed at private as well as social prices, as part of the policy analysis matrix (= PAM); values in brackets refer to negative numbers.

A) Values for the plantation as a whole (total area 10,700 ha) in millions of Rp

	Revenues	Tradable Inputs	Domestic factors		Profits
			Labor	Capital	
Private prices	20 916	5 958	9 430	2 582	2 946
Social prices	44 046	9 083	15 980	3 152	15 832
Divergence	(23 130)	(3 124)	(6 550)	(570)	(12 885)

B) Per hectare in millions of Rupiah

	Revenues	Tradable Inputs	Domestic factors		Profits
			Labor	Capital	
Private prices	1.95	0.56	0.88	0.24	0.28
Social prices	4.12	0.85	1.49	0.29	1.48
Divergence	(2.16)	(0.29)	(0.61)	(0.05)	(1.20)

C) Per hectare in US \$

	Revenues	Tradable Inputs	Domestic factors		Profits
			Labor	Capital	
Private prices	815	232	367	101	115
Social prices	1,715	354	622	123	616
Divergence	(901)	(122)	(255)	(22)	(502)

In understanding a PAM of a certain farming system, we need to know the macro-economic assumptions used in the calculation. With regard to the PAM of the Palm Oil Plantation (Table 1), the macro-economic parameters used in the calculation were:

- an exchange rate of Rp. 2 400/ US \$;
- a wage rate for agricultural labor of Rp 4,000/person-day, and
- a net interest rate (net of inflation) of 20% per annum for private prices and 15% per annum for social prices¹.

Looking at **profitability** identities in the first two rows of Table 1, all entries in the profit column have a positive sign, indicating that palm oil plantations are both financially and economically profitable. The 'divergences' or differences between the use of social and private prices, the third row in the table, are all negative, indicating that private profitability (for the plantation operator) is less than profitability for society. This difference is largely caused by the difference in interest rate (20% for private and 15% for social) and indicates potential gains for the suppliers of capital.

The negative entries for output transfer (the difference of revenues valued at the actual market price and the efficiency valuation of revenues using the world market price) indicate that what the palm oil plantation operator gets is less than what it would be in a

¹ Details can be found in Tomich *et al.*, 1998, pp.62-64

‘free-trade’ system without taxes. The government of Indonesia has actually been controlling trade in crude palm oil (= CPO) through tariffs that ranged from 10% to 40% during the last ten years. The divergences appearing in the total revenues indicate that such policy partly contributes to a reduction in potential revenues of palm oil plantations.

The negative entries in the tradable-input transfer cell (the difference of tradable inputs valued at actual market prices and the efficiency valuation using world market prices of tradable inputs) indicate a positive transfer, as palm oil plantation operators pay lower prices than under a free trade scenario without subsidies. Hence, the operators have enjoyed fertilizer subsidies provided by the government. Fertilizer subsidies have been a major policy instrument in Indonesia’s agricultural development program aimed at obtaining national self sufficiency in rice production, in a ‘green revolution’ approach. Subsidized fertilizer, however, was also available for uses other than growing rice, and this shows the inter-sectoral connections in policy impacts.

The factor transfer cells for labor and domestic capital goods are also negative, mainly due to the difference in interest rate used in the NPV calculation.

Overall, the example shows that the private profitability of palm oil production is limited by the interest rate and by trade regulation, and that under a ‘free trade’ arrangement, private profitability could be five times as high as in the current situation, despite the reduction in fertilizer subsidies that such a scenario would entail.

3.2. Qualitative Participatory Methods (PRA, Case Studies, PDR)

3.2.1 Participatory Rural Appraisal (PRA)

Rapid Rural Appraisal (RRA) methods were initially developed as an alternative to social science research methods that focussed heavily on specific details but did not obtain an overall picture of the opportunities and constraints that farmers face. These methods were further developed by directly and actively involving local communities to a much greater extent than in RRA: this became Participatory Rural Appraisal (PRA) (Chambers, 1997).

Examples of two qualitative PRA methods that were used intensively at a research site in Krui (Lampung Province, Sumatra, Indonesia) to gain a historical perspective and an understanding of the land and tree tenure policy problems there, were time line construction (Table 2) and community mapping (Figure 4). In addition, semi-structured interviews were conducted with several key informants and cross-checked with different social groups in the community (elders, women, farmer groups and representatives from richer and poorer strata).

Table 2. Timeline tool to capture the historical policy perspective for damar agroforests in Krui (Lampung Province, Sumatra, Indonesia).

Time	Event
1400s	• First arrival of Lampungese people from inland areas to the Krui coast: <u>settling, practicing shifting cultivation, and opening irrigated rice fields.</u>
1700s	• Damar resin production from Krui: 200-300 ton, all collected from damar trees in natural forest.
1880s	• First damar gardens planted by a group of farmers (70 ha).
1930s	• Damar gardens planted by farmers.
1935	• Damar production from Krui 200-300 ton; 80 % of this came from farmers’ gardens.

1980-1990s	<ul style="list-style-type: none"> State Forest Zone boundary establishment; prohibiting the to opening of forest inside the reserve area.
1980-1990s	<ul style="list-style-type: none"> Asphalt road construction Commercial utilization of timber and fruits.
1990s	<ul style="list-style-type: none"> Damar production from Krui was 8,000-10,000 ton, all from around 50,000 ha of gardens (based on satellite image analysis); new gardens still being established.

Government Policy	Time	Consequences & Problems
<ul style="list-style-type: none"> Southern part of Krui was designated a logging concession 	1970-1980	<ul style="list-style-type: none"> Logging in Southern Krui.
<ul style="list-style-type: none"> Designated as 'State Forest Land' ('protection forest' and 'production forest' types). Conversion of damar garden to transmigration site in South Krui. Ministry of Forestry grants the management right to State Forest Company. 	1990-1991	<ul style="list-style-type: none"> Loss of farmers' traditional ownership of land and gardens. Damar farmers become illegal squatters. Conflicts between transmigrants, local community, and government. Farmers in south Krui prohibited from continuing to manage their gardens.
<ul style="list-style-type: none"> State Forest Zone boundary demarcated by Forestry Department staff. Oil palm plantation establishment in south Krui. 	1993-1994	<ul style="list-style-type: none"> Loss of land and garden ownership. Opening new gardens and harvesting timber was prohibited. Conversion of some thousands of hectares of damar gardens; conflicts: farmers vs. company/government.

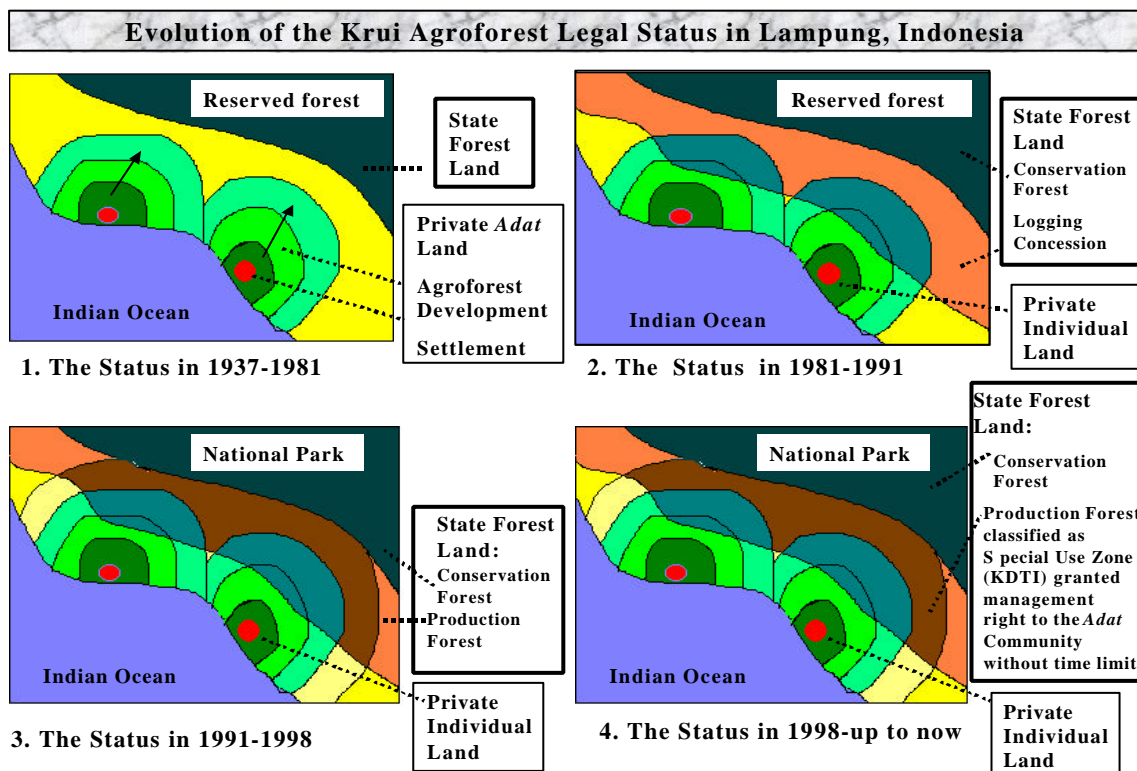


Figure 4. Community mapping: a tool used to capture the policy problem of managing damar agroforest in Krui (Lampung Province, Sumatra, Indonesia).

3.2.2 Case Studies

Robert Yin (1994) developed **qualitative** 'Case Study' methods to understand dynamics at the community level. The aim of using these methods is to gain an understanding of the nature of the community and the root of the problems in the community, in a participatory manner. Detailed information can be gathered on a specific area and can include an individual's feelings and opinions on certain issues (this important information is often elicited on a one-to-one basis). For example, in the case of the damar agroforests in Krui, above, case studies were conducted at the start of the research programme; in-depth interviews and discussions with a number of key informants provided very valuable information. Case study methods are able to capture qualitative policy problems at the community level (Figure 2, levels 2 and 3, both vertical and horizontal). However, to gain a **quantitative** understanding of levels 1 & 2 (both horizontal and vertical), it is necessary to use household surveys.

3.2.3 Participatory Documentation Research (PDR)

Process Documentation Research, or Participatory Documentation Research (Veneracion, C. 1989) are tools which can be used on a day-to-day basis to capture the processes, dynamics and outcomes involved in negotiations. In the Krui work (above), as an example, Process Documentation Research (PDR) was used to capture the dynamic processes in the community regarding the negotiation process and the various negotiating positions. 'Team Krui' was set up, and included the communities, facilitators, ICRAF and two NGOs called WATALA and LATIN.

After the government policy was changed (as a result of the negotiations), the PDR was changed slightly and became the less-intensive PMR (Process Monitoring Research). In practice this meant that ICRAF reduced its involvement to only an advisory role, and monitored the situation from a distance. Evaluations were carried out by independent observers and findings were discussed at 'Team Krui' meetings that were then only held every three months.

3.3 Critical legal studies (CLS) evolving into PCLS (participatory critical legal studies)

'Critical Legal Studies' (CLS) involve examining the laws and regulations that affect a community's situation, to see whether there is the potential to reinterpret these laws (or, if this is not possible, how the laws could be reformed). Laws can be thought of as a double-edged sword: they can be both harmful and beneficial (Figure 5). CLS entails seeing both sides of the law and interpreting it creatively. For example, there is often a provision within the law for protection of the rights of vulnerable groups in a society, but this beneficial provision is sometimes not widely publicised (such a lack of publicity may even be deliberate...). Another aspect of the same law may have negative consequences for these vulnerable groups, and this aspect may be very well publicised and rigorously enforced by the relevant national or local authorities. Thus it appears that the law is harmful to that

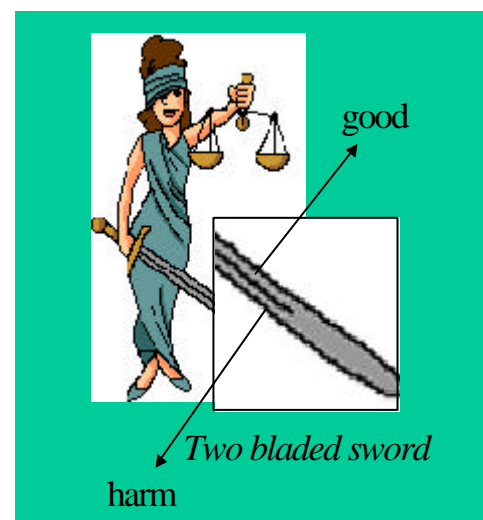


Figure 5. The law as a double-edged sword

group, whereas, a critical and detailed study of the law may show that there is potential for reinterpretation so that the beneficial aspects are expressed.

Owen Lynch (1995) used this approach in his policy documentation study on land and resource tenure in the Philippines, influencing national policy and decision making in incorporating the ‘Community-Based Property Rights’ (CBPR) system into the country’s law. The concept of ‘Private Communal’ and ‘Public Communal’ rights was introduced in the Philippines to provide indigenous people with legal rights to claim their land and resources. Lynch argues that the concept of CBPR is rooted in the folk law and it is not actually contradictory to the national law.

Using the Critical Legal Studies approach, ICRAF-SEA helped to persuade the Ministry of Forestry in Indonesia to develop policy options for indigenous cultural communities (*Masyarakat Adat*) and also communities of migrants (Figure 2, levels 4 & 5). The policy options focused on the widespread policy problem in Indonesia: lack of land tenure security. Tenure security varies in a continuum from semi-permanent tenure security (typologies 1, 2, and 3 in Figure 6) to a permanent tenure security (typology 4, Figure 6). Potential policy options (that were firmly based on the existing national laws and regulations, but with a different interpretation) were developed for the main types of forest management systems actually found in the field (Figure 6, Policy Accommodations). Although initially it appeared that the traditional forest management systems based on *adat* (customary law) were outside the normative (state-written) law, on closer examination there enough similarities to officially accommodate both types of law. This is an important point for law-makers to recognise, especially for those who have been trained to use top-down approaches.

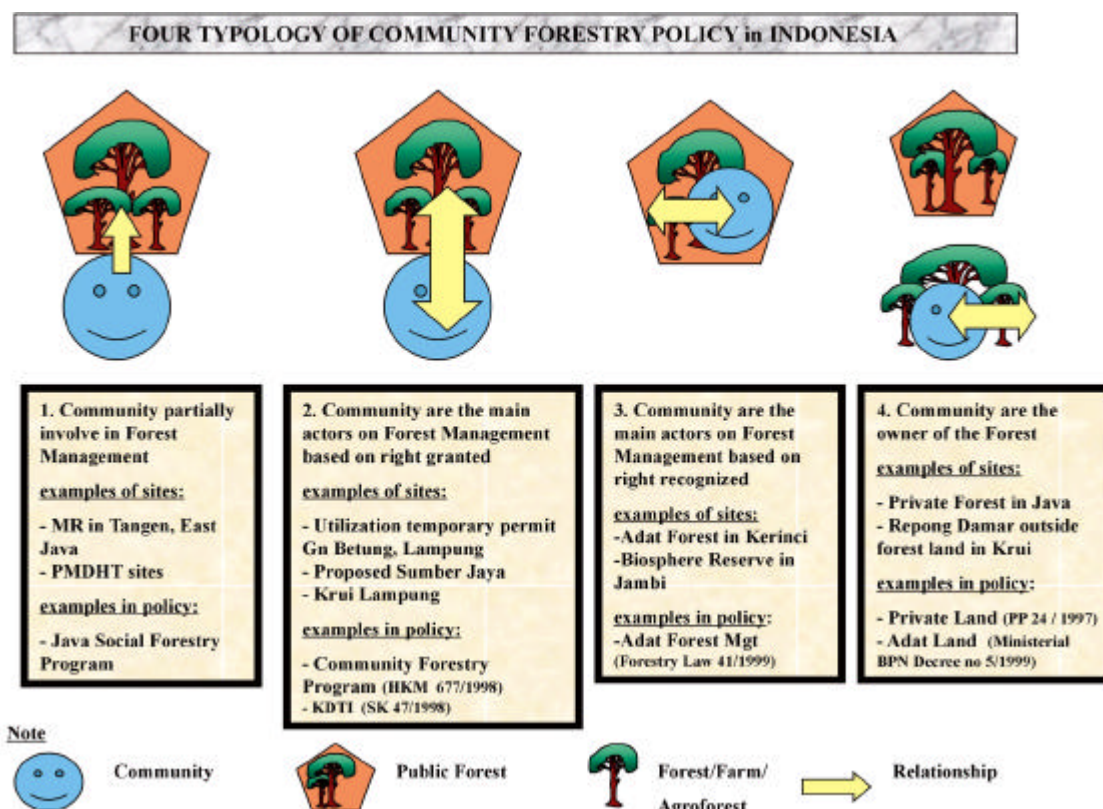


Figure 6. Four types of community-based forest management (CBFM) systems that are legally recognised in Indonesia, with descriptions/locations of the CBFM practices and the relevant policies and laws that enable these systems to exist.

Research on Community-Based Property systems in Indonesia (in the provinces of West Sumatra, West Kalimantan, South East Sulawesi, Maluku and Papua), showed that almost all communities have their own laws (folk law), especially regarding natural resource management (Laudjeng and Simarmata, cited in Awang, 1999). With such a diversity of local folk laws and environments, it is important that any law regarding natural resource management is flexible and responsive, and the local viewpoints are taken into account. Thus, the Critical Legal Studies methodology developed further and became Participatory Critical Legal Studies (PCLS). With PCLS, the local community becomes the active participant in policy formulation. The evolution of the CLS methodology into PCLS paralleled the natural trend where RRA (Rapid Rural Appraisal) became PRA (Participatory Rural Appraisal). In contrast to CLS, which is used only at the decision-makers' level, Participatory Critical Legal Studies methods can be used at multiple levels (Figure 2).

3.4 Natural resources policy dialog and negotiations

A common subject of negotiation in the area of natural resource management is the unclear boundary of jurisdiction between the managers (community and government). From experience in the field, it appears that the three main issues that require negotiation are:

1. Land and resource tenure systems

(e.g. systems defined by the state/government and based on national law *vs.* the community-based land and resource tenure systems based on indigenous knowledge and practices);

2. The types of institutions/organisations who are responsible for resource management

(e.g. legal business entities defined by the government (private/state-owned companies etc.) *vs.* local institutions rooted in the community (e.g. village elders, farmer co-operatives, etc.)

3. The natural resource management system

(e.g. use of a system such as plantation-style silviculture which is based on the discipline of forestry *vs.* local practices based on indigenous knowledge and management for multiple products).

As a result of negotiations on these topics, it is hoped that a new agreement/ social contract will be made between the state/government and the local community (managers) which will result in better natural resource management. The policy dialog process is illustrated in Figure 7, and includes the different vertical levels that are involved. For example, critical legal studies consider the laws and regulations at the national and local government levels, in order to identify a number of policy options and alternatives which would be legally permissible. These theoretical options are then proposed to the local community, and explored in a hypothetical way, in participatory meetings and discussions. This is the policy simulation part of the process (Figure 7) and it is vital. In these fora, the community discusses the relevance of the various options to the local situation, and identifies the potential advantages and pitfalls associated with each, if it were to be implemented. Their decisions on the appropriate policy then feed back to the other stakeholders/decision-makers and negotiations continue, hopefully until agreement is reached.

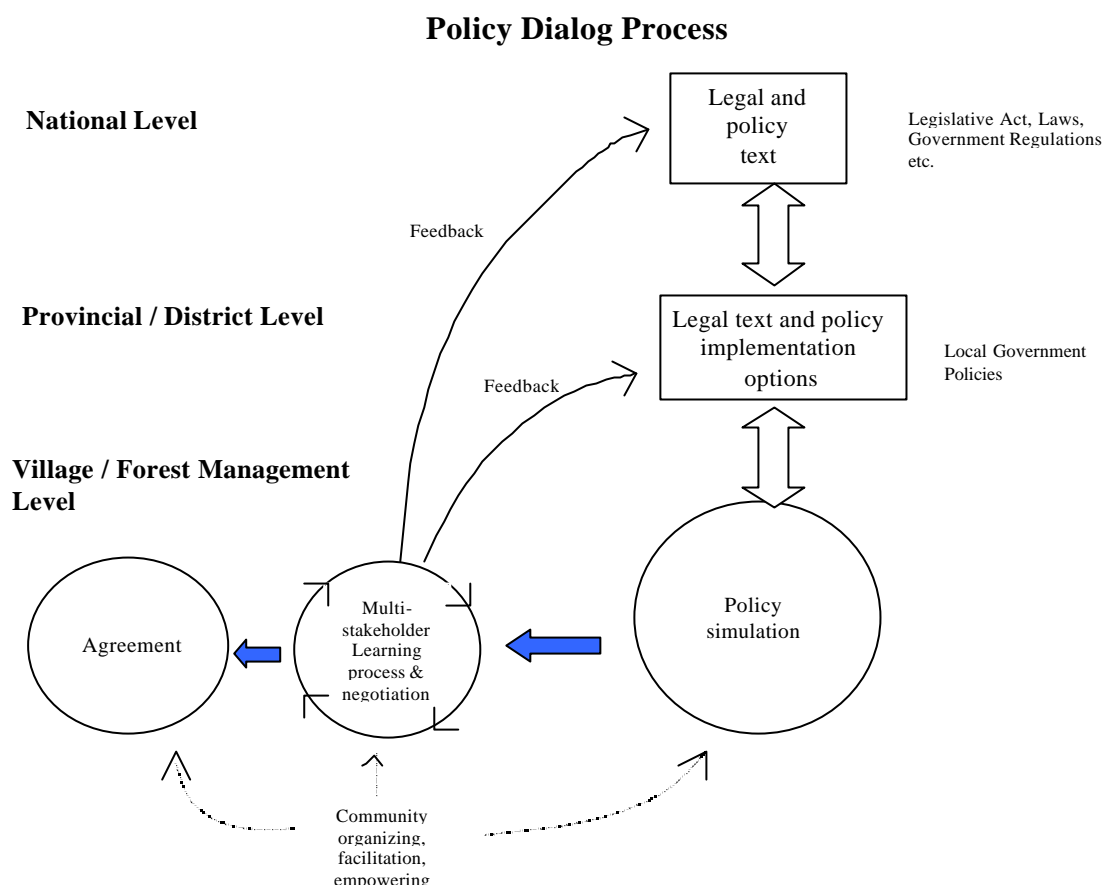


Figure 7. The policy dialog process.

In the case of Krui, illustrated above, all the findings of the policy research (PRA, case studies etc.) provided a good foundation for starting a programme of negotiations between the government and the community about their land boundaries and their ownership and use of agroforests and forests (see also Table 3 in a later section for the outcomes).

4. Examples of policy research in the context of the Alternatives to Slash and Burn

4.1 Recognition of local forest use rights in Krui, Lampung

The result of the negotiations and policy-research described in section 3.1 was a ground-breaking government decree granting the local community the right to manage State land (Table 3).

Table 3. Chronology of policy development in overcoming the problems in Krui, Indonesia.

Event	Time	Consequence
<ul style="list-style-type: none"> • Researchers, NGOs, farmers groups form a coalition • Minister visits Krui agroforest 	1993-1994	<ul style="list-style-type: none"> • Krui CBFM (Community-Based Forest Management) programme • Minister's statement: damar forest is a model of successful

Event	Time	Consequence
		community forestry.
• Seminar (at provincial level) on damar agroforests	1995	• Provincial recognition of agroforest as farmer-made
• National environmental conservation award (from Ministry of Environment) for Krui traditional community groups.	1997	• National recognition of agroforest as sustainable and farmer-made forest
• National workshop: a dialogue between farmers and senior officers from the Forestry Department.		• A sufficiently strong case is made to the Minister of Forestry to justify him considering issuing a new policy
• Ministry decree of KDTI (<i>Kawasan Dengan Tujuan Istimewa</i> = Zone with Distinct Purpose) granting the local community the right to manage State land.	1998	• Grant of access to local community, allowing them to manage State land fully and preventing outsiders from gaining access to that land.
• Damar farmers seek land ownership		• Continued advocacy intended to secure farmers' rights to land ownership

4.2 Policy 'experiments' – the carbon trade and farmers in Brazil

Policy 'experiments' were conducted using a bio-economic model called FaleBEM (Farm-level Bio-Economic Model, Carpentier *et al.*, 2000).

The model was set up to simulate a 'typical' smallholder farm household in an agricultural settlement project in the Western Brazilian Amazon. The farm size is assumed to be 60 ha, and the various land uses that can occur on this area during model runs of 25 years include forest, pasture, annual crops, perennial crops, fallow and degraded pasture. Stocks of financial and natural resources change every year, depending on the activities of the farming household, and this also determines the amount of land under different land-use types.

The effects of various carbon-trade policies on carbon stocks and areas of forest remaining after 25 years were explored using different model simulations (Table 4). Four scenarios were compared with the baseline one (which could be thought of as the experimental 'control') where there was no external policy intervention, and all forest had disappeared after 25 years. The four scenarios were:

1. Carbon payment to farmer: annual payment per ton of carbon that occurs in forest on the farm (R\$1/ton/year*);
2. Tax: a tax must be paid by the farmer per hectare of cleared land (R\$32/ha) - farmers are penalised for low-carbon land uses;
3. Subsidy: a subsidy is given to the farmer for planting coffee trees (free seedlings and fertilizer), in theory to induce farmers to maintain land uses with high carbon content;
4. Regulation: a law is enforced, whereby 50% of the land area must remain as forest.

This useful analytical tool shows that, in theory, one-time carbon payments as low as R\$19/t of carbon stock would preserve around half the existing forest carbon on these farms. In contrast, subsidised coffee planting resulted in much lower areas of forest and carbon left at the end of the simulation. Enforcing the 50% forest rule (if possible in reality!) would save most forest and carbon, but curtail some agricultural activities. Taxing land clearance in the simulation only results in 5 ha of forest being left at the end of the model run, with total carbon only slightly higher than that in the baseline

scenario. This approach could also be used to explore the effect of varying the price paid per ton of carbon.

Table 4. Results of ‘policy experiments’, which were conducted using a bio-economic model. The effect of different policies on carbon stocks and areas of forest on farms were simulated for the case of a ‘typical’ smallholder farm household in Brazil, over a 25 year period.

	Baseline	Carbon payment: annual, for total C in forest	Tax (*R\$32/ha) on all cleared land	Subsidy for coffee planting	Regulation: 5% of farm must remain as forest
Present day value of consumption over the 25 year period (R\$)	50,688	117,165	38,007	82,706	44,201
Forest left in year 25 (ha)	0	25	5	8	30
Total carbon in year 25 (t)	4,021	7,571	4,679	5,014	8,199
Present day value of transfers over 25 years (R\$)	--	**66,477	-12,681	32,018	-6,487
Cost (R\$/t) of total carbon, over & above baseline level	--	18.7	-19.3	32.2	-1.6
Cost /ha of forest (R\$)	--	2,659	-2536	4,002	-216

* Brazilian reais R \$1 = US \$1 in 1996

** This is equivalent to a lump sum payment today of R\$18.7/t for every ton of carbon saved by year 25.

Future research issues

- The identification, validation and recognition of existing agroforest systems.
- The development of products and markets (marketing, processing, infrastructure) suitable to the farmers’ present capacity.
- Remove policy constraints that hamper the development of agroforests.
- Extrapolation of the agroforest model for the rehabilitation of 'degraded' areas by and for farmers.

Questions :

What are the important policy research topics related to agroforestry systems in your country? Consider:

- Policy makers
 - At both the social and institutional level
- Policy objectives
 - Goals they seek to attain
- Policy instruments:
 - Regulations or laws
 - Investment or services
 - Others

5. Environmental policies in a Pressure-Response framework

Much of the debate on ‘environmental policies’ may give the impression that policies are a rational attempt to solve conflicts between actors in society from the perspective of a greater public good. In reality, policy making is much more political, emotional and responsive to pressures and current public interests. Policies therefore do not change

incrementally, but rather as a consequence of a build up of pressure that leads to 'release' in the form of episodic change. Where 'new' environmental issues come to the fore, we can recognise a common pattern in the way society responds: the environmental issue life cycle.

5.1 Environmental issue life cycle

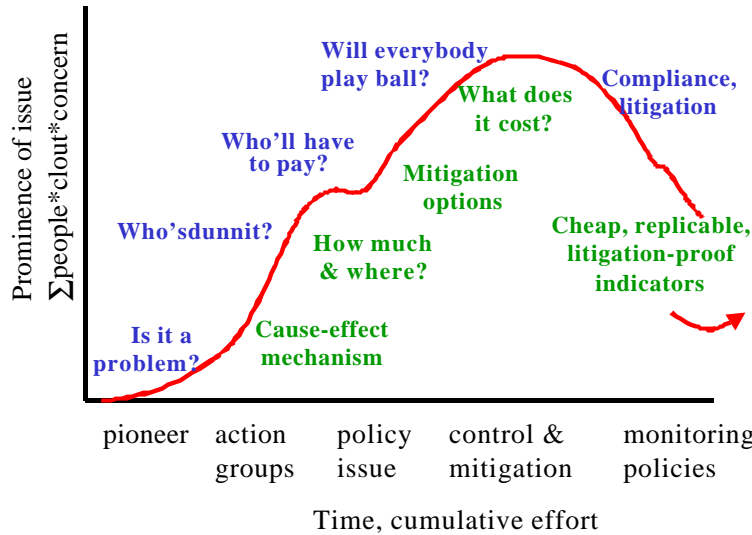


Figure 8. Schematic lifecycle of issues regarding environmental externalities; at the end of a cycle issues may 'fossilize' and after a while 'rejuvenate' in another round.

External effects of land use decisions on the environment downstream, downwind or in future will be ignored by the land user causing them, unless there is an effective feedback loop from external stakeholders to the persons taking decisions. The further away the impacts are, the less likely it is that direct social control mechanisms will work. Direct, sometimes violent, interactions between affected stakeholders and land users may be seen as the only way out, unless governments act as intermediaries. This description of the role of policies as reducing conflicts between land users and external stakeholders may be naive and in practice considerable pressure may be required before such mechanisms are in place (Figure 8).

The data required to have impact on human decisions and policies, and hence the most appropriate methods to obtain relevant data, depend on where the given 'externality' is on the 'issue life cycle' (Figure 8):

1. recognition of impacts by pioneers,
2. lobbying by 'action groups', denial of effects by other stakeholders,
3. increasing acceptance (reduced denial) of existence of (potential) impacts,
4. debate on 'cause and effect' models and attribution of 'blame',
5. inventory of 'mitigation' options and their economic consequences,
6. negotiations between stakeholders on reducing or mitigating impacts,
7. monitoring of mitigation actions.

Whereas details differ between various environmental issues, the course of events in regional issues such as 'acid rain' in Northwest Europe, and global issues such as 'climate change' follows similar trends. In stages 1, 2 and 3 of this process, research will be needed primarily to test whether initial 'suspensions' about a link between an undesirable environmental impact and a change in land use elsewhere are valid. Establishing a probable cause-and-effect chain as opposed to 'mere coincidence' or 'spurious correlation' is important to get broader support. In these stages there is also a need for estimating the likely magnitude of impacts, as initial uncertainty may span several orders of magnitude. Once broad support is formed for its recognition as a valid

environmental issue, the debate will focus on a further specification of cause-and-effect chains, especially where they are important for attributions of blame.

Perceived gaps in the quantitative explanation of the impact phenomena are a major obstacle in stage 4, where the positions are defined for the subsequent negotiation process between stakeholders. In preparation for that, all stakeholders may agree (stage 5) on the need for an inventory of 'mitigation' options, as an alternative to 'prevention'. The negotiation process in stage 6 will require more detailed inventory of the impacts and the role of various actors in causing the problem, often using derived and simplified parameters rather than a full quantification of the cause-and-effect model. If agreements are reached on regulation and control, the research needs will shift to those for (extensive) monitoring of impacts and changes. Standardisation of methods is important; replicability and low measurement error are more important than a direct link to causality. When lack of compliance leads to legal conflicts, the methods for monitoring impacts will be scrutinised further.

During this progression of stages, research priorities shift from intensive (process-oriented, cause-and-effect relations, explanatory models) to extensive (spatial databases, long term monitoring) aspects, with a gradual standardisation of the measurements and data collection protocols used in the pioneering phase. Standardisation of methods and general agreement on cause-and-effect chains obviously brings advantages, but it can also become a liability if it prevents a critical examination of discordant information and refinement of process-based models. Problems which had apparently been 'solved' or at least brought under control, may re-emerge in a new cycle if the initial diagnosis was not really correct and hence the measures not really effective. Once a broad support-base for such measures has been built, however, the pioneers for the new cycle may have to come from a different group of stakeholders. A second-cycle issue will meet opposition from all parties who benefited from the 'solution' provided in the first cycle.

Rules to change the rules

Policies developed to reduce the freedom of individuals to negatively affect the livelihoods of others in society, are influenced by the time and situation in which they are made. Regulations can outlive their usefulness if conditions and perceptions of problems change, yet the mechanisms to modify and update rules are often not clear (Box 2).

Box 2 Indonesian 'Adat'

In Indonesia, local, village level rules and institutions are often described under the term 'adat'. In the past these rules were made, applied and modified by 'village elders', and varied from place to place. The colonial administration in Indonesia was not interested in the details of local policy, as long as its overall economic targets were achieved. The variation in local rules became, however, the object of scientific study, as well as a source of confusion in the relations between local and colonial powers. Considerable effort was thus spent in formally writing up ('codifying') the local rule systems, as a basis for their recognition. A major weakness of these efforts, however, was that the 'rules for changing the rules' were not formalised, and the adat rules thus tended to become 'fossilised', no longer able to adapt to new circumstances. After Independence, the new state gradually modified the legal system as 'inherited' from the colonial state, but the role of 'adat' remained problematic, especially where local rights to land and forest resources were described that did not match with the objectives and intentions of the 'state'. The debate continues...

Episodic technological change and local knowledge

Technological and policy change, like biological evolution, may from a distance appear like a continuous, gradual process, while on close inspection it consists of episodes of radical changes over a short time period, alternating with periods of a fine-tuning of existing models and patterns. Rapid change may be induced by an internally induced 'crisis' that undermines the 'fitness' of the existing life forms or life styles, or by the sudden change of the boundaries of 'the system' through the disappearance of barriers that separated local life from that elsewhere.

At general 'systems' level, from biological and ecological systems to business, economic and political ones, a common pattern has been recognised, that describes life cycles in terms of growth, decline and re-organisation (Figure 9).

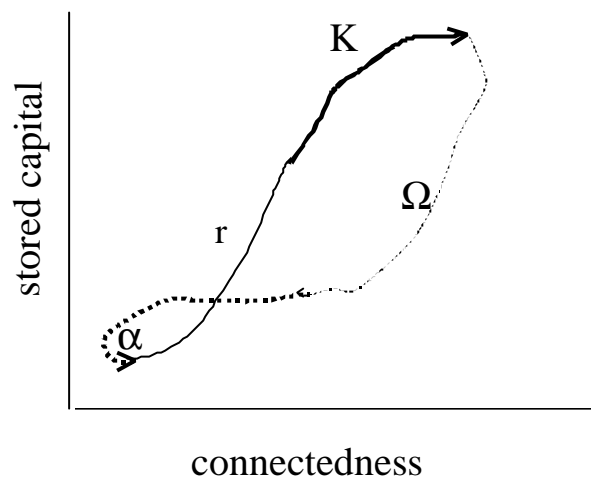


Figure 9. Four stages in the life cycle of a system: r = rapid growth, K = approach to carrying capacity, Ω = crash phase, α = reorganisation phase (after <http://www.resalliance.org/>)

The four phases have very different options for 'management' and 'technology development': r phase management tries to increase the growth rate and may lead to the largest production of outputs, K phase management aims at increasing the carrying capacity by filling in under-exploited niches and may maximize 'environmental services', the Ω phase manager will try to obtain a soft landing during the crash and reduce the loss of capital, while the α phase manager has the best options for real innovation as the system reorganizes itself. There is at least a suggestion that the longer the K phase lasts the deeper the subsequent crash may be... Participatory technology development may function best in a K phase, where targets appear to be clearly defined.

International pressure on tropical forest conservation -- lack of local response?

Returning to the issues raised in Lecture Notes 1 and 2 about the impacts of changes in the margins of tropical forests, we see that much of the concern over the rate of tropical deforestation has so far been raised by environmentalist groups in the developed part of the world. Yet, the pressure they build up will have to lead to responses at local level in order to be effective.

Does it matter at global scale if tropical forests disappear at the current rate? The answer is a clear yes from the perspective of global biodiversity loss, and a partial 'yes' from the perspective of global climate change -- but the way this will affect real-life decisions of the rest of the world may have been exaggerated...

Does it matter enough to enough people to induce effective changes that reduce the current drivers of forest conversion?

Much of the forest conversion is based on activities that are profitable for those involved, both smallholders and large operators; there is thus a strong lobby to keep

things as they are -- until there will be hardly any forest left. The political process in the countries and regions concerned will be the key to success of any outsiders who want change.

Forest functions can be maintained without ‘real’ forests -- is that good or bad news? A. number of the ‘forest functions’ that are considered to be at stake in the ‘deforestation’ debate can probably also be maintained after forest conversion, especially if mosaics with forest-like land use elements, such as the agroforests we discussed before, replace the forest. On one hand this means that the negative human impacts of deforestation may be smaller than initially portrayed, on the other hand it will reduce the likelihood of effective policy change -- the build up of pressure for change is more difficult if the issue is not a simple black-or-white choice.

Can we identify small local answers that can be starting points for a broader change in the drivers? The analysis by researchers in the ASB program and similar other activities has indeed identified useful starting points -- especially where current policies lead to environmental losses as well as losses from a private profitability perspective. Examples are the regulations that make small farmers burn the wood of trees they cut (including old rubber trees in Sumatra) rather than sell it off-farm, or the regulations that lead to conflicts between the state and farmers who have developed sustainable, forest-like land use systems. The initial expectation in the ASB program that other technological options, or the knowledge about these, could trigger a real reduction in rate of deforestation were found to be too naive -- the chance of such new technologies to speed up forest conversion as it is made more profitable and attractive is substantial.

Negotiation Support Systems are needed -- provide clarity on the likely impacts of change, provide a common platform for the various stakeholders to better understand each others perspectives and look for solutions that can be acceptable to all, while being perfect to none. Environmental services can only be maintained if there are sufficient rewards for those who provide these services through their land use decisions. Where forest conversion has led to systems that maintain part of the forest functions, attention is thus needed for mechanisms that provide external support for these systems and the farmers that apply them, to avoid the forest conversion to become a ‘black-or-white’ change. Developing institutions that link ‘supply’ and ‘demand’ of these services may be one of the most effective ways to improve the current situation, and achieve both poverty reduction and maintenance of environmental quality.

III. Reading Materials

Books

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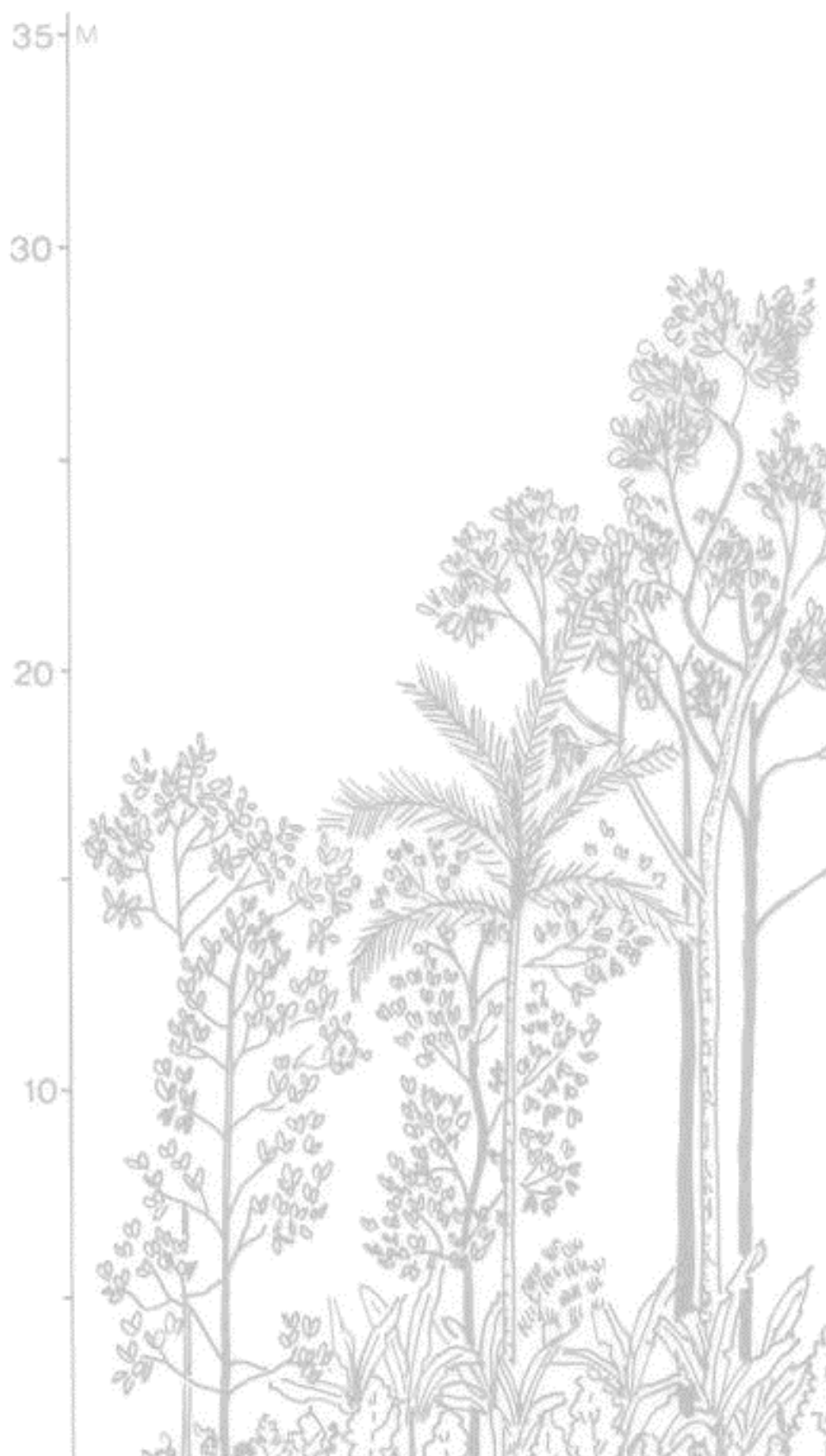
- The Resilience Alliance on <http://www.resalliance.org/>
- Backgrounds on the ASB 'POLICY BRIEFS' series: <http://www.asb.cgiar.org/PolicyBriefs.shtml>

Contents of this series of lecture notes

- 1.** Problem definition for integrated natural resource management in forest margins of the humid tropics: characterisation and diagnosis of land use practices
by: Meine van Noordwijk, Pendo Maro Susswein, Cheryl Palm, Anne-Marie Izac and Thomas P Tomich
- 2.** Land use practices in the humid tropics and introduction to ASB benchmark areas
by: Meine van Noordwijk, Pendo Maro Susswein, Thomas P Tomich, Chimere Diaw and Steve Vosti
- 3.** Sustainability of tropical land use systems following forest conversion
by: Meine van Noordwijk, Kurniatun Hairiah and Stephan Weise
- 4A.** Carbon stocks of tropical land use systems as part of the global C balance: effects of forest conversion and options for 'clean development' activities.
by: Kurniatun Hairiah, SM Sitompul, Meine van Noordwijk and Cheryl Palm
- 4B.** Methods for sampling carbon stocks above and below ground.
by: Kurniatun Hairiah, SM Sitompul, Meine van Noordwijk and Cheryl Palm
- 5.** Biodiversity: issues relevant to integrated natural resource management in the humid tropics
by: Sandy E Williams, Andy Gillison and Meine van Noordwijk
- 6A.** Effects of land use change on belowground biodiversity
by: Kurniatun Hairiah, Sandy E Williams, David Bignell, Mike Swift and Meine van Noordwijk
- 6B.** Standard methods for assessment of soil biodiversity and land use practice
by: Mike Swift and David Bignell (Editors)
- 7.** Forest watershed functions and tropical land use change
by: Pendo Maro Susswein, Meine van Noordwijk and Bruno Verbist
- 8.** Evaluating land use systems from a socio-economic perspective
by: Marieke Kragten, Thomas P Tomich, Steve Vosti and Jim Gockowski
- 9.** Recognising local knowledge and giving farmers a voice in the policy development debate
by: Laxman Joshi, S Suyanto, Delia C Catacutan and Meine van Noordwijk
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by: Meine van Noordwijk, Thomas P Tomich, Jim Gockowski and Steve Vosti
- 11A.** Simulation models that help us to understand local action and its consequences for global concerns in a forest margin landscape
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