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Perennial crops trigger land-use and land-tenure changes in Indonesia

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Introduction.

In Indonesia a double phenomenon can be observed with progressive changes in land-tenure and land-use linked with the striking increase in the number of tree-crops, in particular rubber and oil palm, in the " outer islands " (Mainly Sumatra and Kalimantan).
The coherence, previously and progressively maintained between technical and social systems, favoured a stable social background and the permanence of agro-forestry practices for rubber, which had proven reliable, as well as the development of typical monocultures such as oil palm, which appeared as new " crop opportunities ". A significant increase in perennial crops in the long term (rubber since its introduction at the beginning of the 20th century) as well as in the short term (more recently the introduction of oil palm) and changes in both stakeholders and production systems (Estates and smallholders) are factors that significantly affect both land-use and land legislation (or tenure) in these islands. This paper looks at the factors that trigger changes such as these.

1. Land tenure as a tool for change.

1.1 Changes in traditional land legislation (*adat*).

The individualisation of farmers' behaviour with regard to land property and control has resulted in a progressive decrease in collective land management that has been observed over a period of many years. In fact, from land that was initially communal and traditionally managed with shifting cultivation, the situation is now progressively moving towards more individual management through the introduction and increase in tree-crop based farming systems. The first tree-crop was rubber with the development of an extensive rubber based agro-forestry system called the "jungle rubber" system. The formerly applied " right of use " which traditionally applied in the case of tree-crops has changed into to a kind of " private property " very close to that practiced in western countries. This phenomenon parallels a similar trend in traditional legislation or customary law (Adat) during the last century based on

" rights of user " towards "private property " (Durand, 2000). The two main stakeholders involved in these changes are the State and farmers. There are also two types of opposing land legislation: the official legislation and traditional legislation (*Adat).* Before trying to understand these changes, it was necessary to identify the principal characteristics of the local land-tenure and legal legislation [1].

1.2 Origins of official land legislation: the control of 74 % of Indonesia by the State.

The pre-eminence of a central governmental authority over land, land ownership and land use is a historical phenomenon in Indonesia that dates from the former large central kingdoms in the 15th to the 17th centuries and has continued in our era. The colonial authorities took over land-tenure from the Rajahs (Malayan sultanates) and various indianized Empires and kept control of the land while continuing to grant a " right of use " to local populations according to the local custom. An agrarian law (" the agrarian act ") was voted in 1870 by the colonial government that guaranteed traditional rights *(Adat)* to farmers on permanently cultivated land. Enforcement of this law was theoretically limited to the islands of Java and Madura (Durand, 1999). This law also specified that all virgin lands, including fallow, remained under the control of the State that retained the right to decide on its final use (and consequently on its final users whether public or private). This type of top-bottom approach was the cause of all the land conflicts that subsequently occurred, in particular between the State and individual farmers relying on slash and burn agriculture. In this case, fallows were considered by the government to be " virgin " territory and could be handed over to companies so that timber could be cleared and plantations established (concessions), or for development projects such as transmigration.

However it is necessary to note the fuzziness of the exact legal definition of official land tenure. The 1945 constitution (still in force) declares that *" land (..) is controlled by the State for a greater prosperity of the people* ". As recalled by Durand, the wording states *" forests are therefore not nationalised* (Durand 2000). After independence, the Indonesian government took over this law. All presumed forested land was thus placed under State authority, which implies 74 % of Indonesian land is under the authority of the Ministry of forestry. The actual forest potential of the country is far lower and stood at 66 million hectares in 1998 (Durand 1999), i.e. 35 % of the total surface area of the country. It was necessary to wait for a decree in 1972 that officially confirmed that this land belonged to the state. In the absence of any claim, the State implicitly recognises the traditional law (which was not the case of the 1870 law). The 1972 decree allowed the State to provide land for private or public concessions, including HTI (semi-public forestry projects) and various development projects (NES[2] for example). The local communities were no longer allowed to manage forestland and were obliged to recognise land rights accorded by the State.

Originally, two types of tenure were used for colonists (Private Estates): i) the *emphyteutic lease* in areas under direct administrative control and ii) the *concession* in autonomous areas [Collet, 1925 #94]. The duration was generally 75 years but it was extended to 125 years for perennial crops. In autonomous areas,

[1] The main sources are Dove (1985), Geertz (1966), Holleman (1981) and Durand (1998).
[2] NES = Nucleus Smallholder Estates Schemes.

concessions were granted only in zones where local communities did not exert, or had given up, their traditional rights. The principle of the concession still exists today in the case of forest concessions (over 30 years) as well as in the case of tree plantations owned by private companies (*Acacia mangium* mainly) or perennial crops (oil palm).

1.3 The legal basis of the existing law

In 1960 the " basic agrarian laws " (*Undang² Pokok Agraria*) were passed which laid down the main principles of the new agrarian rights and, for the first time, there was formal recognition of the traditional rights (*Adat*[3]). This law was supposed to remove the legal dualism on land-tenure that had existed since colonial times and abolish the priority of the State over land-use (*tanah negara*). In reality, the formal recognition of *Adat* rights of local communities is still subordinated to State interests at the national level. The government can always make use of this land, provided there is a statute of high national priority. The right of the State over *tanah negara* was recognised and confirmed by the " Basic Act one Forestry " passed in 1967, which spelled out forest exploitation regulations.

The decentralisation laws passed in the late 1990s simply transferred the decision-making centre from the national to the provincial level under the authority of the governors and especially of the "*Buppati* in charge at district level (*Kabupaten*). In practice, the law did not change anything and still does not protect the fallow lands from possible appropriation by the State.

In reality, institutions and particularly development projects consistently argue in the name of national interests, without justifying their arguments in order to avoid having to take local interests into account. Generally, they do not distinguish between " right of ownership " and " right of use ". The first is not recognised in the absence of a land register or land certificates (except for NES project). The latter, the " traditional " right, is only tolerated by default or in the case of the non-use of land (Dove 1985). The confusion between the various types of rights theoretically recognised by "*Adat* " was already latent in the colonial regulation (Holleman 1981).

The 1960 law was not so clear. In the 1970s, the State used its rights over *tanah negara* to plan transmigration and various development projects. NES projects, forestry projects (semi-public joint venture companies called " HTI ", *Hutan Tanaman Industri*) and concessions for plantation companies flourished. The 1990s saw an acceleration of this trend, particularly in some provinces such as West-Kalimantan (Geissler, 1999), Riau (Angelsen, 1995) and Jambi (Stole, 1997).

[3] It also implies that there might be differences between *local adats* , between local customary laws depending on the tribe.

Frame 1: The " *Adat* " (customary law) in West-Kalimantan

Dayaks *Kantus* recognises 2 distinct rights:

- A - the " right of ownership " of land (*hak milik*), including land under fallow, provided that this land is cultivated (including land in shifting agriculture). This right, which is in fact a " right of user " is the " property " of a clan or a family that belongs to the community and lives in a traditional "long house" (*Rumah panjang*), where up to 50 families can reside.
- B - the " right of user " (" right of avail " or *hak ulayat* (Dove, 1985) is the residual right of families or clans who have left the long-house but conserve, in theory, a " right of return ".

The disappearance of longhouses in the 1960s and 70s, under the pretext of modernisation (as a fire-prevention policy) decided by local authorities (of Javanese inspiration) led to a shift in the traditional regulation, (*Adat*) with a redefinition of the four following rights:

- 1 - a "temporary right of individual use" of cultivated land linked to *ladang* activities (shifting agriculture). Fallow land is decreasing. The community controls fallow land and its use: the decisions are made by original land leaders in agreement with " original clans", known as founders of the village. They retain a right of pre-eminence over land use, which remains theoretically indivisible.
- 2 - a "right of permanent use" related to the presence of tree-crops (perennial plantations). This right lasts as long as land is cropped and harvested. It is typically the case of "jungle rubber" and monoculture plantations. This right is transmissible and, in fact, gradually changes into a right equivalent to "private property ", in particular after several replantings under the jungle rubber system.
- 3 - a "right of restricted use" on Community farmed land or for certain trees (including those located on "private land": in particular in some t*embawangs* (fruit and timber based permanent agro-forests). This right grants only the right of harvest to satisfy a family's needs but in no case can be a source of income through sales outside or even inside the village. These resources remain community based.
- 4 – "right of ownership": for house, garden and, more recently, for perennial plantations such as rubber or oil palm. This results in the total disappearance of the " rights of user " of the former users. The ground is declared *tanah mati*, or " dead land " which leads to the recognition of only one owner: the current and real user. Such a right is close to real ownership under western law. The community still has a right to such land in the sense that land is theoretically not saleable to people outside the community. This is now changing with the emergence of a land market and demand coming from Javanese migrants. In some villages, in the vicinity of transmigration projects, land transactions appear to reflect a change in *Adat*. Problems persist in connection with land purchased by migrants.

1.4 Adaptation of the customary law to tree-crops: long-term perspective.

The State recognises the pre-eminence of *Adat* for land provided the government does not claim rights to the land. The traditional land-tenure is characterised by the possession of land on an undivided basis (with the exception of house and garden, *Pekarangan*) by the village community[4]. The right of user is based on the actual use of land for farming. Local differences exist between Sumatra and Kalimantan on the one hand, and between traditional zones and those that are enjoying full economic development on the other. Change occurs rapidly, and there is a real adaptation of social systems to new production conditions (also through specialisation in perennial crops) with more individualisation of the decision-making process and farming activities. Tree-crops only require intensive labour at planting but not for harvesting at least for rubber and oil palm, i.e. once a year, which is not the case in shifting cultivation for instance[5]. As tree-crops require long-term strategies, the " right of user " to the land is moving towards private property. The recognition of a long-term right to plantation land (tree-crops), is gradually becoming a right of ownership, and this is also a significant factor in the permanence of agro-forestry practices linked with rubber. Historically, this trend facilitates the extension of this type of system.

1.5 The case of West-Kalimantan (District of Sanggau and Sintang).

The local land rights "*adat*" are detailed in **frame 1** (Momberg, 1993 and Dove, 1985). Shifting agriculture requires control of labour at certain critical periods. Fallow land cropped in upland rice is regrouped and cleared. It is a system with a short annual cycle. In this particular case, under *Adat,* land remains undivided. Jungle rubber requires a long cycle (at least 35 years or even longer). It does not require collective control of labour. It is adapted to family agriculture with relatively individual management. The *Adat* generally protects the rights of plantation (" rights of user " to the productive trees as long as they are harvested). This guarantees protection of the farmer's investment.

After several generations, this " right of user " is changing into a right equivalent to private property; as the land has not been controlled by the community for several decades. **Table 1** shows the main characteristics of social organisation in West-Kalimantan. Technical constraints and the move to individual decision-making (in the case of jungle rubber and other tree-crops) has led to an adaptation of the land system, which is an integral part of the social system. Technical innovation and the development of a significant family plantation sector have fundamentally changed land use and consequently land tenure.

[4] The village community might in some cases be restricted to the families that founded the village.
[5] Of course, tree -crop plantation is labour intensive, but after planting, harvesting and weeding labour requirements are spread throughout the year (in the case of rubber and oil palm).

Table1: Ethnic and social organisation in West-Kalimantan

	Dayak Bidayuh	Malayus	Java
Basic economic unit	Nuclear family	Nuclear family	Nuclear family
Basic group unit	*Kelompok petani* Collective working groups & " turun " (family groups)	*Kelompok petani*	*Kelompok petani*
Primary territorial unit	Village	Village	Village
Second territorial unit			Transmigration project
Group linkage	Tribes	Sultanate (formerly)	Javanese origin (province & village)
Statute	local *(asli)*	local *(asli)*	Migrant
Main social characteristics	Individualism relative equity between people		High social coherence. Collective decisions take precedence over individual choices
Link with hierarchy	Democratic, individualised		Pyramidal society
Land-tenure and *Adat*	complex: indivision (communal) and quasi private property depending on crops.	ditto	Private property with land titles issued by transmigration projects
Housing	Collective: formerly " long house ", now disappearing. Privatisation of housing.	Family units	Family units

2 Land: a resource that became rare in late 1990s

2.1: An emerging land market.

Land has not been a limiting factor for local populations in pioneer zones for decades. Land was plentiful at the beginning of the last century with an average of 3 inhabitants /km2 in Sumatra and Kalimantan. In the 1990s, the development of large concessions by private companies for perennial or forestry plantations began to change the picture. Independently of this trend, transmigrants, either spontaneous or in projects, and generally Javanese, consistently sought to acquire land to increase their very limited initial plots (generally 2 to 2,5 ha in transmigration areas). This trend was clearly accentuated in the middle of the 1990s in the case of NES farmers who began to profit from the accumulation of capital from their rubber or oil palm plantations.

A SRAP survey made in 1997 provides a preliminary indication of this emerging land market **(table 2)**. The sale of land by local communities with the agreement of land chiefs confirms the changes in *Ada*t with respect to the individualisation of behaviours. Today tree-crop plantations with a quasi " permanent private tenure property " allow sales to third parties or to non-residents of the village (something which was impossible under land indivision). This recent phenomenon is still limited but is tending to increase around centres of transmigration. The fact that rubber and oil palm projects required local farmers to regroup their land into 25-hectare blocks of contiguous land also contributed to voluntary land regrouping and consequently to the individualisation of land backed by local *Adat*. The exchange of plots, even if limited, could thus occur between farmers in the same village, thereby recognising effective control and property rights not only to trees but also to the land itself. The emerging land market also increases land security for producers, even though no

land certificates are available as these are neither provided by governmental agencies nor privately. The logic of land acquisition through tree-crops such as jungle rubber is also reinforced (Penot, E. 2001).

Table 2: prices of land in West-Kalimantan (1997)

Source: E Penot, PH Courbet, 1997. (Exchange rate for 1 US $ in 1997: 2400)

Tribe of the buyer	Village	Type of land	Price in Rp	Price in US $ (1997)
Dayak	Engkayu	Non productive jungle rubber	170 000	**71**
Dayak	Engkayu	Productive jungle rubber	250 000	**104**
Dayak	Engkayu	Lowlands, swampy areas	15 000	**6**
Dayak	Lape	Lowland rainfed rice	1 200 000	**500**
Dayak	Bali	Jungle rubber	150 000	**63**
Dayak	Bali	Oil palm	9 000 000	**3750**
Javanese	Trimulia	Ladang, upland rice	800 000	**334**
Javanese	Trimulia	Jungle rubber	400 000	**167**
Javanese	Trimulia	Lowland rainfed rice	950 000	**396**
Javanese	Trimulia	Lowland rainfed rice	2 000 000	**834**
Javanese	Trimulia	Lowland rainfed rice	1 400 000	**584**
Javanese	Trimulia	Lowland rainfed rice	500 000	**208**
Javanese	Trimulia	Jungle rubber	1 200 000	**500**
Javanese	Pariban Baru	Old jungle rubber	500 000	**208**

The price of land depends on land-se (crops or fallow) and ease of access to roads and markets. It also depends to a large extent on actual land availability in each village. The still very recent land market can provide only indications of purchases (with 1997 prices). However, other factors play a role in land price generation. The first is connected with the purchase of land from Javanese transmigrants who generally favour *sawah* land (for the cultivation of irrigated rice). Overall, the price of land purchased by transmigrants is two to six times higher (4 to 800 000 Rp/ha) than of that purchased by private companies in the Dayak area (150 to 250 000 Rp/ha). Dayaks only very occasionally buy *sawah* land[6]. *Sawah* land has a rather higher commercial value than ladang areas with an average price ratio from 1 to 5. There is a certain amount of price speculation due to the scarcity of sawah land. For cash crops, the purchase price of a plot with oil palm trees is very high and comparable with that of a clonal rubber plantation. Such " plantations " are rarely sold except in transmigration areas where some Javanese buy plantations from planters who quit the scheme.

[6] Historically and culturally, Javanese farmers are used to *sawah* (intensified irrigated rice). Dayak farmers are more used to rainfed lowland rice cultivation (far less intensified).

2.2 Land use changes in West-Kalimantan province.

Changes in land-use in this selected pilot zone are highly representative of the major " tree-crops belts " in Sumatra and Kalimantan. The large-scale adoption of tree-crops by smallholders in fact favours land privatisation in the long term and generates a shift in local customary law as well as in some major factors such as labour organisation and land tenure. **Table 4** shows the main cropping systems in West-Kalimantan and the social organisation linked with these cropping systems

Table 4: Main cropping systems and social organisation in Kalimantan.

Topics	**Sago extractivism <19^{the} century**	**Shifting cultivation 19th century**	**Jungle rubber 1910-> 2001**	**Clonal rubber plantations Smallholding 1973—>2001**	**Oil palm 1995-1997—> 2001**
Land-tenure	territorial	Indivision	Individualised	Private property	Private property
Type of society	migrant	semi-migrant	Settled	settled	Settled
Organisation of labour	individual or collective	Collective	Individual	individual	individual, organised, re-use of collective
Use of collective working groups (*Gotong Royong*)	yes	Yes	Partial for annual crops (Ist year)	no	Yes
Type of exchange between users	Global collective approach	Strict reciprocity	Strict reciprocity	---	For harvest only
Share-cropping	no	No	Yes	possible, rare	No
Use of external labour	No	No	No	yes possible	yes possible
Cultural reference linked to the product	Not known	High	Low	low	No one
Level of crop specialisation	zero	Low	Average	high	High
Evolution for West-Kalimantan	disappearing	More and more limited	Increasing in pionneer zones zones	increasing	Recent increase
Tribs in Kalimantan	Melanaus	Kantus Iban	Bidayuh	Bidayuh Javanais	Bidayuh Javanais

The community has generally ratified these changes through the recognition of ownership by families of land cultivated with perennial species such as rubber or more recently oil palm. Sometimes, originally undivided land for *ladang* (rainfed agriculture) has been divided into plots for several families who wanted to join an oil palm scheme with a private company. This individualisation in terms of farming strategy and land-use is also a process of land securement, which contributes to current plantation dynamics (jungle rubber, clonal rubber or oil palm). To security - in terms of income as well as system sustainability - can be added a third component : land security.

From the 1980s on, various stakeholders (State, private companies, local communities: Dayaks or transmigrated Javanese populations) developed strategies that led to a new definition of land-tenure with respect to the search for land security. Government policy for plantation concessions (oil palm and *Acacia mangium*) led to

a legal redistribution of land to private companies to the detriment of local populations. This type of policy is linked to new crop opportunities, which proved to be extremely attractive in the Indonesian context (plentiful land, low cost of labour...) as well as in the international context (good prices until 1997, and still attractive for oil palm in 2002). The size of Estate concessions varies between 10 000 and 300 000 hectares. The actual planted areas each concession generally lies between 3 000 and 20 000 hectares (around 10 % of total concession land for forestry plantations and 20 % for oil palm plantations in Kabupaten Sanggau (Geissler & Penot, 2000). These tree-crops contribute to a new definition of the landscape.

This type of land-use policy can also lead to conflicts with local communities, when land that is apparently without an owner (especially on maps), but which in fact belongs to a specific village community is allocated to projects or private plantations. It should be noted that local populations are generally not informed of legal changes in land tenure or rights. One then observes two different worlds with two different logics that are not understood by those involved because their spatial perception is not the same. One world is ancestral and based on *Adat*, i.e. the tradition, and the other one belongs to the " legal and official world".

The 1967 forestry law recognises the rights of local populations to forest resources (Momberg 1993). This situation may also be a potential source of conflict in the very near future. In 1998 local communities legally controlled only 29 % of the district (as oppose to 52 % in 1985). In West-Kalimantan, in the district of Sanggau there was a very rapid and striking increase in the number of forest concessions (" HTI " with *Acacia mangium*) and oil palm plantations. This district, which is located in the centre of Kapuas basin, is representative of recent trends and presently has the highest rate of deforestation and of degraded land in the province.

In 1998, the SRAP research project (CIRAD/ICRAF) launched a pilot study (Yan Desjeux, ENITA), followed in 1999 by a complete cartographic study using a GIS (Cathy Geissler, University of Nice) The objective was the quantitative and qualitative measurement of the phenomenon of land transfer to concessions and its impact on the local population (Geissler 1999). The total Sanggau district covers an area of 1 845 000 hectares. The forest has long been a significant resource for local populations. Land-use in the Sanggau area has changed considerably, and there has been a clear acceleration in these changes in the last decade. **Map 2** shows land use in 1998 (cf study area in **map 1**). Three main types of land-use can be distinguished: forest, agricultural activity and concessions for plantations **(map 2).**
At the beginning of the last century, forest covered practically the whole area as witnessed in many reports by travellers. At the beginning of the 1980s, forest still covered nearly 40 % of the area. At the present time, only a few vestiges of this primary forest (approximately 7.5 % of the district) remain and forested areas appear like a mosaic of small plots in mountainous and isolated zones above 500 meters AGL **(map 3**). The introduction of jungle rubber at the beginning of last century allowed Dayak agriculture, which was formerly based on the harvesting of forest products and slash and burn agriculture, to become sedentary. Rubber plantations now cover 463 000 ha in the province, including 97,2 % under jungle rubber (DGE, 1998).

Smallholders thus can be considered as a contributing factor to deforestation, although deforestation has been very progressive and spread out over one century. It is not possible to accurately map jungle rubber plantations on remote sensing images because they cannot be differentiated from secondary forests or fallow. They make up a mosaic of plantations mainly located in a radius of 10 km around the villages. From the 1950s on, forestry companies obtained concessions for timber exploitation under a particular regulation that specified selective cutting only. This regulation theoretically allows sustainable exploitation of the forest in "production forests " which enjoy a special status. In practice, non-respect of the regulations leading to over-exploitation means these companies are largely responsible for deforestation (Gouyon, 1999). Smallholders were long considered the ideal scapegoat. In fact the forest management regulation called " TPI " in 1972 (whose name was changed to " TPTI " in 1989), was for all practical purposes not applied by private Estates (Cossalter, 1992), (Durand 1999). The process of deforestation was then amplified by plantation Estates (Potter L., 1998) and worsened in 1997, the year of the " El nino " phenomenon, when major forest fires occurred (Laumonier Y., 1998).

The recomputed areas in the developed GIS (Geographical Information System using Mapinfo software), carried out for each recomposed layer, are presented in **table 3**.

Table 3: Land-use distribution in Kabupaten Sanggau, from SRAP-GIS in 1995.

Different layers of the GIS	Areas in ha	Distribution
" forest "		
Real production forest	268 455	**14,6%**
Protected forest	137 118	7,4%
Conversion forest	5 498	0,3%
Smallholder agricultural activities	261 500	**14,2%**
Transmigration projects	51 829	2,8%
" concessions for plantations "		
Recent concessions for tree-crop plantations really planted	404 997	**21,9%**
Recent concessions for tree-crops = plantations not yet planted	236 841	**12,8%**
Old concessions for tree-crop plantations really planted	71 682	**3,9%**
Old concessions for tree-crop plantations not yet planted	361 578	**19,6%**
Concessions for industrial forestry plantation (HTI)	45 255	2,5%
Total	1 844 756	100%

Source : C Geissler, 1999.

The production forest areas represent only 14 % of the Kabupaten territory (as oppose to more than 40 % before 1980). These areas are located at the periphery of the district. The zones with smallholder agricultural activity under *adat* only represent 14 % of the district instead of 52 % before implementation of the concessions policy (including the forest zones which remain traditionally under *adat*). These agricultural areas are located in the most populated sectors near main communication axes (roads and rivers) **(map 6).** Transmigration projects represent only 2.8 % of the district. Concessions for perennial and forest plantations industrial now cover 60 % of the district of Sanggau **(map 4 oil palm concessions and map 5 HTI**). They are

also mainly located close to the most populated areas with abundant labour and easy access.
The complete series of layers is shown in **map 2. Maps 4 & 5** show zones with official production forests and zones with concessions for forest plantation (HTI) and tree-crop plantations. Land officially remaining for the Dayak populations is thus extremely reduced. **Map 6** shows the total area under agricultural activity. **Map 7** is a simulation of the " average scenario " where Estate plantations continue to develop but not at an exponential rate as was the case before 1998[7]. Some regulation by the State through limitation of the number of concessions combined with the financial crisis (1997-2001) leads to a scenario that seems more probable in 2002 (Geissler 1999). Nevertheless, around 2010; a large proportion of the land currently occupied by local rural populations will be planted by Estates including more than 45 % by oil palm companies. Less and less land will thus be available for local populations, who do not hold any land titles. This trend implies a significant risk of land conflict between smallholders and Estates in the very near future.

3 Smallholder strategies and reaction.

With very limited capital and land still plentiful, local farmers share their land resource with Estates on a basis which seems to be quite unfair. Beside a full credit for plantation establishment (with relatively obscure rates), farmers get 2 hectares planted with oil palm from the 7.5 hectares they provide to the Estate.

Under this type of policy, pressure has begun to increase significantly on land controlled by local communities, leading to situations where the introduction of new crops is no longer possible. Farmers' sons have to leave the village, despite the fact that intensification is tending to replace current extensive farming systems to increase productivity on the remaining available land. This strategy, based on oil palm adoption irrespective of the conditions, as well as the development of off-farm incomes linked with Estates, are short-term strategies. The decrease in available land, which in some areas is already nil, will result in a mechanism of rural migration in the next generation. In the long term, it may well lead to destabilisation, or even a certain degree of de-structuration of local populations. In reality, in 1998 the situation was less alarming because the concessions are only partially planted: an average of 20 % for oil palm Estates and 10 % for HTI planted *with Acacia mangium*. Consequently, in theory, 54 % of the Kabupaten area is still available for agricultural use by local communities, although these communities have no real legal rights.

Thus the legal situation is a real source of potential conflict; however this statement needs to be moderated to take into account real land-use. There is a clear difference between the legal situation, which could be extremely sensitive politically if local populations realised what is currently happening, and reality in terms of land use. Local populations still have the impression they control their " village territory " through *Adat*. And in fact, Estates do negotiate with the local communities the use of land that has been allocated to them as a concession. However, in theory, the Estates could use all available land within the concessions and thus create a situation of conflict particularly in the most heavily populated areas.

[7] The first scenario is that of the continuation of the 1997 pre-crisis trend. The last scenario is that of a very strong limitation in plantation extension.

Government decisions made on land-use since 2000 and potential reforms can be expected to limit the pressure on local communities. The development of tree-crops and forestry plantations create local employment opportunities in the short term as well as a better road system and thus easier access to markets. Private oil palm Estates in particular have continued a policy of smallholder plantations that was formerly implemented by governmental sectorial projects (these ended in 2000). However, the communities do not have access to reliable information on the real legal threat to their land. Ultimately, the logic of private Estates is in opposition to the logic of local populations in terms of land control[8]. The very recent relative land scarcity has led to two different logics if not to a paradox: on one hand there is a reinforcement of the community vis-à-vis " external aggression" and, on the other, a reinforcement of individual strategies through the acquisition of new tree-crop plantations that secure land statute over time.

One main consequence of this decrease in land availability is the shift from traditional extensive agriculture to more intensive cropping systems, the best example being the move from jungle rubber to more intensive monoculture or improved agro-forestry systems[9].

Conclusion

There has been a progressive change in the social systems in the context of Indonesian economic policy, i.e. a policy of full expansion in the 1970s and the 1980s, which was accelerated in the 1990s. However, the recent crisis raises the question of the limit of the flexibility of the system in particular if the acceleration exceeds the potential for " social change ". It seems clear that in recent years (1995-2000) full expansion of oil palm Estates showed the limit had been reached in some villages. The introduction of rubber has been very progressive over the years and sometimes did not disturb local farming systems. This is because it was introduced by means of the agro-forest system, which required very little labour and no capital at a time when land was not a limiting factor. The adoption of oil palm by smallholders was a good opportunity to increase their income and enable them to finance replacement of ageing jungle rubber with improved clonal rubber based on agro-forestry systems or monoculture. On the other hand, conditions required for the development of oil palm, leading to the ultimate loss of 5.5 hectares for each 2 hectares planted, is not an acceptable solution for local populations in the long term.

The slow and progressive changes in social systems integrate the need for new technical systems and indeed the innovation process as well. Social systems, once stabilised - for example as early as in the second generation in a pioneer area - are often mirrors that reflect the constraints resulting from technical systems. Factors that induce change are thus the following: i) changes in overall needs and income, ii)

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[8] Meantime, Estates favour smallholders' plantations and provide full credit and " ready to use " plantations in order to increase the quantity of rubber processed in their factories.

[9] Since 1994, smallholders have developed on their own improved clonal rubber based on agro-forestry systems, called " *RAS sendiri* ", or "endogeneous RAS" after SRAP tried to optimise these RAS (Rubber Agro-forestry System) through on-farm experimentation using a participatory approach in the area.

a reduction in agricultural risk, iii) an increase in the total productivity of farming systems, iv) optimisation of labour and v) minimisation of capital investment.

Since the beginning of the last century there has been no clear rupture between technical systems, technical change, leading to new constraints and social models. In the 1990s, in spite of a rapid change in the economic context, flexibility and adaptation of social models enabled the integration of the most significant change, i.e., the passage of a Community-based society with communal rules based on the needs of shifting cultivation to an increasingly individualistic rural society where farmers' strategies are more individual. The main decisions are generally made at the farm level.

Land and land tenure have changed due to the particular needs of tree-crops as well as the need for land securement for smallholders. Least, the fact that local land-tenure is becoming more oriented to private property is irreversible. At the contrary, the current trend concerning land-use, and in particular the governmental concessions policy might be changed.

References

Angelsen, A. (1995). "Shifting cultivation and deforestation : a study from Indonesia." World Development. Vol 23(N° 10): pp1713-1729.

Collet, O. J. A. (1925). Terres et peuples de Sumatra. Amsterdam, Elsevier.

Cossalter, C. (1992). Les ressources forestières en Indonésie et les conditions économiques sociales et politiques de leur exploitation. Cifor. p.: 29.

Desjeux, Y. (1998). "Evolution de l'occupation des sols sur la province de Ouest-Kalimantan en Indonésie." Mémoire de fin de seconde année, ENITA/Bordeaux. Juillet 1998.

Durand, F. (1999). "La gestion des forêts en Indonésie : trois décennies d'expérimentation hasardeuses (1967-1998)." Bois et forêts des tropiques. 1999, n° 262 (4), CIRAD, Montpellier , France.

Geissler, C. (1999). "Analyse de l'évolution de l'occupation des sols dans la province de West Kalimantan, Bornéo, Indonésie (1985-1995). La perte juridique des territoires par les communautés locales peut elle engendrer des conflits fonciers potentiels ?" Mémoire de DESS Image, Multimedia et Sciences territoriales., Université de Nice, Sophia Antiplis, France.: 92 pages.

Geissler, C. Penot E. (1999). "" Mon palmier à huile contre ta forêt " .Déforestation et politiques de concessions chez les Dayaks, Ouest-Kalimantan, Indonésie." Bois et Forêts des tropiques , 2000. n° 266 (4): p 7-22.

Geertz, C. (1966). Agricultural Involution, the process of ecological change in Indonensia. Berkeley, Univ. of Callifornia Press.

Gouyon, A. (1999). "Fire in the rubber jungle. Fire prevention and sustainable tree crop development in South Sumatra." Rapport Idé-force. Etude réalisée pour le Forest Fire Prevention and Control Project, Department of Forestry and Plantations. European Union.: 69 pages.

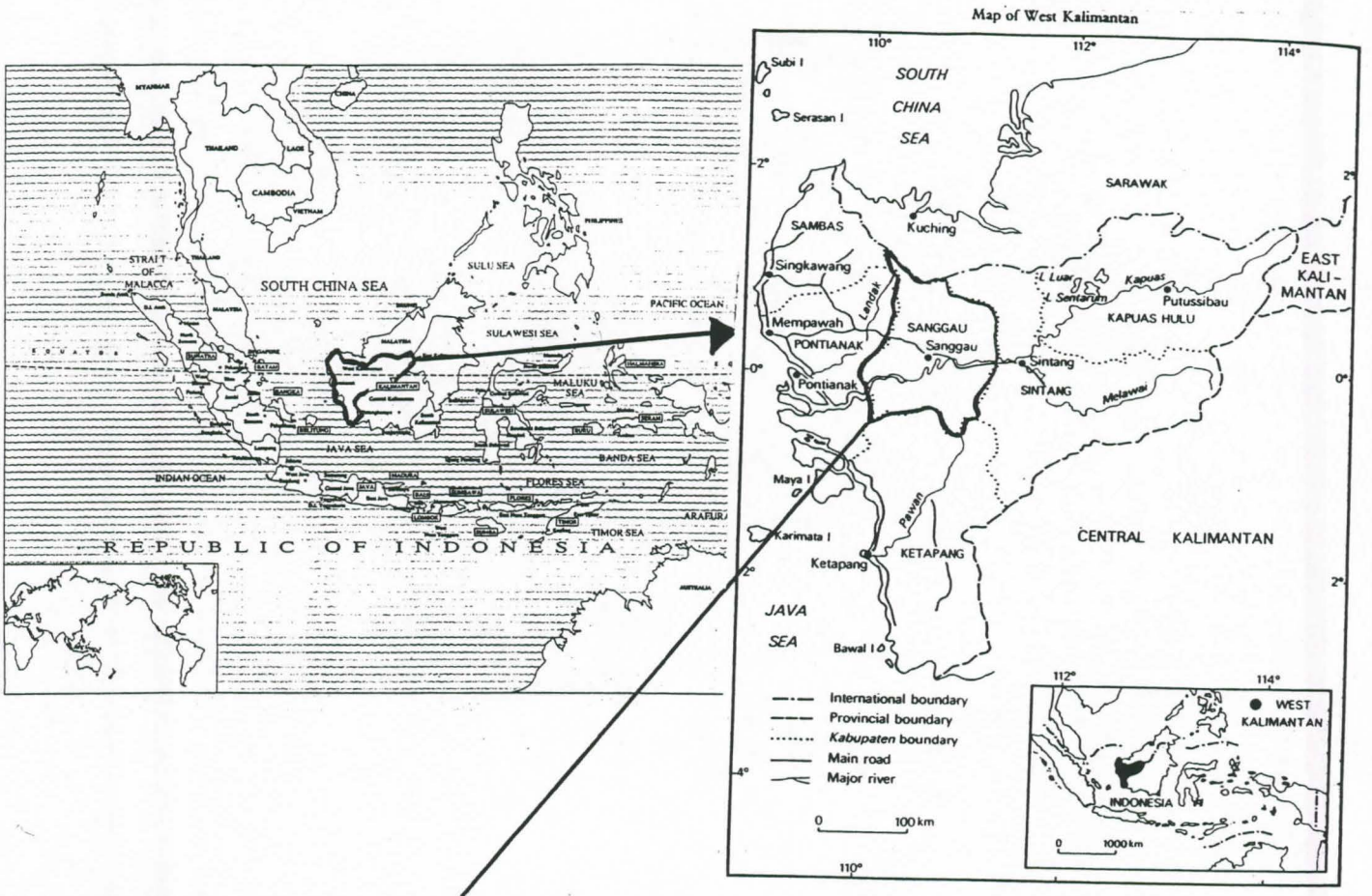
Holleman, J. F. (1981). "Van vollenhoven on Indonesian adat law. KIT, Translation serie n° 20,." La hague, Nederlands.

Laumonier Y., L. C. (1998). "Le suivi des feux de forêts de 1997 en Indonésie." Bois et Forêts des tropiques, 1998, n° 258 (4).

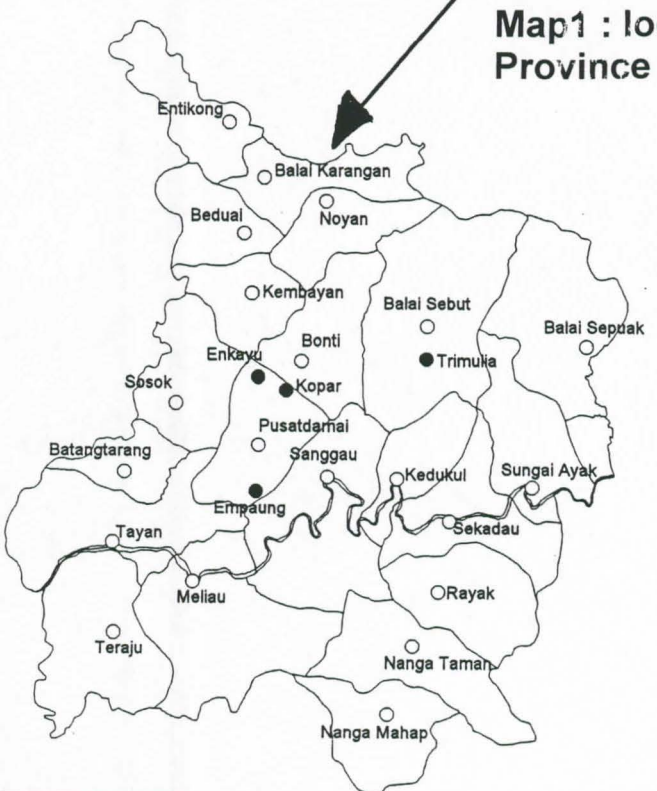
Penot, E. (2001). Stratégies paysannes et évolution des savoirs : l'hévéaculture agro-forestière indonésienne. Thèse de doctorat. Faculté des Sciences Economiques. Montpellier, Université Montpellier I.: 360p.

Potter, L. L., Justin (1998). Tree planting in Indonesia: trends, impacts and directions. CIFOR, 1998.

Stole, f. (1997). Land use in Jambi province in Sumatra: an overview. ICRAF/SRAP workshop on RAS (Rubber Agroforestry Systems), Bogor.



Map1 : localisation of Kabupaten Sanggau, Province of West-Kalimantan

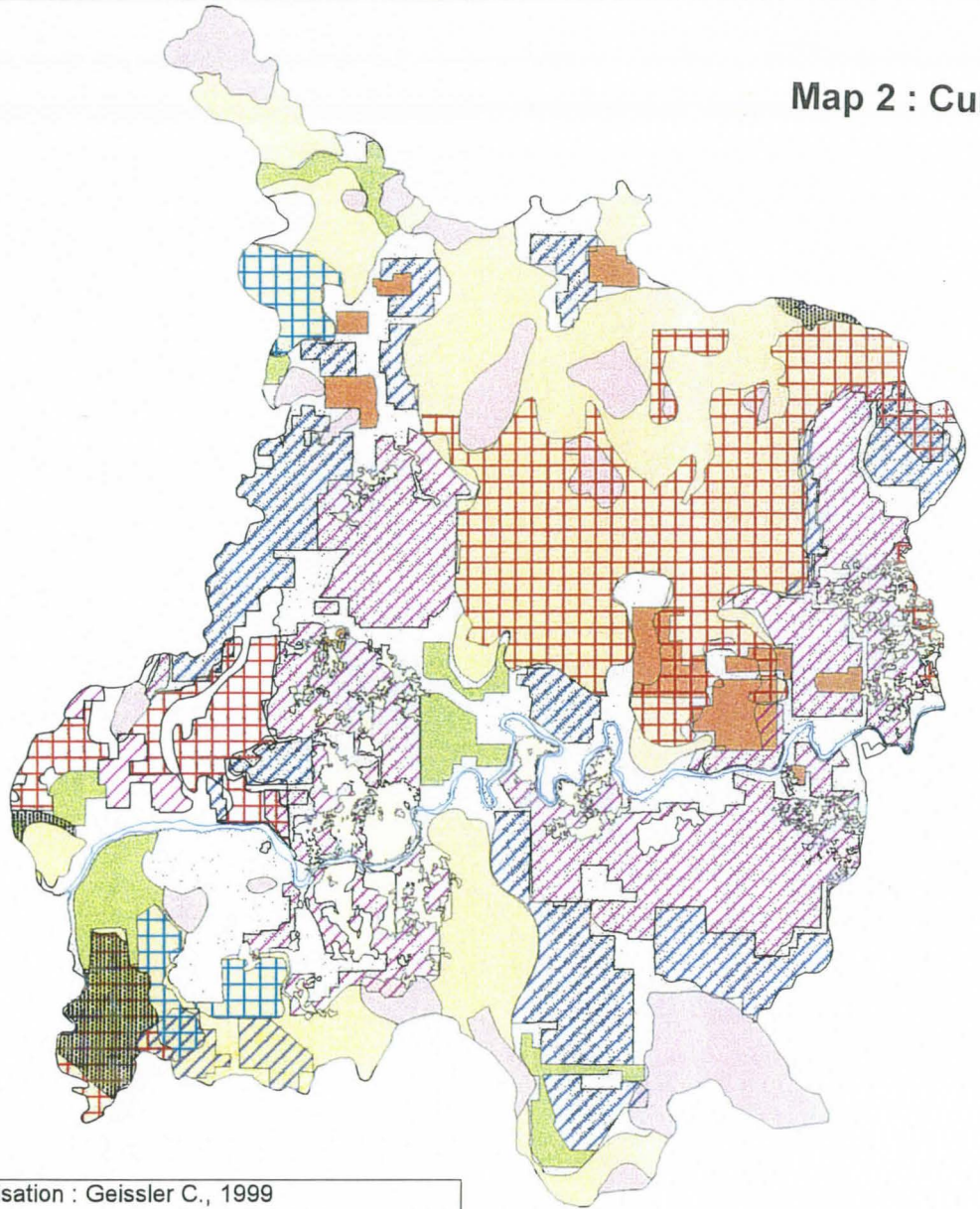


Légende

- Limite de sous-districts
- Fleuve
- Chef lieu de sous-district
- Village d'essai

tion : Geissler C., 1999
: Land-use in West Kalimantan in 1998

Map 2 : Current land-use, 1998.



N
W E
S

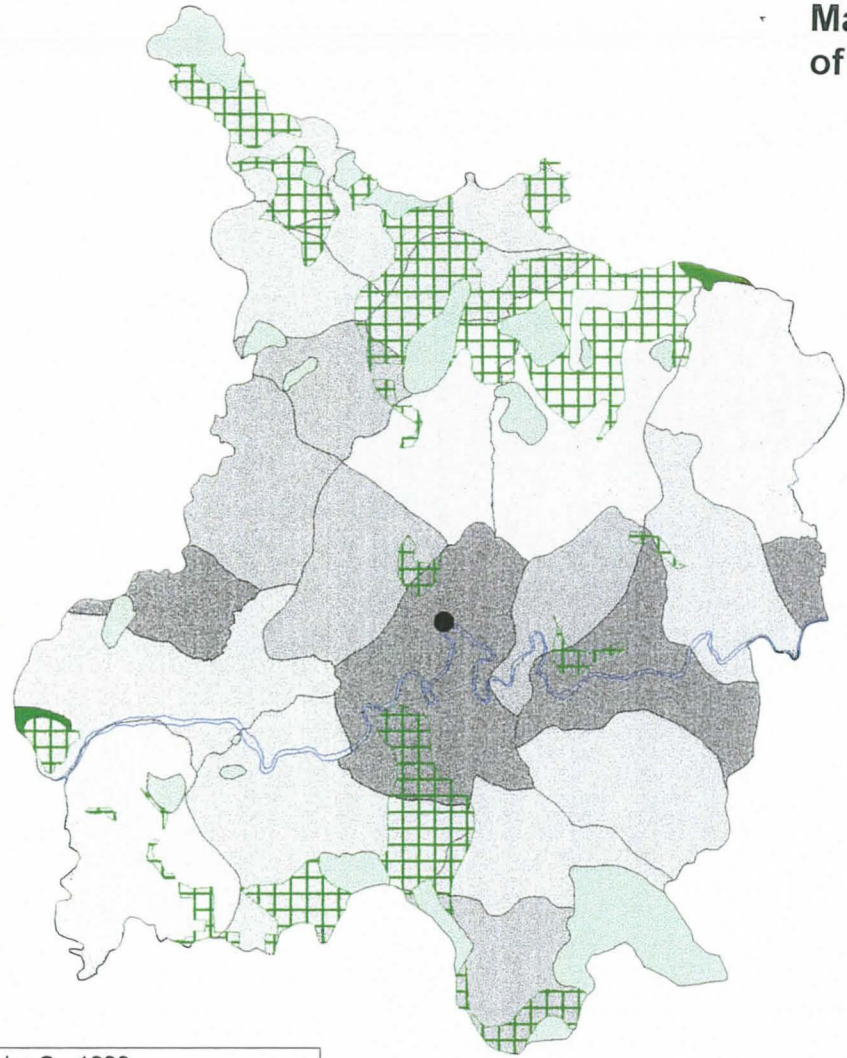
0 25 50
Kilomètres

Légend

- Kabupaten boundaries
- Rivers
- Agricultural activities
- Production forest
- Protected forest
- Private estates : oil palm
- Transmigration projects
- Conversion forest
- Concessions effectively planted
- Concessions not yet planted
- PTP/NES
- HTI transmigration
- Private HTI

Réalisation : Geissler C., 1999
Source : Land-use in West Kalimantan in 1998

Map 3 : Localisation of different types of forests and population density



Légend

Sanggau

Kabupaten boundaries

Rivers

Conversion forest

Protected forest

Real production forest

Population density in 1997

: inhab/km²

41 à 56

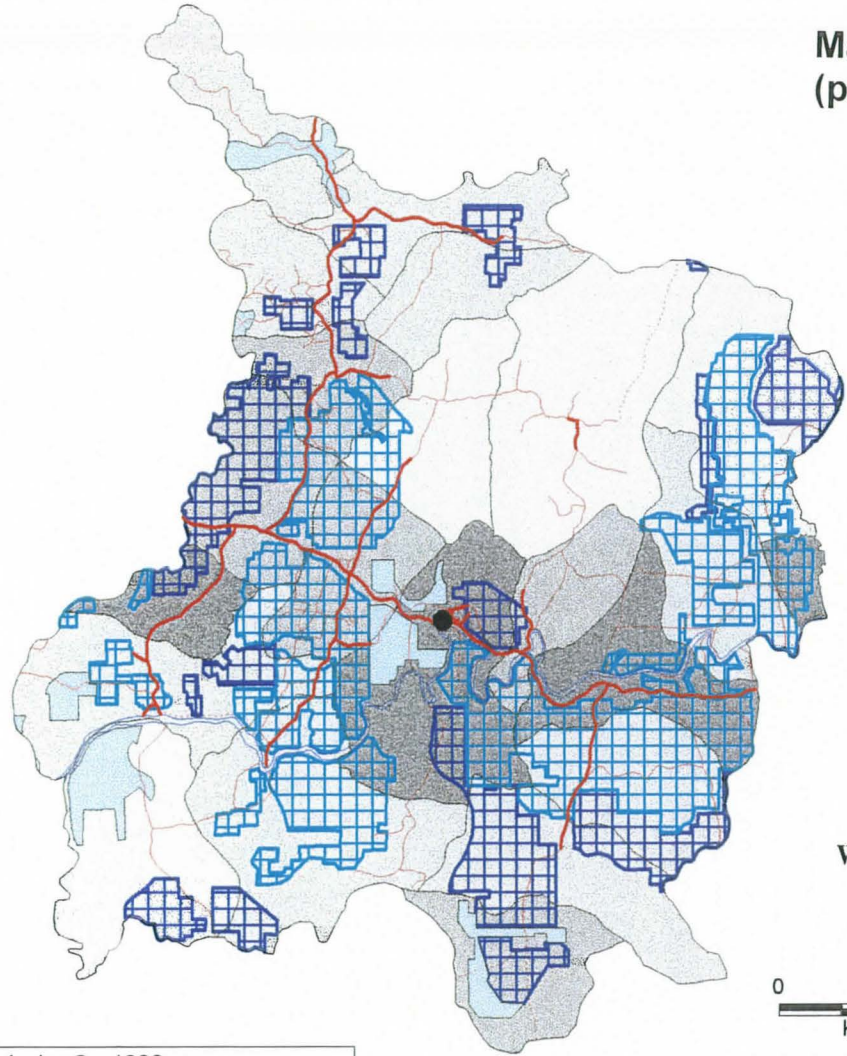
29à 41

17 à 29

10 à 17

Réalisation : Geissler C., 1999
Sources : Land-use in West Kalimantan in 1998

Map 4 : localisation of concessions (planted and not yet planted) in 1995

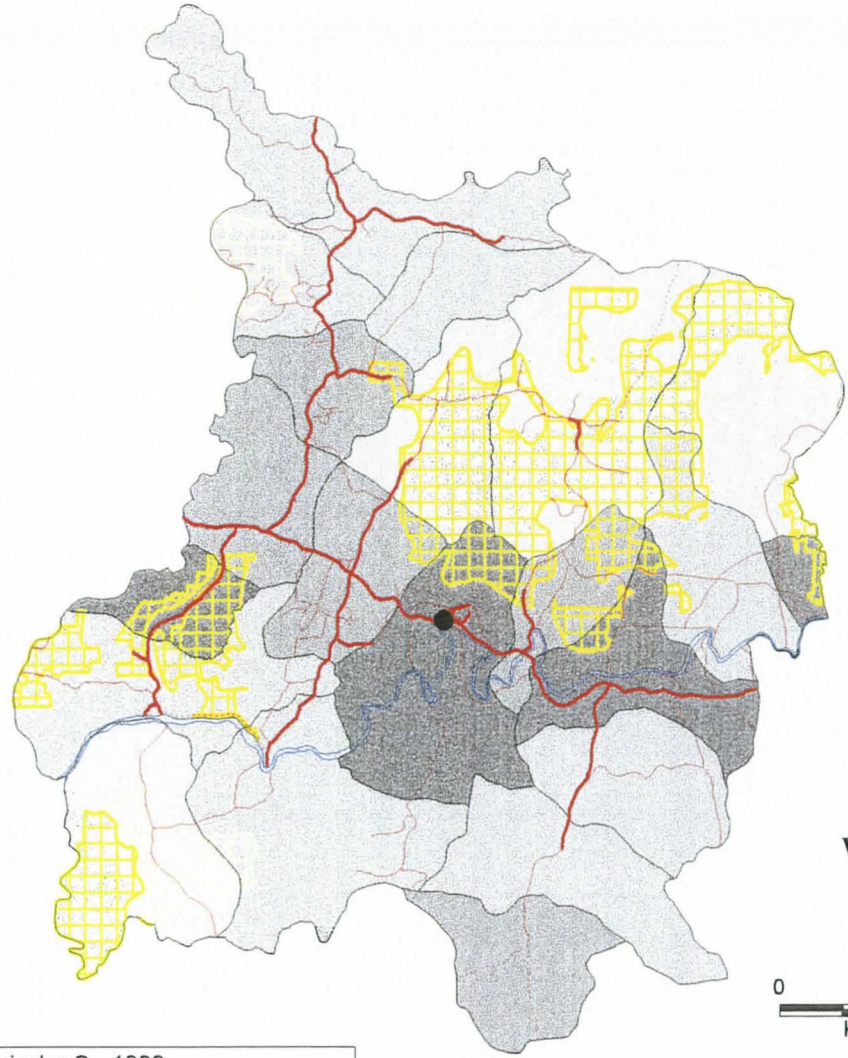


N
W E
S

0 25 50
Kilomètres

- Sanggau
- Kabupaten boundaries
- Rivers
- Main roads
- Secondary roads
- Tracks
- New concessions effectively planted ıntées
- New concessions not yet planted n plantées
- Old concessions effectively planted lantées
- Population density in 1997 : inhab/km²
  - 41 à 56
  - 29 à 41
  - 17 à 29
  - 10 à 17

: Geissler C., 1999
Land-use in West Kalimantan in 1998



Map 5 : localisation of forestry concessions HTI in 1995

Légend

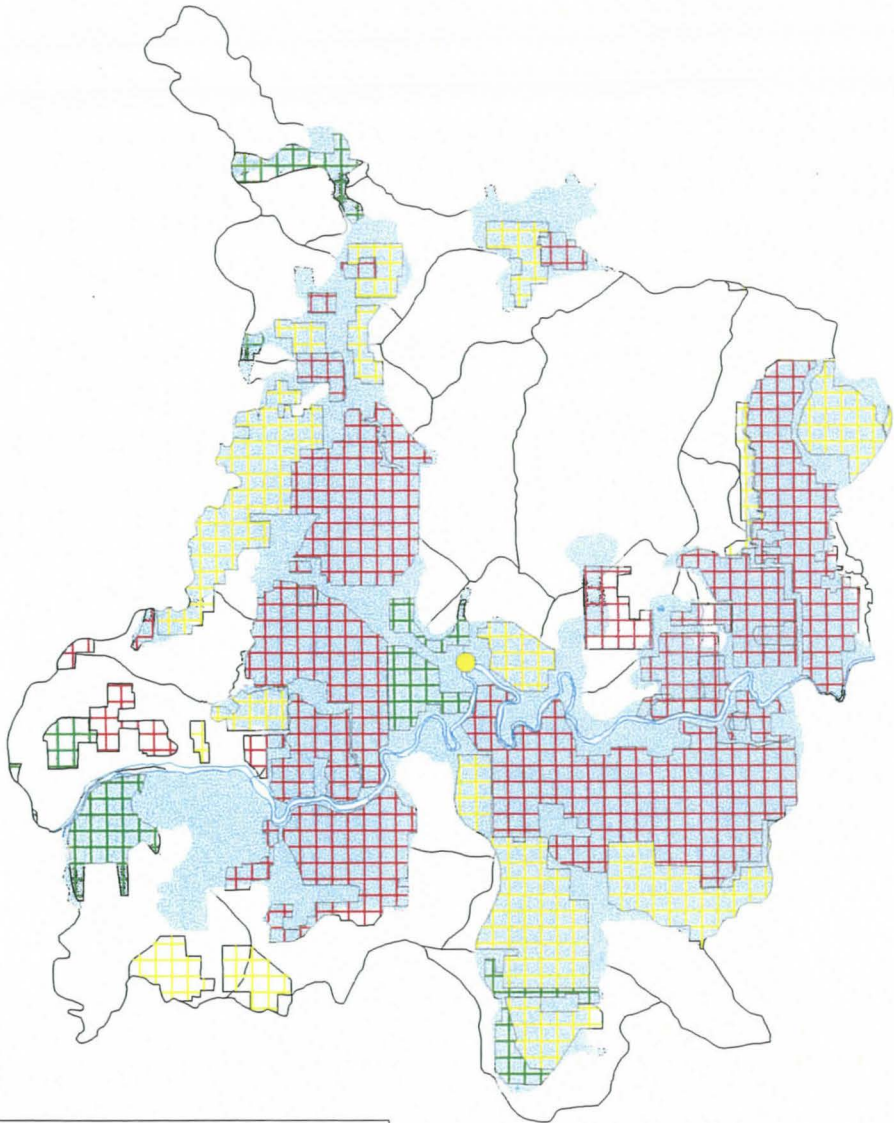
- Sanggau
- Kabupaten boundaries
- Rivers
- Main roads
- Secondary roads
- Tracks
- Private concessions HTI
- HTI concessions for transmigration
- Population density in 1997 : 'inhab/km²
  - 41 à 56
  - 29 à 41
  - 17 à 29
  - 10 à 17

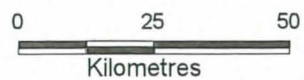
N
W E
S

0 25 50
Kilomètres

Réalisation : Geissler C., 1999
Sources : Land-use in West Kalimantan in 1998

Map 6 : localisation of real agricultural activities in the district in 1995.





Légend

- Commune de Sanggau
- Rivers
- Agricultural activities
- Concessions not yet plantec
- Concessions planted
- Transmigration
- Private Estates
- Sub districts boundaries

Réalisation : Geissler C., 1999
Source : Land-Use in Kalimantan in 1998

Map 7 : simulation of available land in 2010 :
With a moderate growth of Estates.

N
W E
S

0 25 50
Kilomètres

Légend

- Sanggau
- Kabupaten boundaries
- Rivers

% of available land

- 86 - 100
- 66 - 75
- 56 - 65
- 0 - 55

Réalisation : Geissler C., 1999
Sources : Land-use in West Kalimantan in 1998