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Dynamics of Cassava Plantation in the North Bogor Suburban Area of Bukit Sentul



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INTRODUCTION

In Indonesia, a childrens song called *Anak Singkong* tells the story of a child watching a rich man eating cheese, while as a poor child, he just eats cassava. Indeed, cassava has long been and is still considered as a poor crop for poor people. Apart from leading Indonesian as well as international researchers to pay very little attention to this crop, this consideration underlines the fact that cassava is supposed to be a low investment and a low income provider crop, mostly cultivated for subsistence purposes. That is why it is not expected to be found in a suburban area, which characteristically suffers from tough pressure on land use under the competition of other activities (mainly industrial and real estate uses). That is also why its wide spreading along the Jakarta –Bogor Highway banks from the beginning of the economic crisis (called *kerismon*) that pushed many Indonesians under poverty line, raises several questions.

Two main observations led to this research. First was the progressive colonisation of the highway banks that started just after the crisis. People began to cultivate on this area, which is not really a public area since it belongs to the government and as a special private company (named *Jasa Marga*) is in charge of its management. People slowly occupied the land along the highway to the very side of the road (five meters). The total acreage occupied in this way can be estimated at between 35 and 50 hectares from the Bogor highway interchange to the Cibinong exit (km 45 to km 29), but actually the phenomenon was observed from Cibubur until Ciawi (see map in annex 1). This surface area has been cultivated mainly with cassava, but taros, as well as bananas have been planted too in a much smaller proportion. From 1997 to 2001, the area has been more and more exploited. Then from 2001, the cassava crop slowly started to disappear from the highway banks.

The second observation is that large mono-crop cassava fields can be noticed in the north part of Bogor, that is to say in an area under strong competition from urbanization due to the surrounding city centres of Jakarta (to the north) and Bogor (to the south). This phenomenon is quite surprising because many studies on sub urbanization have now shown that high added value crops like horticultural or market gardening crops mainly represent the agriculture in this kind of area. These commodities do not need large surface areas, have a high demand for a specific knowledge, high level of inputs and also involve the use of expensive production factors like water (irrigation systems). On the contrary, cassava demands a very large acreage of land, does neither need high inputs nor installation investments, but provides relatively low returns. It is usually seen in the highlands and used as a subsistence food crop.

These two observations lead to ask what has been the purpose of this crop in this area and from the beginning of the crisis (subsistence farming as a response to the economic crisis, or industrial production?), and which factors enabled it along the highway.

The first question is related to the factors of the widespread cassava development along the Jakarta highway. This phenomenon has been observed not only along the highway, but also on other vacant land inside the villages. Therefore the crisis appeared like a break in an existing system. That is why two main categories of factors may be identified:

- « Deep » or ancient factors: the existing production of cassava (mono-crop for industrial purpose), due to the traditional starch processing and reinforced by land tenure change.
- « Factual » ones: the crisis and the oral permissiveness from the government for the cultivation of the unused land, favoured by economic conditions for cassava roots production in 1997

The second question is related to the cassava-based farming system. What has been the behaviour of the different stakeholders and particularly the farmers' in front of the conditions designed by the two situations (ancient and recent)? According to their positions, means and intentions, how did they react to the crisis breaking? Is there a type of cassava plantation clearly related to the economic crisis? These questions will be answered by analysing the different situations of the farmers to understand their aims for cassava cropping and what may be their way out after the crisis ending. How far are cassava growers dependent on the cassava crop?

However on a larger scope, this report will finally raise the issue of the future of the cassava crop in the Bogor suburban north area, now the crisis has smoothed.

After an explanation of the method used to realise this work and a presentation of the research area, the framework of this report will be organised as follows:

The first two parts will highlight the conditions enabling cassava to be planted in a large monocropping way on *laban tidur* during the crisis, while the third part will analyse the way stakeholders reacted to these conditions.

- 1) « Ancient factors »: existing conditions enabling cassava plantation, (traditional starch processing, land use and land tenure changes);
- 2) « Factual factors » reinforcing the existing conditions: the oral permissiveness given by government in 1997 allowing unused land occupation and the economic pattern of cassava production in 1997;
- 3) How have stakeholders acted in a situation marked by the crisis breaking?

PRESENTATION

Methodology

The methodology relies on a data **crosscheck from several sources**: figured data from the Statistical Institution of Indonesia, different public services concerned with agricultural development or urban and rural development planning, searchers, « key-persons » in the villages, entrepreneurs (in starch, tapioca, housing and industrial enterprises) and cassava growers, landowners... Appendix 2 lists all interviews and sources of data. The first period of the research aimed at building a map of cassava crop in order to border the research area, and to understand the dynamics of cassava cropping in this area.

This **map**, bordering the different types of areas where cassava is planted, enabled to choose the two villages where the research was to be extended.

Then a series of **questionnaires-interviews with cassava growers** were carried out in order to understand what cassava plantation represents for them, according to their different characteristics. The series of interviews was based on a previous identification of all types of people involved in cassava plantation. (These typologies appear in appendix 4). They are different for Sentul and Cimahpar since land tenure varies from one village to another. Most cassava growers in Cimahpar are not landowners but sharecroppers or agricultural workers. A total of 41 cassava growers or/and landowners (25 in Sentul and 16 in Cimahpar) were interviewed.

Definition of the research area

This first part of the research consisted of a general survey including a short trip around the area in order to delimit the main cassava cultivation area by observing the different crops in the villages. It was then completed with a combination of figured data from the BPS (Badan Pusat Statistic, Bogor - Jakarta), and from dialogues with people in both the Dinas Pertanian of Bogor City and Bogor District, and in different sub-districts and villages¹.

From Bogor to Cibinong, the number of villages along the highway is 14, distributed among 5 *kecamatan*:

Kecamatan Kota Bogor Utara (North of Bogor City): Cimahpar, Ciluar,

Kecamatan Sukaraja: Sukaraja, Ngampar,

Kecamatan Babakanmadang: Cipambuan, Kadumunggu, Sentul,

¹ Indonesia is administratively divided into 27 provinces. A province is subdivided into several districts. There are three types of districts: *kabupaten* (district), *Kotamadya* (municipality), and *Kota administratif* (administrative municipality). A district is subdivided into several *kecamatan* (subdistricts), and a *kecamatan* consists of several *desa* or *kelurahan* (villages). *Kabupaten* and *Kotamadya* are administrative units at the same hierarchy. *Kabupaten* normally covers a wider area than *Kotamadya*, and is dominated by rural areas. *Kotamadya* (municipality) is dominated by urban areas.

Kecamatan Citeureup: Leuwikutug, Sanja, Karang Asem Timur, Karang Asem Barat, Puspasari,

Kecamatan Gunung Putri: Karanggan, Gunungputri,

Bogor Utara is the only one that depends on Bogor City; the others are under the Kabupaten Bogor administration.

As shown on the map (appendix 3), the north of Bogor is cultivated with two types of cassava: bitter cassava (*singkong pahit*) and sweet cassava (*singkong kuning*). Bitter cassava is mostly intended for starch production, while yellow and white cassavas are used to make *tape* or *makanan kecil* (direct consumption purpose). The outlet of the cassava production was used as criteria to border the research area. From Bogor to Bukit Sentul, along the highway where we observed the cassava boom between 1997 and 2002, starch production is the main outlet for cassava plantation.

We chose two villages to deepen the research, especially to make more interviews with the farmers.

The first village is **Sentul**, for it is an example of the central part of the defined area, where more than 60 % of the agricultural land is utilized for bitter cassava crop intended for starch production. This village is crossed by the highway, which separates it into two parts. The western part is more heterogeneous, with an «intern part» still quite «rural» and residential, and a «front side» more open, with better access to roads and more industrial activities. It is bordered on its west side by the river *Ci Keas*. The eastern part of Sentul is quite different from the western part for it is very «urban», as well as the whole eastern part bordering the highway². This part is organised around the main road running alongside the highway and which seems to provide more activity. The *sirkuit* Sentul occupies the southeast part, while the river *Ci Tereup* marks the very east boarder of the village. Sentul total surface area is 347 hectares (that is to say almost 100 ha more than the average acreage of a village in the research area which is 250 ha). Apart from cassava, other agricultural resources are remarkable, among which many fruit productions (durian, papaya, banana, *rambutan*, *duku*...) and chilli. The village administration registered 10 435 inhabitants in 2001. Seventy five percent of the people are originally from the Sunda region (West Java). Most of them are farmers, daily workers as *kuli* or in the starch enterprises, drivers (*ojek* or *angkot*, urban transport system,). Fifteen percent of the population are migrants from Central and East Java, who began their settlement in the beginning of the 90's, and who mainly moved to catch the new job opportunities in industry. The remaining 10 % of the population are from Batak and are mostly involved in catering. With a total of 156 poor families (468 persons), Sentul is still classified as a poor village, entering the IDT (*Inpres Desa Tertinggal* or village level poverty alleviation) program³.

² This situation meets the observations made by Rustiadi in Bekasi, who shows evidence that the existence of toll roads pulled the urbanization process toward the highway : to the south in the case of Bekasi, to the east in the case of Sentul.

³ The IDT program was created in 1994 and consists of financial assistance to the elected villages without any interest nor repayment. The projects likely to be settled in the villages might take several forms : installations, investment in small-scale enterprises, not only in industry but also in agriculture. These subsidies raised the amount of 2 000 USD per year per village, allowed for at most, three years running. The loans to the government for this program were provided by the World Bank and the International Monetary Found and managed in Indonesia by the BAPENAS (National Planning Board).

According to the municipality, 30 % of the farmers are landowners, (on average 0,3 ha/farmer): they only cultivate their land with cassava. However they have a secondary activity, as *pegawai negeri*, traders... Agriculture is still the main source of incomes for very few people.

The second village is **Cimahpar**. Two main reasons governed the choice for this village: first, it is part of the most important area for bitter cassava production. Secondly, it is highly threatened by the expanding urbanization of Bogor. The fact that it became part of the Bogor City administration in 1995 is particularly relevant, meaning that the city of Bogor expands its borders⁴. The last reason concerns Bogor City as a whole, since the production, as well as the cassava harvested area (including the *laban tidur*), increased in a significant proportion: from 100 ha in 1995/1996 to 366 ha in 2001⁵. Since 1976, the surface area of Cimahpar is 441 ha, 91 of which are owned by housing enterprises. There are 11 178 inhabitants living in Cimahpar (this number has increased by almost 3000 persons since 1997). on the Kotamadya Bogor boundary, starch enterprises are only located in Cimahpar (one is bigger than the other four).

⁴ Interview with Pak Azrin, Economics Section Chief, BAPEDA Kota Bogor

⁵ Interview with Pak Robert Hasibuan, Food Crop Section, Dinas Pertanian Kota Bogor.

PART I.

ANCIENT FACTORS : EXISTING CONDITIONS ENABLING THE CASSAVA CROP

Two phenomena may be called «ancient» or «deep» factors. The first one is the traditional cassava agro-food system in the north part of Bogor district, based on traditional knowledge and practices of starch processing, since the beginning of the century (around the 1930's). The second one appears more as a middle term factor, extracted from the recent history of the development in the region. It is related to the rapid urbanization of the area since the beginning of the 1970's, including the building of the highway. These two elements are the basic conditions explaining the particularity of cassava plantation in this area: mono cropping and the absence of other types of commodity.

I. THE CASSAVA AGRO-FOOD SYSTEM

The existence of a traditional production chain is a «pull» factor towards the permanence of cassava plantation in the area since it guarantees a demand for cassava roots from starch enterprises and for starch from tapioca mills. Indeed, starch processing settled in north Bogor since the 1930's. Five main stakeholders are involved in the tapioca agro-food system: cassava grower, intermediate trader (if there is), starch entrepreneur, tapioca mill and tapioca buyer (*kripuk* or glue producers...).

I.1) Cassava production in Bogor is boosted by demand from starch enterprises

Demand from starch enterprises as well as the functioning relationships between two main stakeholders at this level - cassava growers and starch entrepreneurs - are important factors boosting cassava roots production.

In Sentul, there are 10 starch enterprises, while the only starch enterprises in Bogor City are located in Cimahpar. These two villages are cradles of starch processing in West Java.

1 - Traditional starch processing in Bogor district: competitiveness based on quality

The starch-processing industry in the research area is based on several elements, related to:

- Raw materials:

- Closeness of abundant clear water (springs),
- Availability of cassava roots of the desired quality;

- Workforce:

- Local skills, (traditional local knowledge)
- Local and cheap labour force,

- Service facilities:
 - Transportation facilities
 - Close markets (close to Jakarta and Bogor).

These elements explain why small starch enterprises are located in north Bogor.

The competitive power of the enterprises in north Bogor relies on their high-quality production obtained through low cost labour, and the workers' local skills in starch production⁶. High quality also relies on a short time from harvesting the roots to processing them (because of fermentation). This calls for a well-organised supply of roots within relatively short distances from the processing plants. That is why starch processing in Bogor relies on the closeness of cassava roots production, and also why cassava roots supply in the research area will inevitably find their demand.

This quality characteristic enables Bogor District to compete with one of the main tapioca producer in Indonesia, Lampung, where production is based on the low cost of production and quantity.

2 - From cassava growers to starch entrepreneurs

Strong vertical relationships are dominant within the cassava agro-food system in the research area. This dependence on the next level is one of the major constraints for all producers and is also an important factor encouraging cassava production.

There are two ways for the entrepreneurs to buy cassava roots: directly from the producers or indirectly from go-between traders, who have a bulking function. There is a tendency for farmers to sell directly to a starch entrepreneur when both the field and the enterprise are quite close, and to sell to a go-between when the cassava grower's field is located further. However, the smallest enterprises are more used to buying the major part of the raw materials they need from the close local growers. They can benefit from their closeness to the growers and often don't need to buy by the intermediary of a trader. The smaller the enterprises are, the more they buy the raw material directly from the growers (since their size can't allow them to pay go-between's additional costs). In both villages of Sentul and Cimahpar, where there are several starch enterprises, most of the interviewed cassava growers are used to sell their production directly to a close starch entrepreneur. Most of the time, they sell to the same one, (*langganan*).

This practice - selling to the same buyer - is due to the **loan system**: the promises made by the cassava grower to sell his production to the starch entrepreneur or to the trader who lend money to him stands for the guarantee. For small cassava growers, who most of the time have no access to the banking system, nor to credit institutions (since *KUD*⁷ is no more efficient in either village), this system favours the choice of cassava production. Farmers are used to borrowing 50 000 to 200 000 Rp a year, but the most frequent sum is 100 000 rupiah. They borrow money when they are about to plant the cassava, and then give it back to the starch entrepreneur at harvest time. Most starch

⁶ Koeslag, A., *The resilience of a rural small-scale industry. A case study of the cassava starch-processing industry in Kedung Halang sub-district, Bogor district, West Java, Indonesia.* 1997

entrepreneurs don't take any financial interest and only want it as a guarantee to be the buyer of the farmer's production. Still, some starch entrepreneurs ask for interest: in this case, if the price of the roots should be 450 Rp / kg, the starch entrepreneur will pay back 400 Rp / kg only.

As a matter of fact, there are two kinds of starch entrepreneurs: those who are able to be moneylenders for farmers, and those who cannot. For the first category, it is a way to ensure the access to the raw material they need. The second category might suffer acutely from a lack of raw material when production decreases (in the rainy season for example).

In turn, the starch-enterprise (smallest ones are mainly affected) has a problem of cash availability (to pay back the growers and the workers). Then, as A. Koeslag asserts (but the present study did not notice this practice), sometimes, when growers accept so, the entrepreneurs may pay the growers two days late (after they have bought the roots), so that they can sell their own production to the tapioca mills and get enough cash to pay back the roots producers. In that case, the growers are paid a little more, as a credit.

These two practices may push farmers towards the choice of cassava plantation. It is also a good way for other people who want to have an agricultural activity to find the needed capital for input investments. Moreover, it remains difficult for farmers to cultivate another kind of crop because they all are used to it, since there is a local skill for cassava cropping. Therefore they continue planting cassava because they don't want to take the chance of trying another kind of crop⁸.

The buyer (intermediate trader or starch entrepreneur) mostly handles peeling and transporting cassava roots. Hence, the farmer does not have to handle this cost.

I.2) The demand from tapioca mills is quite sure

Demand for roots from starch enterprises depends in turn on demand for coarse starch from tapioca mills that will process it into fine tapioca flour. Starch entrepreneurs directly sell their product to tapioca mills and are sure their production will be bought since demand for tapioca is quite sure and since some tapioca mills use a stock system.

Outlets for tapioca flour are very numerous: krupuk, biscuit industry, fresh and dry noodles, textile industry, binding element in pharmaceutical products, adhesive in paper and plywood manufacturing, « Asian flour » (made from dry residue onggok, and used for traditional food stuff making)... Diversity of tapioca uses partly explains the high demand for tapioca and then for starch and cassava roots. Concerning Bogor District, the tapioca produced from the coarse starch is a high-quality product for which demand rises with rising income levels. Thus income elasticity of demand is relatively high. That may be why there was a steady or increasing demand from tapioca mills during the 1990's.

⁷ KUD : Kooperasi Unit Desa, institutional system aiming at furnishing inputs or credit at lower costs for farmers.

Moreover, the supply of tapioca is quite steady thanks to a stock system in some tapioca mills, (the importance of this system among tapioca mills still has to be studied). For example, in one of them, in 2001-2002, 500 to 600 tonnes were processed a month, while 800 to 1000 tonnes of starch is permanently stocked. It is a way for this tapioca mill to regulate its supply and also makes it never refuse starch.

I.3) Determination of prices and levels of demand for tapioca and roots

Depending on supply and demand at each stage of the agro-food system, prices of tapioca, starch and roots are related both to a top-down and a bottom-up logic, though the former seems to prevail.

The determination of the **prices and of the levels of demand for tapioca** depends on the whole tapioca market in Indonesia, (top-down logic), and mostly from Lampung production. The local government of Lampung province launched a special programme called «The Community-owned Cassava Starch-Industry», since 1998, to increase the demand for cassava⁹. This programme (based on the fact that an increase in demand will call for production growth) reinforced Lampung province, becoming the main tapioca-producing province in Indonesia. Contrary to West Java, which has a labour intensive processing system, it uses a much more « industrial » and modern processing method (use of ovens to dry the starch). Thus, demand from enterprises using tapioca as an intermediate product (krupuk, biscuit industry...) toward Bogor tapioca mills depends more and more on the price of tapioca in Lampung which, as the most important producer, carries the heaviest weight on prices: if the tapioca price is low in Lampung, it will lead to a decrease in Indonesia as a whole. However, a production decrease in Lampung may also reduce the influence of Lampung on prices so that other producers (West and East Java) may carry more weight.

The price of tapioca will then pass on to the **price of starch**. The latter also depends on the quality of starch, which is lower during the rainy season because the drying process is more difficult. From September to January, the price of starch is most expensive, (since quality as well as production of roots decrease), while from January to August, the price is lowest (roots production increases as well as starch quality). Even though market conditions are favourable, coarse starch small-scale industries are widely dependent on a few tapioca mills that determine starch price. Tapioca mills master all decisions on price, quantity and quality (according to their own situation of dependence on the tapioca market). Hence, starch industries have no bargaining power since they make an intermediate product that has no other outlet but tapioca mills.

In turn, as regards to the determination of **cassava roots prices**, it depends on a compromise between three elements:

⁸ Interview with Pak R. Hasibuan, Kasi Tanaman Pangan, Dinas Pertanian Kodya Bogor

⁹ Nasir Saleh, Koes Hartojo and Suyamto, in *Cassava's Potential in Asia in the 21st Century: Present Situation and Future Research and Development needs*, Proceedings of the Sixth Regional Workshop held in Ho Chi Minh City,

a - The structure of demand for tapioca at a national level

If demand for tapioca at a national (and international) level is higher than supply, the decrease in prices for tapioca will pass on to the prices of starch paid to the starch entrepreneurs. An increase might have a repercussion as well, since tapioca mills try to compete by attractive prices paid to starch entrepreneurs.

b - The availability of raw materials (and its proximity)

At a local level, the price of cassava roots depends on three main elements: the total amount of roots produced, the season and transport access or proximity between producer and buyer.

The price is governed by the total amount of roots produced (so any improvement in productivity might not inevitably increase farmers' incomes). Hence, any decrease in price can be perceived as an indicator of limited demand and any increase as a lack of raw material. So, the most important limiting factor for production growth is not only the demand, as asserted in *Cassava's Potential in Asia in the 21st Century: Present Situation and Future Research and Development needs*¹⁰, but also the conditions enabling the cassava crop. The next section will analyse two of them - land tenure and land use - which are particularly influencing the cassava crop in the research area.

Total cassava roots production has influenced price tendencies throughout the years, but also within a single year, since the amount of cassava roots produced varies from one season to another: there is a peak during the dry season, and a trough during the wet one. Hence, during the dry season, prices are lower than during the wet season when the enterprises compete to buy the local cassava roots. The difference in price between the two seasons is currently in about 200 Rp / kg.

Indeed, local cassava roots are more profitable since they enable a low cost of transport, and a short time from extraction to processing. This is the third reason why prices may vary from one place to another. When production is located far from transport access (road), the intermediate trader or the starch entrepreneur will pay less than if production is located close to the road. That is why for example, the price of cassava paid to the producer is likely to vary between the Kotamadya and the Kabupaten Bogor.

c - Quality of roots, based on the starch content in the tubers.

At a producer level, price may also be determined according to the quality of roots. Very precise criteria are used: freshness, firmness, colour...

Vietnam, February 21-25, 2000, organised by the Centro Internacional de Agricultura Tropical (CIAT) and the Institute of Agricultural Sciences of South Vietnam (IAS), R.H. Howeler, S.L. Tan Editors, September 2001

¹⁰ Nasir Saleh, Koes Hartojo and Suyanto, op. cit. p 10

Top-down logic	Bottom-up logic at a district level
International prices	Total amount of tapioca produced and quality of the tapioca
National prices (mostly set by Lampung)	Total amount of starch produced and quality of the starch
	Total amount of cassava roots produced and quality of the roots

Table 1: A top-down and a bottom-up logic influence determination of prices for tapioca, starch and roots.

Thus, definition of prices is a vicious cycle: the small starch enterprises are dependent on the tapioca mills to determine the price of their production. Tapioca mills are dependent on the starch market, and cassava growers are dependent on small starch enterprises to determine the price of their roots. The small starch enterprises have no bargaining power in the face of tapioca mills¹¹.

A price increase depends on the condition that demand is larger than supply. That is what happened in the 1990's, when the trend of cassava production was a decrease, while the demand from tapioca mills and for starch remained steady. Bogor cassava roots production is now insufficient to satisfy tapioca mills demand, creating a good opportunity for cassava growers.

¹¹ KOESLAG, A., op. cit. p 9

II. EVOLUTION OF LAND USE AND LAND TENURE

In Bogor District, soil characteristics and the urbanization spread have first determined land use patterns. The east part of Bogor is the most fertile, initialising rapid development before the 1970's. Then, the impact of the Bogor-Bandung corridor also led to rapid urbanization since the 1980's. The north part of Bogor is under the strong influence of Jakarta City wide spreading. The west part of Bogor is not fertile and was mostly used for tree crop plantations (hevea). That is why the possible spreading of agriculture and urbanization is now turned towards the extension along the Bogor-Bandung road, and the west part of Bogor. The map in appendix 7 shows these dynamics. Bogor District is part of the Jabotabek region, which encompasses Jakarta City and the three main urban centres around it: Bogor, Tangerang and Bekasi. Hence, it is subject to the same trends in urbanization. The research area is also suffering from one of the strongest pressures on land.

This description is based on the observations in Sentul and Cimahpar and tends to explain why there is no other commodity but cassava and why there is a permanence of traditional cassava crop in the area. It shows how land use toughly reduced agricultural area but how paradoxically, land tenure patterns from the 1970's to the 1990's created a very encouraging opportunity for short term, wide cassava plantation.

II.1) Land tenure

Who land belongs to and to what extent land tenure determinates the farmers' choice of cultivating cassava rather than another crop? This part will show that Sentul and Cimahpar offer two different patterns of land tenure, producing different effects on cassava plantation.

1- From the 70's to the late 90's: from farmers to enterprises

The interviews completed in Sentul and Cimahpar show the importance of land trade from the 1970's to the present with two main waves: the first in the 1970's and the second in the 1990's. However, they seem to have been more numerous in Sentul and involving different actors in Cimahpar.

It is necessary to first describe the tree types of price existing for land, a special commodity on the market:

- « harga dasar tanah »: price determined by the government; the land is bought for social purposes (building a road, a sport area...); this price is generally the lowest;
- « harga NJOP » (Nilai Jual Obyek Pajak): this price includes the tax paid on the land by the owner, (the higher is the tax, the higher the price of the land);

- market price: price spontaneously determined between the buyer and the seller; there is no existing law to regulate these transactions, prices have no limit.

All kinds of prices depend on the accessibility of the land. They partly explain the power of all stakeholders in land transactions.

The first wave of land transactions started in the early 70's, with the project of the highway. The farmers sold Land to Bina Marga (government services), who bought it at a very low price. Indeed, Bina Marga bought the land using the « *harga dasar tanah* ». Then from Bina Marga, it was sold to different kinds of private actors: Jasa Marga in charge of building the highway (starting in 1978), Tommy Soeharto (who built the circuit, and also owns a large part of the land around it), enterprises (cement, shoes...).

In the 1990's, the transactions continued, involving directly or indirectly, private buyers (persons and enterprises). These transactions were mostly determined by the market price. However, in the transaction process, the frequent commitment of municipality must be noticed since the village chief has to check farmers' and sellers' property certificates. This practice lets the municipality employees a *zone d'incertitude*¹², that is to say an uncontrolled margin where they can freely turn a situation to their advantage. The intermediation of the municipality was observed in Sentul as well as in Cimahpar. In the west part of Sentul, for most transactions, the village chief, who now owns himself on average 130 ha, acted as an intermediate trader between farmers and enterprises.

These transactions may aim above all at making money, since the price of the land in the suburbs increases more and more every year (in this case, land is a special commodity on the market and since it won't stop increasing until it has reached its maximum, that is to say when no more facilities may be added, in other words, when it becomes a town).

Now, according to the municipality office of Sentul, enterprises own almost 75 % of the total surface area of the village while the last 25 % is dedicated to agriculture (almost 15 %), and housing (10 %).

During the land trade process, several pressures hung over farmers, even if it remains impossible to know in what proportion. Sometimes they might have been impressed by shows of force (in the 1970's), while in the 1980's and 1990's, threats were more «economic»: some farmers sold their land because they believed in the rumour that public services were about to buy land in their area (in this case, farmers have no negotiation power at all and have to sell to a low price, *harga dasar tanah*), they therefore preferred to sell to an enterprise, likely to pay more. Some farmers also argued that once their neighbours had sold their land, they could not stay alone surrounded by enterprises' land (this is understandable regarding the irrigation systems for paddy, that needs a collective management).

Farmers carry very little weight in land trade negotiations in both villages, what already underlines their being in a vulnerable position. They still received advantages from the transactions

¹² According to the french concept stated by M. Crozier and E. Friedberg, (*L'acteur et le systeme*).

(as seller), as different uses of money received from the sale of a plot of land proves. These advantages may be:

- **economic**, by preserving their main production means as farmers. In Sentul as a whole, farmers would use the money from the sale to buy land in another part of the country. They purchase land in another area (Cimayang, Leuwiliang) where the price is cheaper, « *jual satu di sini, dapat dua di sana* » (« You sell one here you will get two there »).

In East Sentul, those who sold their land in the 70's and 90's used the money to buy or build houses to rent to the in-migrants working in the factories close by.

They may also receive a short-term advantage by going on cultivating the land they no longer own. They will still get the product of the land, without paying its eventual costs, but, overall, making money from it.

They may also be employed as workers in the enterprise they sold land to. In Cimahpar, one of the most important housing projects (built in the early 1990's) gave a priority to employing people who had sold their land to the project. These people (about 300 persons), mostly women, were employed as gardeners, cleaners, surveyors... But the enterprise is now decreasing the number of its labourers.

Savings may be another economic strategy, but this phenomenon would need deeper and longer research to understand and measure its importance in the two villages. People remain very mute on this matter, as well as on everything touching land trade (mostly when the interviewed benefited from the transaction or if he does not want to denounce someone else).

- **social and religious** : selling land is a way for Muslims to quickly find a large available amount of money to pay the trip to Mecca, where they have to go at least once in their life.

To sum up, land tenure has evolved in the following ways:

Sentul:

Farmers -----> Bina Marga / Village chief -----> Private owners (Jasa Marga, Tommy Soeharto) and enterprises

Cimahpar:

Farmers -----> Bina Marga / Private purchasers -----> Private owners and enterprises

A first observation is that farmers have few opportunities to carry weight on sales decisions as well as on price transactions. Economic as well as political power benefit from their position, while the law has few impacts on stakeholders behaviour.

A second observation is that this land tenure pattern may push towards the permanence of cassava in the area for several reasons. Firstly, farmers do not want to invest on a crop planted on a

land they don't own and from which there is a risk of being evicted. Secondly, enterprises or private owners don't plan to use the land for agricultural purposes anymore. Thus, they don't mind if it is planted with a crop draining the resources of the land and decreasing its fertility.

2- *Cultivating land owned by someone else: an ancient phenomenon*

When the fact of cultivating land owned by someone else is not linked to the crisis, there are several types of land access for farmers, which already existed, before the economic crisis.

a - Cultivating land owned by someone else is an ancient phenomenon to the extent that private owners ask for landless farmers to cultivate their land.

There are four cases like this in Sentul and none in Cimahpar. Whatever the year of first cultivation by the farmer may be, the system remains the same: the land is confided to a farmer's safekeeping (*ditiip*). Farmers were asked to cultivate the land. There is only one case of a waged worker who cultivates a land *ditiip* (he receives his wage twice a year). This practice is meant for the private owner to be sure that his land won't be spontaneously occupied by growers he cannot control.

b - Cultivating land owned by someone else is an ancient phenomenon since the fact of cultivating land owned by enterprises has existed since the beginning of the 90's.

In Sentul, on a total amount of 18 plots of occupied land (*tanah garap*), 7 (that is to say 39 %) started to be cultivated since the 90's (and before the crisis). Among them, only one is owned by a private owner, all the others being owned by an enterprise.

c - Sharecropping 1/3 system

This system is dominant in Cimahpar (out of 16 plots of land which are not owned by the cassava grower, 11 are subject to the traditional sharecropping system 1/3 »). This system still exists in Sentul, however, in a very small proportion (one case of traditional sharecropping).

3- *Land tenure definitions*

These observations lead to the necessity of defining all types of land tenure that are present in Sentul and Cimahpar. A previous agreement on what is «land which is not owned by cassava growers» is fundamental. Two categories of this kind of land are identified: land «informally» occupied and land rented or used by cassava growers in a more traditional way, even though the criteria of « informality » remains a little bit confusing. That is why a specific identification of this criterion in the case of these two definitions will be proposed. « Informal » will mean, in this report, that the agreement between two parts (owner and farmer) has been reached afterward and that there is no financial relationship between them. An intermediate person between the two stakeholders, if there is, perceives a payment. The level of the perceived amount of money is determined by the spontaneous adjustment of supply and demand of land. But the criteria of ' informality ' for the first case (land ' informally occupied ') do not mean that the second case (land rent by cassava cropper or confided to his safekeeping in a more traditional way) is exactly « formal »: let us just say that there is

a direct agreement between owner and farmer, corresponding to a more traditional pattern of land renting.

These differences are important in the extent that they enable to establish a certain level of security in land tenure for the farmer. His probability of being evicted may be higher if he is a « land occupier » than if he has a direct agreement with the owner. Besides, the land occupier won't invest in land intended for other purposes (industry or real estate) or he ignores the intended purpose of which and the time when the owner will use it. Contrary to him, the « traditional land renter or land safe keeper » may benefit from the investments or the attention of the owner (he is not likely to be evicted during a season since most of the time, the owner gets a share of the product).

Therefore, in this report, the words « unused land » or « occupied land » will stand for the translation of the Indonesian words *lahan tidur* (or « sleeping land ») and *garapan*. Even though these words would suggest that this kind of land has remained unoccupied for some time, it has not always been the case. Actually, *lahan tidur* means that the land is not used yet for the purpose intended by its owner. For example a real-estate enterprise has bought land but still has not built on it. As shown in the case of Jasa Marga, *lahan tidur* also encapsulates the land left intentionally empty. It is also the case of golf fields in other parts of Bogor suburbs. Other general characteristics may be identified for this kind of land tenure: most of the time it is owned by an enterprise and the acreage per farmer does not exceed 0,5 hectares.

The second situation (land rent by cassava grower or confided to his safekeeping in a more traditional way) encompasses two types of land tenure. First it encapsulates plots of land owned by private owners but not yet used (would it be because of the meantime of the transaction if the owner wanted to speculate or because the owner did not use it yet as he plans to). These lands are *ditiip*, confided to a farmer for safekeeping, often in a free way. The second type is a traditional sharecropping system (*bagi hasil* or *paro*): the farmer has to give back to the owner part of his production. Even though farmers often use the Javanese term *paro*, originally meaning that the production is split into two equal parts, they actually mean that a third of the product is received by the owner while the remaining two thirds are for the farmer. Just like for the « occupied land », other general characteristics may be identified for this kind of land tenure: most of the times it is owned by a private owner and the acreage per farmer is larger than 0,5 hectares.

<p>« Unused » or « occupied » land</p> <p><i>Lahan tidur</i></p>	<p>Traditional system</p> <p>Land <i>dititip</i> (confided to a farmer's safekeeping) or sharecropping <i>bagi hasil</i></p>
<ul style="list-style-type: none"> • Spontaneous occupation and agreement on payment reached afterwards between farmer and payment perceiver. • Mostly owned by an enterprise • Informal payment to an individual or free use • Less than 0,5 ha • High eviction risk 	<ul style="list-style-type: none"> • Previous agreement between owner and farmer • Mostly owned by a private owner • Sharecropping or free use • More than 0,5 ha • Lower eviction risk

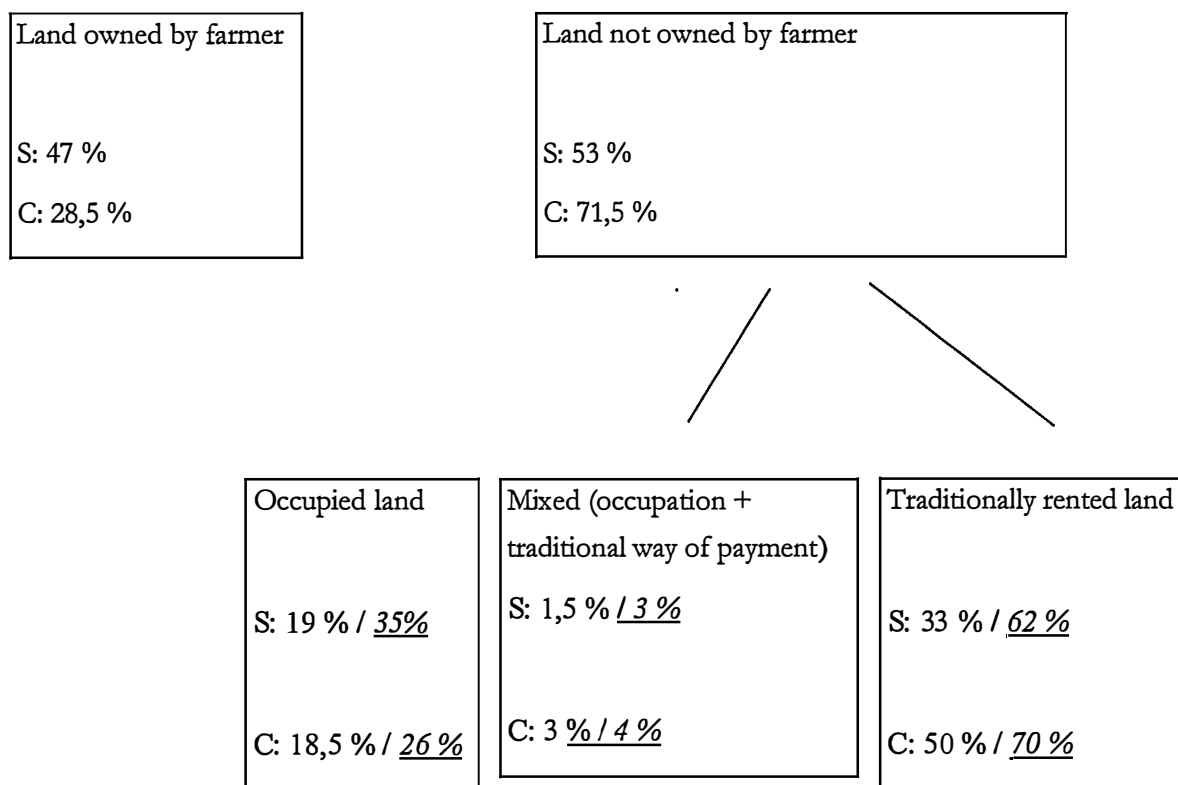
These definitions enable to design the pattern of land tenure before the crisis:

- **Permanence** of previous traditional practices: land confided to a farmer's safekeeping or rented by a sharecropping system (a third of the product is directly perceived by the owner);

- **Superposition** of practices: two cases in Sentul mix the two previous definitions, since there is occupation of an enterprise's land but a third of the product is paid to an intermediate person (occupation and traditional). There is only one case in Cimahpar.

- **Emergence** of new practices: informal occupation with payment to an intermediate person or free using.

Schematic view of land tenure in Sentul and Cimahpar:



Legend:

Percentage of the land used by cassava grower for agricultural purpose in Sentul S (18.82 ha) and in Cimahpar C (17.15 ha)¹³.

Percentage of the land used but not owned by cassava grower for agricultural purpose in Sentul S (10.06 ha) and in Cimahpar C (12.25 ha).

As regards the 25 stakeholders interviewed in Sentul¹⁴, out of the 19,58 ha they use for agricultural purposes (excluding land owned by stakeholders in other villages), 9,52 are owned (49%), while 10,06 are not owned by the stakeholders (51 % of the total land they use for agricultural purposes). Now considering only the 21 cassava croppers' points of view, who represent 18,82 ha used for agricultural purposes in Sentul, 10,06 ha are not owned by the farmers (that is to say 53 % of their total cultivated area). Owned land represents 8,76 ha of land used by cassava growers for agricultural purposes, (that is to say 47 % of their total cultivated area).

¹³ These figures exclude a special private owner who owns 20 ha (Bu Ohom). She is not representative since she may be the only owner owning a very large surface area and who is still a cassava grower.

¹⁴ excluding the two enterprises and including Pak Musa and Pak Mongkas who were not interviewed with questionnaires but who cultivated on unused land during the crisis.

As regards all stakeholders interviewed in Cimahpar¹⁵, among the 37.15 ha they use for agricultural purposes (excluding land owned by stakeholders in other villages), 24.9 ha are owned (67%), while 12.25 ha are not owned by the stakeholders (33%). These figures include a special private owner who owns 20 ha (Bu Ohom). Excluding this stakeholder who is not representative of farmers, the number of cassava growers is 14, representing 17.15 ha of land used by cassava growers for agricultural purposes. 12.25 ha are not owned by farmers, that is to say almost 71.5 % of their total cultivated area. Owned land represents 4.9 ha (excluding Bu Ohom), on average 28.5 % of total cultivated area. It must be noticed that only 3 (out of 14) cassava growers own 28.5 % of the total area cultivated by farmers.

In Cimahpar, the closest village from Bogor, 71.5 % of the cultivated land is no longer owned by farmers, while in Sentul, 53.5 % remain on their own property. Not enough data is available to explain who are the current owners of the land in Cimahpar (except enterprises) and what are their intentions, when they acquired the land.

On the land used but not owned by farmers, the two villages have different patterns concerning land tenure. **In Cimahpar, sharecropping is dominant**, concerning almost 70 % of the land used but not owned by farmers, (since most of the owners are private) and involving 8 sharecroppers (out of 14 cassava growers). They generally cultivate a large surface area (on average 1 ha). In Sentul, farmers who are subject to the « traditional system » also use the most important share of the land used but not owned by farmers (62 %) whereas they are only 4 (out of 21 cassava growers). In their case, as regards to surface area, sharecropping is in the minority while land *ditiip* is dominant (4,75 ha). As regards the number of farmers involved in each type of land tenure, **occupation is dominant in Sentul**. Fifteen farmers are land occupiers (including « mixed » category), that is to say more than 70 % of them. They occupy on average 0,25 ha, which is a quarter of the sharecroppers surface area in Cimahpar and 6 times smaller than the « traditional system » in Sentul.

4- Is there an influence of land tenure on the cassava crop?

SENTUL:

Within the 10.06 ha which are used but not owned by farmers, 9.81 are cultivated with cassava (i.e. 97.5 %). Within the 8.76 ha of land owned and used by cassava growers for agricultural purpose, 4.34 ha are cultivated with cassava (i.e. almost 49.5 % of owned land used by cassava growers is for agricultural purposes). In total, 75 % of the land used by cassava growers is planted with cassava.

The Sentul pattern of land tenure suggests that land property has a deep influence on the cassava crop to the extent the land which is not owned by the farmer is much more likely to be cultivated with cassava rather than to be used for another agricultural activity. Furthermore, 100 % of the occupied land (which is the most vulnerable land status for a farmer) is cultivated with

¹⁵ Including Pak Suminta who is now a landless worker but who has cultivated cassava on the highway banks from 1996

cassava. Therefore, the fact that there is a high risk for the farmers to be evicted may push them to cultivate cassava, (even if it is not the only push-factor as the analyse of land use will show).

CIMAHPAR:

Within the 12.25 ha which farmers do not own, 7.35 ha are cultivated with cassava (i.e. 60 % of the land not owned by farmers) and 0,6 ha planted with papaya (i.e. on average 5 % of the land not owned by farmers), which is the second most important crop in Cimahpar. Within the 4,9 ha of owned land (excluding Bu Ohom), 1.7 ha is planted with cassava (34,69 % of owned land), while 1,2 ha is planted with papaya (24,5 % of owned land). Thus, 52 % of total land used by cassava growers for agricultural purpose is planted with cassava (9.05 ha) while 10.5 % is planted with papaya (1.8 ha).

In Cimahpar, there is no association between cassava and papaya. Both are cultivated on a particular plot of land. Owned land is more likely to be planted with papaya (which is a long term tree crop), while cassava is planted on land that is not owned by farmers. The correlation between land property and type of crop is also proved by the case of a farmer, cultivating 3 hectares owned by someone in his family. It can be supposed that this family relationship greatly reduces the risk for him to be evicted. On this land, he favoured tree crops plantations (palm trees, fruit trees) and pisciculture. The 0,5 ha he planted with cassava are owned by an enterprise. He adds: «when planting cassava, soil quickly becomes unfertile and that is why I cultivate cassava on someone else's land»¹⁶.

Moreover, comparing the two villages, we may conclude that in a traditional sharecropping system or when the land is owned, agriculture is more diversified (papaya, pisciculture, taro, a few paddy...), while where the occupation phenomenon is dominant, cassava monocrop is also dominant.

The second part of the report will show that the crisis has partly reinforced the so-called « traditional » practices as well as the way land is « informally » occupied. Let's see before how the pattern of land tenure not only changes the whole suburban landscape but also has an influence on the agricultural land use.

II.2) Land use

Concerning cassava plantation, land use changes from the 1970's to the 1990's had both positive and negative effects: positive because the better transportation system brought by urbanization has been an important factor of the competitiveness of starch and tapioca enterprises

to 2001.

¹⁶ « Tanah jadi cepat rusak kalau tanam singkong, karena itu saya garap singkong di tanah orang lain ».

and negative because of the reducing agricultural land and of water becoming scarce and contaminated. The first point describes the shift from agriculture to industry and housing while point two shows how agricultural commodities shifted from paddy to cassava.

1- From agriculture to industry and housing

Each village, Cimahpar and Sentul, provides a good example of land use change through the main projects that were built there in the early 1990's: Cimahpar which is located closest to Bogor was subject to a 80 ha housing project (part of which was inside the village boundary) while a 100 ha industrial complex project was built in Sentul (60 % of which inside the village boundary).

The pattern of land use in the research area enables to say that it is part of a *desakota* region, as defined by Mc Gee (1987). As a process, this concept highlights the characteristics of this type of Asian region « that are neither rural nor urban and combine some of the features of both types of area into a continuously changing symbiotic relationship ». A *desakota* region « encompasses both the city itself, with typical urban land use and associated compact and densely settled on sprawling areas that are closely enmeshed with the urban economy. During this process, the countryside is urbanized without the hinterland population necessarily moving to the city. Rural economics and lifestyles become submerged under the expansion of urban economic activity and culture, but do not disappear altogether. (...) Mc Gee describes *desakota* regions as previously agricultural areas with an intense mix of settlement and economic activity, comprising agriculture, industry, housing development and other land use »¹⁷.

North Bogor became a *desakota* region between the 1970's and the 1990's, while Jakarta reached the status of « global city » as argued by T. Firman (1999). « The formation of 'global cities' in Asia is reflected in urban economic and physical restructuring in the cities including: (1) the development of economic activities on a global scale; (2) division of function between the core and periphery in the city; (3) shifting from a single core to multi-cores of the metropolitan region; (4) land use change in the centre and agricultural land conversion in the periphery; (5) development of large-scale urban infrastructure, (...); (6) substantial increase in space production; and (7) high growth in the number of commuters and increases in commuting distance and time »¹⁸. Bogor became one of the cores of Jakarta Metropolitan region (just as Bekasi and Tangerang). The map of land use changes in appendix 12 shows the important expanding urbanization in the Jakarta-Bogor corridor from 1972 to 2001. While Jakarta's function shifted from being the centre of manufacturing activities to the centre of high added value activities like services and finances, industrial and housing activities have moved to the countryside.

Now with Jakarta becoming a megalopolis, « the more affluent classes are moving into the surrounding countryside to escape the social and environmental consequences of excessive

17 Rustiadi, E., Panuju, D.R., A study of spatial pattern of suburbanization process : a case study in Jakarta suburb. In Himiyama, Y. (Ed), Land use change in comparative perspective, Pre-congress meeting in Tsukuba, 8 August 2000

¹⁸ Firman, T., *From 'global city' to 'city of crisis' : Jakarta Metropolitan region under economic turmoil*, HABITAT INTL. Vol. 23, N°4, pp 447-466, Elsevier Science Ltd., 1999

concentration »¹⁹. This is one source of demand for **housing** on Jakarta's fringes. The second one comes from in-migrants moving out from Jabotabek to Jakarta suburbs to work in the new factories. Regarding land, housing is a very demanding activity since until 1997 the rate of acreage to build a house was 100 m². (It decreased to 70 m² in 1997). Housing is more visible in Cimahpar than in Sentul since an 80 ha project was built in south Cimahpar in the early 1990's.

Land use changes contributed to agricultural surface area reduction, including cassava plantation. Indeed, starting from 1973, the cassava production system in Indonesia has shown a declining annual growth rate for the harvested area (- 0,41 %), (indicated values are trend only)²⁰.

However, as an example of the anarchical way land was acquired and the land use determined, the BAPEDA (development planning agency) planned to dedicate 20 000 ha to housing in Bogor District. Actually, it only gave land use authorizations (*ijin lokasi*) between 1994 and 1997 to enterprises which had already acquired these 20 000 ha of land starting 1993-1994. We can call that retroactive planning. Theoretically and chronologically, an enterprise should ask for authorization by the government, *Surat Keputusan (SK)*, to the PEMDA (*Pemerintah Daerah*). It authorizes the enterprise to acquire a limited surface area (no more than 20 or 30 ha) for a determined project. That is why an enterprise will actually be an association of several different enterprises in order to bypass the law and buy a larger surface area dedicated to one same activity.

However, as a matter of fact, only 5000 ha of the 20000 ha dedicated by BAPEDA to housing in Bogor District are already built on today, meaning that the 15 000 ha left are *lahan tidur*, remaining unused. According to the BAPEDA Kabupaten Bogor, 1000 ha a year are built on. That is why we can say that *lahan tidur*, most of which is used for cassava plantation, still has 30 years before its total disappearance.

Though land use had negative effects on cassava plantation in north Bogor, it also had a positive one. To Arjan Koeslag, the building of the Jagorawi Tol in the early 80's stimulated a good accessibility and use of the services provided, very favourable for the transport of cassava roots to starch enterprises and starch conveying to tapioca mills²¹.

2- From paddy to cassava

In the 70's, land was mostly cultivated with paddy, the main Indonesian food crop, benefiting from government's support. According to their localisation, farmers started in 1970 to the late 1980's cultivating paddy every single season, planting cassava in the meantime. Then in the 1990's only cassava remained.

From the 1970's to the end of the 1990's, the shift in land owners and therefore in land use had a major consequences as regards to water:

¹⁹ Rustiadi, E., Panuju, D.R., *ibid*.

²⁰ Nasir Saleh, Koes Hartojo and Suyamto, *op. Cit* p 10

We don't know if these figures only consider legal exploitation.

²¹ Koeslag, A., *op. Cit*. P 9

- degradation of the water quality due to river contamination by some enterprises. (It is not impossible that starch enterprises contribute to water pollution since they use springs water to wash and crush cassava roots and then throw out the waste to the rivers).

- degradation of the water access: some rivers were hidden in the soil (embankment), destroying the irrigation system for sawah. According to the farmers and different Tokoh Masyarakat, enterprises willingly acted this way in order to bypass the law, as they knew the agreement (*kebijakan polis*) of the government preventing them from eradicating *sawah* (1994): no irrigated land can be used for other purposes. Thus, the enterprises closed the water access so that the land became dry and they could buy it for non-agricultural purposes. A third cause led to bad water access in Sentul and Cimahpar: the abandonment by the *Pekerjaan Umum* (public services in charge of irrigation maintenance in each village) of the irrigation system. The municipality office is in charge of the *PU*. It is supposed to have been deeply committed to this strategy because municipality employees could easily act as intermediate land trader this way.

Thus, here is the way land use evolved:

Sawah (irrigated land, mostly cultivated with rice) 1970's -----> 1980's dry land (cassava) -----
----> housing, industry or unused land (cassava) 1990's

Therefore, second and third stages are favourable to cassava plantation.

Lack of water and the destruction of the irrigation system led to the abandonment of paddy for other commodities. However, with such a lack of water, the choice between commodities was not that large since horticulture and market gardening commodities demand good water access.

A lack of water combined with a change in land status can be regarded as the main reasons for the cassava crop in Sentul. As people who cultivate the land are not the owners, and as the risk for them of being evicted is very high, they won't invest in this exploitation. They will choose a commodity that is not too demanding as far as production costs are concerned: no irrigation needs, few fertilizers, little work. In Sentul, land tenure patterns add low costs for land exploitation.

From the 1970's to the late 1990's, there was a slow acquisition of the land by enterprises in Sentul and Cimahpar, even though in Cimahpar, not only enterprises but also private owners purchased land. Hence, the lack of security and knowledge on the terms until which time the farmer can use land may push them to cultivate a low investment crop like cassava. Moreover, the lack of water due to the change in land use prevents them from cultivating paddy or other garden crops. These conditions are favourable to the existing cassava processing industry, which suffer from a lack of raw materials in close proximity. This phenomenon ensures to cassava croppers an outlet, as well as, for some of them an access to a loan system guaranteed by selling their production to the money lender starch entrepreneur. All of these dynamics - land tenure, land use and traditional starch processing - the first one reinforcing the second one, are the main explanation of the presence of large cassava monocrop fields in the area. If the main effect of land use towards cassava plantation is negative (because of the reducing agricultural land and lack and contamination of water), land tenure

tends to encourage it. However, it is already clear that this situation is a short-term opportunist system only deferring agriculture's disappearance. In this suburban area, and particularly in Sentul, cassava seems to be the last breath of a dying agriculture. This trend was highly reinforced by the break in acquiring land as well as in building on it during the crisis in the late 90's.

PART II.

FACTUAL FACTORS: ORAL PERMISSIVENESS ON THE OCCUPATION OF UNUSED LAND IN 1997 AND THE SUPPLY AND DEMAND FOR CASSAVA ROOTS AT THAT TIME

In July 1997, when the crisis pushed the whole country into economic and social turmoil, two factors led to widespread cassava plantation. The first one is related to the government, and indirectly reinforced the 1990's trend in land occupation, whereas the second one is directly inherited from the previous cassava production situation in the area.

I. 1997: ORAL PERMISSIVENESS FROM THE GOVERNMENT AFTER THE ECONOMIC CRISIS SHOCK

In July 1997, the economic turmoil pushed many Indonesians under the poverty line: while in 1996, 11 % of the population was classified as « poor »; this situation affected 20 % of the population after the crisis (40 million people). In an attempt to cope with this situation, the government decided to allow the cultivation of unused land through an oral decision (*kebijakan*).

As observed by T. Firman: « the Asian economic crisis has spatial impacts including: (...) growing unemployment, poverty and slowing down in-migration to the core urban regions; and growing amounts of vacant land, empty high-rise buildings, and partially finished construction projects »²².

The permissiveness from the government implies occupation by people of two types of vacant land, (*lahan tidur*): first type is land that is already formalized, meaning that it already has a purpose but this purpose is to remain « empty » (no industry nor any type of housing). It mostly encompasses landscapes for leisure and ornamental purposes (like golf fields, large gardens) or security purposes (highway banks). The second type of *lahan tidur* is land remaining empty because of direct crisis effects that led to a break in investments and in many economic and financial activities (enterprises had no more capital to invest or went bankrupt and had their physical capital confiscated by banks). Two categories may also be designed here: land planned to be built either for industrial activity or for housing, and land which is subject to speculation.

Indeed, the economic crisis put a stop to land trade and land use in the north Bogor area. No one bought any land during the crisis, even though many farmers wanted to sell at very low prices (from 50 to 20 Rp/ m²). The enterprises did not want to sell, because they would have lost money: money invested in land was more secure than in other kinds of investment or than if it was saved in the banks.

²² T. Firman, op. Cit., p 20

Besides the oral agreement from the government allowing people to cultivate the unused land, during the political crisis, people felt free to exploit different kinds of land²³:

- Forests: then started the illegal logging in Java, whereas before the crisis, it was only on the other islands;
- Plantation lands: many plantation companies owned large areas they did not exploit totally, so people started to cultivate on part of the land they own;
- Unused land: land owned by « P.T. », by Real Estate Perumahan, by different kind of enterprises, aimed at building houses or mills.

We can say that the cassava crop boom during the crisis took place in this dynamic.

In 1997, as reports Dinas Pertanian, people first planted cassava in vacant land close to the houses, and then when all the available unused land was exploited, they started to plant along the highway banks. The assertions on where the cassava « boom » started vary according to the different respondents. Dinas Pertanian has a more « technical » explanation, saying that it started where the oldest starch enterprises are located, i.e. in Cimahpar and Sentul, because of the closeness of the outlet. Some farmers have a « rural-urban » vision, asserting that it started in Cibubur, that is to say in the part of the suburbs most « connected » with the city, (meaning with policies and decision makers, knowledge...).

Into Bogor City boundaries, before the crisis, each farmer could cultivate on average a 3000 m² land, whereas after the crisis, this acreage increased by 10 %, i.e. 3300 m² per farmer. This 10 % are vacant land owned by real estate enterprises. Farmers first started to claim back the land. Then they asked for estate agents to let them cultivate the unused land, arguing that they owned it before and that because of the crisis, they needed it again. Therefore, they asked for the village chief and the estate agents' authorization to cultivate the unused land²⁴, but in each case, depending on the involved stakeholders, the process of vacant land occupation went along in different ways. This chapter aims at describing how the government's permissiveness was taken up at local level and what were the implications for the farmers. Hence, it will lay the emphasis on vacant land occupation processes.

²³ According to Pak Doctor Hernan Rustiadi, Dosen tanah in the Institut of Agriculture of Bogor (IPB), and to Pak Ervidodo (caser)

²⁴ Interview with Pak R. Hasibuan, kasi Tanaman Pangan, Dinas Pertanian Kodya Bogor

I.1) Its taking up and regulation at the local level

The taking up at the local level of the government's permissiveness was meant to lead to an agreement between the owner of the land and the farmer occupying the land. According to the situations and to the stakeholders involved, different meetings were reported.

1- Meeting organised by public institutions

The meeting organised by the Dinas Pertanian was based on the observation of a conflict between farmers, workers and landowners. The former argued the land was theirs, which had been taken up by the estate agents and were forced to claim the vacant land because they had no more land to cultivate. That is why in 1997, the Dinas Pertanian gathered several stakeholders in a meeting: Kepala Desa, estate agents and farmers. They all settled an agreement: the estate agents would get their land back when they needed it, but in the meantime, farmers were allowed exploit it²⁵.

BAPEDA organised another meeting (*Rapat Koordinasi Perencanaan*) in august 1997, to try to cope with the situation. Still, the conclusion of the meeting remains unclear. For sure, it was organised according to the current process of BAPEDA administration, corresponding to a mixture of « top-down and bottom-up logic », leading from villages to a national level through every administrative level (village, kecamatan, dinas, kabupaten, propinsi, country) and trying to involve all stakeholders who are concerned. This process is made up of a total amount of 6 stages, and is supposed to induce the participation of Tokoh Masyarakat (key-persons in the villages), villages chiefs, R.T. and R.W., enterprises, and different public services in the first three stages. We may suppose that fitting the current process of decision for « program and activities » (which usually concerns all type of fields: health, education..), the particularity of this question was bypassed. Actually, as far as Sentul is concerned, none of the people from the municipality or Tokoh Masyarakat attended the meeting. They didn't even know it happened.

2- Meeting organised by « key-persons » and enterprises

Agreements have existed since enterprises bought the land in the early 1990's. Farmers and other persons started to cultivate vacant land owned by enterprises, sometimes with the agreement of the owner, sometimes not. In Sentul, a Tokoh Masyarakat²⁶ went to every enterprise in the area to ask the boss if farmers could exploit the unused land they owned. There was also a meeting in 1992, (in Indocemen), in order to find an agreement to let the farmers use the land until the enterprises decide to evict them and to build.

In Sentul, another agreement was stated by an enterprise that tried to make it more helpful for the poor: theoretically, the poorest were allowed to cultivate enterprise's land. That is why some

²⁵ ibid

of them may then auto define themselves as « poor »: « before I had no land, I am poor »²⁷. But actually, not only « the poor » have a priority on cultivating vacant land.

3- The case of *Jasa Marga*

People spontaneously occupied the highway banks at the end of 1997 and started to cultivate them. Then *Jasa Marga* tried to regulate this fait accompli by giving the authorization for occupying this land for one season only (perhaps *Jasa Marga* company could not do anything since producers were too numerous).

The way *Jasa Marga* tried to formalize this spontaneous occupation was by making an inventory of all cassava growers along the highway banks. In total, 230 persons were inventoried this way. However, no kind of meeting was organised with public institutions. *Jasa Marga* only sent some of their employees into the villages to gather people and tell them *Jasa Marga*'s decisions concerning land use.

Cassava cultivation was allowed on the basis that growers intended their plantation for consumption only. In spite of the one season authorization, people went on cultivating. Then people from *Jasa Marga* realized that cassava was a cash crop rather than a food crop. Cassava growing was forbidden again in 2001 by putting signs along the highway banks, and by sending a letter to the local administration. One year later, in June 2002, *Jasa Marga* decided to destroy the cultivations to prevent people from continuing planting. Some cassava growers lost six month plantations this way.

The problem caused by spontaneous cassava cultivation on the highway banks is that *Jasa Marga* already has its own management system since it confided this land to another private company's safekeeping. This private company is allowed to exploit land with tree plantations intended to be sold (acacias) and ornamental plants to boarder the highway. Spontaneous cassava cultivation prevented this company from working on and managing the land from 1997 to 1999. The company also needs fertile soil to cultivate (which is threatened by cassava depleting soil resources). Moreover, there is a risk that cassava cultivation will damage security concerns along the highway.

I.2) The settlement

In Sentul, 17 farmers cultivate on land they don't own, called *tanah garap* or *garapan*, from a total amount of 25 farmers interviewed, (that is to say 68 % of them cultivate on land they don't own). It encapsulates a total amount of 18 plots of land (one farmer has two *garapan*, one owned by an enterprise, the other owned by a private owner).

²⁶ Guru Agama in Sentul

²⁷ « dulu saya nggak punya tanah, saya orang miskin »

In Cimahpar, almost all cassava growers use land they don't own (16 plots of land).

According to the owner and the different people involved, land access for cassava growers varies, as well as its price.

1- Access to unused land

This part is based on the analysis of all the plots of occupied land, (except the four cases in which land is confided to a farmer's safekeeping, see point 2 in part I, II.1) would they be cultivated before the crisis or after, that is to say a total amount of 13 plots in Sentul and 2 in Cimahpar. Different land access was inventoried:

- The farmer owned the land before

In Sentul, three farmers sold their land in the 90's (before the crisis). Two of them directly continued to cultivate it, while the last one started to cultivate in 2002, even though he sold his land in the 80's.

- An intermediary manages the access to enterprise's land

This go-between person may be:

- Someone from the municipality, (two cases in Sentul), showing the commitment of municipality in land trade, especially in Sentul.
- An intermediary, whether he is employed by the enterprise to manage the land or not, he can be an intermediate trader who carried out the transaction between the farmer and the enterprise and who now claims a share of the product on the *tanah garap*;
- An intermediary who is not a P.T. surveyor but who acted as an intermediary between farmer and enterprise for the occupation of the land.
- A land surveyor from the enterprise

Five people in Sentul accessed the vacant land this way.

- « Traded » access to land (sale of a right to exploit the plot of land)

This phenomenon occurs between cassava growers: if one does not want to exploit the land any more, he may « sell » it to another one who wants to do so. Even though he is not the owner, actually, he sells the right or the possibility to exploit this land. The land is then « sold » for about Rp 30 000 / 100 m².

- Spontaneous occupation of the unused land (especially on the highway), and after the meetings. It might be the case of 4 farmers between 1990 and 1997, and of 1 farmer starting after 1997.

To sum up, access to occupied land is very regulated, since very few people could spontaneously start cultivating unused land. In this case, regulation (whether it involves means payment or not) was frequently retroactive. Moreover those who have intervened in the distribution of occupied land often receive a certain amount of money.

2- Occupation regulation and land cost for farmers

Land access partly determines land cost for cassava growers. Two situations may occur concerning regulation of enterprises' land: in the first one, land is free, in the second one, there is a cost to the farmer. In Sentul, among the 13 interviewed farmers who cultivate on an enterprise's land, only 4 are free users while the other 9 have to pay. In Cimahpar, only two farmers cultivate an enterprise's land, and only one of them has to pay for it. However, cassava growers are not inevitably asked for a payment, they may offer it to one of the possible « collector » (mostly when he is the enterprise's surveyor).

In the second situation, the main method of payment is an inclusive payment that can be paid to different kinds of intermediary persons between farmer and enterprise:

- Security surveyor of the enterprise (*orang kontrol*)

Three quarters of the people in Sentul have to pay a share of the product or an inclusive payment to a P.T. surveyor. Four of them pay an inclusive payment raising 20 000 Rp to 50 000 Rp according to the production, and acreage (from 0,1 to 0,5 hectares). The other two are sharecroppers and must give 20% of their product to the surveyor (for 0,1 and 0,2 ha). This latter method corresponds to the declarations of a trader and another starch entrepreneur in Sentul who explained that most of the time, people who cultivate *tanah garap* have to give back about 20 or 30 % of their production (at the harvest time) to the enterprises' surveyors.

- A person in charge of the land

Only one person in Sentul has to pay a share of his product to someone in charge of an enterprise's land. In this case, a traditional sharecropping system has been adopted, the farmer giving 1/3 of his production to the holder of the land.

- Someone from the local administration

A share has sometimes to be paid to persons from the municipality or in charge of a part of the village (Pak R.T., Pak R.W.). Two people in Sentul are in this situation. For one of them a traditional sharecropping system is used (for 0,0,8 ha). The share is paid to Pak R.T. As regards the other farmer, (who is also a Pak R.T. himself), an inclusive payment is paid to someone of the village administration (who is his senior in the local administrative hierarchy).

It is not excluded that people from the municipality and P.T. surveyors be one in the same person. Indeed, in one P.T. (P.T. Sigma, which is one of the biggest owners not only in Sentul but also in the surrounding villages), different systems can be observed (payment to surveyor or to local administration).

The case of Jasa Marga remains special since no cassava grower was asked for a payment, even though some of them offered.

The fact that no tax nor share, nor inclusive payment is collected by an enterprise is to be noticed: an individual always receives the payment, in an informal way.

As well as land access, occupation of the land is very « regulated » too, though very informally, given that very few people could spontaneously occupy land without paying any tax for its exploitation (only one plot among 7, starting from 1997 in Sentul). However, it appears that no one has any interest in regulating it too much in a formal way, except for Jasa Marga who have a real interest in getting land back (because it is already exploited by an enterprise, and Jasa Marga gets a share of the product for that) as well as for enterprises who need the land even though it is only to create an ornamental area (like in Cimahpar). In these cases, when enterprises want to evict cassava growers, they sometimes try to inform cassava growers, sometimes not and just directly seize it back (by destroying plantations first). Being aware of this, some cassava growers are not likely to invest a lot.

Regulation of government decisions at a local level highlights different elements:

- Difficulty for institutions to gather stakeholders, and take measures with the means to apply them;
- Importance of personal relationships at the local level,
- Numerous « out of law » margins enabling every stage of « power » to benefit from it, even illegally;
- Role of the interdependence between activities (in an area of intense mixture of different kinds of rural and urban activities): at an individual level, one activity (for example R.T. function) will serve another (farming) and vice-versa.

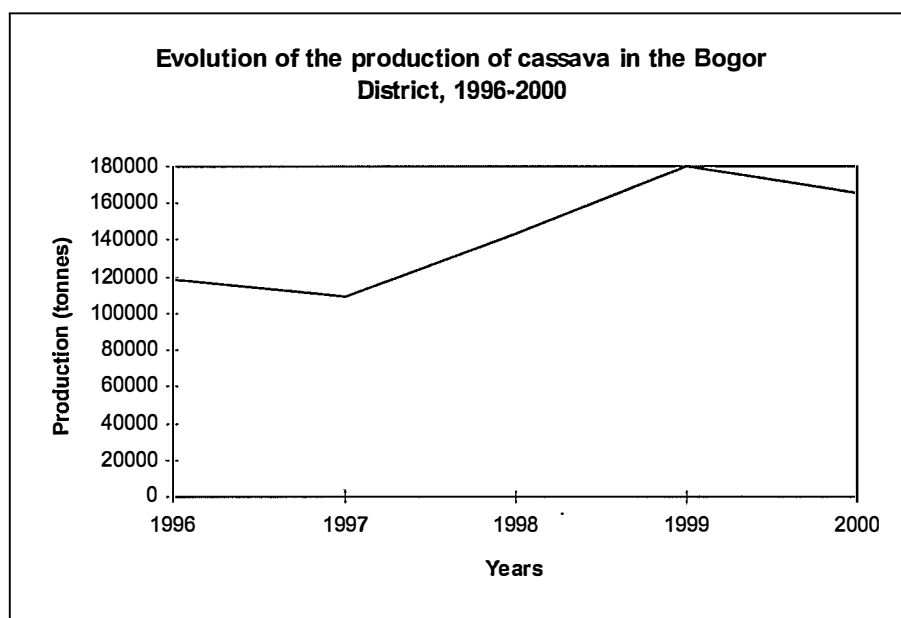
The way « formalization » or regulation at a local level and on enterprises' land is mostly characterized by informal practices: municipality intermediation or go-between of a person in charge of a neighbourhood, or enterprise surveyor... On private owners' land, traditional sharecropping systems remain dominant.

Cultivating an enterprise's land seems to be cheaper but more risky and is the main pattern in Sentul, while cultivating a private owner's land may be safer but more expensive, and is the main pattern in Cimahpar. Before the crisis, cassava growers who cultivated on enterprises' land were likely to cultivate for no longer than 4 to 6 years. With the crisis, this deadline has only been deferred but still exists.

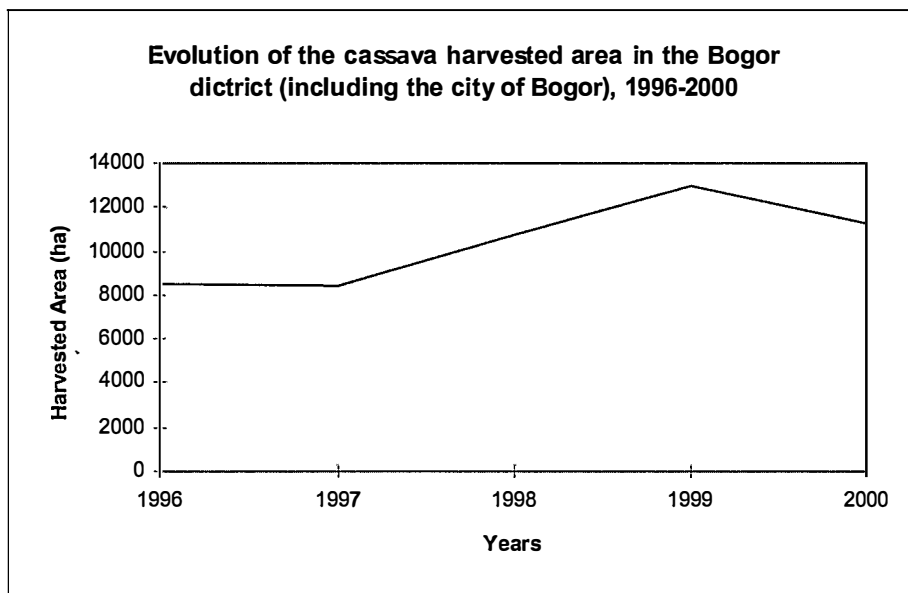
II. THE ECONOMIC PATTERN OF CASSAVA PRODUCTION IN 1997 AND DURING THE CRISIS

II.1) Decrease in cassava roots production in the 1990's...

According to the BPS data, in Indonesia as a whole, the production of cassava decreased until the beginning of 1998 (from more than 17 million tonnes in 1996 to less than 15 million in the end of 1997), and then increased from 1998 to 1999 (by 1,5 million tonnes), before decreasing again. This general pattern is also reflected by the situation in Bogor district (as shown in the graph below), which sums up what happened for cassava production during the crisis.



The first element explaining this pattern must be the evolution of the cassava harvested area that followed a similar evolution: decrease until 1997 and then increase by 4000 ha until the peak of 1999. Pressure on land tenure and land use from the 1970's to the late 1990 described in chapter I, combined with bad weather conditions (lack of rainfall due to El Nino effects) made cassava production decrease (the trend for all West Java is a total decrease in 60 000 ha on average from 1983 to 2000). The increase starting from 1997 must be due to the sudden boom related to the economic crisis.



This pattern highlights that in 1997, when the crisis exploded, cassava roots production in Bogor was not sufficient to satisfy starch enterprises' demand (and is still not sufficient). Indeed, lots of starch entrepreneurs suffered from the lack of raw materials and still do. This lack passes on to the tapioca mills which had to diversify their starch providers' origins in the 1990's: while in the early 1990's, all starch bought by tapioca mills was produced in Bogor District, in the late 1990's, 30 to 40 % also came from Sukabumi, and even from Central Java and Lampung.

A. Koeslag also highlights this phenomenon: « Since the early 1980's and before 1997, the local production of cassava roots in the Kedung Halang Sub-district have decreased because of the pressure on land due to the urbanisation. Hence the local cassava roots supply is now insufficient to satisfy the demand of the starch-processing industries so that they have to buy part of the raw material they need out of the district. This happens mostly for the biggest enterprises that can afford the cost of transportation of the roots »²⁸.

II.2) ... pulled up the prices

The lack of raw materials pulled up the prices while demand for tapioca (and then for starch) did not decline, (even though demand for tapioca has a relatively high income elasticity). Demand for tapioca and starch still exists and encourages the local roots supply.

With decreasing roots production, prices increased until 1997 (600 to 750 Rp/kg), and then decreased from 1997 to 1999 and 2000 (declining to 300 Rp /kg) while production was increasing²⁹.

²⁸ KOESLAG, A. op. cit. P 9

²⁹ These figures were given by cassava growers, but given the difference in prices due to seasons during a single year, it remains difficult to state them exactly. Still, the trend is at least trustable because asserted by different stakeholders.

Now the production boom has smoothed, prices are becoming higher. If it remains difficult to know exactly what was the evolution of the prices for roots (because of the season differences), the prices for starch also testify the general trend: high prices in 1997 calling for cassava production, and decrease until 1999-2000.

In 1997, all conditions (prices, permissiveness, closeness of high demand for cassava roots, temporal availability of land) seem to have created a favourable environment for people to adopt this crop rather than any other.

PART III.

HOW DID STAKEHOLDERS ACT IN THESE CONDITIONS?

What have been the different stakeholders' behaviours and particularly the farmers' one in facing the conditions designed by the two situations (ancient and recent) previously described in part II and I? According to their positions, means and intentions, how did they react to the crisis breaking? These two questions will be answered by analysing the cassava-based farming system and the different situations of all stakeholders to understand what cassava crop does mean to each of them and what shall be the end of the period of stop occurred with the crisis. How far are cassava growers dependants on cassava crop and how does it determine their way of acting?

Why does the rupture of 1997 does not seem to lead to any change in the cassava production system?

Part I will describe the different profiles of cassava growers who cultivate land they don't own. It will first try to explain why they did so, and then distinguish between those who did so before the crisis and those who did so during the crisis and because of a degradation of their economic situation. The second part will analyse profiles of stakeholders who did not cultivate land they don't own.

I. PROFILES OF FARMERS CULTIVATING ON LAND THEY DON'T OWN

In Sentul and Cimahpar, those who cultivate on the unused land are:

- farmers,
- different kinds of traders (itinerant, grocery, restaurants...);
- workers in close factories: they have the right to cultivate the unused land owned by the enterprise that employs them. Still, for all kind of factory workers, it remains difficult to plant cassava since they might not have time to do so. Moreover, only those from Bogor are likely to resort to cassava plantation. Indeed, lot's of factory workers are people from Central and East Java, whose purchasing power is higher here than in their original province (they might not need this additional source of income).

Those who cultivate on the unused land cultivate on average:

- maximum: 5000 m² / person;
- minimum: 400 m² / person;
- on average: less than 2000 m² / person;

T. Firman asserts that « the economic crisis has apparently affected rural-to-urban migration (...). On the one hand, rural migrants tend to increase in intensity and number, as the economic crisis

has also hit rural areas, pushing the rural people to look for additional sources of income, in spite of the decreasing urban job opportunities. On the other hand, (...), a large number of migrant urban workers have gone back to their village of origin as they have lost their jobs in the cities, while other urban job opportunities are greatly diminished»³⁰. Is cassava cropping part of these survival strategies - going back to agriculture or trying to look for rural additional sources of income - to cope with the economic crisis? Or is it the mere continuation of the previous phenomenon of land occupation and large cassava monocropping fields that prevailed in the 90's? This first part will analyse stakeholders' behaviour in cultivating a land they don't own, both before and after crisis.

I.1) WHY CASSAVA GROWERS CULTIVATE LAND THEY DON'T OWN?

This part aims at designing general profiles of cassava growers cultivating land they don't own (including those who also own land). These profiles were designed according to the cassava growers' strategy when they started to cultivate land they don't own. Thus, it does not always fit their current profile but **reflect their lifespan**. As different profiles exist in Sentul and Cimahpar, each of the villages will be detailed. Table 1 and 2 present each profile and its characteristics according to the village. In Sentul, profiles are more varied and more numerous, while in Cimahpar, two main sorts of cassava growers exist: agricultural workers and sharecroppers. However in both villages, three main reasons led stakeholders to cultivate land they don't own with cassava:

- (1) a change of activity, leading to enter agriculture;
- (2) to keep, to get or to enlarge an access to an agricultural surface area;
- (3) to get a necessary additional source of income, apart from main activity.

We separated the first category into two types of cassava growers for Cimahpar as well as the second one for Sentul, since these types have an impact on land access for the considered farmers. Let us notice that in Cimahpar, people who were interviewed are on average older than in Sentul, (respectively 61 and 51 years old). Sentul also counts two other profiles that are more marginal. They will be detailed finally.

Profile 1.

In this category, stakeholders had another main activity before becoming farmers (frequently as an itinerant trader or as a fruits trader in Jakarta or Bogor). When they decided to enter agriculture as farmers (to get a more quiet or closer job), they started to cultivate on available land, that is to say on the land already sold by other farmers to enterprises or private investors.

³⁰ FIRMAN, T., Guest Editorial *Indonesian cities under the « krismon »*, Cities, Vol. 16, N°2, pp 69-82, Elsevier Sciences, 1999

The important criteria defining this category are: large cultivated surface areas, not to be a **landowner** (for most of them), different levels of investment, a « **retiring** » behaviour.

In Cimahpar, profile 1 includes more people and two different types. For type 1.B cassava growers, the change of activity was an improvement of their status of agricultural worker, since they became their own boss with an access to land, while type 1.A. cassava growers had another job before entering agriculture (as a wage worker for Jagorawi and in the golf, and as a fruits trader). Type B cassava growers are quite old, (57 years old). Before becoming cassava growers, they worked as shepherds, or *buruh tani boronggan* (agricultural worker paid according to his work), or wage agricultural worker (*buruh harian*). They plant more various crops: fruits, paddy, and taro, except one of them. They are generally more dependent on cassava crop than type A farmers, especially the only one cultivating cassava only. Type 1.B farmers are quite close to the traditional farming system, even though they don't own land. It appears that ex-agricultural workers have a better land-access.

The land they occupy is quite large (on average 0.5 to 2 ha) since they need a large surface area to be able to earn their lives with agriculture. However the reasons enabling them to get a good land access (considering the acreage) varies according to the stakeholders and their villages. In Sentul, whether a combination of two land tenure system (sharecropping and occupation³¹), either a good social and administrative position (as a Pak R.T.) enabled people to get a 1 ha cultivated area. In Cimahpar, type 1. B. cassava growers cultivate largers surface areas than type A since most of them are subject to the sharecropping system. Contrary to them, type A cassava growers cultivate a quite small plot of land (0,2 and 0,3 ha), what may be due to the fact that enterprises are the owners of the land they exploit (even if the owner of one plot never stop changing, from P.T. to private owner and so on). In both Sentul and Cimahpar, these cassava growers whether occupy land, either are sharecroppers (1/3).

Concerning the investment in cassava crop, **different investment levels** are observed. In Sentul, one has other sources of income (as Pak R.T and by lending a starch enterprise and two houses) that may enable him to invest much more in inputs and workforce while the other only relies on agricultural activity and declares to have no other sources of incomes. In Cimahpar, most of type 1 cassava growers spend more than 190 Rp/m² for cassava cropping (excluding the costs of the land), except two. Their employing workforce remains generally uneven or non-existent, (depending on their available capital).

In turn, the different levels of investment (especially inputs) explain the different yields.

Most of them are in a « **retiring behaviour** ». They chose cassava cultivation because it provides an activity close to home (contrary to itinerant trader), not too energy demanding and with a quite easy access.

Most of them can get around 25 to 35 % of their household estimated income, would it be because they have other agricultural activities (sale of papayas), or because they have other

³¹ This person started to cultivate one plot of land in 1985 as a sharecropper and a second one in the early 1990's, that is to say at the beginning of the enterprises arrival in the area (first wave of occupiers).

sources of income (like political activities, lend of a starch enterprises, financial help from children who are wage workers). In this pattern, there are two exceptions. One gets less than 30% (8 %) of his household income with cassava cultivation because he mostly relies on his children to cater with the household needs. He is in a « day to day » logic, trying to find new jobs and *sampingan* (additional jobs to cope with the lack of incomes), when he needs money. That may be why he cannot invest a lot in cassava cropping. He is a land occupier, with no cost for it. Another gets more than 90 % since he has no other activity but cassava plantation and has to earn his life with it.

Profile 2.

The second category encompasses occupiers who tried to increase or not to shrink their agricultural surface area or merely to get one in the 90's and during the crisis. For all of them, **agriculture is the main activity** or an important activity as far as time is concerned (it is not always the main source of income)³².

In Sentul, two types may be identified in this category, having an impact on their cassava cultivated area in the village: (A), those who went on cultivating the land they had sold and benefited twice from the sale by getting money without loosing the exploitation of land (even if it was not intentionally), and those who only benefit from the availability of unused land (B). All of them own land but type A growers' land is out of the village whereas type B farmers' land is in Sentul.

As all Sentul cassava growers in this category are landowners and since in Cimahpar; if they are not, sharecropping system gives them an access to large lands, they all have a **quite large cassava cultivated area** (more than 0,6 ha) except type A cassava growers in Sentul (0,3 ha), who only cultivate enterprises' land.

All of them are quite old (on average 70 years old) except three (out of 11 cassava growers in this category in both villages).

Three **different levels of investment** are reported among them : high level (more than 250 Rp / m²) in Cimahpar and for type B. Farmers in Sentul, « normal » level (on average 130 Rp / m²) for type A farmers in Sentul, and low level (less than 80 Rp / m²). Low level of investment in cassava plantation appears into these three groups (they are underlined in following table 2 and 3), affecting the poorest farmers. These levels mostly depend on the available capital for the farmers (that is to say on their having another source of income or not).

In Sentul, **profile 2.A** farmers are quite exceptional in this category. They all own a small plot of land (less than 0,5 ha). The land they occupy is quite small as well (less than 0,3 ha). All profile 2.A cassava growers started to cultivate on land they do not own before the crisis since they went on using the land they just sold in the 1990's. Two of them sold on average 1750 m² to enterprises and bought on average 0,2 ha in another village (Leuwiliang, west Bogor). They

³² It is now a main activity except for one of them, for whom it has been his main activity until two years ago, when he built a small starch processing industry. But at the time when he occupied a plot of land (1970), his strategy was to enlarge his agricultural surface area.

lend or get a share of the product from these lands. They now don't own any more land in Sentul. The third one, used the money he got from the sale of a 0,7 ha plot of land to go to Mecca. He had inherited from the land he sold and still own 0,04 ha in his village.

Profile 2 B. farmers seem to be more dependent on cassava crop. They are younger, except Pak H. Ali who is the oldest among all stakeholders. They all cultivate both their own land and land they don't own. Hence, they reach on average a 0.6 ha cassava cultivated area.

Type 2.B farmers invest a lot in cassava crop (more than 370 Rp/m²), and type 2.A farmers invest on average the normal rate (130 Rp/m²). But in each group enter a poorer stakeholder (earning less than 1.5 million Rp / year / capita), who cannot invest more than 80 Rp/m² in cassava plantation. The standard of living of the others amounts 1,5 to 2 millions per year and per capita.

In Cimahpar, category 2 cassava growers are very similar to type B. In Sentul : most of them are old (more than 70 years old), and they all cultivate more than 0,5 ha (on average 0,78 ha), even though only two of them are landowners (whose land is located in Cimahpar). They all invest more than 230 Rp / m² in cassava cropping, (except one of them). However they all are sharecroppers (contrary to Sentul) what enables them to cultivate a quite large surface area with cassava. Only one of them spontaneously started to occupy land to get an access to an agricultural surface area³³. Another one is a sharecropper on part of his land, while he rents another 0,5 ha to plant cassava. They are very dependent on agriculture and on cassava crop, since few of them have other sources of income (only one has a wage worker wife).

Profile 3.

The third category encapsulates farmers who have another main source of income but for whom it is necessary to find other sources of income to live.

Their household estimated income is just above the poverty line (1 million Rp / year / capita). However two categories may be identified among them, according to the level of security as well as to the amount of their incomes:

- A. Six cassava growers in category 3 in Sentul and Cimahpar are **daily or boronggan workers** (out of 9). They are **quite younger** than the other stakeholders (28 to 43 years old). In Sentul, for two of them, cassava crop added to daily or *boronggan* work in cassava fields covers more than 75 % of their income. Their household estimated income is not higher than 1,3 million Rp / year / capita). They **invest very few** in cassava plantation (on average 45 Rp / m²).

As far as investments in cassava crop are concerned, type A growers in Cimahpar are closer to type B behaviour since they invest the average « normal » yield (between 120 and 160 Rp / m²). Considering their household, they get on average 1,5 million per year and per capita (in Cimahpar).

³³ He has a special profile since the 1,5 ha he has been occupying since 1976 has no determinate status (several people claim for this land, which was State owned before).

Among all type 3 A. cassava growers, only one has a certain employment security for he is a factory worker with a monthly wage. All the others have day-to-day logics, with no security on their being employed or not. Three of them temporally cultivated land on the highway banks.

- B. Three category 3 cassava growers in Sentul and Cimahpar **have another activity**, (starch enterprise, small restaurant, papaya trading). Therefore they also have a more secure status than type A growers. For them, cassava crop covers less than 10 % of their estimated income. They have more capital to invest in cassava cropping (on average 130 to 190 Rp / m²), thanks to the capital they get from their other activity. Hence they get higher yields.

Profile 4.

This profile only appears in Sentul (as regards the interviews). The farmer is **being confided a land to his safekeeping (*ditiip*)**. The surface area is larger (0,75 and 4 ha). They are 60 and 53 years old. Cassava cultivation represents on average 5 and 28 % of their household expenditure. We have only reported this case in Sentul.

Profile 5.

In this category enter people whose main activity is not agriculture and who are classified as quite « rich » (on average more than 20 000 000 Rupiah per household per year). We may wonder if for them, going on cultivating this way is not a meant to increase a social prestige (by employing workforce). They are 52 and 48 years old. Cassava cultivation represents very few of their household expenditure. We have only reported this case in Sentul.

As a conclusion for this description of the reasons that led people to exploit someone else's land, we should notice several elements :

- Land access is better in Cimahpar than in Sentul and cassava growers are closer to the « genuine » farmer archetype in Cimahpar since they have more various agricultural activities, larger lands and are more dependent on agriculture;

- People who were previously agricultural workers seem to be likely to get a better land access than people who were not involved in agriculture before;

- In each category, different standards of living and household patterns are already remarkable: day-to-day logic with searching of various and insecure activities; balanced farming system with enough investment to earn money with agriculture only, whether for a whole family, whether for two or three persons only; higher added-value activities and possibility of an intensive cassava cultivation... These situations have an influence on the way people will cultivate cassava.

- All the designed profiles reflect the first step of cassava growers' strategies for cassava plantation, that is to say the access to the most important production means - land - in the given constraints carrying weigh on it.

Now let us see who, in these profiles, started to cultivate during the crisis and because of it?

Table 2 - SENTUL: Different profiles of farmers cultivating land they don't own

Why cultivating land not owned?	1. To change of activity, entering agriculture	2. To increase or not to shrink the agricultural surface area, with agriculture as an important activity		3. To get a necessary additional source of income apart from main activity <i>sampingan</i>		4. To cater to a private owner's demand	5. Unknown (Probably non-economic reasons)
		A. Going on cultivating the sold land	B. Increasing the agricultural surface area	A. Wage or <i>boronggan</i> worker	B. Other main activity		
Farmers	Pak Husen ³⁴ Pak Karta	Pak Hilyas Pak Muhidin Pak Halimi	Pak Khotib Pak Makfudin Pak H.Ali	Pak Fandi Pak Ujang Pak Musa Pak Mongkas	Pak Iyan Pak Tamin	Pak Mahmur Pak Midji	Pak H. Kosasih Pak Atang
Age (years old)	60 / 45	60 / 57 / 60	45 / 47 / 80	37 / 43 / 40 / 28	55	60 / 53	52 / 48
Land not owned (ha)	1 ha	0,1 / 0,5 + 0,08 / 0,2	0,2 / 0,1 / 0,08	< 0,2	< 0,3	0,75 / 4	1 / 0,3 ha
Land owner	P.T.+private owner	P.T.	P.T. + private owner	P.T.	P.T.	Private owner	Private owner + P.T.
Year of first occupation	Before crisis	1991 / 1995 + 1998-2002 / 1991	1970 / 1996 / 1999	During crisis	During crisis	1985 / 1997	1992 / 1999
Type of land tenure	Occupation + sharecropping	Occupation	Occupation + mixed	Mixed + occupation	Occupation	Traditional system	Occupation + traditional system
Owned land (ha)	0 / 0,8	< 0,3	on average 0,46	0	0	0	0
Average total cultivated area with cassava (ha)	1,25	0,3	0,6	0,13	0,16	2,3	0,5
Total investment in cassava crop (inputs and workforce) Rp / m ²	79 523,13	1208 130,5 75	369, 85 595,8 79	on average 45	on average 158	0 650	on average 530
Employing workforce?	No / yes	Yes / uneven / no	Yes / yes / uneven	No	No	No / yes	Yes
Cassava yields (ton/ha)	7 and 20	2 / 9 + 15 / 10	28 / 35 / <10	> 2.5 and < 6	< 10	1,5 and 15	on average 14
Percentage of cassava income in total household income	39 % 35 % ³⁵	1,8 % 30 % 6,5 %	30 % 72% ?	75 % 86% ³⁶ ?	8 % ?	5 % 28 %	Less than 2 %
Estimated income (M Rp /year/capita) ³⁷	1.25 > 4	> 2 / 1.4 / 1.4	1.5 to 2	On average 1.2	1.5	0.7 1.5	> 5
Other agricultural activity	Fruits, goats / Pisciculture /	None / Goats, corn / poultry	Goats	Goats / Goats /none /none	Goats	Goats	Goats, Paddy / Goats

³⁴ The case of Pak Husen may need to be deepened since he occupies two types of land : one owned by a private owner, (a 0,5 ha land he occupies since 1985), and another owned by an enterprise, (a 0,5 ha land he occupies since 1992). The second land may correspond to another type of category: his will to enlarge his cultivated surface area, (5.B). He now totally cultivates 1 ha.

³⁵ Calculated without considering the household's uneven expenses.

³⁶ This calculation includes the wages from the daily agricultural worker activity. If cassava crop is only considered, these percentages become 1,55 % and 4,24 %

³⁷ The total amount of estimated expenditure is the calculation basis for total income estimation

Table 3 - CIMAHPAR: Different profiles of farmers cultivating land they don't own

Why cultivating not owned land?	1. To change of activity, entering agriculture		2. To get an access to an agricultural surface area or to enlarge it, with agriculture as an important activity or as main activity	3. To get an additional source of income, apart from main activity <i>Sampingan</i>	
	A. From another activity to agriculture	B. Improvement of the agricultural status		A. Wage or <i>boronggan</i> worker	B. Other main activity
Farmers	Pak Suhandi Pak Dayat	Pak Mamad Pak Saman Pak Omay	Pak Sahib / Pak Ohim / Pak Duloh / Pak Dadang ³⁸ / Pak Parman	Pak Suminta ³⁹ Pak Ata	Pak Neng
Age (years old)	45 / 60	62 / 54 / 55	82 / 85 / 72 / 36 / 72	85 / 40	45
Occupied land (ha)	0,5 / 0,2	0,5 / 2 / 1,15	0,3 / 0,5 / 1 / 3,5 / 1,5	0,5 / 0,1	0,5
Owner of occupied land	P.T.	Private owner	Private owner	Jasa Marga + private owner	Private owner
Year of first occupation	1998 / 1996	1996 / 1985 / 1989 and 1999	1997 / 1996 and 1999 / before 1980 / 1991 and 2000 / 1977	1996 to 2001 / sebelum krismon	?
Type of land tenure	Sharecropping + occupation	Occupation + sharecropping	Sharecropping + occupation	Occupation + Sharecropping	Sharecropping
Owned land (ha)	0	0	0,9 / 0 / 0 / 0 / 1	0 / 0	3
Total cultivated area with cassava (ha)	0,25	0,9	0,78	0,5 / 0,1	0,3
Total investment in cassava crop (inputs and workforce) Rp / m ²	253 0	252 195 36	503 / 49 / 500 / 297 / 230	162 / 120	196
Employing workforce?	Uneven / no	No / yes / no	Yes / no / yes / uneven / uneven	No / no	Yes
Cassava yields (ton/ha)	35 and 10	30 / 10 / 22	14 / 10,5 / 35 / 21 / 21	21 / ?	9
Percentage of cassava income in total household income	32 % 8 %	93 % 24 % 23 %	30 % / 50 % 100 % / 63 % / 69 %	57 % / 5 %	3,25 %
Estimated income (M Rp /year/ capita)	1.6 1	1 / < 2 / 1	> 2 and < 3	on average 1.5	2
Other agricultural activity	Papaya, goats/ Goats	Goats / Fruits, taro/ Paddy, papaya /	Papaya, vegetables, goats / Goats / Goats / Fruits, poultry, trees / Pisciculture, wood/	Goats, bananas/ Landless worker, goats/	Landless worker, goats/

³⁸ Pak Dadang enters A and B in category 3 because he cultivates his family's land (since 1991) and also rent another 0,5 ha private owner's land since 1999.

³⁹ Pak Suminta occupied land between 1997 and 2001, so the indicated « Percentage of household expenditure paid with cassava incomes » does not refers to this crop but to his income from his daily work.

I.2) BEFORE THE CRISIS: SURVIVING AGRICULTURE

This part will first detail the elements determining cassava growers' strategy in cassava plantation. The two others will show both the cassava growers' strategies and their vulnerability.

1- Determining factors

Different factors generate different economic situations in Sentul and Cimahpar. These factors are all interdependent and enable to understand what is stakeholders' cassava plantation «strategy». They can be defined as following:

- Investments level in cassava plantation

The investment level in cassava plantation is the main indicator of cassava growers' strategies. It will determine yields (and partly incomes from cassava plantation). It mostly depends on two elements. The first one is the fact that the cassava grower has or not another source of income and if there is, what kind of activity it is. This element carries more weight in Sentul where there is an intensive mixture of activities (agricultural and urban activities). The second element is the land tenure system: in Cimahpar, sharecropping system must induce people to invest the 'normal rate' (130 Rp / m²) or more since they feel more secure regarding their land status. The different investment levels are a very important factor defining the cassava plantation strategy since they are revealing of how the grower considers his crop but also of its production means;

- Employing or not workforce

As well as investments levels, employing or not workforce is revealing of the cassava growers' production means. But, if they cannot but invest a minimum sum in inputs, they are able to avoid employing workforce. Their employing workforce will depend on their having other sources of income, but also on their surface area. Those who adopted an 'intensive' cassava plantation are more likely to employ labourers than other people. The more they are vulnerable (having no other source of income, being worker or close to the 'genuine' farmer archetype), the less they are likely to employ additional workforce.

- Having or not other sources of income

Would it be another activity (agricultural or not) or financial help from another member of the household, this criteria has a tough influence on cassava plantation and is revealing of how far the grower relies on cassava crop. In some cases (when the activity is non-agricultural and has a higher added-value, like a starch enterprise or a grocery), this other source of income will enable the cassava grower to invest more in cassava plantation than the 'normal rate' described in appendix 6 (more than 150 Rp / m²). He will adopt an 'intensive' plantation pattern.

In other cases (when the cassava grower gets financial help from his children) he won't invest a lot because he has this other source of income but also because he cannot afford such a cost (it depends on the received sums).

When the activity is a combination of other agricultural activities or when incomes from cassava are associated with an insecure activity (like agricultural daily worker), the investment does not exceed 80 Rp / m² (in Sentul) and the « normal » rate of 130 Rp / m² in Cimahpar, where sharecropping is dominant.

When there is no other source of income, the cassava grower will invest as much as he can but it won't exceed the « normal » rate (130 Rp / m²).

- The acreage of the cassava cultivated area

The total cassava cultivated surface area will also partly determine incomes from cassava plantation: it may depend on land access for the farmer (according to the land tenure system) but may also be the result of a strategy (combination of owned land and occupied land, combination of occupied land and sharecropping, combination of several plots of land in sharecropping) as the previous description of the profiles shows it.

- The estimated income per year and per capita

The estimated income per year and per capita, resulting from an estimation of the expenditure in the household during one year, is another indicator of the stakeholders' vulnerability or ability to face degradation in the economic situation of the household. It is a result of an economic and social situation, more useful as a confirming element rather than as an explaining factor.

These elements enable to see how vulnerable cassava growers are and what constraints and resources they have in their situation.

. Two kinds of cassava growers, related to the level of activity in the cassava growers' **lifespan**, started cassava cultivation before crisis in Sentul and Cimahpar:

- Those who are in the ending period of their active life: cassava crop is for these 60 to 80 years old cassava growers, a more quiet, closer, and less energy demanding activity providing income during the end of their active life; few people remain in their household, they have no more scholar costs to handle for their children who are more likely to help financially their parents than to depend on them;

- Those who are still active: they are younger (30 to 50 years old) and still are in charge of a whole family with more than 6 persons in their household (on average) and children going to school; they cultivate large areas; cassava crop is for them an important source of activity among other agricultural activities (Cimahpar) or in addition to another non-agricultural activity (Sentul).

2- Cassava growers who started to cultivate land they don't own in Sentul before the crisis:

In Sentul, all cassava growers who started to cultivate land they don't own were involved in agriculture before that, except two (profile 1), but for very few of them agriculture is the main income provider. Nine cassava growers started to occupy land before crisis (on 10 plots of land).

Table 4: Cassava growers who started before the crisis to cultivate land they don't own in Sentul:

Code typology	Cassava grower	First year of occupation	Profile .	Land tenure
TS2	Pak H. Halimi	1991	2.A	Occupied land
TS4	Pak Karta	1996	1	Occupied land
	Pak H. Makfudin	1996	2.B	Occupied land
	Pak Khotib	1977	2.B	Traditional system
	Pak Muhidin	1995	2.A	Occupied land
TS5	Pak H. Hilyas	1991	2.A	Occupied land
TS8	Pak Mahmur	1985	4	Land <i>ditiip</i>
	Pak Husen	1985 and 1992	1 and 2.B	Sharecropping 1/3 + occupied land
TS9	Pak Kosasih	1992	5	Traditionnal system

a. End of active life

Out of these 5 cassava growers, two types are remarkable. First type is closer to the « traditional » farmer archetype, since agriculture is the main source of income for them. They also cultivate several different crops (not only cassava), including papaya, corn, and taro. Besides, they cultivate a larger surface area (more than 0,54 ha).

Second type cassava growers have another activity (as an agricultural worker) or get incomes from their children's working in factories or elsewhere. They cultivate smaller plots of land (on average 0,15 ha,) with cassava only⁴⁰.

Most of them are **dependent on cassava crop and economically rational** in their way of cropping.

They are part of profile 1, 2 and 4. According to the collected data⁴¹, three of them get a gross income four times higher than the total amount they spent for inputs and workforce, (even though sometimes, a gap may be due to changes in roots prices in the meantime between planting and harvesting season). The other two, whether might have more capital available to invest, whether no capital at all.

⁴⁰ Except one of them who was confided a land to his safekeeping (land *ditiip*) and thus cultivate 0,75 ha with cassava only.

⁴¹ Investment sums, as well as the incomes cassava growers get from cassava plantation may be questionable since most of the time, people answered the questions related to inputs and production according to the previous harvest, or sometimes to their expectation. Eventhough, they are still useful since sharp differences appear between different categories of cassava growers.

Most of them are **part of the poorest cassava growers** (less than Rp 1,5 million / year / capita) and do not invest more than 130 Rp/m² for inputs. Hence they get around 7 to 9 tons of roots / ha. Their employing workforce remains uneven or non-existent⁴².

These cassava growers are the most vulnerable one. One of them also exploited a land during the crisis (see following part). But the other too did not, whether they could not occupy another plot of land without employing workforce (what they cannot afford), whether they might not have enough time to do so (with 1 ha to exploit or another time demanding activity).

b. « Active » cassava growers

These four cassava growers are younger than the previous ones (46 years old in average) and have other current sources of incomes (as a starch entrepreneur, or with political activities, houses and land renting or other unknown sources of income). They are **fewer dependants on cassava crop**, since they can rely on other sources of income. However, it remains necessary for some of them as an **important source of income**, since they still are in charge of a quite numerous family (7-8 persons) so that they have to find more important incomes (they have scholar costs to pay for their children).

They are part of profiles 1, 3 and 5.B. They all cultivate quite **large areas** (0,7 ha). They adopted a more **« intensive » cultivation pattern** since, thanks to other sources of income, they have enough available capital to invest more, even if their level of economic rationality may vary. They all spend more than 400 Rp / m² in cassava cropping, that is to say 250 Rp more than the average « normal » investment in cassava plantation (130 Rp/m²). Hence they get **high yields** (more than 20 tonnes/ ha). That is why we can say that they adopted an intensive way of cultivating cassava. They all **always employ workforce**. This expenditure covers more than 60 % of their investment sums (excluding cost of land), except for one of them, who only spends 35 % of his total cost in workforce payment (he was only a farmer before he built a starch enterprise two years ago). For him as well as for Pak Karta, cassava crop enables to afford on average 30 % of their household expenditure. We may suppose for some of them, especially Pak Kosasih who has several other activities and Pak Karta who is a R.T., that cassava crop is a way of keeping a link with agriculture and farmers (what may be understandable since they both have political activities).

⁴² In this « group », the case of Pak Hilyas remains special, since he might have more capital available thanks to his children working in factories. Hence he may invest more and get higher yields. Still he enters this first pattern of cassava grower since he is old, has no more children at school and declare to have no other current activity. For him, cultivating another plot of land during the crisis might not have been rational since he already have other sources of incomes (from his children) without an additional effort.

3 - Cassava growers who started to cultivate land they don't own in Cimahpar before the crisis:

In Cimahpar, 8 started to occupy land before the crisis⁴³:

Table 5: Cassava growers who started before the crisis to cultivate land they don't own in Cimahpar:

Code typology	Cassava grower	First year of occupation	Profile	Land tenure
TC2	Pak Parman	1977	2	Occupied land
TC8	Pak Omay	1989	1.B	Sharecropping 1/3
	Pak Ohim	1996	2	Sharecropping 1/3
	Pak Dayat	1996	1.A	Occupied land
	Pak Mamad	1996	1.B	Occupied land
	Pak Ata	?	3.B	Sharecropping 1/3
TC9	Pak Dadang	1991	2	Sharecropping
	Pak Saman	1985	1.B	Sharecropping 1/3
	Pak Duloh	Before 1980	2	Sharecropping 1/3

Out of 9 cassava growers who started to cultivate land they don't own before 1997 in Cimahpar, only three were not involved in agriculture before that. Contrary to Sentul, agriculture remains the main provider of incomes for most of them, and also the main activity as far as time spending is concerned. This element combined to the sharecropping system may push towards higher investments levels for both types of cassava growers (end of active life and active stakeholders). However, financial help from children (or wife) is sometimes significant. Just as in Sentul, among people who started to cultivate on land they don't own before the crisis, two main categories appear, related to the level of activity in the cassava growers' lifespan.

a. End of active life

Five cassava growers out of nine are at the end of their lifetime (with on average 72 years old). They are part of profile 1 and 2. Except for one of them, their household does not count more than three persons and they no more have scholar costs to pay. Sometimes, their children who are working are used to help the household economy with their income. Hence they just have a reduced activity sufficient for a reduced household. As well as in Sentul, these cassava growers needed a more quite, closer, and less energy demanding activity providing enough income. They are **dependent on cassava crop** and **economically rational** in their way of cropping.

Still, their way of cultivating cassava is closer to the model of « active » persons described in Sentul: large cassava cultivated area, high investments. Indeed, excepting one of them cultivating 0,2 ha on an enterprise land, they all exploit quite **large surface areas** (more than 0,5 ha), what may be due to the fact that they cultivate on a

⁴³ There is 1 plot of land for which the first year of exploitation remains unknown.

private owner's land. Then, if the land tenure system may push them to adopt a more « intensive » way of cropping with large plots of land, the combination of several characteristics may explain their level of investment in cassava cropping, higher than in Sentul for the same category of cassava growers:

- Most of them are sharecroppers (people with this status are likely to invest more than others who pay a lower cost for land exploitation),
- Only two of them receive financial help from their children
- No one has another significant activity, and only two have more **various agricultural activities** (including papaya, poultry, vegetables...), so that they have to get their main income from agriculture.

Indeed, except two of them who invest very few or not at all, their investment sums are not lower than 230 Rp / m² and reach 500 Rp / m² for two of them. However, this « intensive » pattern of cassava cultivation is no longer valid as far as workforce is concerned. They might not have enough capital for this expenditure. Only the two cassava growers who have the largest cassava fields (and who have no family help to cultivate it) employ workforce, whereas for the others it remains uneven or non-existent. Moreover, if the collected data on cassava production are reliable, they don't spend for inputs and workforce more than 25 % of the gross income they get, (is it due to the fact that, as sharecroppers they are more careful concerning their expenditure since they still have to give back a third of the product to the owner of the land?)

According to the estimations on household standard of living, only two of them (who were previously wage workers), are very close to the poverty line. The other four households have more than 2 millions per year and per capita. Only two of them started to cultivate another plot of land during crisis, but it must not be related to crisis itself. Their behaviour is more similar to this one than to « crisis » one as the following part will show. Moreover, we can suppose that this kind of people, in Cimahpar, might not have been likely to cultivate an additional land during the crisis, since they already exploit quite large acreages (unlike in Sentul). An additional land would mean for them additional workforce costs that they might not afford.

b. « Active » cassava growers

Just like in Sentul, these four cassava growers are younger than the previous ones (on average 46 years old) but contrary to this category of cassava growers in Sentul, they have no other current sources of incomes than agriculture (except one of them who is a worker in buildings, and whose case is a bit particular because of that). They are **less dependent on cassava crop** than the previous 'a' category, since cassava plantation is combined with other agricultural activities (fruits, taro, paddy, pisciculture, poultry...). Still, it remains a **necessary source of income**, since they only rely on agriculture to earn their life and to cover the household's needs.

They are part of profiles 1 B, 2 and 3.A. They all are sharecroppers who exploit quite **large areas** (on average 2,2 ha), except the wagemaker. But as far as cassava crop is concerned, the cultivated surface areas are different: only one of them exploits a very large land (1,75 ha), the other two cultivate 0,5 ha of cassava, and the daily worker has only 0,1 ha.

Farmers adopted to a « normal » cassava cropping pattern (spending on average 150 Rp / m²). It must be noticed that, compared to this category of cassava growers in Sentul, and as sharecroppers, they have to pay an additional cost for land renting. That may partly explain why there is not such an « intensive » way of cropping. This characteristic, combined to the fact that they have few or no other sources of incomes (with no financial help from family or with a low and insecure job just like daily worker in buildings), may explain their « normal » cassava cropping behaviour (not too few and not too much investment).

In this category, we have to notice that two farmers started to cultivate cassava during the crisis (they only relied on other agricultural activities before that), that is why cassava cropping system is more heterogeneous and does not fit the « intensive » cultivation pattern described for Sentul and in previous category « a. end of active life » cassava growers. These two cases will be studied in the following part.

Table 6: Schematic characteristics of cassava growers in the ending period of their active life in Sentul and Cimahpar:

Criteria	Sentul	Cimahpar
Investment level	¼ of their gross income (less than 130 Rp/ m ²)	High (more than 230 Rp/m ²)
Workforce employment	Uneven or non-existent	Uneven or non-existent
Having another source of income	Yes (agricultural or not), but remaining a quite low source of income	Few (other agricultural commodities or non significant sources of income)
Cassava surface area	- Farmers: 0.54 ha - Cassava growers having another source of income: 0.15 ha	Large (more than 0,5 ha)
Estimated income Rp / year / capita	1,5 million	More than 2 millions

Table 7: Schematic characteristics of still active cassava growers in Sentul and Cimahpar:

Criteria	Sentul	Cimahpar
Investment level	High (more than 400 Rp / m ²)	Normal (150 Rp / m ²)
Workforce employment	Yes	Uneven or non-existent
Having another source of income	Yes (with higher added-value than agriculture)	Other agriculture commodities
Cassava surface area	Large (0.7 ha)	Quite large (more than 0,5)
Estimated income Rp / year / capita	More than 2 millions	Between 1 and 2 millions

In conclusion of this point, several things must be noticed:

- With the sharecropping system, Cimahpar counts more « genuine » farmers, (meaning that they have no other activity but agriculture), than Sentul;
- Two opposite phenomenon - having or not another activity - may have the same effect: whereas in Sentul, having another activity may enable to invest more in cassava cropping, in Cimahpar, where more people earn their life with agriculture only, having no other activity may also push people who are in a « retired » behaviour to invest more in cassava cropping (since it is the only source of income);
- In Sentul, elder people in a « retired » behaviour are vulnerable and more likely to occupy land during the crisis whereas the opposite pattern is dominant in Cimahpar, where the « active » cassava growers seem to be more vulnerable.
- In Sentul, « active » people seem to have taken advantage from the opportunity of unused land owned by enterprises and which cost remains quite low, while there is no more « genuine » farmer, whereas in Cimahpar, a traditional sharecropping farming system is still dominant, since private owners are more numerous. In Cimahpar, still active people are more vulnerable and more likely to cultivate another plot of land during the crisis than in Sentul. However, the prevailing sharecropping system may prevent them to adopt an opportunist strategy during the crisis as well as during the 90's, since the cost of the land is higher and since they already exploit quite large plots of land.

Thus, two categories of cassava growers are more vulnerable and more likely to cultivate an additional land during the crisis: old cassava growers in Sentul and active farmers in Cimahpar.

Cassava plantation on land not owned by growers reveals that in Sentul it is the last manifestation of a possible agriculture while in Cimahpar, cassava plantation is part of agricultural activities but without any growth possibility for the farming system. That is why we can say that the cassava plantation before the crisis reflects a surviving agriculture.

I.3) DURING THE CRISIS: SURVIVAL STRATEGIES

In Kota Bogor (including Cimahpar), for example, cassava cultivated area has shifted from 153 ha in 1997-1998 to 366 ha in 2001 (calling for a production increase in almost 2/3)⁴⁴. According to the Dinas Pertanian Kota Bogor, this increase in cultivated area is due to the occupation of *lahan tidur*, (unused land).

In the inventory of the plots of land that was made in Sentul and Cimahpar, 35 are not owned by the farmer who cultivates them. Among these 35 plots of land, 13 were started to be cultivated by the interviewed farmer in 1997 and after, i.e. say during the crisis. These figures mean that more than a third of the land not owned by cassava growers in both villages has been cultivated by the interviewed farmers starting from 1997 or from the next years, or between 1997 and 2002. Though it remains more difficult to know if this phenomenon is basically related to crisis or if it is the « normal » and mere continuation of the previous practices. This part aims at gaining an insight into this question, even though all cases can't be detailed and asserted yet.

The collected opinions about who cultivates unused land or along the highway banks during the crisis vary: these people may be farmers who wanted to extend their cultivated area, or *PHK* (unemployed) who lost their job during the crisis, workers in closed factories... But regarding the Tokoh Masyarakat opinions as well as the identified people in the interviews, two main categories appear: 1) workers and people having another main activity, 2) farmers enlarging their surface area. We will study the cases of other persons in point 3) for each village, since they have particular profiles.

44 Sources : Dinas Pertanian Kota Bogor, Kaci tanaman Pangan

1 - Cassava growers who started to cultivate land they don't own during the crisis in Sentul

In Sentul, out of the total amount of interviewed people, 10 started to cultivate a plot of land they don't own during the crisis, (3 of them along the highway banks). Almost all are land occupiers⁴⁵. They are agricultural workers or people for whom agriculture is not the main activity.

Table 8: Cassava growers who started to cultivate land they don't own during the crisis in Sentul:

Code typology	Cassava grower	Profile	Land tenure
TS4	Pak H. Ali	2.B	Mixed system
	Pak Muhidin	2.A	Occupied land
TS8	Pak Fandi	3.A	Mixed system
	Pak Ujang	3.A	Occupied land
	Pak Musa *	3.A	Occupied land
	Pak Mongkas *	3.A	Occupied land
	Pak H. Iyan	3.B	Occupied land
	Pak Tamin	3.B	Occupied land
TS9	Pak Atang	5	Occupied land
	Pak Midji	4	Land <i>ditiip</i>

* Pak Musa and Pak Mongkas were not interviewed with a questionnaire like the others and that is why their names don't appear in the table: typology of stakeholders in Sentul (annex 4).

1) Workers and people having another main activity

Most of those who started to cultivate land they don't own during crisis (6 persons) enter the TS8 category in the typology (see appendix 4), that is to say cassava growers who do not own any land and who cultivate themselves (without employing workforce). Out of the total amount of interviewed people in TS8 category (8), more than a half (6) started to cultivate when the crisis came.

The group of profile 3.A persons presents the most homogeneous characteristics: they are quite young (30-40 years old), they cultivate the smallest plots of land (on average 0,13 ha) on an enterprise's land, they do not own land, nor employ any workforce and only cultivate occupied land. They invest very few on cassava crop and hence get quite low yields (3 to 6 ton / ha which is twice to four times lower than the average yield in the area which is 13 ton / ha, see appendix 6). The members of their household are very near the poverty line. They don't have other agricultural activities, except the two agricultural workers who also have goats.

Profile 3.B cassava growers get their main income from another activity (not as workers nor as farmers) Pak Iyan is a starch entrepreneur, while Pak Tamin has a small restaurant in a clothes factory.

⁴⁵ But two of them are subject to a traditional sharecropping (1/3) system, even though they cultivate an enterprise's land and give back a share to a go-between man (« mixed » system).

All of them are **part of the poorest interviewed population** (on average less than 1,5 millions rupiah per capita according to estimated household income). They merely took advantage from the oral permissiveness given by the government to cope with their difficult economic situation. Whether they have experienced a change in their status and tried to cope with it by entering one of the easiest and cheapest activity inside the «informal sector», either they have not experienced any change in their status but in their standard of living (that may be due to the sudden increase of prices while wages remained the same or while the activity decreased).

For example, Pak Mongkas experienced a change in his status: in 1997, the small clothes business he rent in Citeureup went bankrupt. Then he became a daily worker in buildings, earning an uneven wage according to the importance of the enterprise activity (he loads-down lorries and his wage depends on the number of lorries a day entering the enterprise). He stresses that he started to cultivate a plot of land on the highway banks to get an additional income for the household.

Table 9: Workers and people having another main activity in Sentul : schematic characteristics

Criteria	Evaluation
Investment level	Very few (45 Rp / m ²)
Workforce employment	None
Having another source of income	Low and insecure incomes
Cassava surface area	Small (0,13)
Estimated income / year / capita	Less than 1,5 million

2) Farmers enlarging their surface area

The two farmers who enlarged their cultivated area during the crisis are the **poorest profile 2 farmers**, (less than 1,5 million rupiah per year and per capita). Both of them are quite old, entering the category of people reducing their activity at the end of their lifetime. They started to occupy a very small plot of land: 0,08 ha. One of them started to cultivate on the highway banks since the land he already occupied is located just along the highway. The other, whose land is located inside Sentul, started to exploit a plot of land next to it. One had a free access to land (on the highway), but had to stop cultivating in 2002, when his 6 months old plantation was erased. Contrary to him, the other is still cultivating this plot but for a higher cost, since he is a sharecropper. He is subject to the « mixed » system, paying back a third of his production to Pak R.T.

Both of them can be called « farmers » since they earn their livings with agriculture (their children might help them too). They combined several land status (occupation, mixed system) and several plots of land to obtain a quite **large surface area** they mostly cultivate with cassava. But they cannot invest more than 80 Rp / m² and unevenly employ workforce.

Table 10 : Farmers enlarging their surface area in Sentul : schematic characteristics

Criteria	Evaluation
Investment level	Few (80 Rp / m ²)
Workforce employment	Uneven
Having another source of income	Low sources (children financial help or other agricultural commodities)
Cassava surface area	Quite large (0.6 ha)
Estimated income / year / capita	Less than 1,5 million

3) Others

The two other persons who started to cultivate on land they don't own have more special profiles: did they really benefit from crisis conditions or could they have acted like this in the previous existing pattern of land tenure and land use? One of them only improved his status with the change of landowner in 1997: he went on cultivating this land, but he was confided the land (*ditiitip*) instead of going on as a waged worker. For the second one, the occupation of a 0,3 ha plot of land remains difficult to explain: for sure he needs cassava roots since he works as an intermediate trader, but he has several other activities and is quite « rich » compared to other people interviewed. A hypothesis is his will to keep a link with agriculture and farmers (who are also his customers) by having the same activity, but also by employing wage or *boronggan* workers. Since he is not a landowner, he has no way to access land but occupying available land (land must be too expensive for him to buy). Then he would occupy it for « social » purposes.

2 - Cassava growers who started to cultivate land they don't own during the crisis in Cimahpar

In Cimahpar, those who started to cultivate during the crisis are 5 (with 1 other questionable case).

Table 11: Cassava growers who started to cultivate land they don't own during the crisis in Cimahpar:

Code typology	Cassava grower	Profile	Land tenure
TC8	Pak Omay	1.B	Sharecropping 1/3
	Pak Ohim	2	Sharecropping 1/3
TC9	Pak Suhandi	1.A	Mixed system
	Pak Dadang	2	Rent land
TC10	Pak Suminta	3.A	Occupied land

1) Workers and people having another main activity

Two persons in Cimahpar enter this category. Their characteristics are very close to those described for the same category in Sentul. They are workers who tried to cope with the crisis by cultivating cassava. Both of them are **quite poor** (on average 1,5 million per year and per capita). Still, we can see two differences with Sentul workers: the first one is that they **invest a little more** (160 to 250 Rp / m²).

The second one is that one of them started to cultivate because of a change of status, due to the crisis: he gave up his job as a fruit trader in 1997 because of the hard competition between small itinerant traders like him. Then he decided to enter agriculture. Hence, cassava cropping is not only an additional source of income (*sampingan*), but also a main source of income. This second « farmer » is in the same situation as *PHK* (unemployed) workers. As he completely changed of activity, he adopted the current land tenure system in Cimahpar, that is to say sharecropping, which is surer than occupying land along the highway for example.

Table 12 : Workers and people having another main activity in Cimahpar : schematic characteristics

Criteria	Evaluation
Investment level	Normal and high (160 to 250 Rp / m ²).
Workforce employment	None
Having another source of income	None or low and unsecure incomes
Cassava surface area	0,4
Estimated income / year / capita	Less than 1,5 million

2) Farmers enlarging their surface area

Three farmers are in this case in Cimahpar. It might not be wrong to assert that at least two of them, who are classified as « active » farmers started cassava cropping because of the crisis and bad economic conditions. If we cannot say that they adopted opportunist behaviour since the cost they pay for the land is quite high (renting and sharecropping), at least they tried to cope with the difficult economic conditions by planting cassava. This behaviour was mostly a mean to **maintain their previous standard of living** (hence the criteria of the estimated income is no more valid, since it is more relevant to consider the reduction of the income than its current level).

Let us notice first that these two people are farmers who did not plant cassava (or not regularly) before the crisis. One of them clearly suffered from the bad economic conditions. His case remains special, since he has an « entrepreneur » mentality comparing to other farmers: he took risks (we must precise that he is a sharecropper on a land owned by his family, who is very helpful), by planting palm trees and by building a large pisciculture complex. Both these initiatives failed, because palm trees did not found outlet (they had to be sold just when the crisis bloomed), and because of the pollution of the water that killed the fishes. Then in 2000, the farmer started to rent a land to plant cassava, which is for him an important source of income (covering almost 60 % of his household expenditure). Contrary to the category of « workers and people having another activity »,

this farmer may fit the so-called « **intensive** » **cultivation pattern**, since he spends more than 250 Rp / m² and employs workforce (though unevenly).

Contrary to him, the other farmer who started to cultivate a 0,15 ha land in 1999, does not invest a lot in cassava cropping. It is for him an important *sampingan* that helped him to create an additional activity for the whole family by buying an *angkot* (a small bus for public transportation), which in turn became a main provider of income. This farmer noticed that even though his cultivated land is very close to the highway, he did not plant cassava there because he was too busy to do so.

As regards the third farmer, we cannot assert that he started to cultivate another 0,3 ha land because of crisis. He might have only made up for a far away cultivated land from his house with a closer one. Indeed, he stopped cultivating a 0,3 ha plot of land on the other side of the highway until 1999. This same year, he started to cultivate a plot of land very next to his house (in sharecropping system). That is why this farmer may not enter the group of people who started to crop because of crisis.

As a conclusion of this second point analysing cases of people who started cultivating cassava on land they don't own during the crisis, we can first define land occupation as part of the « informal sector », even though (as already stressed in part I, II, 1) this expression is a bit confusing. Indeed, many criteria may define « informal economy»: the business size, its level of legality⁴⁶. But though « informal », this type of activities also demands a certain capital and other requirements. Barriers caused by the cost for entering these activities may prevent people who cannot overcome them from entering informal activities. Cassava cropping on occupied land and overall on « mixed system » land presents this kind of barriers: cost of the inputs, cost of the land. But contrary to other « informal activities », it does not require a lot of time, so that it remains possible even though the stakeholder has another activity. Besides, it should be interesting to evaluate if cassava plantation barriers (financial ones) still remain lower than other informal activities that may adopt people when they have to cope with a difficult economic situation or when they want to improve their economic situation, (for example, is owning a small itinerant restaurant more capital demanding than cassava cropping?). If true, cassava would be the activity of last resort in the informal economy.

Second, we can identify two main behaviours of « crisis croppers »: survival strategies, and behaviours in an attempt to maintain a previous standard of living.

Those who adopted a survival strategy are whether quite young, whether quite old that is to say at the beginning or at the end of their active lifespan (old farmers or young workers). Whether they have no time to cultivate (since they have another activity as workers), or they are quite old and need a not too demanding activity (time and energy) but they need to keep a source of income (even a physical activity) as close to their house as possible. They are land occupiers who generally cultivate a small plot of land owned by an enterprise,

46 B. Lautier stresses that an activity may be legal on one point (payment of a tax to the government for exemple), but illegal on another (for exemple, by employing workforce paid with a low wage, under the legal minimum wage). Thus, some activities may be both « formal » and « unformal », whatever is their size. Lautier, B., *L'économie informelle*, Editions La decouverte, 1998

they don't invest a lot in cassava crop (less than 79 Rp/m²) and hence don't get an important yield. They have no other agricultural activity but goats (except agricultural workers), which are a good complement to cassava crop. « Crisis cassava growers » are all part of the poorest population. For none of them cassava is a real « food crop » since they don't consume it in a high proportion. Cassava is intended to be sold. For them « cassava is money » (« *singkong jadi duit* »).

Those who tried to keep their previous standard of living and suffered from the crisis are active farmers in Cimahpar. Cultivating this additional land has a cost for them; still it remains an important additional source of income to cope with the bad economic conditions of crisis.

ACTIVITY AND PROFILE	CASSAVA CROPPING STRATEGY DURING THE CRISIS
WORKER (YOUNG IN SENTUL, UNEVEN IN CIMAHPAR)	SURVIVAL STRATEGY
OLD FARMER IN SENTUL	SURVIVAL STRATEGY
ACTIVE FARMER IN CIMAHPAR	TRYING TO KEEP A PREVIOUS STANDARD OF LIVING

Considering all cassava growers who started to cultivate land they don't own before and during the crisis, we can identify a strategy for each group.

Those who have a **survival strategy** (low investments, low incomes, insecure or low other source of income) are :

- workers and people having another insufficient activity,
- poor « retired » people earning their life with cassava crop in Sentul,
- poor active farmers living from agriculture in Cimahpar

Those who have a « **security oriented** » strategy (with normal investments and other low sources of incomes) are farmers living from agriculture.

Those who have an **intensive cassava cultivation pattern** (with high investments, large areas and other significant sources of income) are:

- « retired » people earning their life with cassava crop in Cimahpar,
- active people having another non agricultural activity (with a higher added-value) in Sentul.

II. PROFILES OF CASSAVA GROWERS WHO DO NOT CULTIVATE LAND THEY DON'T OWN

Owners who are not cassava growers (who lend their land) are not included since they may not need to do so but the case of land owner cassava growers and landless workers is analysed since they were likely to enter the occupation system.

II.1) LAND OWNERS

This part aims at analysing the situation of landowners who are also cassava growers but who don't cultivate on land they don't own. How did they react in both the conditions of the crisis and before? Why didn't they start to cultivate an additional land?

SENTUL

Table 13 - Cassava growers who don't occupy land in Sentul:

Code typology	Cassava grower
TS1	Pak H. Rasan
TS3	Pak H. Baesuni
	Pak H. Hassan

Only one is a « **genuine** » farmer, which is a disappearing professional status in Sentul. He owns 2 ha that he bought in the late 60's and in the early 70's. He might have been more likely to escape the sharp pressure on land along the highway since he lives in the remote part of Sentul. But after having bought land in the centre part of Sentul, he sold almost 0,7 ha near the highway, in 1980. He cultivates with his son. His household seems to be quite vulnerable (1,7 million per year and per capita). Pak Rasan's way of exploiting his land is very similar to active farmers who are sharecroppers in Cimahpar. His investments sums are « normal » (170 Rp / m²). He will employ less workforce or not at all if he lacks money. Moreover, he already has a 2 ha land, which is a quite large surface area. That may be why he would not afford a larger cultivated area that he could not exploit without employing workforce.

The two others are not farmers but **combine as many activities** as possible in the household (clothes trader, angkot driver, starch entrepreneur, grocery...). They are on average 50 years old and are still very active economically. Cassava cropping does not provide them more than 10 % of their household expenditure. Both of them regularly employ workforce but do not spend more than 100 Rp / m² for that. They don't employ more than one person (one for a week, the other during a month). One bought 0,2 ha in the 1970's, to have a small

cassava field in order to provide some roots to his starch enterprise. The other was rich enough to buy land in the middle of the 1980's, to enlarge the previous inherited land. He then got a 0,45 ha agricultural surface area. He combines both agriculture and other trading and services activities. Considering his household, he earns more than the previous stakeholder (about 3 millions per year and per capita). He also invests more than him; still he does not have an « industrial » cassava plantation.

CIMAHPAR

The only cassava grower who doesn't occupy land in Cimahpar is Pak H. Rohmah, (TC3). He might not be very representative since very few people are landowners and cassava growers like him. Moreover he has a special « mentality » since he is a kind of « self-made-man » who bought land to keep a link with agriculture and countryside (in a romantic way). Still he is an important and reliable employment provider for landless workers.

We must precise that the situation of this type of cassava grower - landowner might influence the one of some others since they are employment providers for landless workers.

II.2) LANDLESS WORKERS

In Sentul and in Cimahpar, five landless workers who do not occupy land have been interviewed. Considering the household, they all earn less than 2 millions per year and per capita (less than one million for two of them). They have almost no security on their being employed (except one of them who has only two employers and who also works in a starch enterprise). They have a « day to day » logic. The most trustable reason for them not to have occupied land is that they had no access to unused land: « I don't cultivate enterprise's land because everybody already use it »⁴⁷ says one, while in the area of two others, there was a quite sharp competition between people to cultivate unused lands during the crisis.

⁴⁷ « *Saya ngak pakai tanah P.T. karena semuanya sudah dipakai* »

As a conclusion of this third part, we can sum up the different behaviours as follows:

ACTIVITY AND PROFILE	CONSTRAINTS	RESOURCES	CASSAVA CROPPING STRATEGY	PROBABILITY OF BEING A « CRISIS CASSAVA GROWER »	BEHAVIOUR AFTER THE CRISIS
WORKER (YOUNG IN SENTUL, UNEVEN IN CIMAHPAR)	Few time Few capital High vulnerability Small cultivated areas	Few financial resources	SURVIVAL STRATEGY Low investment	HIGH	SHORT TERM: OUT
OLD FARMER IN SENTUL	Few energy, few capital Need of a non-remote activity Small cultivated areas Not land owners	Few financial resources from children working in factories	OPPORTUNIST STRATEGY DURING THE 90'S Low investment No workforce	HIGH SURVIVAL STRATEGY	LONG TERM: IN
OLD FARMER IN CIMAHPAR	No other activity High dependence on cassava crop	Few financial resources from children working in factories Large cultivated areas	OPPORTUNIST STRATEGY DURING THE 90'S High investment	LOW	LONG TERM: IN
ACTIVE FARMER IN CIMAHPAR	No other activity	Other agricultural resources Large cultivated areas	TRYING TO KEEP A PREVIOUS STANDARD OF LIVING « Normal » investment Uneven employment of workforce	HIGH	LONG TERM: IN
ACTIVE FARMER IN SENTUL	Few time	Other activity (starch entrepreneur, grocery, political activities...) Capital available Large cultivated areas	OPPORTUNIST STRATEGY DURING THE 90'S Intensive cultivation High investment Employing workforce	LOW	LONG TERM: IN
LANDLESS WORKER	High vulnerability Few time	No capital available Multiplication of worker jobs (porter, worker in buildings, wage or <i>boronggan</i> agricultural worker...)	NO ACCESS TO LAND HENCE NO STRATEGY	LOW	SHORT TERM: OUT
LAND OWNER AND CASSAVA GROWER	Few time	Other main activities Capital available	Normal investment Employing a few workforce	NO	-

This analysis enables to say that some of the cassava growers are likely to be out of cassava cultivation in a very short term (now or in a few years): workers are the most concerned. Other cassava growers may be out of agriculture and cassava plantation in a longer term (10 to 30 years): active cassava growers in both Cimahpar and Sentul, because they cultivate lands they don't own and which are bound to other land uses (industry or housing). All landowners are less vulnerable. Still, cassava cannot remain for them their only source of income.

CONCLUSION

As a cash crop, cassava seems to be largely cultivated by old persons (who have a short-term vision) and quite poor people, (confirming the fact that it is not too capital, time and energy demanding), or as an additional source of income for active people. This observation may explain why it is still considered as a marginal activity even though it is not so for certain groups. Bearing the image of a « marginal » crop, often cultivated on land which status is marginal, it is not likely to call for a special planning. This study highlights several points at « macro » and « micro » level:

2 - At micro level the study identified some of the most vulnerable groups in a suburban area where several types of activities and profiles are intensively mixed. In Cimahpar, that is to say in a sharecropping dominant pattern of agricultural land, the « active » farmers are the most sensitive to economic changes, while in Sentul, where « genuine » farmers land owners are very few and where almost all cassava growers occupy land, the most vulnerable groups are eldest people who try to live with cassava cropping. In the two villages, workers (in agriculture or in factories) appeared to have suffered from the crisis too and entered the cassava plantation system at that time.

Studying cassava plantation conditions before and during the crisis enabled to identify several cassava growers: (1) those whose main activity (as a social status and also as main income) is cassava plantation, (2) those for whom cassava plantation is only part of their activity (whether they are farmers, like in Cimahpar, and it is part of their agricultural activity, they don't have a lot of capital to invest in it; whether they have another activity enabling them to invest in a cassava production), (3) those who will turn to cassava production in case of a sudden reduction in their standard of living. In this third case, crisis showed that cassava plantation is still a « poor crop » for vulnerable people, constantly adjusting to the changing socio-economic environment.

3 - At macro level, this study shows that in north Bogor suburban area, agriculture is surviving: there is no plan for agricultural land use, moreover, the decided plans on the development of the area were largely overcome since speculation and land pressure sharply pushed towards the disappearance of a « planned » or « organised » agriculture (especially as far as water access is concerned). Hence, cassava plantation is only an opportunity, of which two kinds of people (active and less active) took advantage in a different way and in two different land tenure situations. However, as the least endowed and the last in row, they took advantage of the remnant left after a tough and anarchical land acquiring in the north Bogor area. Still, this remnant kept some of them from an unbearable social and economical situation, even though close to it, drifting away the risk of a social outburst during the crisis.

We can now answer the questions raised by A. Koeslag's conclusion in his 1997 study on small-scale starch industries. He was there concerned with cassava roots supply for starch enterprises: cassava cultivation in so-called « illegal areas » (like on the highway banks) is both a proof of a maintained demand for roots and the sign of the decreasing surface area allowed to agriculture purposes. But paradoxically, the second phenomenon, by creating vacant land, enables to respond to the first one. And that is very remarkable, since it leads only to a short-term life of the opportunity created this way. That is why we can say that cassava growers just took advantage of an opportunity, of a short-term recess, whether as a subsistence meant, either for additional

business purposes. But in this opportunity, cassava growers only chose the only crop that could respond to all the constraints (lack of water, non-property and short-term availability of land...) and even turned them into « opportunities » (availability of vacant land for a low cost).

The combination of demand for cassava roots and land use and land tenure patterns led to cassava cultivation situation in north Bogor in the 1990's and during the crisis. It is made of both push and pull factors, determining two logics: a short-term one encouraging cassava plantation, and a long-term one that will lead to its disappearance. The economic crisis only deferred the short term by continuing and even reinforcing the previous practices on vacant land (in Sentul).

But once enterprises will take back their land and use it (or when private owners will have them for other purposes than agriculture), cassava roots production is bound to decrease in the area. In this case, will small-scale starch enterprises be able to support the additional cost due to raw material transport from far away areas? Starch enterprises are also threatened by the way things go, concerning their two main raw materials: water and roots. If rivers are already contaminated and are getting a smaller and smaller flow, what about springs?

There is no planning for cassava production neither for agriculture in the research area. Public services for agriculture base their policy on increasing yields by improving technical methods. But it is clear that as far as the research area is concerned, investments also depend on land status and on the available capital for the farmer. Moreover, it is clear that in the research area, there is no concern for cassava or for cassava growers who 'shouldn't be there'. Even though every one knows about this practice, it is like ignored. But not only some of the cassava growers are threatened but also smallest starch enterprises.

What is now expected is a move to the west part of Bogor District. This move already exists at individual level since farmers and people who sold their land in Sentul or Cimahpar bought some in the west part of Bogor (Leuwiliang). It would be for them an « interrural » movement. The activities of those who stay will definitely move to « urban » activities. However they have to reach a sufficient level of instruction if they want to enter the factories as workers. Planning institutions now formally forecasts this move to the west by supporting a big cassava-processing project in Jasinga (as well as public institutions in Lampung undertook a large-scale cassava production). This project aims at building a 120 000 tonnes capacity starch processing unit thanks to a joint venture between local government, and two private companies (Indonesian and Nederland companies). Less than 10 starch enterprises have already moved there. It seems that this project announces the final disappearance of the cassava crop in the north Bogor area, letting it access to urbanity.

GLOSSARY

A

Aci kasar : coarse starch

Angkot : angkutan kota, transportation system in Bogor, by minibus.

B

BAPEDA : Badan Perencanaan Pembangunan Daerah or Regional Development Planning Agency

BPS : Badan Pusat Statistik or central bureau of statistics (Jakarta and Cibinong)

Borongan : Category of worker paid by the quantity of work that they complete

Buruh bangunan: worker in buildings

Buruh tani: agricultural worker

D

Dalamn angka : statistical annuals

Desa : village

Desakota : suburb zone of an intense mixture of agricultural and non-agricultural activities that often stretch along corridors between large cores.

Dinas Pertanian : District or town office for agricultural issues.

G

Garapan: or Tanah garap , name given to the land cultivated by a farmer and that he does not own.

H

Hadji : name given to those who already went to the pilgrim to Mecca.

Harian : Category of worker paid by day

J

Jabotabek : extended Jakarta metropolitan region, including JAKarta, BOgor, TAngerang and BEKasi, (the first letters of each of them made the word).

Jalan Tol Jagorawi : Modern highway directly connecting the cities of JAKarta, BoGOR and CiaWI (two letters of each name made the name).

K

Kabupaten : District

Kampung : village, it is broadly used in reference to any unregulated or popular settlement.

Kecamatan : sub-district

Kebun : non-irrigated land (generally planted with small tree crops like cassava)

Kotamadya Bogor : City of Bogor

Krupuk : chips

KUD : Koperasi Unit Desa or Village Cooperative Unit

Kuli : Daily or borongan workers, or workers who carry the cassava (or other material like grass) in baskets called « pikul » on the end of the shoulder-poles.

O

Ojek : transportation system by the sale of a motorbike ride.

Onggok : Dry residue from starch processing

P

Palawija : Secondary food crops

Pasar : market

Pedagang: trader

PEMDA, Pemerintah Daerah: Regional Government

Pengilangan aci : small industry for starch processing

Pikul : standard sized baskets. One pikul of peeled cassava equals 70 to 72 kg

P.T., Perseroan Terbatas: enterprise

R

R.T., Rukun Tetangga: person in charge of a neighbourhood in village administration

R.W., Rukun Warga: person in charge of a limited number of households in village administration

Rumah tangga : household

Rupiah : Indonesian currency (with on average 1 USD for 8000 or 9000 rupiah)

S

Sagu : coarse starch

Sawah : irrigated land (often cultivated with rice)

Singkong : cassava

T

Tanah garap : or garapan, name given to the land cultivated by a farmer and that he does not own.

Tapioka : refined cassava flour

Tenaga kerja TK : workforce

Tokoh masyarakat : key-person, usually someone who already went to Mecca, or a religious teacher, a rich or educated man.

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FIGURED GENERAL DATAS

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Kabupaten Bogor Dalam Angka, 2000

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APPENDICES

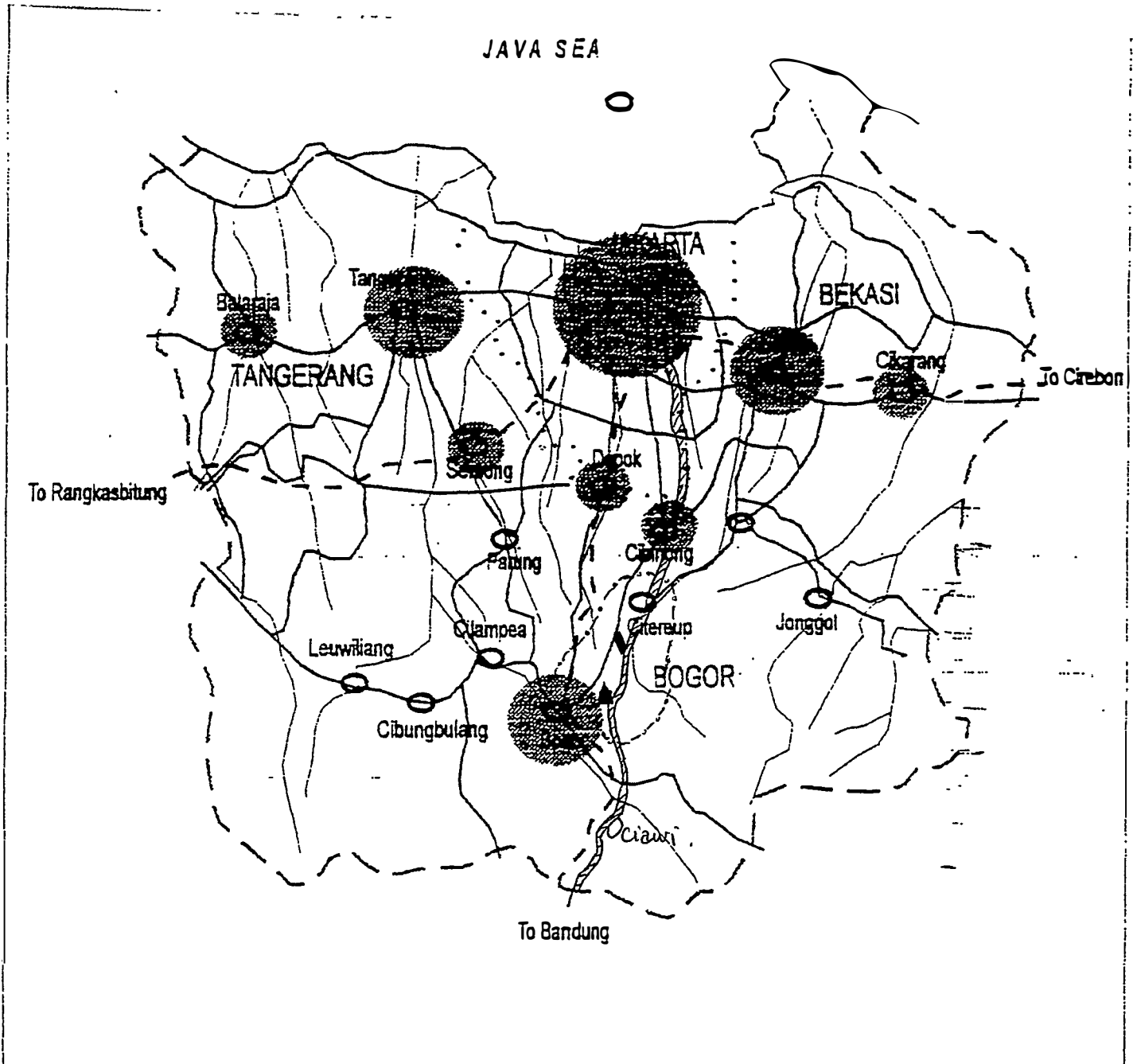





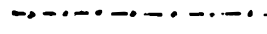


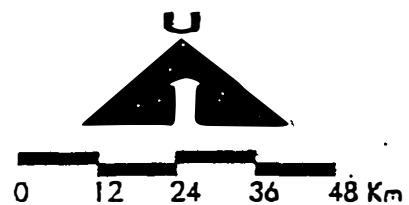
FIGURE 1

RESEARCH AREA

JAKARTA METROPOLITAN AREA

-  Highway
-  JAKARTA BOUNDARY
-  MAIN ROAD
-  SENTUL
-  CIMAHPAR
-  GENERAL SURVEY BOUNDARY.

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Annex 2- list of the interviews

Interviews and people met

Searchers

Pak Erwidodo, economist

Patrice Levang, IRD director in Indonesia

Pak Ernan Rustiadi, Bogor Agriculture Institute (IPB)

Administrative staff

- Agricultural services

Ibu Eliza, agribusiness section, Dinas Pertanian Kabupaten Bogor

Pak Saidun, food crops section, sub-dinas productions, secondary food crops and padi production, Dinas Pertanian Kabupaten Bogor

Pak Robert Hasibuan, food crops section, Dinas Pertanian Kota Bogor

Pak Wawan, PPL (extension worker), Dinas Pertanian Kotamadya Bogor

- Development planning agencies

Pak Ajrin, economics section chief, BAPEDA Kotamadya Bogor

Pak Suwandi, economics section chief, BAPEDA Kabupaten Bogor

- Sub-districts and villages

Pak Dedi Mulyadi, economics and productions section, Kecamatan Sukaraja

Ibu Isbi, PPK, Kecamatan Citeureup

Kantor Desa Cilebut Barat, (Kecamatan Sukaraja)

Kantor Kecamatan Cibinong

Pak Hanafiah, village chief, Desa Sukatani, (Kecamatan Sukaraja)

Village chief, Desa Harapanjaya, (Kecamatan Cibinong)

Village chief, Desa Sukahati, (Kecamatan Cibinong)

Village chief, Desa Karanggan, (Kecamatan Gunung Putri)

Pak ..., Desa Kadumanggu (Kecamatan Babakanmadang)

Pak Daelimi, village chief, Desa Sentul (Kecamatan Babakanmadang)

Pak ..., Desa Cimahpar (Kecamatan Bogor Utara)

Tokoh masyarakat (key persons)

Pak Acep, religious teacher and school owner (East Sentul)

Pak Hadji Soleh, retired state employee, (East Sentul)

Pak Hadji Supriyadi, religious teacher, (West Sentul)

Enterprises

Pak Lufti, secretary of the Kooptar, Tapioca cooperative in the village of Ciluar

Pak Iwan, Pabrik Tapioka Setia, in the village of Ciluar

Entrepreneur in a krupuk small-scale industry, (Bogor)

Security surveyor, P.T. Nova, Sentul

Pak Sugiarto and Pak Wawan, technical and maintenance managers, P.T. Kawasan Bogor Indo, Sentul

Pak Didi Subrata, architect, manager perencanaan dan proyek, Danau Bogor Raya (Cimahpar)

Pak Dadang, jabatan surveyor, mapping, Danau Bogor Raya (Cimahpar)

Pak Agus, security surveyor, Danau Bogor Raya (Cimahpar)

Pak Sumardji, Land management section, P.T. Jasa Marga (Indonesia Highway Corporation), Agency of Jagorawi

Pak Duloh, highway banks cleaner, Jasa Marga

Pak Tolib, ex-worker in the Jasa Marga contractor enterprise, for the exploitation of the land bordering the highway.

Farmers (except those of the series of questionnaires)

Pak Hadji Romli, farmer and starch entrepreneur, Kadumanggu

Pak Musa, factory worker who cultivated along the highway banks during the crisis, (Sentul)

Pak Mongkas, factory dayly worker who cultivated along the highway banks during the crisis, (Sentul)

Pak Misnen, farmer, (East sentul)

The second hand data come from :

BPS Bogor,

BPS Jakarta,

BAPEDA Bogor,

Dinas Pertanian Kotamadya Bogor

Dinas Pertanian Kabupaten Bogor

Annex 3- Map of the research area : cassava crop in the north of Bogor, and explanations

General survey of the area

After a two weeks rapid general survey, several types of cassava harvested areas can be classified, according to the estimations made by every people met (please, refer to the annex). Two types of cassava are dominant in the region, according to the outlet of the production : first, the « singkong pahit » (bitter cassava), which purpose is to make starch, and then, the « singkong kuning » and the « singkong putih » (yellow and white cassava), which are both used to make « tape » and also to be directly consumed. On the map, the green color stands for cassava to make starch, and the pink color stands for the cassava for consumption (direct consumption, « kue » - sweets) and tape.

Area 1 - The specialised area for starch production, which stands for the center part of the cassava production area, mostly encapsulates seven villages : Kedung Halang, Ciparigi, Ciluar, Tanah Baru, Cimahpar, Ciujung and Pasir Laja, divided into two kecamatans, Sukaraja and Bogor Utara. This area is the main zone for starch production : this is where the small starch enterprises (and several tapioca mills) are situated and also where the « singkong pahit » production and harvested area are the most important. This area is pointed by the green color on the map.

Area 2 - The main area for « singkong kuning » and « singkong putih » production, that is to say cassava for consumption, appears with the pink color on the map and encapsulates two main villages : Tangkil and Hambalang. Concerning Tangkil, whose cassava harvested area is higher than 55 hectares of the whole agricultural land of the village, the production contains « pahit » as well as cassava for direct consumption.

Area 3 - Between these two previous areas (1 and 2), a group of villages produces both the two types of cassava, in an equivalent proportion : Kadumanggu, Cipambuan, Citaringgul and Babakanmadang, all part of the Babakanmadang kecamatan. The total amount of their harvested area is not less than 40 % and no more than 55 % of the total agricultural land of each village. Another group of villages whose harvested area characteristics are similar is situated in the Northern part and encapsulates Tengah, Sukahati, Nanggewer, Nanggewer Mekar and Cibinong, all part of the Cibinong Kecamatan.

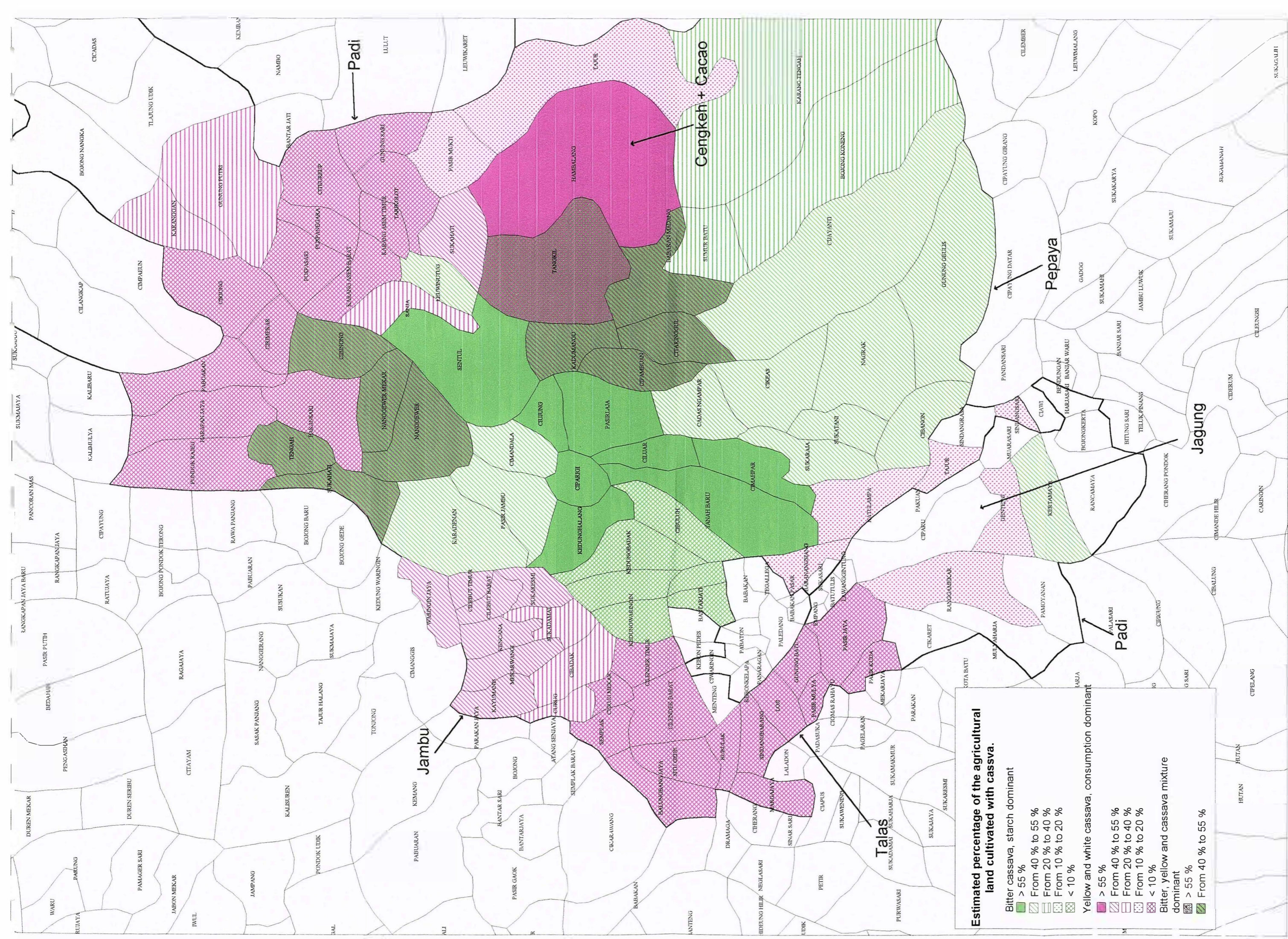
Area 4 - Around the main starch production area appears a second ring in which the cassava harvested area represents from 40 % to 55 % of the total agricultural land. For bitter cassava production, in the north part, four villages are part of this second ring : Karadenan (kecamatan Cibinong), Pasir Jambu and Cimandala (Kecamatan Sukaraja), Sentul (Kecamatan Babakanmadang). In the south East, the second ring for bitter cassava production contains Cadas Ngampar, Cikeas, Sukaraja, Sukatani, Nagrak, Cibanon, and Gunung Geulis in the Sukaraja Kecamatan, Cijayanti in the Babakanmadang Kecamatan, and Leurwinutug in the Citeureup Kecamatan. For cassava intended to be consumed, the second ring encapsulates in the west part : Kayu Manis, Mekarwangi, Kencana, Sukaesmi (Tanahsereal Kecamatan), Cilebut Barat and Timur (Kecamatan Sukaraja), and Waringin Jaya (Bojong Gede Kecamatan); and in the North East part : Sukahati (Citeureup kecamatan).

Area 5 - We can also distinguish a « third ring » where the proportion of cassava harvested area arises from 20 % to 40 % of the total agricultural land in each villages. For the bitter cassava production, this third ring is mostly situated in the South East part, in the Babakanmadang Kecamatan (Sumur Batu, Bojong Koneng and Karangtengah. For the white and the yellow cassava, the third rings contains Curug (Bogor Barat), Cibadak and Sukadamai (Tanahsereal Kecamatan), in the west part, and Sanja (Citeureup kecamatan), Gunung Putri and Karanggan (Gunung Puri kecamatan) in the North East part.

For points 4 and 5, the cassava production is not clearly dominant : there are no lands cropped only with cassava like in points 1, 2 and 3. Associated crops are mostly used, for example, papaya - cassava in the south east part, and cassava - guava in the west part. Cassava can also be associated with other secondary food crops (taro, green beans..), or with corn.

Area 6 - The « fourth ring » is made with the villages whose cassava production uses between 10 % and 20 % of the total agricultural land. The agricultural economy of these villages mostly relies on other crops (padi). They mostly concern cassava meant for consumption and are situated in the external parts of the total survey area: Pasir Mukti and Tajur (Citeureup kecamatan) in the eastern part, Bogor Selatan in the southern part.

Area 7- The last part represents the villages which have not any more agricultural land or very few agricultural land. In these villages, cassava harvested area covers no more than 10 % of the total agricultural land. The land is intended to be used for building houses. The agricultural area and, as a matter of fact, the cassava harvested area is bordered by the towns and the suburbs of Bogor in the south west part, and of Jakarta in the north and north west part.



Estimated percentage of the agricultural land cultivated with cassava.

Bitter cassava, starch dominant

- > 55 %
- From 40 % to 55 %
- From 20 % to 40 %
- From 10 % to 20 %
- < 10 %

Yellow and white cassava, consumption dominant

- > 55 %
- From 40 % to 55 %
- From 20 % to 40 %
- From 10 % to 20 %
- < 10 %

Bitter, yellow and cassava mixture dominant

- > 55 %
- From 40 % to 55 %

Typology of stakeholders in Sentul

PEMILIK Land Owner					BUKAN PEMILIK Not land owner				
PENGARAP Cassava grower					BUKAN PENGARAP Not cassava grower		PENGARAP Cassava grower		BUKAN PENGARAP Not cassava grower
Sendiri Alone		Pakai tenaga kerja Employing workforce			Bukan P.T. Not enterprise	P.T. Enterprise	Sendiri Alone	Pakai tenaga kerja Employing workforce	Landless worker
Pengarang Tanah sendiri / Cutlivating his own land	Pengarang tanah orang lain + menyewakan tanah sendiri / Occupying land + lending his own land	Pengarang Tanah sendiri / Cutlivating his own land	Pengarang Tanah sendiri + tanah orang lain / Cutlivating his own land and occupying land	Pengarang tanah orang lain + bagi hasil tanah sendiri / Occupying land + sharecropping his own land					
TS1	TS2	TS3	TS4	TS5	TS6	TS7	TS8	TS9	TS10
- Pak H. Rasan	- Pak H. Halimi	- Pak H. Baesuni - Pak H. Hassan	- Pak Karta - Pak H. Makfudin - Pak H. Ali - Pak H. Khotib - Pak H. Muhidin	- Pak H. Hylas	- Pak H. Saleh - Pak H. Joan - Pak H. Chasbi	- P.T. Bogor Indo - P.T. Nova	- Pak Husen - Pak Mahmur - Pak Iyan - Pak Tam in + Buruh tani / daily agricultural worker : - Pak Pandi - Pak Ujang	- Pak Midji - Pak Atang - Pak H. Kosasih	- Pak Midsidik - Pak Isak - Pak Rudin

- Typology of stakeholders in Cimahpar

PEMILIK Land Owner					BUKAN PEMILIK Not land owner				
PENGARAP Cassava grower					BUKAN PENGARAP Not cassava grower		PENGARAP Cassava grower		BUKAN PENGARAP Not cassava grower
Sendiri Alone		Pakai tenaga kerja Employing workforce			Bukan P.T. Not enterprise	P.T. Enterprise	Sendiri Alone	Pakai tenaga kerja Employing workforce	Landless worker
Pengarap Tanah sendiri / Cutlivating his own land	Pengarap tanah orang lain + tanah sendiri / occupying land + cultivating his own land	Pengarap Tanah sendiri / Cutlivating his own land	Pengarap tanah sendiri + tanah orang lain / Cultivating his own land + occupying land	Pengarap tanah orang lain + bagi hasil tanah sendiri / Occupying land + sharecropping his own land					
TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	TC10
	- Pak Parman	- Pak H. Rohma	- Pak Sahib	+ buruh - Pak Neng	- Bu Ohom	- P.T. Danau Bogor Raya	- Pak Omay - Pak Ohim - Pak Dayat - Pak Mamad + Buruh tani : - Pak Ata	- Pak Dadang - Pak Saman - Pak Duloh -Pak Suhandi	- Pak Omang - Pak Suminta - Pak Aat

Annex 5 – Land not owned by cassava growers in Sentul

Code typology	Name of the cassava grower	Occupied land (m2)	1st year of occupation	Cost	Tax collector	Owner	Did the farmer owned the land before ?
TS1	Pak Rasan	0	0	0	0	0	0
TS2	Pak H. Halimi	2000	1991	25 000 Rp	Pt surveyor	PT	yes (part of it)
TS3	Pak Baesuni	0	0	0	0	0	0
	Pak H. Hassan	0	0	0	0	0	0
TS4	Pak Karta	10 000	1996	60 000 Rp	municipality	P.T	no
	Pak H. Makfudin	1000	1996	0	intermediate	P.T	no
	Pak H. Ali	800	1999	scpg 1/3	Pak R.T	P.T	no
	Pak Khotib	2000	1970	0	0	private owner	no
	Pak Muhidin	5000	1995	50000 Rp	P.T surveyor	P.T	yes
TS5	Pak H. Hilyas	1000	1991	0	0	P.T	yes
TS6	Pak H. Saleh	0	0	0	0	0	0
	Pak H. Djoan	0	0	0	0	0	0
	Pak H. Chasbi	0	0	0	0	0	0
TS8	Pak Fandi	2000	1998	80 000 Rp	man in charge of land	P.T	?
	Pak Ujang	1000	1999	scpg 20%	P.T surveyor	P.T	no
	Pak Mahmur	7500	1985	0	0	private owner	no
	Pak H. Iyan	2000	1999	50000 Rp	P.T surveyor	P.T	?
	Pak Tamin	1000	2002	0	0	P.T	yes
	Pak Husen	5000	1985	scpg 1/3	private owner	private owner	no
		5000	1992	0	0	P.T	no
TS9	Pak Midji	40000	1997	0	0	private owner	no
	Pak Atang	3000	1999	scpg 10%	P.T surveyor	P.T	no
	Pak Kosasih	10 000	1992	0	0	private owner	no
TS10	Pak Madsidik	0	0	0	0	0	0
	Pak Isak	0	0	0	0	0	0
	Pak Rudin	0	0	0	0	0	0

Scpg : sharecropping

Land not owned by cassava growers in Cimabpar

Code typology	Name of the cassava grower	Occupied land (m2)	1st year of occupation	Cost	Tax collector	Owner	Did the farmer owned the land before ?
TC2	Pak Parman	15 000 ?	1977	0	0	?	no
TC3	Pak H. Rohma	0	0	0	0	0	0
TC4	Pak Sahib	3000	1997	scpg 1/3	owner	private owner	no
TC5	Pak Neng	5000	?	scpg 1/3	owner	Private owner	no
TC6	Bu Ohom	0		0	0	0	
TC8	Pak Omay	10000	1989	scpg 1/3	owner	Private owner	no
		1500	1999	scpg 1/3	owner	Private owner	no
	Pak Ohim	3000	1996	scpg 1/3	owner	Private owner	no
		2000	1999	scpg 1/3	owner	Private owner	no
	Pak Dayat	2000	1996	0	0	Private owner / P.T.	
	Pak Mamad	5000	1996	scpg 1/5	holder ofland	Private owner	no
	Pak Ata	1000	?	scpg 1/3	owner	Private owner	no
TC9	Pak Dadang	5000	?	0	0	Private owner	
		3000	1991	scpg	Family	Private owner	
	Pak Saman	20000	1985	scpg 1/3	owner	Private owner	no
	Pak Duloh	10000	before 1980	scpg 1/3	owner	Private owner	no
TC10	Pak Suhandi	5000	1998	scpg 1/3	owner	P.T	?
	Pak Omang	0	0	0	0	0	0
	Pak Suminta	5000	1996-2001	0	0	Jasa Marga	no
	Pak Aat	0	0	0	0	0	0

scpg : sharecropping

Annex 6- General characteristics of cassava production in the research area

In the research area, cassava is a cash crop rather than a subsistence crop (a source of income rather than a source of food). However, some cassava growers will invest more than other in cassava plantation, (according to different reasons explained in the text). This appendix aims at describing cassava roots production general pattern, in order to be able to situate each cassava grower.

Cassava needs at least a 10 months growing period to produce roots. But the advantage of this crop is that the farmer can leave it into the soil for several months (no more than two or three) before harvest. When cassava is intended to direct consumption, it may be left much more longer, but when it is intended to starch production, the longer it remains into the soil (after 10 months), the more its quality is damaged. That is why, in order to get a good price, cassava growers have to harvest when cassava is aged from 10 to 12 months.

In the research area, two main inputs are always used : manure and urea. Chronologically, cassava plantation is rythmed as follows :

1- **Plantation** : the cassava grower first cut short sticks (20 to 30 cm) in order to take cuttings from grown up cassava trees (usely those of the previous crop or cuttings taken from a neighbour's crop). He let them dry for a few days. In the meantime, he digs the soil over with a spade. Then he plants the cuttings into the soil (only a few cm deep) every meter. (He uses a thread linking two short sticks in order to make a straight rank).

2- During the **first month**, the cassava grower puts on average 0,6 to 1,5 kg manure per m₂. Then he digs the soil over again to mix it with manure.

3- From the second to the seventh month, the cassava grower regularly weeds the field and sometimes digs the soil over again.

4- During the **7th month** : the cassava grower puts on average 0,04 kg urea per m₂.

5- **Harvesting** : when the cassava trees are 10 to 12 months old, the farmer pulled them out of the soil. Usely, the starch entrepreneur or the roots trader who buys the production handle this task. The buyer is the one who pay the workforce for pulling out the roots, peeling them and taking them to the processing unit.

With the indicated quantities of inputs, one may get a **13 tonnes per hectare yield**, (1000 m² of cassava may give about 1,3 tonne of roots). The total inputs cost, considering these quantities, reaches on average 130 Rp / m₂, that is to say 130 000 Rp / ha.

But, if one man is able to work alone on a 1 ha surface area, many cassava growers employ daily workers or workers paid according to the work done (*boronggan*). In the former case, the worker is paid from 10 000 Rp a day (then lunch, cigarettes and coffees may be provided by the employer) to 15 000 Rp a day. In the latter case, the worker will earn 100 Rp for planting and digging over one cassava plant. Most of the time, cassava growers will employ workforce in the harvest and plantation time two or three men during one week to one month, (according to the surface area) to harvest, plant and dig the soil over. Cassava growers will employ women for weeding between the first and the seventh months.

Cassava plantation frequently goes along with **goats breeding**. They are a very appropriated complement for this crop. Each farmer earns several goats (generally 3 or 4). He breeds them in a special sheepfold where the animals are kept one meter above the soil. This method, apart from avoiding bacteria proliferation, makes it easier for the farmer to take manure. He will use manure for cassava plantation. In turn, he will feed the goats with cassava leaves (cassava sticks are too toxic for direct animal food).

Besides having a complementary role for cassava plantation, goats very often play a banking role for farmers.

In Indonesia, there is no special credit for cassava growers. Most of the 1,4 millions hectares of cassava area is cultivated by small farmers characterized by either small capital or low technical capabilities.

In Bogor City, the Dinas Pertanian encourages the association of cassava with other crops to increase yields. It also encourages to cultivate something more profitable than cassava, a crop with higher yields since it became

more profitable to sell the land and save the money in a bank than to plant cassava. But the Dinas Pertanian first way of acting towards cassava plantation is by technological improvement and diseases eradication.

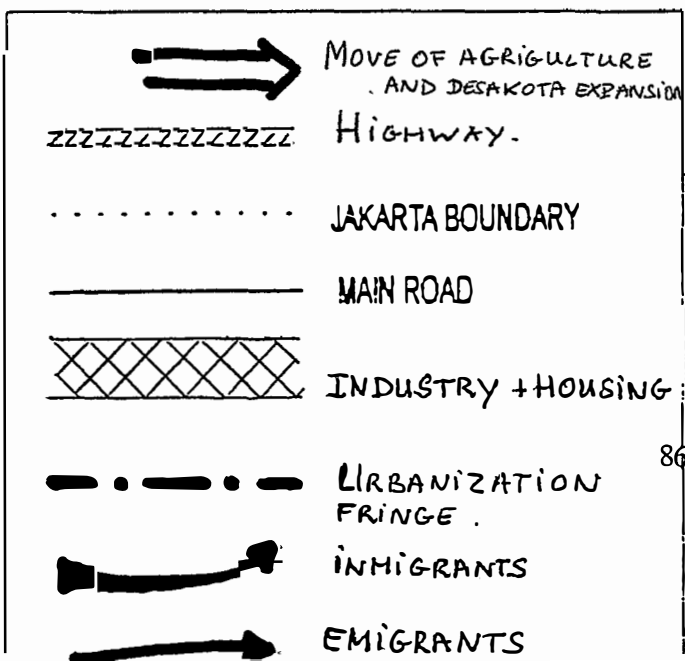
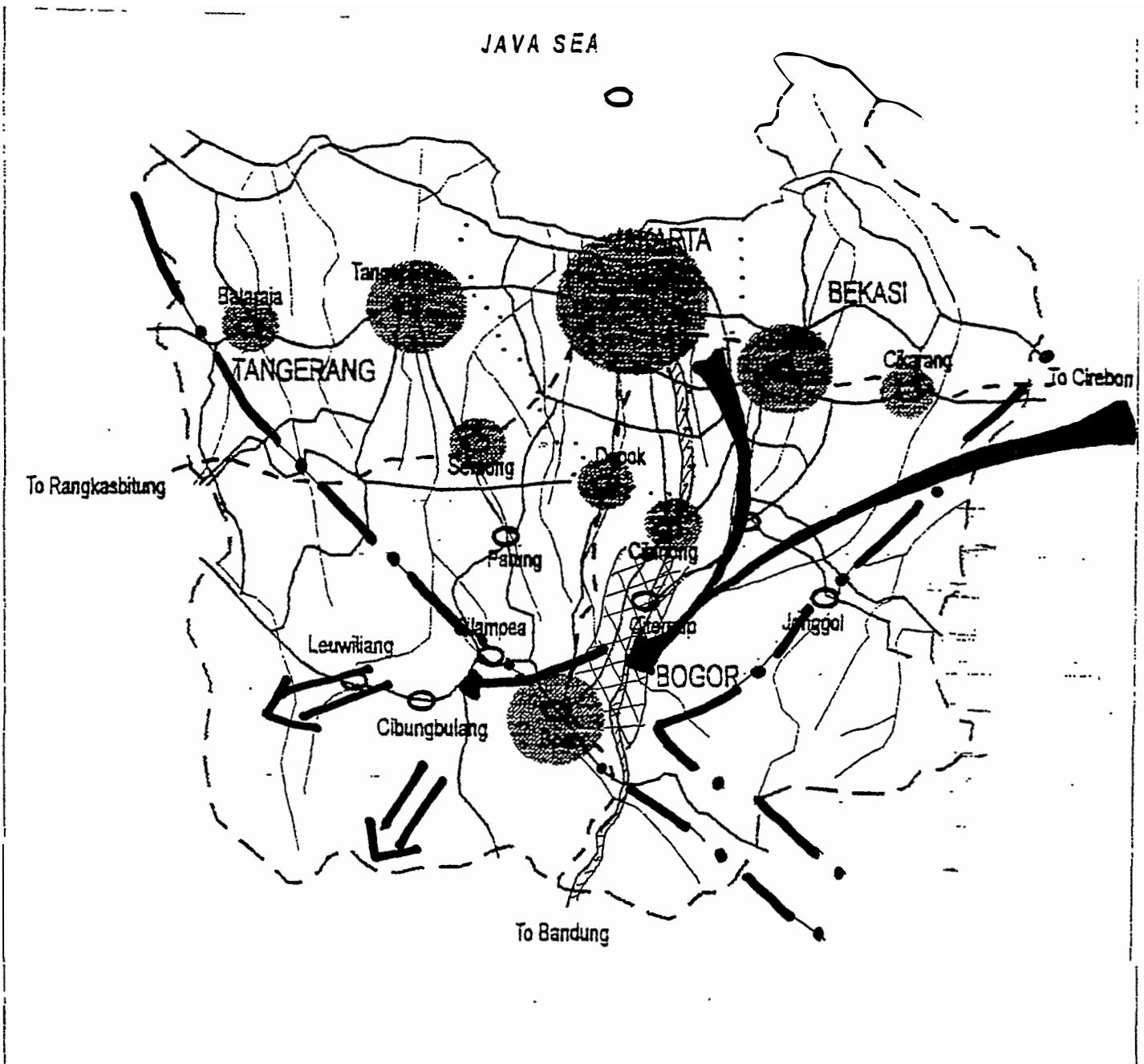
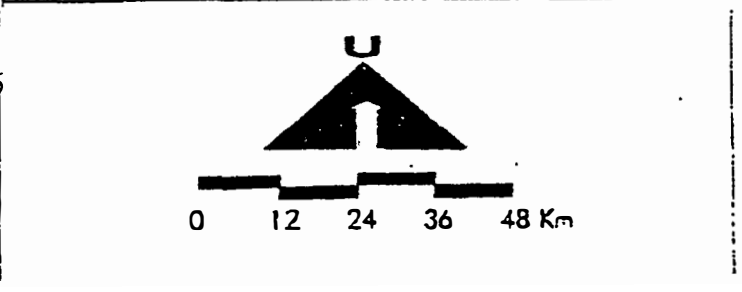


FIGURE 1
LAND USE AND POPULATION MOVEMENTS

JAKARTA METROPOLITAN AREA



Annex 8- Land use change: 1972-2001 in Jakarta Metropolitan region

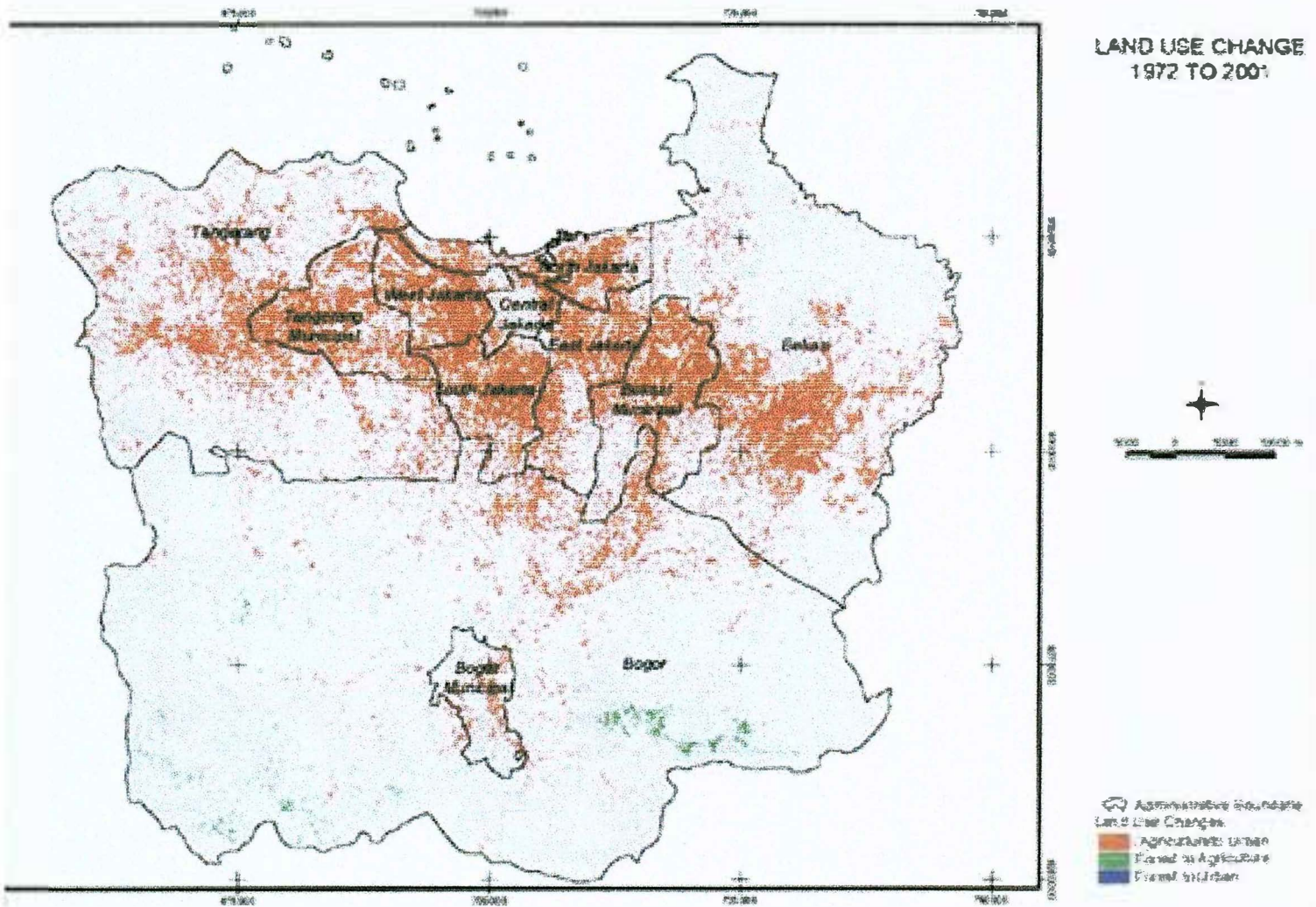


Figure 6. Land Use Change: 1972 to 2001

Sources: Department of soil sciences, Institut Pertanian Bogor, IPB.

Appendix 9 – Photos of occupied land



Cassava cultivation on the Jagorawi highway banks



Sentul : Bogor Indo industrial complex and cassava plantation along the highway banks.



Jasa Marga forbids cassava cultivation on the highway banks by placing signs since 2001.



Tanah Milik P.T. Sigma ProperIndo :
Enterprises owning land in Sewntul

Photos by Robin Bourgeois

