



WORKING PAPER 99.20

**THE IMPACT OF THE ECONOMIC CRISIS ON
INDONESIA'S COCOA SECTOR**

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between

CASER (Bogor) • CIES (Adelaide) • CSIS (Jakarta) • RSPAS (ANU, Canberra)

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**CASER/CSIS/CIES/ANU
joint research project on**



**Policy analysis of linkages
between Indonesia's agricultural
production, trade and
environment**

Rapid economic growth in Indonesia has been accompanied by significant structural changes, including for its agricultural sector and its unique natural environment. Recently questions have been raised about the impact of Indonesia's agricultural, industrial, trade and environmental policies on sustainable rural development. The nature of interactions between the economic activities of different sectors and the environment are such that an intersectoral, system-wide perspective is essential for assessing them. An international perspective also is needed to assess the impact on Indonesia of major shocks abroad, such as the implementation of the Uruguay Round agreements, APEC initiatives, or reforms in former centrally planned economies. There is increasing pressure on supporters of liberal trade to demonstrate that trade reforms at home or abroad affecting countries such as Indonesia will not add to global environmental problems (e.g., deforestation, reduced biodiversity). Again, this requires system-wide quantitative models of the economy and ecology, because typically there are both positive and negative effects at work, so the sign of the net effects ultimately has to be determined empirically.

To begin to address these issues, the Australian Centre for International Agricultural Research (ACIAR) has generously provided funds for a collaborative 3-year project (to mid-1999) involving the University of Adelaide's Centre for International Economic Studies (CIES) as the lead institution, Bogor's Centre for Agro-Socioeconomic Research (CASER) which is affiliated with the Ministry of Agriculture, Jakarta's independent Centre for Strategic and International Studies (CSIS), and the Economics Division of the Research School of Pacific and Asian Studies (RSPAS) at the Australian National University in Canberra. Being based on Indonesia with its rich diversity of environmental resources (and on which there are relatively good data) and its rapid economic growth, the project could also serve as a prototype for similar studies of other developing countries in Southeast Asia and elsewhere.

The key objective of the project is to assess the production, consumption, trade, income distributional, regional, environmental, and welfare effects of structural and policy changes at home and abroad particularly as they will or could affect Indonesia's agricultural sector over the next 5-10 years. Among other things, the analysis will focus both on the effects of economic changes on the environment, and on the impacts on Indonesia's agricultural production and trade of resource and environmental policy changes. The implications of regional and multilateral trade liberalization initiatives and Indonesia's ongoing unilateral trade reforms will be analysed, along with other potential domestic policy changes and significant external shocks such as the entry of China and Taiwan into the World Trade Organization. The analysis will draw on and adapt computable general equilibrium (CGE) models such as the national INDOGEM Model (built as part of an earlier ACIAR project) and the global GTAP Model.

The project is being undertaken in close collaboration with the Indonesian Ministry of Agriculture and ministries involved in trade, planning, and the environment. A Research Advisory Committee has been established to encourage close collaboration of representatives from those and other ministries.

ACIAR INDONESIA RESEARCH PROJECT

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Introduction

After the 'El Nino' drought in 1997, 1998 will be remembered as the 'krismon', or the year of dire monetary depreciation in Indonesia. However, in Sulawesi, in a free market background, a highly competitive marketing chain, and an already booming economy, its cocoa sector is experiencing an unexpected and fabulous windfall: the price of cocoa increased five fold within a few months. This helped farmers in the hills to recoup the losses in yields caused by the drought, and even slightly improve their purchasing power. In the plains, where the cocoa trees resisted the drought quite well, the windfall enabled farmers to buy motorcycles, cars, improve their houses and also to invest in new land. The Sulawesi cocoa sector was already booming before the crisis, but 1998 definitely was the cocoa year. It will accelerate deforestation and investments in new plantings and create jobs. Rice farmers and people from the rice growing regions will keep coming to cocoa pioneer fronts in the highest numbers. However, those who gain the greatest profit from the 1998 windfall are the already established cocoa farmers who have all required information and experience about cocoa. Very few new migrants seem to have come from cities, and none from among unemployed people in the cities.

With regard to cocoa production, Sulawesi (formerly Celebes) is one of the finest historical examples of a cocoa boom. Exports reached 250,000 tonnes in 1996, from zero 20 years earlier, and the island helped Indonesian production to increase from 5,000 to 350,000 tonnes during the same period. Those mainly responsible for this fine economic success are the Bugis people, well known as traders and travellers (Lineton 1975; Pelras 1982, 1996). They migrated from southern Sulawesi to the plains and forest-covered mountains in the western, central-southern, central and northern parts of the island. Many Balinese transmigrants then followed the Bugis steps.

With regard to marketing of cocoa within Sulawesi, the Bugis trading tradition found a new field of application. They filled the niche between grower and exporter, allowing speed and flexibility in the funding and establishment of cocoa sectors. The assumption of the middleman role by people of the same ethnic group as the growers is no doubt one of the reasons for the speed of the boom. The marketing sector is extremely effective, as the grower seems to receive between 80% and 90% of the export FOB price (Ruf 1993: 32-35; Akiyama and Nishio 1996: 12-23). Any price change in New York is usually transferred to the producer within 24 to 72 hours. This was already the case in 1990: when a middleman tried to reduce the price, he was forced to come back to the market price the day after, otherwise he would lose

his market share. This was even more true in 1997, the transference of price changes being closer to 24 hours.

Owing to cocoa, Bugis farmers switched from survival at a subsistence level to relative wealth, enabling an increasing number of families to build nice houses, send their children to school, buy motorcycles and parabolas, and last but not least, to afford a pilgrimage to Mecca. Some Balinese transmigrants also achieved spectacular cocoa success stories, symbolised by wonderful Balinese temples in every backyard. Some have even flown back twice to Bali to show off their success.

All these changes had already occurred before the monetary crisis. No other country has ever achieved such rapid development, neither in terms of tonnage nor, more importantly, in terms of the revenues and enrichment of farmers.

The local historical factors of the DI/TII uprising in the 1950s and the 1960s greatly favoured the triggering of the cocoa boom in the 1970s and 1980s, by bringing information about cocoa and planting material to Sulawesi. Two plantations were created on the western coast around Pasangkayu in 1958, and those plantations have played a key role in providing planting material. Then the DI/TII operations, with its base camps in remote forests, also played a role by showing its members where forest land was available. Many of them remembered those places and migrated there later to plant cocoa. (Ruf, Ehret and Yoddang 1996).

Access to land and price factors played a major role in this boom. As long as land is available, price increases always lead to a strong supply response, mostly by new families entering the cocoa sector through an acceleration of migration. This has already been shown in Ghana in the 1950s (Hill 1956, 1954), and proven again in a number of countries, including Indonesia (Ruf and Ehret 1993). The copying effect enhances the whole story (Pomp and Burger 1995). So with the price of cocoa in rupiah rocketing in 1998 due to the dire monetary depreciation, we may also expect a spectacular supply response in the years to come.

Is that the case? Is the 1998 price surge confirmed? Before the 1998 monetary crisis, most farmers had to endure a severe drought which took its toll on yields and tree stock. To what extent was this felt in terms of revenues in 1998? How have the 1997 ecological and 1998 monetary crises interfered with the cocoa farmers' dynamic? In Sulawesi, most cocoa farmers are still relatively young migrants who own young cocoa orchards with spectacularly high yields and who benefit from an 'almost perfect free market' (Ruf and Yoddang 1996, 1997). How have these 'crises' and price surges influenced some preliminary signs of very local recessions, and the much stronger, and more visible signs of dynamic Bugis and Balinese entrepreneurship?

With regard to the methodology and presentation, we attempt to show the dynamic of Sulawesi cocoa through case-study examples, and small samples of farms followed over time. To appreciate the dynamic before the 'crisis' and the changes in Sulawesi related to that crisis, which is not yet over, the best tool seems to be a follow-up of a few farms, rather than large samples and econometric analysis based on second hand data. However, the presentation is also based on time series and clear charts. The analysis ends at December 1998.

A spectacular windfall from a farmer's point of view

A case-study of a household is an excellent tool to introduce and understand a farming system and its dynamics over the years. Both before and during the monetary crisis, this is what we do here. We take an example from Noling, one of the first villages and regions to adopt cocoa. This began at the end of the 1970s, and developed through the 1980s.

A glimpse of a cocoa farm and its management of trees, labour and capital

Ahmad's farm is around 3.25 ha, which is slightly above the average. Most households in South Sulawesi own between 2 and 3 hectares of cocoa. Taking into account the high yields per hectare, 3.25 ha is already too much to be cared for by the owner and his wife. As the children are sent to school, there is a need to hire workers.

Such hiring is mostly done under the 'bagi hasil' contract, which is a type of share cropping. Three fourths of the cocoa output goes to the owner, one fourth to the worker, and fertiliser and pesticide costs are covered by the owner.

'Bagi hasil' is the most frequently used labour contract in Sulawesi cocoa farming, especially since 1996/97. Around one third of workers are Bugis, and two thirds are Balinese who come from transmigration schemes (often transmigrants' sons and relatives). With the price increase, most Balinese workers paid per month clearly understood that it would be advantageous to switch to bagi hasil contracts, and they managed to impose that change on their employers (the owners). They were right to do so. When the price of cocoa rocketed in 1998, they also gained a share in the windfall.

Table 1. Description of the cocoa farm plots of Ahmad's household (cocoa farm in South Sulawesi)

	Ha	Date of planting	Site location	Who manages that farm	1993	1995	1998
Plot 1	1	1982	plain (Buntu Batu)	owner	owner	owner	owner
Plot 2	0.75	1983	plain (Noling)	<i>Bagi hasil</i>	<i>GADAI</i>	<i>NEW GADAI</i>	
Plot 3	1	1985	foothills (Noling) ex army base camp	<i>Bagi hasil</i>	<i>Bagi hasil</i>	<i>Bagi hasil</i>	
Plot 4	0.5	1986	foothills (Noling) ex army base camp	owner	<i>Bagi hasil</i>	<i>Bagi hasil</i>	
Total	3.25						

Sources: data collected by authors, CIRAD/ASKINDO.

If there is a lack of labour, and a need for fresh capital, an alternative is 'gadai' or 'pledging'. The pledge is made for one to three years and the return of the plantation is then accompanied by loan repayment. Some 5% to 25% of cocoa farmers have, at least once, pledged a cocoa plot or a rice field to obtain credit.

Of course, the amount of cash involved in the gadai transaction depends on the estimated yield of the farm plot and on the current cocoa price. In 1992, when the price of cocoa was at its lowest, around 1,300 rupiah per kilogram, the amount was between 1 and 2.5 million rupiah, with a pledge of 0.25-1.25 hectares of cocoa trees for a minimum period of 1-2 years and longer if the borrower was unable to repay the loan (Ruf and Jamaluddin 1995: 359).

In 1995, with a price of around 2,500 rupiah per kilogram, and for a high yielding 0.75 ha plot in the plains, the amount borrowable was 7 million rupiah for three years. The lender and the borrower could also attempt to anticipate prices. If the cocoa price increases just after the transaction, the lender is the winner and the borrower is the loser. If the price suddenly increases just before the end of the contract, and if the owner pledged only a part of his farm, it becomes easy for him to repay the loan. This is what happened to Ahmad in February 1998. He took the opportunity of the sudden price increase (to some 10 000 Rp/kg) to tie the farm to a new lender for an amount of 13 million rupiah for another three years, and to refund the former with his 7 million.

The amount paid in 1998 was only twice that of 1995 and did not fully follow the cocoa price, which quadrupled. The owner was in a hurry to negotiate a new pledging in order to seize the opportunity of the booming price and to refund the former lender. The new lender may

have also anticipated a price decline, knowing that the 1998 bonanza was not going to last for ever. Anyway, between the refunding of 7 million and the new gadai of 13 million, this transaction enabled the owner to get a net profit of 6 million rupiah in 1998.

Table 2 Relationship between cocoa prices and cocoa farm pledging in the plains. Ahmad's case, Noling, South Sulawesi.

	1992	1995	February 1998	ratio 1998:95
Price of cocoa (Rp/kg)	1 300	2 500	10 000	4
'Gadai' (pledging) of a cocoa farm in the plains. Average amount (Rp/ ha/ year)	1 000 000	2 300 000	4 300 000	1.8

Source: data collected by authors, CIRAD/ASKINDO.

The 1998 cocoa windfall : the net income tripled in nominal terms

The use of cocoa trees as collateral is one way to get credit and to cash in on the cocoa windfall. However, it is certainly not the best way. By keeping other farm plots under full control, as most cocoa owners do, Ahmad benefited enormously from the windfall (Table 3).

Owing to the free cocoa market in Sulawesi and to the free exchange rate of the currency, the price in rupiah followed the international price in dollars, and exploded in rupiah in 1998. This helped to maintain the net output, expressed in US dollars, and to triple it in rupiah. "Net output" here means that only the fertiliser and pesticide costs are withdrawn from the output. The labour costs are not taken into account. However, as 'bagi hasil' workers are paid 20% of the output, and if the depreciation costs of the plantation investment are excluded, it can be estimated that the net profit Ahmad is around 80% of the net output; If herbicides are used, as they mostly are, to save labour, costs are paid by the 'bagi hasil' worker). Over the last five years, the net cocoa output has remained remarkably stable, at a level close to US \$5500 per year, and thus the net profit is around \$4000 to \$4500, which means a spectacular bonanza of 55 million rupiah in 1998.

Table 3. Follow-up of input and output of Ahmad's farm from 1993 to 1998

year	price (Rp/kg)	Cocoa output (kg)	Cocoa output (Rp)	Fertiliser expenses (Rp)	Pesticide s expenses (Rp)	Net output (Rp)	Exchange Net output rate (Rp/\$)	(\$)
'93	1 484	5 044	7 484 655	630 000	50 000	6 804 655	2096	3 246
'94	2 140	6 046	12 938 425	1 190 000	100 000	11 639 425	2176	5 349
'95	2 292	5 771	13 228 653	978 000	100 000	12 150 653	2258	5 381
'96	2 601	6 873	17 875 600	1 200 000	125 000	16 550 600	2350	7 043
'97	3 458	5 421	18 746 090	1 426 000	150 000	17 170 090	2900	5 921
'98	12 669	4 610	58 403 475	2 500 000	250 000	55 653 475	10416	5 343

Source: data collected by authors, CIRAD/ASKINDO.

These astonishing results were achieved despite a drop of 25% in yields in 1998, as compared with the average of previous years. This drop is due to the El Nino related drought in 1997.

The 1997 drought and the differences between plains and hills

In terms of rainfall and yields, 1996 was an excellent year. In 1997 only the second harvest at the end of the year was affected by the drought. A 'normal yield' for a 'normal year' is something between the 1996 and 1997 yields and the impact of the drought in 1998 must be compared with that average. On the whole farm, the decline was around 25%.

However, this 25% decline was the result of two very different impacts of the drought, one in the plains and one in the hills. In the rich alluvial plains, the decline in yields was often limited to a mere 5 to 15%. In fields close to river with humid soils and easy irrigation, some yields were even higher. The impact was more severe in the hills, with a drop in yields around 35 to 40% (Table 4).

Table 4: Average yields and impact of the 1997 drought in the plains and foothills (Ahmad's farm)

Years	Plot 1 in the plains (1 ha)(kg/ha)	Plots 3-4 in foothills (1.5 ha) (kg/ha)	Average of all plots (kg/ha)
1996	3138	2490	2749
1997	2876	1696	2168
1998	2664	1297	1844

Source: Weekly follow-up of farms, by Ruf, Yoddang and Rais, 1996-1998.

A 20% decline in yields is representative of villages, such as Noling, set in alluvial plains, where farmers own farms in the plains and on the surrounding foothills. The decline may reach 35% to 50% in villages in the hills, where most farmers only own plantations on tight slopes and in micro-regions which have been deforested for several years.¹ In regions where deforestation has hardly begun, like in Central Sulawesi, the impact of El Nino was relatively low. New migrants still benefited from the forest atmosphere and from the forest 'rent'.

In terms of incomes, owing to the 1998 boom price in current rupiah, almost all farmers gained something from the balance between the drought and the windfall. The change in yields varied from -50% to + 5% but usually was more than offset by the 300% to 500% increase in prices in 1998 as compared with 1996/1997.

Had the drought not been followed by rocketing prices, the Sulawesi cocoa boom would have experienced some migrations of established cocoa farmers. They would have tried to escape the negative impact of the drought by looking for new forests, and attempted to profit from the forest 'rent'. However, many farmers would have faced recessions. Owing to the 'crisis', they did not. The dire monetary depreciation was a really important positive factor which enabled farmers to keep faith in cocoa and which encouraged the whole dynamic.

A brief look at the use or non-use of the extra incomes

Compared with the 18 million rupiah gained in 1997, Ahmad gained 58 million rupiah. This makes an extra 40 million plus the 6 million he earned by reallocating the pledged plot to a new lender. How did he use the 46 extra million rupiah?

¹ In rare cases, some farmers in the hills also managed to buy or hire water pumps and irrigate some of the farm plots not too far from mountain rivers.

He redistributed an additional 3.5 million to his 'bagi hasil' workers which shows that the windfall also benefited the workers to some extent; many of them were able to buy motorcycles in 1998.

He improved his house with some 5 million rupiah. He increased the scholarship budget for his sons to 7 million rupiah. He bought a motor sprayer for Rp 600,000. Above all, he intended to buy land and had left a 30 million rupiah deposit at what he believed to be a new form of local cooperative bank, called KOSPIN (Koperasi Simpan Pinjam), offering very high interest rates. This turned out to be a swindle, and he lost the 30 million KOSPIN was banned and closed down by local authorities by the end of 1998.

Although this is a serious loss according to the scale of the South Sulawesi province, this case is of course not representative of how farmers used or did not use their money. For instance at the level of Noling village, some 5% of the farmers might have been cheated that way and Ahmad was certainly one the biggest victims.

Our interest in this case is not in the cheating itself, but in stressing that the windfall was totally unanticipated by farmers. These incautious deposits can be interpreted as a form of hasty behaviour leading to financial losses. Farmers were unprepared for the opportunity to invest that money. In coherence with the Dutch disease theory, which says that unexpected windfalls lead to waste, there were some wastes and losses.

However, the windfall was also widely used to improve the standards of living and to invest in agriculture, especially in new land (see Section 4).

The fabulous cocoa windfall from a middleman point of view

In 1998, the cocoa windfall clearly benefited farmers and their workers. Beyond case study examples, this can also be illustrated at a regional level by data recorded with one of three biggest middlemen based in Palopo, South Sulawesi. The relationship between the increasing production trend explained by new plantings coming into production, and the price increase of June-July 1998, generated enormous wealth in mid 1998. As the competition between middlemen remained intense, the bulk of this wealth went to the cocoa farmers.

However, despite competition, this gave the opportunity for the middlemen's profit margins to increase in nominal terms. According to the middleman tonnage and his position in the marketing chain, his average margin used to vary, before the crisis, between Rp 40 and Rp 125 per kilogram. In June/July 1998, it varied between Rp 300 and Rp 600. It also was a spectacular bonanza for middlemen from June to

September 1998. In the recorded case, the middleman was able to buy cars, a truck, land for housing and also fund the construction of a new store. More importantly, he added hundreds of million rupiah to his available capital, and therefore can expand his commercial activities. It was a real windfall.

A real windfall and enrichment of cocoa farmers

In mid 1998, almost all cocoa farmers are smiling, and many of them provide obvious examples of the excellent rates of “exchange” between cocoa and most goods and services. Rather than using official commodity prices, which are general and not necessarily relevant to the rural regions, our own records were used. These include price data collected in the rural market of Noling also prices quoted by farmers, which are often more illuminating than official statements

Motorcycles and cars

“With only one big cocoa sale, I got 9.5 million rupiah and I immediately bought three motorcycles, one for each of my sons! Last year, you needed *two tonnes* of cocoa for buying one 50 cc bike. Now you need *less than one tonne*” (Noling farmer, July 1998). There is not much to add to that farmer’s comment.

Rice

Compared with mid 1997, the price of rice was 200% higher at the end of 1998. This increase does not deter interest and investment in cocoa. In all countries where we studied competition and complementarities between food crop systems and cocoa/coffee farms, we always found that a cocoa : rice or coffee : rice price ratio, around 1.5, is sufficient not to deter investment in tree crop farms. Investment is only endangered when that price ratio falls below 1.5, which was the case in Madagascar coffee regions (Blanc-Pamard and Ruf 1992: 229).

This was confirmed by recent adopters of cocoa in Sulawesi in 1990, when the price had slumped as compared with 1987. Many answered that they would continue to plant and maintain cocoa as long as the selling price of cocoa was above the purchase price of rice. The main reason was return for labour ratio. Rice needs to be planted every year or twice a year, while cocoa only once “for ever”, or at most every 20 to 25 years.

It can be seen here that the comparative price of cocoa and rice is always above 2, even at its lowest point in 1992. In 1987 and 1988, and again since 1995, it is around or above 3, which is extremely stimulating. In mid 1998, it peaked at 8, but fell in late 1998. However, it has returned to a level of around 3, this remains a price ratio extremely favourable to new cocoa investments, namely new plantings.

Fertilisers

Up to the mid 1980s, the price of fertilisers increased, but much less rapidly than the price of cocoa. In mid July, at the peak of the monetary crisis, urea and TSP prices increased by only 10 to 20%. However, in November-December 1998, the final removal of government subsidies, plus the shortage of fertiliser (probably due to the exhaustion of imported stocks or to the temptation of re-exporting them) made this input suddenly much more expensive. In December 1998, prices of all basic N (nitrogen), P (phosphate) and K (potassium) fertilisers were higher by 100% to 200% as compared with mid 1997. The comparative price of cocoa to urea came back to its 1989 level. Buying one bag of TSP and KCl in December 1998 required two and three times more cocoa respectively than 10 years earlier. This is one of the rare products whose price increased more than the price of cocoa. This happened recently, in December 1998.

Labour costs and participation of some workers in the windfall

Contracts on a daily basis

In 1989, smallholders needed to sell around 1.7 kg of cocoa to cover the cost of one day of hired labour, (including one or two meals, coffee and cigarettes). In late 1993, as the price of cocoa recovered, the ratio started decreasing. In July 1998, due to the spectacular price increase, to 18,000 rupiah per kilogram, the ratio fell to an all time low, around 0.5 kg. However, this triggered demands for increased pay from workers, who obtained an 80% increase in daily wages. As a result, when the international price decreased the ratio returned to 1.3 kg of cocoa to cover one day of labour. In short, although almost back to the 1989 situation, the comparative price of cocoa to labour is still more favourable than in the early 1990s. This should encourage farmers to hire daily workers and to invest in new cocoa plantings.

Meanwhile, an 80% increase in labour wages also shows that there is a shortage of available labour. Those who are prepared to sell their labour for a few days are in a strong position. At first sight, the increase to 80% seems modest compared with the increase of 100 to 200% for rice and fertilisers. In coherence with the basic theory, non tradeable inputs or 'less-tradeable' inputs such as labour seem to increase less rapidly than tradeable ones. However those who are willing to be hired as daily workers are either neighbours' sons and daughters, and Balinese workers working as monthly workers and share-croppers. The latter tell another story about trends in labour costs.

Share-cropping contracts

By definition, if sharing rates are maintained, share-cropping contracts are neutral with regard to unexpected and sudden price changes. According to share-cropping theories, this protection against risks is precisely one of the reasons behind share cropping arrangements. Even if the proportion gained by the share cropper seems low (between one sixth and one fourth) if the price of cocoa increases by 400%, and as fertilisers and pesticides have to be bought by the owner, the revenue also increases by close to 400%.

In addition, Balinese who used to accept wages on a monthly basis switched *en masse* to 'bagi hasil' contracts one year before. This clever change means that their wages increased enormously in 1997 as compared with 1996 and again in 1998 as compared with 1997.

Partial Conclusion

Although the peak was reached in mid 1998, levels will probably never be that high again. However the price of cocoa, comparative to all factors of production and goods, remains more favourable than ever before, at least in December 1998. To some extent, workers also benefited, yet they did not hamper the smallholders' success story.

How was the windfall used ?

Motorcycles and cars

In Palopo city, 40 km from Noling, there was a waiting list for motorcycles, either new or second hand. One of the most spectacular and visible impact of the "monetary crisis" was the purchase of cars, and more rarely, trucks and buses. Cocoa farmers were suddenly in a position to buy new cars for less than \$5000. The actual percentage of farmers that bought cars in 1998 is quite low, no more than 3 to 5% even in well established cocoa villages no more than 3 to 5% of farmers bought cars in 1998. However, in a village of 400 families, this meant a sudden additional arrival of 12 to 20 cars; This changed the atmosphere of the village considerably.

Savings, losses and waste

The case of pseudo cooperatives like 'KOSPIN' and thefts of money show that many farmers did not know how to save all of that sudden wealth. In July 1999, they came to middlemen's shops with bags of cocoa and left again with, almost literally, bags of bank notes. Small wonder they were unsure how to handle their new found wealth. This was one of the reasons they bought cars or curious items such as washing machines, or freezers, although there was not always electricity in their houses. They were aware of the fragility of the windfall and of

the need to buy something before the expected drop in the price of cocoa. They also knew that they had to buy things before prices of items increased.

It was as if there were not enough goods on sale. Some farmers, unavoidably, fell victim to criminals and were swindled through deposit systems which offered extremely high interest rates. These losses are much less visible than car purchases and constitute difficult to obtain information. However, in a village like Noling, such circumstances affected something like 5% of cocoa farmers.

Agricultural inputs such as fertilisers: relative stability and innovations

In mid 1998, even though the increase in the price of fertilisers had not yet occurred, except for KCl, preliminary discussions with farmers indicated a possible decline in fertiliser consumption. Fertiliser prices were considered to be increasing and their physical availability was becoming uncertain. However, by the end of 1998, survey results indicated that fertiliser consumption changed with regard to the type of fertilisers but remained relatively high in absolute terms.

This is an opportunity to stress the high degree of fertiliser consumption in Sulawesi. In Noling, in 1993/94, a sample of 20 households and 48 farm plots, showed an average use of 600 kg of NPK per hectare in the plains and some 500 kg in hills. \ Ahmad's case shows that these averages can be exceeded. Some farmers use more than 1000 kg of N,P and K per hectare. Moreover, after some 15 years of cocoa growing, fertiliser traders started to promote 'Kaptan,' or lime, as a "new fertiliser" which could keep yields quite high in aging cocoa farm plots.

Data from 1998 is not available yet, but taking into account the enormous and increasing consumption of fertilisers on the farm, a possible slight decline in 1998 might not be detrimental and may be rather more rational.

Table 5: Average amount of fertilisers applied per hectare in Ahmad's farms. Evolution from '93-'97

	NPK kg/ha	Lime kg/ha
1993	676	0
1994	892	1260
1995	1000	1600
1997	1100	580

Source: regular follow-up by Ruf, Yoddang and Raïs.

Table 6: Changes in fertiliser consumption between 1993 and 1997 in Ahmad's cocoa farm., Noling village.

Year and area	Number of 50 kg Fertiliser bags					Lime	Expenses (Rp)	Expenses (% of output)
	Urea (N)	TSP (P)	KCl (K)	Sub-total of NPK				
1993 (3.25 ha)	24	10	10	44		0	630 000	8.4
1994 (3.25 ha)	40	6	12	58		82	1 190 000	9.3
1995 (2.5 ha)*	38	0	12	50		80	978 000	7.4
1997 (2.5 ha)	33	0	22	55		29	1 426 000	7.6

Sources : follow-up by Ruf, Yoddang, Raïs and Kassa, CIRAD/ASKINDO.

* Note : In 1995, one plot of 0.75 ha was used as collateral and put in 'Gadai'

The sudden increase in price of fertilisers at the end of 1998 may well favour a more rational use of basic NPK fertilisers, and at the same time promote the adoption of lime, which costs 6000 rupiah per bag. Lime traders represent it to cocoa smallholders as a an alternative to TSP and KCl, which now cost more than 100,000 rupiah per bag. However, after 15 years of cocoa cultivation, this increasing adoption of lime seems to have come at the right time. A "crisis" is always an opportunity for change and innovation.

At the end of 1998, the first conclusion must be to stress the wide range of farmers' responses to the fertiliser price increase. This depends on the location of the farm, and its condition after the drought . In many cases, despite the price increase, farmers knew that they would have to increase fertiliser application at the end of the year, in order to save their trees after the drought. In the village of Noling, provisional results are given in Table 7.

Table 7: Changes in fertiliser consumption in 1998, Noling.

Changes in fertiliser consumption in 1998 compared with 1997	% of farmers
Increase	50
Decrease	25
No change	21
Missing data	3
Total	100

Source: survey by authors, CIRAD/ASKINDO, Sept. 1998

The second conclusion must be that, between those who had to increase fertiliser consumption to save their trees and those who could afford to reduce fertilisation, the average 1998 consumption more or less stabilised and was close to that of 1997, around 500 to 600 kilograms of the basic NPK fertiliser per hectare.

Some investment in replanting or attempts at replanting

Although some farmers were already getting ready for replanting, by establishing nurseries in October 1997, a number of failures had to be expected. On the other hand other farmers might well not try to replant, but might instead look for 'better land' somewhere else (Ruf 1997). Rather than re-plantings, many new plantings must be expected in the coming years. New plantings seem to have resumed since 1994 and even accelerated in 1996. In 1998, as the farm gate price has increased five times in a few months, all the factors are in place for encouraging new migration and new plantings

The thirst and rush for land and forest

If a commodity price increases, and if there is still forest land available, migrations will accelerate at the expense of tropical forests. As mentioned in the introduction, this was demonstrated in cocoa farming in Ghana in the 1950s at an, apparently, low level of technology (Hill 1956, 1964). The same thing was demonstrated in Côte d'Ivoire under similar conditions and levels of technology and in Sulawesi in the 1990s, despite a high technological level, spectacularly high yields and access to herbicides which helped with the replanting of grassland fallows (Ruf 1995, Ruf, Penot and Yoddang 1999). Moreover, once 'cocoa fever' has tempted migrants and boosted their expectations, even if the current price decreases, prices anticipated by farmers keep increasing in their minds. This may be enough to keep deforestation reasonably active.

Lack of land necessarily limits impact

From a sample of 40 farmers, mostly based in Noling and along the main road to Tampumea village in the hills behind Noling, it would be difficult to deny increasing price as an influence on the migration and planting decision, at least in the 1980s when land was still abundant and easy to negotiate.

Even when land is abundant, price is not the only factor stimulating new plantings. A 'copying effect' also plays a role, as 50% of farmers do not necessarily know the exact price of cocoa when they make the decision to plant (Burger and Pomp, 1995). However, the

copying effect is a way to estimate and anticipate good revenues from a new crop without having precise information about prices. From the success stories of people who planted before them, and from what these first adopters can buy (zinc roofs, motorcycles, trips to Mecca), farmers know that they can make much more money by planting cocoa than maize, or whatever they used to grow before. If the price of cocoa increases, the first adopters may buy more luxurious things, and thus the copying effect is a direct tool for turning price increases into new investments, even though the new investor does not know the exact price.

In addition, after several years of cocoa farming in Sulawesi, information about prices is much more precise than in the early era of cocoa adoption. The first reason for this is that any potential investors are already cocoa farmers. The 1998 price hike may thus have a tremendous impact in the years to come. Before 1998, the price increases since 1994 should also have provided an incentive for farmers to plant.

This however has not been seen in the case of Noling and Tampumea villages, because the land around Noling and the main road to Tampumea has already been fully planted since 1990. Expansion of the planted areas to the forested hills is, in theory, forbidden, as this is State forest land. However, in practice, enforcement of this by the Forestry service is not very effective. Thus there are still new plantings in the steep hills behind Tampumea, and forest clearing is being resumed in the 1990s, with these new pioneers building houses or shelters close to their new planting. Following the usual processes in new pioneer fronts, this will lead to creation of a new village in the mountains later on.

However, taking into account the remoteness of these mountains and the steep slopes, the only people who are prepared to come are poor migrants who have no alternatives, and no capital or experience. Those who have both, such as the majority of the established cocoa farmers in Noling and Tampumea, prefer to look for more accessible and fertile land in the plains and foothills in other areas. This accumulated experience and capital has a huge impact on forests in new regions and pioneer fronts.

A more significant impact on pioneer fronts and deforestation

Eventually, one of the most visible impacts of the cocoa price hike in an already well established cocoa village is not new local forest clearings, but instead the organisation of cocoa farmers in groups to hire buses and collectively look for forests in remote regions, especially in the province of Central Sulawesi. In a village like Noling, the

movement to organise groups of farmers and look for land had already started in 1995/96 and in 1997, but accelerated in 1998. At least three groups of 10 to 30 farmers organised themselves to achieve that objective.

One of the most current active pioneer fronts in Central Sulawesi is the Bungku region. The first major observation is that new plantings started to take off in 1992 when the price of cocoa was at its lowest point, and this accelerated in 1995 when the price really increased, but well before the crisis. In 1998, new plantings even seemed to have slowed down a little. However, this is because new migrants have not yet had time to arrive in large numbers. They are very likely to come and start planting in 1999. The real numbers of new migrants are certainly above those that were quickly recorded in September 1998. Many more may have come in the last few months of 1998. On the other hand, if new migrants did not establish their own plantations and built their own houses or provisional shelters, they were difficult to meet, identify and so count.

In short, although it is still difficult to demonstrate with figures collected in 1998, forest clearing, and more importantly forest appropriation (with or without monetary transactions) are on an exponential rise since the monetary crisis and the price hike. This should be easier to demonstrate with data from surveys that will be conducted in 1999 and 2000. Now, if cocoa attracts new migrants, then in accordance with its historical role, cocoa cultivation will create new jobs. Where do these migrants come from? Does cocoa help to solve unemployment in the cities?

Do the monetary crisis and cocoa planting create jobs?

The details of migrants' jobs and origins before coming to Bungku confirm the importance of transfers from the rice to the cocoa sector (see Table 8).

Due to the spectacular incomes obtained in the cocoa sector, to the capital accumulated in land, the use of draft animals and new tools in rice farming, and also due to the labour freed up by the Green Revolution, a major transfer occurred in terms of capital, labour, innovations as was the case with fertilisers (Ruf and Yoddang 1996, 1997). The transfer of labour through migrations from the rice-growing regions to cocoa pioneer fronts was started in the early 1990s, and continued in 1997 and 1998 (Table 9).

Table 8: Status and jobs of migrants before they came to Bungku

Status/ job	Percentage
Rice farmer	37
Rice farmer's son	13
Cocoa farmer	13
Cocoa and rice farmer	8
Cocoa farmer's son	3
Cloth trader, driver	10
Wood trader	3
Agricultural worker	3
Resettled by the army after the control of the DI/TII uprising in the 1960s	5
Non active, still young	5
Total	100

Source: survey by authors, CIRAD/ASKINDO, Sept. 1998.

Table 9: Region of origin, and employment sector of migrants before arrival in Bungku. Evolution in 1997/1998

	% of all migrants	% among migrants arrived in 1997/98
Rice sector	50	47
Cocoa sector	24	35
Other rural sector	16	0
Services and more urban activities	10	18
Total	100	100

Source: survey by authors, CIRAD/ASKINDO, Sept. 1998.

In 1998, having only conducted preliminary surveys, with small samples, in Central Sulawesi, it is still too early to make conclusions on such a major issue. However, even small samples seem to confirm what is seen in South Sulawesi. The actors who display the most active entrepreneurship in new forest clearings and cocoa plantings in 1997 and 1998 are the already established cocoa farmers. This is logical, as they have the most information about cocoa and land, and also have the planting material. The most important thing is that their experience in cocoa farming helps them to anticipate and evaluate what they can do in a new region. They can be much more ambitious than in their former cocoa farms, and can

increase the areas cleared and planted. The same process occurred in Ivory Coast in the 1970s and 1980s.

However, from observations in Bungku, we suggest that people formerly employed in the service sector and more 'urban' activities such as cloth traders and drivers also benefit from information and contacts given by their jobs with the rural and cocoa sectors. A few people from these service sectors are also likely to plant cocoa in the near future. This will be a hypothesis to test in the years to come.

Conclusion

Cocoa supply and revenues

1997 will be remembered as the year of a disastrous drought which caused revenue losses that same year, but was also a driving force for searching out new forest land for cocoa planting.

1998 will be remembered as a terrible 'krismon year' in most regions of Java, but as the 'cocoa year' in Sulawesi. Throughout Sulawesi, 1998 brought a spectacular windfall, which in the short term helped tremendously to overcome the effects of the drought in established cocoa producing regions.

It was an extraordinary 'cocoa year', for all actors in the cocoa sector, and another factor which accelerated the clearing of forest for new plantings. Thus, through migrations and new clearings and plantings, the 'crisis' triggered new job opportunities in the cocoa sector.

This is being achieved without any investment from the state or large private companies. The investments are entirely financed by smallholders. 1999 and 2000 should confirm these trends in forest clearance and new plantings, and thousands of jobs should be created.

Impacts on the other sectors of Sulawesi and other islands

The most important short term effect lay in the consumption capacity. While shops were unable to sell anything in Java, cocoa farmers and traders suddenly gained unexpected and huge purchasing power. They benefited from that themselves, and in addition, they also helped commercial activity to survive in the whole country, by providing an outlet for goods in Sulawesi.

In terms of jobs, the impact on other sectors is less certain. Among new Sulawesi migrants in 1998, most job opportunities seem to be taken by people coming from families who came from the rice growing regions, and from families *already involved in cocoa*. The

latter have expanded their cocoa plantings, and involved their relatives in a new cocoa cycle. They are efficient, because they already have all the information about cocoa production, the capital to use it, and have the experience to get forest land for themselves, and to resell it. They create institutional arrangements to accelerate the buying and selling of land. For instance they can afford to look for land in pioneer regions and then hire somebody to go the regions of the south and propose that land to be sold. They become sort of brokers and promoters between the potential supply of, and demand for land.

At the end of 1998, migration from cities seem marginal. Although we can now find numerous people below the poverty line, we have not yet recorded clear cases of migrations to the rural and cocoa regions. However, this is to be expected in 1999/2000, and will be studied then. Among migrants from other rural regions of Indonesia, there are more hopes. From Bali especially, we expect more spontaneous migrants to arrive, as a result of two main processes: calls by relatives who are already established in Sulawesi, and the 'copying effect' inspired by the success stories of other Balinese with cocoa, made spectacular by the rocketing price.

Land conflicts and social risk

Troubles encountered in some places in Sumatra, such as the destruction of assets of estates by angry smallholders whose land had been taken over, may be less crucial in Sulawesi as there are relatively fewer estates on this island. However there are some cases, and the risk is far from being nil.

Policies

As the Indonesian currency collapse has stopped, and is fortunately appearing to recover, Sulawesi cocoa farmers may face the paradox of a downturn in 1999 and 2000. Especially if the international cocoa price keeps falling, there is a unavoidable risk that the local cocoa price will plunge, after the spectacular 1998 windfall. This would be a major disappointment in Sulawesi. In this case, the main pitfall to avoid would be the introduction of a tax on cocoa revenues. This would not be the right time to impose it.

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