

Part 2. Research studies in aid programmes

Economic crisis, farming systems and forest cover change in the humid forest zone of Cameroon†

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SUMMARY

The rate of forest clearing by small farmers in the humid forest zone (HFZ) of Cameroon increased significantly in a period of economic crisis dating from 1986. A random sample survey of 648 households was conducted in 54 villages in the HFZ to understand the effect of the crisis and of a 1994 currency devaluation on the practices of small farmers, and the effect of these practices on forest cover change. Three hypotheses were tested concerning: (1) the balance between export crop and food crop production; (2) the degree of market-orientation of food crop production; and (3) the gender division of labour. Among the key results are that: (1) the area of cocoa production has stagnated while that of coffee, plantain and other food crops has tended to increase; (2) food crop production is now more market-oriented; and (3) men are now far more involved in food crop production than in the past. The results corroborate other studies showing that increased deforestation in the HFZ is largely a product of these three factors and also of: increased rural population, partly resulting from urban-rural migration; decline of food imports and corresponding increase in food crop production; decreased government subsidies for agricultural inputs; and increased logging. The study concludes that: (1) macroeconomic instability can lead to unforeseen and grave consequences not only for the well-being of farmers but also for efforts to protect remaining tropical forests; and that (2) crop diversification might be one way to help avert future income shocks to farmers and minimize forest clearing activity.

Keywords: Cameroon, farming systems, forest clearing.

INTRODUCTION

Central Africa's 200 million ha of humid tropical forest (in the Democratic Republic of Congo, the Popular Republic of Congo, Central African Republic, Gabon, Equatorial Guinea, and Cameroon) are the second largest remaining such area in the world after the forests of the Amazon basin in Latin America (Laporte *et al.* 1995, Talbot 1993). Cameroon's humid forest zone (HFZ), in the southern third of the country, is estimated at 17 million ha (Laporte *et al.* 1999) or about a tenth of Central Africa's humid forests. The area of annual deforestation in Cameroon is estimated to be between 80,000 and 200,000 ha (Ndoye and Kaimowitz forthcoming), or 0.4 - 1.0% of the total area in Cameroon. Population growth and swidden cultivation are viewed as the main cause and agent, respectively, of deforestation in Cameroon (Amelung and Diehl 1992, Hoogeveen and van Soest 1993, Thiele and Wiebelt 1994). Other factors include logging (Amelung and Diehl 1992, Thiele and Wiebelt 1994), the construction of transportation infrastructure (Mamingi *et al.* 1996), and the establishment of agricultural plantations.

Research conducted by the Center for International Forestry Research (CIFOR) found that the rate of net

deforestation in the HFZ increased substantially during a period of economic crisis dating from 1986 (Sunderlin *et al.* forthcoming). In a 42,000 ha block in the peri-urban zone of Cameroon's capital Yaoundé, satellite imagery data show that the average rate of annual net deforestation increased by a factor of two in the period 1987-1995 as compared to the period 1973-1988.¹ In a 110,000 ha block in the region of Bertoua (East Province), the average annual rate of net deforestation doubled in the period 1986-1996 as compared to the period 1973-1986 (Mertens and Lambin 2000). In a 70,000 ha block in the Ndélélé region (East province bordering the Central African Republic), satellite imagery

² This paper is an adaptation of a longer report: Bikié, Henriette, Ndoye, O. and Sunderlin, W.D. 1999 L'impact de la crise économique sur les systèmes agricoles et le changement du couvert forestier dans la Zone Forestière Humide du Cameroun. Occasional Paper No. 27, CIFOR, Bogor, Indonesia.

¹ These results are from satellite imagery research conducted by Nadine Laporte for CIFOR in 1998.

data show that the average rate of annual net deforestation increased by more than four times in the period 1986–1996 as compared to the period 1973–1986 (Mertens *et al.* 2000).

The crisis was caused by a decline of the world prices of oil, cocoa, and coffee (Cameroon's leading foreign exchange earners), by diminishing supplies of Cameroonian oil, and by overvaluation of the national currency (francs de la Coopération Financière en Afrique - CFA franc) against the US dollar. Prior to the crisis, from the mid-1970s to 1985, real GDP growth averaged 7% per year (EIU 1997). During the crisis, from 1987 to 1993, average annual GDP change was negative (EIU 1997). In 1989, the government dealt a massive blow to rural producers by reducing by approximately half the producer prices for cocoa and coffee. In January 1994 a major (50%) devaluation of the CFA franc was implemented in Cameroon and in the other African countries using that currency² to boost the competitiveness of exports. In the period 1995 to 1998, Cameroon's real GDP growth has averaged 4.7% (EIU 1999).

The CIFOR research found that eight factors explain the increased rate of net deforestation during Cameroon's economic crisis:

1. With declining prices for cocoa and coffee, and increased demand for food crops, small farmers reduced their cocoa and coffee harvests and increased production of food crops for the market (Pokam and Sunderlin 1999, Bikié *et al.* 1999).
2. Farmers tended to maintain their cocoa and coffee orchards even if they did not harvest them, implying that new food crop production tended to be established on freshly-cleared forest land, rather than on existing agricultural lands (Pokam and Sunderlin 1999).
3. The population of rural villages in the HFZ grew, in part because of return migration from the city to the countryside (Pokam and Sunderlin 1999).
4. The absolute number of farming households in the HFZ grew (even though farming households declined as a proportion of all rural households) (Pokam and Sunderlin 1999).
5. Food imports declined, which boosted demand for food crops produced within the country (Ndoye and Kaimowitz forthcoming).
6. Food crop production, in comparison to tree crops (cocoa and coffee), implies more forest clearing because it tends to require more exposure to sunlight and because, unlike tree crops, food crops require extensive fallow lands due to swidden practice (Ndoye and Kaimowitz forthcoming).
7. Agriculture became more extensive as a result of the withdrawal of government subsidies for agriculture (*e.g.* fertilizers, pesticides and herbicides) and the increased cost of these inputs.
8. Logging was accelerated after the 1994 currency devaluation (Eba'a-Atyi 1998), and particularly in the East province – a development that facilitated migration, colonisation and clearing of agricultural lands.

This paper concentrates on one of three field research components of the CIFOR research. The first component,

carried out in August to December 1997, was a survey of all 4,078 households in 38 villages in the Centre and South provinces (Pokam and Sunderlin 1999). The survey emphasised population and migration trends since the 1970s, but also gave some attention to the practices of small farmers, in particular changes in the area of particular crops and forest clearing practices. The second component, carried out in March to May 1998, was a random sample survey of 648 households in 54 villages in the Centre, South and East provinces. It is the basis for this paper and for Bikié *et al.* (1999). The third component, carried out in August and September 1998, was a random sample survey of 552 households in 33 villages in the so-called 'Ndélélé' block, a 700 km² area in the East province bordering the Central African Republic. This component replicated many of the farming systems questions posed in the second component, and in particular sought to understand farming systems changes in relation to time-series satellite imagery of forest cover change (see Mertens *et al.* 2000).

The results of the 54-village survey provide insights on changes during the crisis in the practices of small farmers concerning land use, crop production and marketing, and gender division of labour, and how those changes have in turn affected forest cover in Cameroon's HFZ. This paper addresses these themes in three subsequent sections. The next section explains the hypotheses tested and the methodology used in the survey. The empirical results of the survey are presented in the following section. The final section summarises the results and discusses policy implications.

HYPOTHESES AND METHODOLOGY

Hypotheses

Three hypotheses were tested in the 54-village study concerning: (1) the balance between export crop and food crop production; (2) the degree of market-orientation of food crop production; and (3) the gender division of labour. This section states the hypotheses and explains why they were posed.

Hypothesis 1 on the balance between export crop and food crop production

The first hypothesis states that: Since the beginning of the crisis in 1986, cocoa and coffee have stagnated, especially in terms of area increases. Farmers have made up the slack through increased production of food crops, especially plantain, which is usually grown in newly-cleared forest land.

² The countries using the CFA franc are: Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Equatorial Guinea, Gabon, Mali, Niger, the Popular Republic of Congo and Senegal.

Several studies provide strong evidence in support of this hypothesis. Research by CIFOR in 1997 in 38 villages in the Centre and South provinces showed stagnation in the area devoted to cocoa and coffee, as well as increased area of plantain and other food crops (Pokam and Sunderlin 1999). This paper, reporting on the empirical results of a subsequent CIFOR survey in 54 villages in the Centre, South and East provinces, aims to confirm and deepen our understanding of the 38-village study. Additional evidence is supplied by other research. A study by Gockowski (1997), using a simulation model based on a sample of 4,906 households surveyed between 1984 and 1989, estimated an increase of 3,600 ha in the area of plantain in the Centre and South provinces after a drastic decrease in the price of cocoa in 1989. Sieffert and Truong (no date: 7) relate growing interest in the production of food crops, as well as a tendency to produce one-hectare plantain orchards in primary forest areas, to problems that affected export crops beginning in 1988. A survey of 60 producers of export crops revealed that before 1989, 83% of the producers prioritised coffee, whereas in 1992, 62% of the same producers prioritised food crops (Tchouamo 1994:346).

This hypothesis distinguishes plantain from 'other food crops' because of the exceptional importance of plantain in the themes broached by this study. Plantain is not only a key crop for production and consumption in the HFZ, but is also important in terms of forest cover because of the tendency to establish it in newly-cleared forests.

It should be emphasised that this hypothesis has strong forest cover implications because a turn to food crops implies greater forest clearing: cocoa and coffee tend to be grown in the shade of trees, and food crops tend to require not only more sunlight, but also fallow land.

Hypothesis 2 on the degree of market-orientation of food crop production

The second hypothesis states that: In the period of the crisis, production of food crops for the market increased to compensate for the loss of income from cocoa and coffee.

According to Tiayon (1998: 4), food crops have become more and more commercialised by rural households. Sieffert and Druong (no date:10) say that income from food crops is used to cover a larger share of household expenditures since the drastic decline in income from export crops. In the village of Nkometou in the Centre province, for instance, food crops provided 49% of household income in 1996, whereas cocoa and fruit trees provided only 17% (Endama and Sonwa 1998:28). A survey of 183 coffee-producing households in the Littoral and East provinces showed that the proportion of household income from the sale of food crops rose from 1% in 1987 to 28% in 1992 (Fadani 1993: 26). A survey conducted in three villages of the Centre province (Ngala 1997:132) showed that 41% of household income came from food crops as against 23% from cocoa and coffee.

This hypothesis reinforces the forest-cover implications of the first hypothesis. To the extent that households go beyond production of food crops for household consumption,

they amplify the greater forest-clearing consequences of food crops as compared to tree crops (cocoa and coffee).

Hypothesis 3 on changes in the gender division of labor

The third hypothesis states that: The collapse of export crop prices has led to growing participation by men in the production of food crops. Although the gender division of labour has been strong (*i.e.* in the past men produced almost exclusively cocoa and coffee, and women, food crops), it has weakened as a consequence of the urgent need to increase household income.

This hypothesis is strongly-supported by CIFOR's 38-village study on population and migration (Pokam and Sunderlin 1999). Other studies provide anecdotal field observations rather than survey data. For example, according to Tchouamo (1994:349), men have become more and more involved in the production of food crops, bringing into question the gender division of labour in farm households whereby women specialise in food crops and men specialise in export crop production. In general, observations on the gender of labour on farms in Cameroon provide only limited insight on the process of change, because they note conditions during the crisis but provide no data on conditions before the crisis.

This hypothesis, like hypotheses 1 and 2, has strong forest cover implications inasmuch as a flexible gender division of labour is the 'vehicle' that permits significantly expanded food crop production at the farm level.

Methodology

Questions were posed to the head of household and spouse (in cases where there was a spouse) concerning changes over time in: the area planted to cocoa, coffee, plantain, or other food crops; the type of land on which plantain was established; the use of agricultural inputs including fertilizer, insecticide, fungicide, herbicide and labour; the production, marketing, and income from particular crops; and the location (primary or secondary forest) and area of forest clearings in 1996 and 1997, and the method of clearing (chainsaw or no chainsaw).³

The respondents were asked to specify these changes in terms of three key reference years: 1985, the year before the beginning of the economic crisis; 1993, a year in the midst of the crisis and one year prior to the currency devaluation; and 1997, three years after the devaluation. The challenges of using a long-term recall methodology were met in the following three ways. First, we knew from the survey pre-test that the distant reference years 1985 and 1993 would adequately serve as mnemonic devices because they were commonly associated with abrupt socio-economic transitions.⁴

³ Other questions were posed as well on the length of fallows and on the gathering and production of non-timber forest products.

⁴ If respondents needed additional help to locate themselves in time, the enumerators would ask (for example): 'During the year that you began farming...?' or 'When your son was X years old...?'

Second, all long-term recall questions posed simple rather than complex questions. For example, we sought to know the *comparative* direction of change of area of agricultural lands (larger, same, smaller) and not the *absolute* change of area between reference years. Third, survey enumerators were instructed to be unhesitant to record the answer 'Respondent does not know' if they had the slightest doubt about the respondent's capacity to remember.

The sample frame for the selection of study villages and households was as follows.

In each of the ten departments of the Centre province, in each of the four departments of the South province, and in each of the four departments of the East province, three subdivisions (districts) were chosen randomly. In each one of these 54 districts, one village was chosen randomly. This yielded a distribution of 30 villages in the Centre province, 12 villages in the South province and 12 villages in the East province. Twelve respondent households were selected at random in each of the 54 study villages, yielding a total of 648 respondent households. A uniform number of respondent households in each study village simplifies village-level analysis, even though it biases the sample somewhat toward smaller villages.

Owing to constraints of time and finances we were able to survey only three of the five provinces in the HFZ. The other provinces are the South-West and Littoral provinces. In spite of this limitation it should be noted that the Centre, South and

East provinces include more than three quarters of the forest area in the HFZ (Gartlan 1989:31-32) and more than half the total population of the five provinces (Pokam 1997:36).

EMPIRICAL RESULTS

Before reporting the empirical results with respect to the three hypotheses, it is important first to report some general information that provides a context for interpreting the results. Among all 648 respondent households, 447 (69%) produce cocoa, 168 (26%) produce coffee, 600 (93%) produce plantain, and 641 (99%) produce 'other food crops' (FC). Most of the households produce several of the key crop types, *i.e.* cocoa, coffee, plantain, or other food crops.

The empirical results are reported below in keeping with the sequence of the three hypotheses concerning: the balance of the area of export and food crops; the commercialisation of food crops; and the gender division of labour of farming.

Results on the changing area of export and food crops

In general terms the results support the first hypothesis stating that the areas of cocoa and coffee have tended to stagnate, while those of plantain and other food crops have tended to grow. Figure 2 shows that in both periods of comparison (1985-1993 and 1993-1997) 40% or more of cocoa and

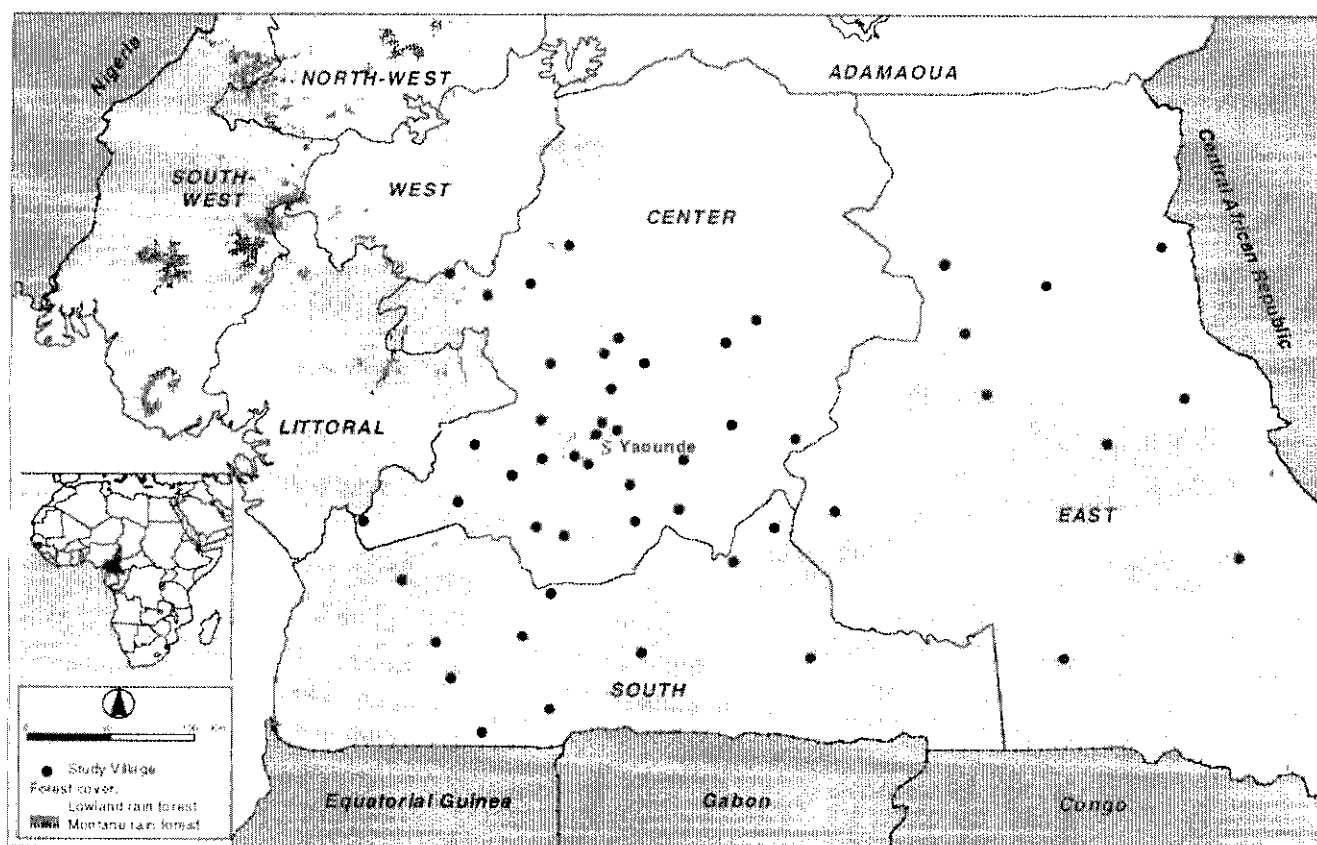


FIGURE 1 *Locations of 54 villages studied in the humid forest zone of Cameroon.*

coffee producing households had no change in the area of their cocoa and coffee, and more than 50% of households producing plantain and other food crops expanded the area of these crops.

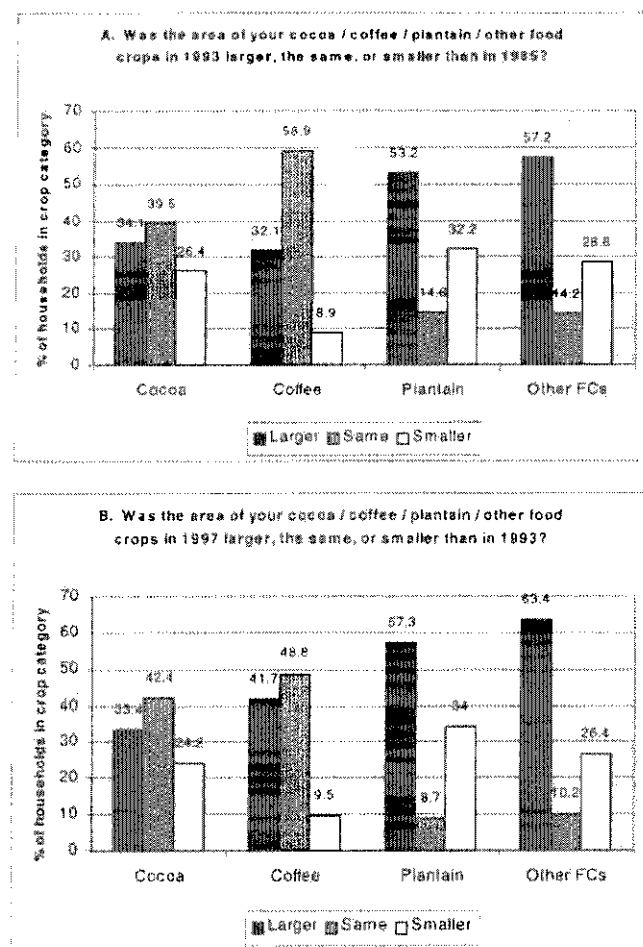


FIGURE 2 Change in area of various crops, 1985 as compared to 1993 (A) and 1993 as compared to 1997 (B)

There are, however, two notable exceptions to these general patterns. First, whereas the area of cocoa growth is close to completely stagnant (dominant tendency toward no change in area, and percentage of households showing increase in area barely larger than those showing decrease), the same is not true for coffee. The percentage of coffee producing households showing increased area of coffee is substantially larger than the percentage of such households showing a decreased area of coffee. So whereas both cocoa and coffee show a central tendency toward no change in area, the net area of cocoa growth is slight while that of coffee is appreciable. Note, however, that there are many fewer coffee producing households than cocoa producing households.

The second exception is that while plantain and other food crops show a dominant tendency toward area growth and only a small propensity for areas to remain the same, there is a notable percentage (26-34%) of households showing a decline in area of these crops. Research on the causes of this volatility was carried out in the population and

migration component of the CIFOR field research. It was found that the volatility occurs mainly in villages relatively near to Yaoundé. Among the reasons for the decreased area of food crops in some villages is declining soil fertility and unavailability of forests for clearing (mainly with respect to plantain), and decreased household labour force in some households (with respect to both plantain and other food crops) (Sunderlin and Pokam 1999).

Some of the food crop expansion in the crisis period results from shifting emphasis within households from tree crops to food crops, whereas some results from expansion of the household labour force. Population increase is evident among the study households. In 1985-1993, 53.0% grew, 16.7% stayed the same size, and 30.3% got smaller. In 1993-1997, 48.2% grew, 20.8% stayed the same size, and 31.0% got smaller.⁵ An association between household size and food crop area is evident in the following information. Among the 292 plantain-producing households that grew in size in the period 1993-1997, 67.8% increased their plantain area, 6.2% maintained the same area, and 26.0% decreased their plantain area; among the 194 plantain-producing households that *decreased* in size in the period 1993-1997, 50.0% increased their area of plantain, 10.3% maintained the same area, and 39.7% decreased their plantain area. The positive association of household size and food crop area holds true in the 1985-1993 comparison, and for 'other food crops' as well. It should not escape our notice, however, that about a quarter of food crop-producing households increased their food crop area in spite of stable or decreasing household size, demonstrating clearly that household population size is not the only relevant factor to be considered.

Results on the commercialisation of food crops

The research results generally support the hypothesis stating that in the period of the crisis, production of food crops for the market would increase to compensate for the loss of income from cocoa and coffee. The results on change in the area of export and food crops (Figure 2) give preliminary evidence confirming this trend. Additional evidence is supplied through the results on changes in the production and marketing of, and income from, various crops.

⁵ The 38-village study provides detailed information on rural population growth during the pre-crisis and crisis periods in the Center and South provinces (Pokam and Sunderlin 1999). Between 1976 and 1987 population in the study villages grew 8.2% or 0.7% on an annual basis. Between 1987 and 1997 population in the study villages grew 45.5% or 4.1% on an annual basis. One of the villages (Ngoulemakong) distorts the results because in recent decades it has become a part of peri-urban Yaoundé; the large population growth in this village cannot properly be considered rural. If Ngoulemakong is removed from the calculations the general pattern is evident: 1.6% overall growth (0.1% annually) in 1976-1987; and 23.9% overall growth (2.2% annually) in 1987-1997.

Figure 3 shows that in both periods of comparison (1985-1993 and 1993-1997) half or more of cocoa and coffee producing households reduced their production, whereas half or more of households producing plantain or other food crops increased their production of these crops. Note, however, that a third or more of cocoa and coffee producing households *increased* their production of these crops in both comparative periods. Some producers felt compelled to increase their production of export crops, in spite of extremely low producer prices prior to the devaluation, in order to make ends meet. Increased production of cocoa and coffee after the devaluation often involved resumption of harvesting of trees that had been neglected during the period of extremely low prices, rather than from new stands. It is noteworthy that production of plantain and other food crops fell for a third or more of households producing these crops in both periods. This is related to the reasons for volatility of the area of these crops explained above.

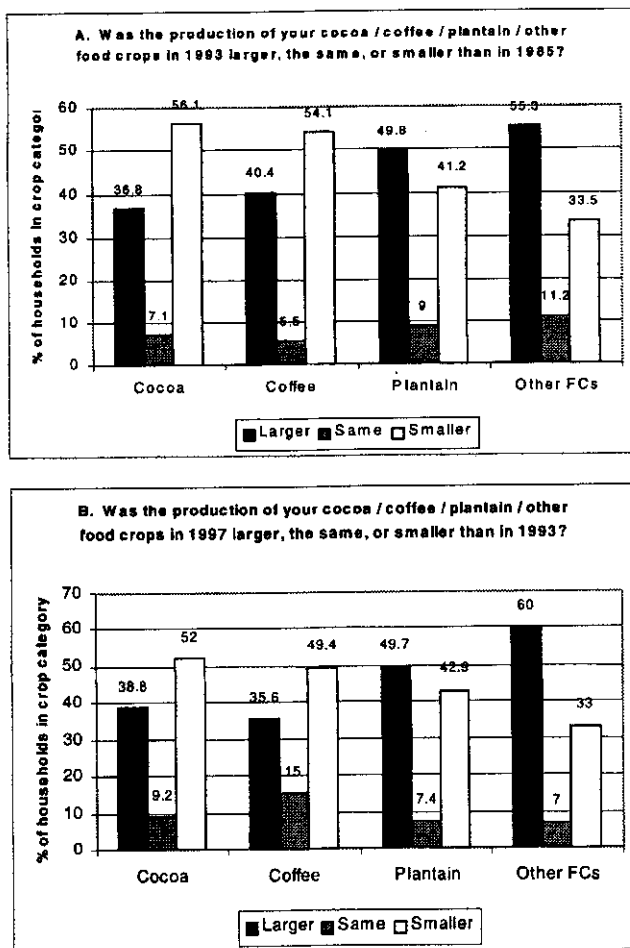


FIGURE 3 Change in production of various crops, 1985 as compared to 1993 (A) and 1993 as compared to 1997 (B)

The respondents were asked to report the proportion of their production of plantain and other food crops sold in the three reference years. The proportion of households selling half or more of their plantain production went from 24.4% in 1985, to 27.5% in 1993, to 30.4% in 1997. The proportion of

households selling half or more of their other food crop production went from 23.4% in 1985, to 26.3% in 1993, to 26.2% in 1997. By this measurement the change is not significant, but nonetheless indicates a trend toward increased commercialisation of these crops.

Figure 4 explains the reasons propelling increased attention to food crops during the crisis, as well as renewed attention to export crops after the 1994 devaluation. In the first comparative period A (1985-1993), more than two-thirds of cocoa and coffee producers found that their cash income from these crops was smaller in 1993 than in 1985. In the same period, almost half of producers of food crops (combining plantain and other food crops) found that their cash income from these crops was higher in 1993 than in 1985. In the second comparative period B (1993-1997), more than 60% of cocoa and coffee producers found that their cash income from these crops was higher in 1997 than in 1993; in the same period, more than half of food crop producers found that their cash income from food crops had increased.

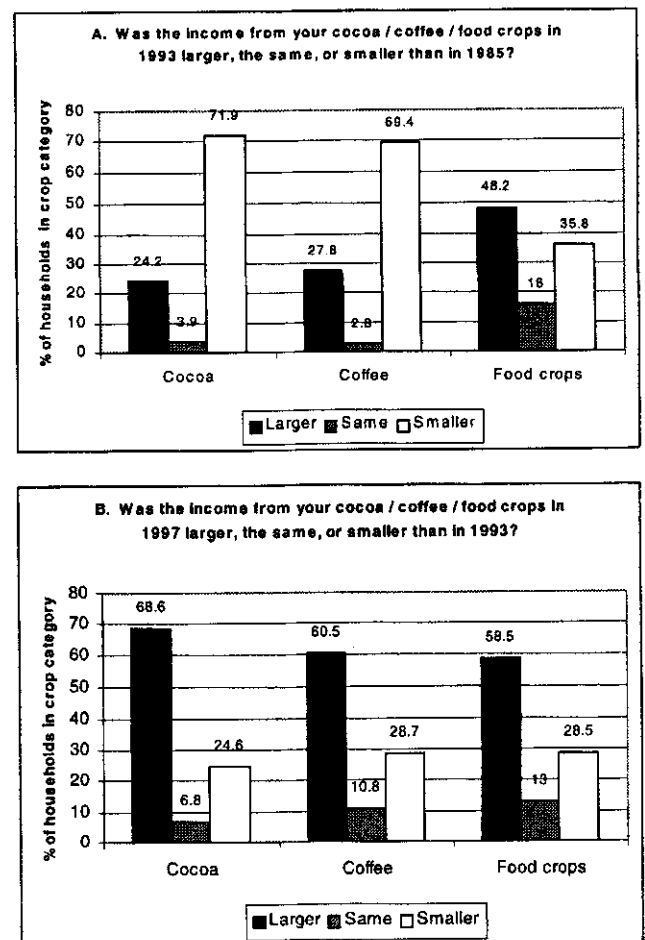


FIGURE 4 Change in cash income from various crops, 1985 as compared to 1993 (A) and 1993 as compared to 1997 (B)

Why is there little observable change from period A to period B with respect to the area change of crops (Figure 2) and production of crops (Figure 3), in spite of the dramatic

shift in income occasioned by the devaluation (Figure 4)? The explanation provides an important insight on why forest clearing increased significantly in the early part of the crisis. In spite of dramatically lower prices for cocoa and coffee in 1989, most producers decided to maintain or even increase their area of these crops in the hope that – at some point in the future – these sources of revenue would once again be profitable. As we noted, many increased production of cocoa and coffee (Figure 3) in spite of low prices (Figure 4). The implication of valuing cocoa and coffee orchards, in spite of the collapse of the market for these crops, is that in many cases increased cultivation of food crops took place not in place of cocoa and coffee, but rather outside the orchards on cleared forest lands.

Results on the gender division of labour

The research results strongly confirm the hypothesis that the collapse of export crop prices would lead to growing participation by men in the production of food crops. Figure 5 shows that since the mid-1970s the heads of farm households, the great majority of whom are men,⁶ have greatly increased their participation in the production of marketable food crops. In 1974-75 in 38 villages in the Centre and South provinces, 84% of heads of household described themselves as producers of cocoa and coffee and only 6% were producers of food crops (Franqueville 1987).

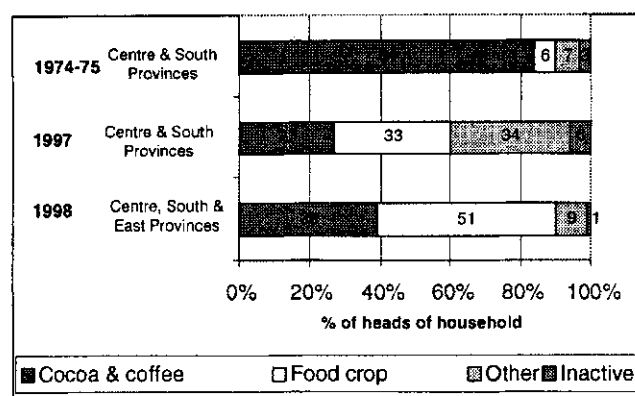


FIGURE 5 Change of occupations of heads of household, 1974-75 and 1997-98

Notes:

- (1) 1974-75 data are from Franqueville's (1987) research on population and migration in 38 villages in the Centre and South provinces.
- (2) 1997 data are from CIFOR research on population and migration (Pokam and Sunderlin 1999) in the same 38 villages researched by Franqueville (1987).
- (3) 1998 data are from CIFOR research on farming systems in 54 villages in the Centre, South and East provinces (Bikié et al. 1999).
- (4) The reason for the large proportion of 'other' (non-farm) occupations in the 1997 data is the distorting influence of one exceptionally large peri-urban village among the 38 villages.

In 1997 in the same 38 villages, 27% of heads of household were primarily cocoa or coffee producers and 33% were producers of food crops (Pokam and Sunderlin 1999). In 1998 in the 54 villages of the Centre, South and East provinces surveyed in the study reported here, 39% of heads of household were cocoa or coffee producers and 51% were producers of food crops.⁷ Although the number of men involved in food crop production has grown greatly since the 1970s, the rate of participation of women in food crop production remains much higher than that of men (Sunderlin and Pokam 1999: 19-20).

Why is it that the proportion of heads of household describing themselves as producers of cocoa and coffee has greatly decreased over time (Figure 5), yet the proportion of respondents producing cocoa remains high (68% of total), and there has been no net tendency for the area of cocoa and coffee to decrease since the beginning of the crisis (Figure 2)? Resolution of this apparent inconsistency provides an important insight. Most producers of cocoa and coffee have attempted to maintain or increase the area of their tree crop stands, but have ceased to identify themselves primarily as producers of export crops. They have diversified to non-export crops in an effort to avoid repetition of the calamity that resulted from over-reliance on cocoa and coffee income.

CONCLUSION

This paper has examined the underlying causes of an increase in the rate of net deforestation in the humid forest zone of Cameroon during an economic crisis dating from 1986. It is known from previous research that this increase in forest clearing activity was caused mainly by increased population in rural villages, attributable in part to return migration from cities to the countryside, and by increased production of food crops to compensate for a loss of income from cocoa and coffee. In particular, this analysis has aimed to confirm and deepen our understanding of a shift from export to food crop production, increased commercialisation of food crop production, and increased involvement of men in the production of food crops.

Research results on changes in the area of particular crops corroborate other research showing relative stagnation (stronger for cocoa than for coffee) in the growth of the area of tree crops, and relatively rapid increase in the area of plantain and other food crops. Results on the commercialisation of food crops indicate that, after 1985,

⁶ In the 38-village study (1997 data), 78.9% of the heads of household were men.

⁷ It is fitting to ask why only 60% are farmers in 1997 in the 38-village survey, whereas 90% are farmers in the 54-village survey. (Stated differently, why are 34% of heads of household in the 38-village survey classified as having 'other', non-farming employment?) The reason is that about a quarter of the 38-village sample is in Ngoulmakong, a large peri-urban village close to Yaoundé that has become heavily urbanised since the mid-1970s.

production and income of these crops tended to increase and a growing percentage of households sold half or more of their food crop production. The results on changes in the area of, production of, and income from, particular crops jointly demonstrate that when the prices of cocoa and coffee plummeted, farmers maintained their orchards rather than replace them with food crops. This is a key factor in the burst of forest clearing activity observed in the early 1990s. The results on the principal activities of heads of household corroborate the results of associated research indicating dramatic increase since the 1970s in the involvement of men in food crop production, particularly marketable food crops.

The most important lesson to be drawn from these results is that macroeconomic instability can lead not only to rapid impoverishment of rural producers, but can also lead to unforeseen and unwanted environmental consequences. Small farmers in the HFZ of Cameroon were overly reliant on few export crops, yet were unwilling to abandon them when the prices of, and subsidies for, these export crops dropped dramatically, and consequently cleared neighbouring tropical forests for increased production of food crops. Policy makers would be wise to note that economic shocks, whether spontaneous and unpredicted, or whether planned (as in the case of many structural adjustment programmes), can have adverse consequences for farmers and can set back the aim of improving the conservation and management of remaining tropical forests.

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