



# When the Dutch Disease met the French Connection: Oil, Macroeconomics and Forests in Gabon

Sven Wunder

Report prepared for the CIFOR-CARPE-USAID project  
'The impact of macroeconomic and agricultural policies  
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# 1 Introduction<sup>1, 2</sup>

Gabon is not a common representative of Sub-Saharan Africa. The country has been called the 'African Emirates'—the ultimate rentier state depending heavily on a single wealth-generating export commodity: oil. Where most of Sub-Saharan Africa over the last two decades has suffered from low and stagnating incomes, chronic balance of payment problems and foreign exchange shortages, high per capita oil revenues have been the key to make Gabon a rich country. At more than US\$6000, per capita income was in 1998 more than four times that of neighbouring Cameroon. Petroleum exports have totally dominated and transformed Gabon's economy over the last three decades. Throughout the history of Gabon, other rent-generating extractive sectors have also been important, such as manganese, uranium and, notably, the export of timber, mainly *okoumé* (*Aucoumea klaineana*), a valuable timber species. Yet, none of these commodities has generated rents that are comparable to oil. This richness in extractive resources, distributed among the small population of around 1 million, has implied that agriculture has remained underdeveloped. A traditional hunting-gathering culture of a forest-dwelling people has transformed into a society harvesting natural resource rents, where agriculture (as other types of commodity *production*) has remained underdeveloped.

Gabon's oil wealth coincides with the fact that it is one of the most forested countries in Africa; about four-fifths of its land area is covered by forests. But this is not really a coincidence. The central hypothesis of this report is that oil rents have enabled a series of policies that, together with the low demographic pressure, have been key in protecting forests from degradation and deforestation. Most probably, oil has helped *expand* forest cover in absolute terms, and reduce forest degradation, compared to what would likely have happened without oil (see Section 2). This has occurred through a number of economy-wide market and policy responses to oil wealth that have in combination been extremely favourable to forest conservation. Yet, none of the policies has been implemented because the government cared particularly about forests. Rather, the policies accompanying oil wealth have caused agriculture to decline. This misfortune has enabled forests to expand by default. Gabon's unintentional, 'blind' conservation policies have been far more successful in conserving forests than most of those designed consciously by governments that actively strive to protect their forests through direct

conservation measures. This underlines the potential strength of underlying factors in affecting forests (Contreras-Hermosilla 2000).

The title of this report merits an explanation. Countries facing high-rent bonanzas from natural resources are frequently exposed to a macroeconomic phenomenon termed the 'Dutch Disease', a concept derived from the experience of the Netherlands in the 1960s and 1970s with booming natural gas revenues. Typically, the large inflow of foreign exchange from the booming export sector causes aggregate demand to rise, which fuels inflation and/or appreciates the nominal exchange rate. This causes the *real exchange rate*—i.e. the nominal rate adjusted over time by the difference between domestic and foreign inflation—to appreciate, and relative prices to change in favour of non-traded goods, such as construction, import-protected sectors, or public and private services. On the other hand, traded sectors tend to decline. These tend to be industry in developed countries, where agriculture is import-protected and thus (quasi) non-traded; in developed countries, primary sectors (agriculture, forestry and fisheries) are traded, whereas manufacturing tends to be protected. The traded sectors face rising costs but cannot raise their prices because of foreign competition in import and export markets. Hence, while society as a whole usually gets better off from the bonanza, the Dutch Disease implies declining competitiveness and structural change across sectors, normally triggering 'deindustrialisation' in developed countries (Ellman 1981; Corden and Neary 1982; Corden 1984) and 'deagriculturisation' in developing countries (Roemer 1984; Scherr 1989; Wunder 1991). Yet, this deagriculturisation also tends to significantly reduce pressures to convert land for agricultural uses, which globally is the principal direct cause of deforestation. This is why the bulk of tropical mineral-exporting countries have more forest left, and lose these forests at a slower rate, than countries that are not endowed with minerals. The latter have to develop their agriculture much more and dedicate larger land areas for cultivation purposes (Mainardi 1998; Sunderlin and Wunder 2000; Wunder 2003).

Gabon was certainly hit by the Dutch Disease. At the same time, the country's elite has also maintained very tight links to its former colonial master, France. The business environment in Gabon remains generally closed, in many sectors singularly dominated by French interests, and linked to personal ties (Yates 1996:187; EIU:1999:10, Barnes 1992:71-5). This limited competition and the clientelistic structures have tended to further reinforce the phenomena of vested interests' rent-seeking and corruption, which generally are common to countries that are rich in natural resources. The Gabonese policy cocktail, spiced with its Dutch and French ingredients, has produced results that are not particularly conducive to sustained economic development of the country's population, as will be argued below.

Yet, at the same time, this policy mix accompanying oil wealth has proved extremely efficient in protecting forests. The main factors in securing that outcome were government spending with a heavy urban bias, an inflexible and frequently overvalued exchange rate, resettlement policies that concentrated people near roads and, in particular, the total neglect of smallholder producers and of the rural road network. All of this was strongly biased against agriculture; it unanimously favoured the abandonment of cultivated areas and forests' natural regeneration. In this respect, the case of Gabon contrasts sharply with certain other tropical oil exporters, where key policy elements like heavy road building through forested

areas (e.g. in Ecuador) and recurrent currency devaluation protecting agricultural competitiveness (e.g. in Indonesia) fully or partially reversed the forest-protecting core effect from the Dutch Disease (Wunder 2003).

Why is the Gabonese policy cocktail not likely to be adequate for sustained economic development? The main reason is that, with the already advanced maturity of its oil fields, production and revenues are set to gradually continue their ongoing decline over the next couple of decades, until the point of complete exhaustion. The predictions say that the discovery of new large oil fields is very unlikely. Recently, Gabon has made production-sharing agreements more favourable to foreign investors, and several smaller discoveries have delayed this decline in national production (EIU 2001:21-23). Still more important, high international oil prices and a strong US dollar have over the last two years offset the impact of declining production on revenues, with a large trade surplus in 2000 amounting to 12.4% of GDP (*ibid.*:28).<sup>3</sup> Yet in the medium run, most predictions forecast a pronounced decline in oil revenues. At the same time, it will be argued that no alternative rent sources are in sight that could fully take over the declining role of oil. Finally, Gabon has indebted itself significantly—a debt which can reasonably be serviced with the level of current oil exports, but which will become an ever increasing burden on the economy when oil revenues start to decline.

If we accept the notion that Gabon's days as a pure rentier economy are numbered, this will pose significant challenges both for economic development and for forest conservation. Many observers currently speak about a severe economic crisis in Gabon—a somewhat misleading judgement, as will be shown below. In this report, we will mostly be concerned with the long- and medium-run changes that the transformation to an oil country has triggered, rather than recent year-to-year oscillations triggering mini-busts. Indeed, the current mini-crisis is minor, compared to the adjustment pressures that Gabon will face once oil revenues really plummet. This will trigger a substantial decline in per capita incomes, urban employment opportunities will increasingly go missing as oil rents dry up, and many Gabonese will have to embark on alternative livelihood strategies. These alternatives will certainly include land-using sectors, and in particular agriculture.

How much will the pressure on land resources and forests rise? Many simplified projections reckon that post-oil Gabon will automatically be re-ruralised. In reality, this depends on three factors, all of which remain uncertain: the speed of decline in oil revenues, the possible rise of other non-oil rents (mining, timber, etc.) and the success in developing value-added production sectors (e.g. timber processing, manufacturing). The scenarios and possible economic responses will be discussed in depth in Section 8. Yet, one likely answer is still that a growing share of the population will turn back to growing food crops for their own consumption and for sale—perhaps mostly in periurban areas, for a start. Cash crops like cocoa—a Gabonese export crop until a couple of decades ago—will not revive in the short run, due to a combination of economic and technical obstacles, but might (and probably should) be developed in the medium run (see Section 8).

We would thus expect to see some return migration to rural areas and a rise in the slash-and-burn production of land-extensive food crops like plantain and tubers, which is what people in the region usually by default fall back on in times of a sustained urban crisis. In addition, pressures may rise to accelerate timber extraction to partially compensate for the foreign exchange shortfall. These factors

would also cause an upsurge in forest degradation and, to the extent that agriculture is expanding, in deforestation. The post-1986 experience in Cameroon, with a decade-long crisis coupled with escalating deforestation for food crops, is a bugbear scenario for Gabon, although lower population density and less tradition of agricultural entrepreneurship will downscale the effect. While the economic downturn will inevitably cause some deforestation, there also seem to be some options for minimising the emerging economic and environmental costs, respectively. This outlook certainly gives the present research project a predictive value vis-à-vis strategic future choices. Different scenarios and policy options will be discussed in detail in the closing section of this report, hopefully contributing to ideas on how to meet Gabon's emerging policy challenges without sacrificing its natural resources.

The report contains eight sections, including this Introduction. The next section will briefly describe the history and current status of forest resources in Gabon. The third will look at macroeconomic changes since the start of the oil era. Section 4 describes how this translated into declining competitiveness for agriculture and forestry. The fifth section deals with the forest impact of more specific government policies, like road building or resettlement. Section 6 illustrates the impact of structural changes in income, consumption and demographic variables on forests. Finally, Section 7 summarises the arguments, while Section 8 discusses future policies.



## 2 Forests and deforestation

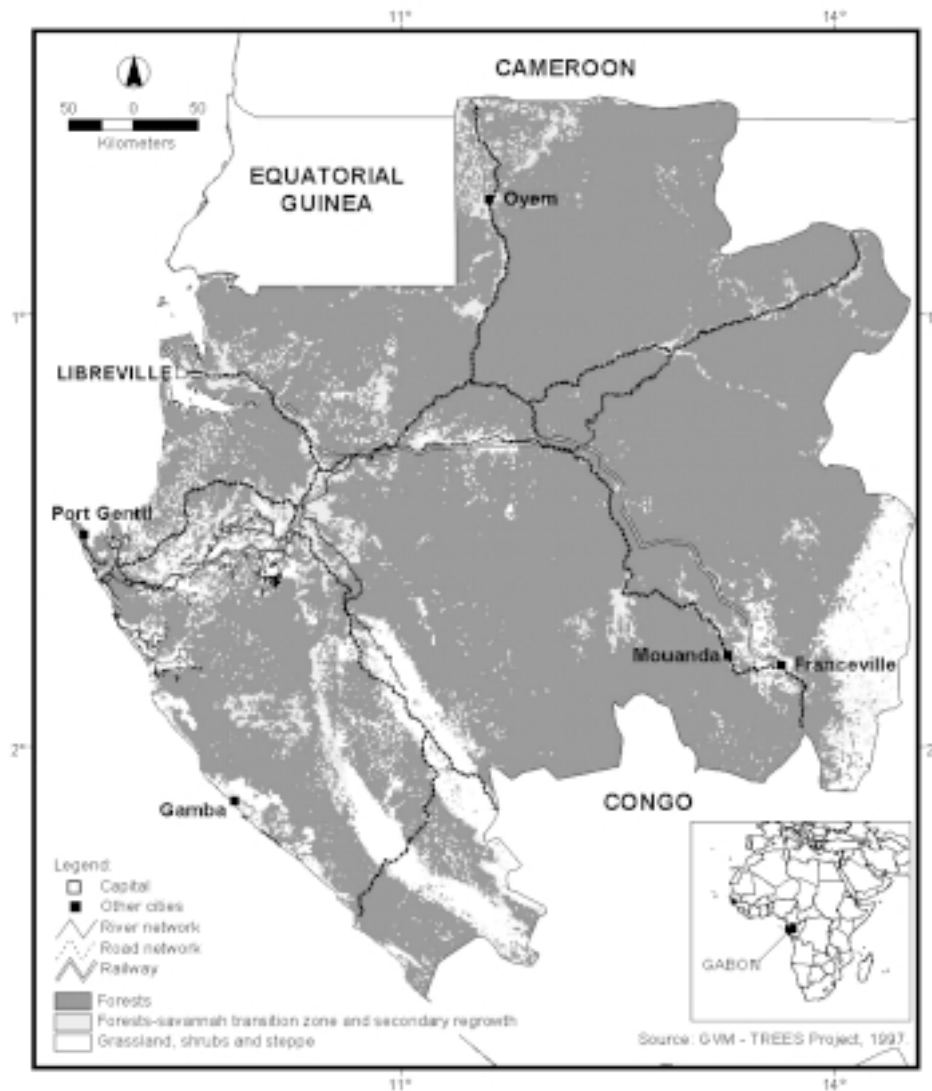
### 2.1. Historical trends

Of Gabon's land area of 267 665 km<sup>2</sup>, tropical forests currently cover more than 80%. Forests can be divided into three categories: the broad group of coastal basin forest, the more homogeneous forests of central Gabon, and the northeastern forests that share characteristics with semi-deciduous forests (Drouineau and Nasi 1999). Gabon's small population density with respect to its forest cover is notorious: no other country in Africa retains a forest cover in the range of 13-20 ha for each inhabitant.<sup>4</sup> In other words, Gabon remains an extremely forest-rich country.

How has forest cover changed over time? Savannahs covered most of Gabon's land area 25 000 years ago (Clist 1995). During particular sub-periods (20 000-15 000 BP and 2800-2000 BP), only microrefuges of forest survived, such as small patches in savannahs and gallery forest along watercourses (Maley 1998:1). Subsequently, climate change has contributed greatly to a gradual forest colonisation of savannah areas, a gradual effect that continues today (C. Wilks, personal communication, 6 Oct 2000). Human impacts on the forests only become noteworthy after 10 000 BP, especially through the use of fire. Thus the forest-savannah distribution has historically been shaped jointly by climatic change and humans, such as the southwestern savannahs, which have evolved together with repeated burning by Bantu tribes who migrated into the area in the fifteenth and sixteenth centuries.<sup>5</sup>

Historically, human presence in Gabon definitely dates back to hunter-gatherers in the Middle Stone Age, 100 000-40 000 BP, although evidence of hominids has been found as far back as 250 000 BP. Archaeological research around the Ogooué, Gabon's largest river, shows that nomads lived in dispersed settlements. They probably practised extraction from rivers, forests and savannahs. In the Iron Age, the development of agriculture also facilitated settlement expansion, but population density remained low, at around 0.5 inhabitants per km<sup>2</sup> (Clist 1995:198).

Colonial settlement by the Portuguese and French was initially concentrated in the Estuary Province. Penetration into the interior only occurred later, in 1850-80, along the Ogooué river (Ropivia and Djeki 1995). Trade with the Portuguese, Dutch, English, German and French focused on extractive products (ivory, palm oil, timber, honey and beeswax), much more than agricultural commodities (NEA 1994:19-25). These early trade flows provided no direct incentive for additional



Map: Gabon infrastructure and vegetation cover

forest conversion to crops. On the contrary, the emerging slave trade from Gabon, fuelled by colonial labour demands for overseas plantations, depressed population densities. Much later, between 1911 and 1933, French and German systems of forced labour led to a number of famines in villages, further reducing population density (Adams and McShane 1996:212). This limited human intervention historically has favoured forest preservation in Gabon.

It is also notable that the country never developed a strong agricultural tradition. It has been claimed that, at independence, between 80% (Richard and Léonard 1993:230) and 86% (Yates 1996:64) of the labour force worked in agriculture. But one should rather see this rural population as a 'forest people' practising complementary subsistence cropping. Some observers claim that agricultural neglect is rooted in the extremely adverse natural conditions, that is, 'the predominance

of swamps and dense forests' (EIU 1999:22). Gabon does suffer from soil limitations and a less diverse agricultural potential than, for example, neighbouring Cameroon (Richard and Léonard 1993:58-63). Yet, as French Gabon expert Roland Pourtier notes, biophysical conditions do not differ to such a dramatic extent from other central African countries where agriculture is far more important (Pourtier 1989a: 35).

Gabon's abundance of forests and agricultural underdevelopment is best explained by its particular socio-economic and historical circumstances (ibid.:146). For instance, at the beginning of the twentieth century, efforts were made to promote oil palm plantations in Gabon, but these failed because of a small labour force that was unaccustomed to working in plantations and clearly preferred extractive activities (Pourtier 1989b:141-3). Following independence in 1960, foreign trade shifted gradually towards mining (manganese, uranium and petroleum), which had little impact on forests. Only one externally traded commodity directly affected forests in Gabon: the selective logging of *okoumé*. Until the 1980s, exploitation occurred in easily accessible coastal areas, especially the estuary region (Raponda-Walker and Sillans 1961:28). In recent decades, progress in transport and extraction technologies has rapidly expanded production into the interior (Droineau and Nasi 1999:8-13).

On the whole, a combination of historical, socio-economic and cultural factors have meant that an extraordinarily large part of Gabon's land area has preserved its natural forest cover. The most important, and interrelated, reasons for this seem to be the country's low population density, the negligible trade-led incentives for the development of cash crops, and the economy's continuous reliance on extracted rather than cultivated resources. This is the background against which the more recent macroeconomic changes have to be compared.

## 2.2. Current forest loss

Gabon is extraordinarily rich in forests, but there is no consensus on the extent of forest cover or its change over time. Table 1 gives an overview of the estimates. The most frequently used source is FAO's Forest Resources Assessment (FRA). FAO basically defines forests as areas covered by trees of minimum 5m height, without alternative (agricultural or urban) land uses, and with a canopy crown cover of at least 10%. Deforestation is thus defined as a process that brings an area below one of these criteria. This is also the definition that shall be used in this report.

The FRA 1990 figures (FAO 1993) are shown in Table 1, including the update for the mid-1990s in the State of the World's Forests report (FAO 1997). The latter estimates total forest cover as having been 18 314 000 ha in 1990 and at 17 859 000 ha in 1995. For 1995, this would correspond to only 69.3% of Gabon's land area. Almost all of this is natural forest: in 1995, plantations accounted for a mere 21 000 ha. The FRA reported annual deforestation of 116 000 ha throughout the 1980s and slightly less (91 000 ha) in the first half of the 1990s.

Unfortunately, FAO's FRA1990 figures were highly misleading. Forest stock estimates had been extrapolated from just a single forest assessment, dating back to 1970. The deforestation estimates of around 100 000 ha yearly loss were not an actually *measured* change in land use, but rather a *model prediction* extrapolating the 1970 assessment. Hence, the FAO rightly classified the reliability

**Table 1.** Forest cover and deforestation estimates

Author	Forest cover (in ha)	Year	Annual deforest. (in ha)	Relative decline	Period	Source type	Coverage notes
FAO (1993)	18 235 000	1990	116 000	0.6%	1980-90	Model estimate	Total forests, > 10% tree cover
FAO (1997) SOFO	18 314 000 17 859 000	1990 1995	91 000	0.5%	1990-95	Model estimate	Total forests, > 10% tree cover
FAO (2001) FRA 2000	21 962 000 21 862 000	1990 2000	10 000	0.0%	1990-00	Expert estimates	Total forests, > 10% tree cover
TREES - Mayaux <i>et al.</i> (1998)	20 677 000	1991-95	-	-	-	NOAA-AVHRR satellite images	Evergreen and semi-deciduous forests, > 70 % tree cover
TREES, cited in Collomb <i>et al.</i> (2000)	21 338 900	1991-93	-	-	-	NOAA-AVHRR satellite images	Unspecified
Wilks (2002)	22 957 000  1 839 000	1991-93	22 500	0.1%	'current'	TREES, and own guesses	All forests > 10% tree cover Assumes high resolution
WRI (1996)	19 411 000 18 314 000 17 859 000	1980 1990 1995	109 700 91 000	0.6% 0.5%	1980-90 1990-95	FAO & ITTO	All forests (incl. plantations)
FAO (1996) Production Yearbook	20 030 000 19 960 000 19 966 000 19 900 000	1979 1984 1989 1994	14 000 -1 200 13 200	0.01% -0.0% 0.01%	1979-84 1984-89 1989-94	Forestry agency reporting	Prod. forests + other categ. (1)
IUCN (1990)	22 531 000	1987	-	-	-	Map G.Caballé (Edicef)	Total forest (>10% tree cover)
Sayer <i>et al.</i> (1992)	23 544 500 (3)	1987	-	-	-	Maps IGN Paris, INC Libreville	Rain forests (2)
Myers (1994)	22 000 000 16 400 000	'original' 1989	230 000	1.4%	1989	Not specified	Tropical moist forests
Collomb <i>et al.</i> (2000)	25 767 000 22 000 000	'original' unspecified	-	-	-	WRI MoWF	Unspecified Unspecified

**Notes:**

(1) Production forests + other wooded land + intended reforestation , recreation forests

(2) According to the source, forest cover is overestimated because forest fragmentation is underestimated.

\* Regional estimates

of both the forest stock and change estimates as 'low' (FAO 1993: Annex 1). FAO's universally applied model was based on forest stock, forest type and population growth. However, Gabon's considerable oil wealth over the last three decades meant that people did not 'eat their way' into the forest by following a logistical S-curve (which was the underlying assumption of the model); no alternative land use could explain conversion on this scale. Rather than clearing the 1.62 million ha over fifteen years as predicted by the model, in net terms they probably abandoned cultivated areas and let forests grow back! Hence, Gabon's deforestation was a 'modelling mirage', but it still found its way into many national and international publications.

This error has been acknowledged in the FAO's new FRA assessment for 2000. In the FRA 2000, the deforestation estimate is no longer model-estimated, but based on a consensus figure derived from expert approximations. Gabon's annual deforestation has been revised downwards to a mere 10 000 ha (0.0%) (FAO 2001:31), an adjustment which an earlier draft of this report contributed to.<sup>6</sup> Yet, this meant that the 1990 forest stock baseline also had to be revised upwards in retrospect—by as much as 20%. If we compare that revision to the low rate of deforestation estimated in the 2000 FRA, the Gabonese could still keep on deforesting for 370 years before their forests were reduced to the level that FRA 1990 had predicted them to be. This illustrates the huge problems with intertemporal comparisons when assessment methodologies are shifting abruptly.

A recent and direct forest stock measurement from NOAA-AVHRR satellite images has been undertaken by the TREES project under the EU-financed Joint Research Centre. TREES takes into account evergreen and semi-deciduous dense forests, with a minimum of 70% tree-cover, compared to the FAO's 10% criterion (Mayaux *et al.* 1998). This excludes highly fragmented forests and forest-savannah transition zones. It is thus natural that the TREES estimate of 20 677 000 ha (80.2% of land area), based on a more exclusive forest definition, is about 10% lower than the FAO figure from FRA 2000.<sup>7</sup> Yet, Wilks (2002) stresses the fuzzy character of the TREES distinction between the forest and non-forest categories. Including fragmented forests (10-70% forest cover), which is closer to the FAO's definitions, Gabon's total forest area would thus be 23 957 000 ha (of which 21 188 000 ha is dense forest), corresponding to no less than 89.5% of total land area, and slightly higher than the FRA 2000.<sup>8</sup> He also makes a back-of-the-envelope estimation of current yearly net deforestation, which adds up to 22 500 ha (ibid:33-5). This educated guess includes the following components: 2000 ha for food crops, 1000 ha for industrial agriculture, 14 500 ha for forestry and 5000 for other uses (urban sprawl, oil production and exploration, open-pit mining, etc.). The forestry estimate is thus dominant, and it includes clearing for logging roads and minor canopy openings that are normally not included by FAO. The reason is that Wilks' estimate is representative for a detailed scale of assessment (1m<sup>2</sup>), whereas at higher aggregation levels—e.g. the TREES estimates based on NOAA-AVHRR images at the 1.1 km<sup>2</sup> scale—these minor openings are simply not registered.<sup>9</sup>

While the TREES figures represent the best currently available knowledge on forest stock, most other estimates shown in Table 1 build on a mixture of sources, many of which are of dubious quality. WRI (1994) combines the FAO data with other (unspecified) deforestation sources for 1981-85. As 1981-85 forest loss figures are much lower (0.1% yearly loss), it would require an unlikely acceleration of

deforestation during 1986–90 (to 1.1% per year) for this to remain consistent with the 0.6% average for the whole of the 1980s. Data in the *FAO Production Yearbook* (FAO 1996) show random variation around a forest stock of 20 000 000 ha, based on forest agency reports to FAO, and are generally unreliable. The Gabon Report of the WRI Global Forest Watch initiative (Collomb *et al.* 2000:34) cites an estimate of 22 000 000 ha from Gabon’s Ministry of Water and Forests (MoWF) for the mid-1990s. The same source publishes an ‘original’ forest estimate from the WRI’s Frontier Forest initiative that corresponds to 97% of Gabon’s land area (25 767 000 ha), but scientific evidence shows that, on the contrary, historically there was *less* forest in Gabon during various subperiods.<sup>10</sup> Finally, the 23 544 500 ha reported in the IUCN Conservation Atlas<sup>11</sup> is, as admitted in the source, a very high figure, due to the rough scale of the underlying maps that cause both small clearings within the forest and forest fragments within transition areas to be overlooked.

The TREES data thus provide a reliable current estimate of forest stock, but no deforestation figures over time. One indicative exercise is to calculate the FAO-FRA’s wrongly extrapolated figures from the 1990 estimate (18 235 000 ha) back to their base year, that is, forest cover on the original map of 1970. With an alleged 0.6% yearly deforestation during the period 1970–90, 1970 forest cover must have been 20 567 338 ha. Although map methodologies and resolutions are probably different, it is noticeable that this is marginally *lower* than the recent TREES estimate for 1991–93 (20 677 000 ha). The comparison would indicate that forest cover has basically remained unchanged since 1970, probably with marginal net *reforestation*.<sup>12</sup>

Recent changes in forest cover over time thus appear to be minor, and not well documented. Logging may be the main influence on forests. As indicated by Wilks (2002), this would cause deforestation of 14 500 ha if measured at a very



Forest savannah transition zones can pose a serious challenge to forest assessments (La Lopé) (Photo by Sven Wunder)

refined resolution level (see above), and forest modification of an estimated 350 000 ha per year. The latter figure has basically followed the rise in logging, though at a less than proportional rate (see Section 4). For the sake of comparability with the predominantly coarse-resolution estimates, we shall assume here that selective logging causes degradation, but not deforestation.

Can additional clues to land use be gained from other sources, such as agricultural censuses? Unfortunately, agricultural sources are of little help in Gabon. An agricultural survey was carried out in 1960-1, and a proper census in 1974-5 as part of an FAO project. After 1975, no agricultural census exists for Gabon, reflecting the generally low priority of land use data.<sup>13</sup> Some recent figures are available, based on yearly reports from regional agricultural offices, but there is clear evidence that these figures grossly overestimated cropped area. Even for the 1961 and 1975 point estimates, methodologies may differ.<sup>14</sup> Still, the comparison is interesting for us: in 1961, Gabon was not yet an oil-dependent economy (the *avant-pétrole* period), while in 1975 it was in the midst of the first international oil price boom (MAEDR 1975:56-61). The number of cultivating households increased marginally (1.8%), from 71 440 in 1960-1 to 72 734 in 1974-5. Yet, cultivated area declined by a stunning 33 542 ha, from 106 280 ha to 72 738 ha (31.6%). The average age of the cultivating household head had also risen remarkably: in 1960-1 the over 50 years old subgroup made up 30.4%, while in 1974-5 this share was 52.2%. This reflects the fact that the younger generation migrated to urban areas for better job opportunities (see Section 6 on urbanisation), leaving behind an ageing rural population, including retired return migrants. As is confirmed by case studies, these old or retired farmers tend to cultivate much smaller plots.<sup>15</sup>

Can any changing land use trends be identified from the subnational analyses? A series of regional deforestation studies have focused on land use changes in and around urban areas (see Section 6). This concerns urban areas: Libreville (Magrin 1994; BDPDA 1998; Trefon 1999), Franceville (Wolff *et al.* n.d.; IGAD 1997; Rippert 1997) and Oyem (Wolff *et al.* n.d.). In periurban areas, there has been an expansion of land colonisation, and even garden plots in intra-urban areas are cultivated. Plantain, tubers and legumes are the main crops in intensified, semipermanent production systems (Trefon 1999:45). This food supply only partly satisfies increasing urban demand, and most foodstuffs consumed in Gabon are imported. For a town like Oyem, satellite analysis shows that cumulative forest clearing (cultivation and fallow areas) reached 5015 ha from 1961 to 1990, corresponding to about 25% of the study area (Wolff *et al.* n.d.:22). For Franceville, 1699 ha of forest (about 30%) were cleared or degraded for cultivation from 1953 to 1994, and 1489 ha of savannah integrated (*ibid.*:26-7). Around the capital, Libreville, a recent study commissioned by *Institut Gabonais d'Appui au Développement* (IGAD) (BPDA 1998:18-26) shows that the currently cultivated area is 9000 to 10 000 ha, while the total area affected (including fallow and secondary regrowth) is 55 000 to 65 000 ha (*ibid.*:23). Periurban cropped areas may perhaps make up about 50 000 ha in the whole of Gabon.<sup>16</sup>

However, periurban deforestation only represents a partial, quite specific phenomenon, which can in no way be generalised to the entire country. Higher forest loss around the cities is likely to have been more than counterbalanced by abandoned slash-and-burn activities and reduced periods of fallow in rural and semi-rural areas. Pourtier (1989b:270, 277) clearly documents a contraction of cultivated area around the small towns of Makokou and Lastoursville. Studies of

rural areas by the Libreville-based consultants 'Africa Forest' comparing aerial photographs from the 1950s and the 1990s find a substantial decline in cropped area. For instance, the population of the village of Nyonyie (southern estuary, near Libreville) declined from 500 to only 20 people, and a 4 km strip of coastal plantations has now regenerated as secondary forest (Christy *et al.* 1990a). Another coastal village, Oyan, was reduced from 100 to 10 people, with a similar decline in traditional agriculture (Christy *et al.* 1990b). Similarly, at least 13.5% of the forest has historically been cleared for agriculture in the Avocette area, which is ten times the impact of local oil-producing activities (Wilks 1992:34). The village of Atem on the northern coast has retained a higher population density, and a corresponding patchwork of plantations, fallows and regenerated forests (Christy *et al.* 1991a). But Adams and McShane (1996: 207-13) describe a similar process of rural abandonment and forest regrowth in northeast Gabon. Overall, it is estimated that only about 50 000 families are still practising traditional agriculture in Gabon (Marchés Tropicaux 1998:20). While current rural population levels may be stagnant rather than declining, the continuous ageing of farmers probably still causes some net abandonment of cultivated areas in the country's interior.

It thus seems probable that Gabon experienced some net *reforestation* over the past three decades, with forest regeneration outstripping deforestation. Extensive traditional agriculture in the interior of the country has been reduced massively by the rural exodus, and more intensive systems near the urban areas have expanded only moderately. From the TREES data, Wilks (2000:13-4) estimates that industrial plantations in Gabon cover 23 000 ha (0.1%), traditional agriculture about 90 000 ha (0.3%), while the mosaic of post-agricultural vegetation at different stages of regeneration towards forest cover occupies nineteen times the area cropped, that is, 1 718 000 ha (6.7%). Areas cleared for oil production amount to a maximum 10 000 ha (Wunder 2003:ch.4).

For the sake of a dynamic interpretation, let us make the conservative assumption that about 90% of this regenerating vegetation is secondary forest (1 538 000 ha), while non-forest fallows make up 10% (180 000 ha). Total deforestation from traditional agriculture would thus as a rule of thumb be three times the area cropped; in the present hypothesis, 90 000 ha times three equals 270 000 ha. Imagine now that the area under slash-and-burn in 1961 was twice as large as it is currently (180 000 ha), that fallow length has not changed, and that there were no industrial plantations.<sup>17</sup> This would have caused a deforested area in 1961 of three times the cropped area, that is, 540 000 ha. Thus, 270 000 ha more than today would have been deforested in 1961 by slash-and-burn agriculture combined with long fallows. This is more than ten times the size of the 23 000 ha of industrial plantations that have been created up to the present day. Net forest cover would thus have been 247 000 ha less in 1961. Although this exercise remains speculative, it indicates that food crop cultivation is the decisive driver of deforestation, and that the combination of agricultural decline and the shift to sedentary, intensive systems is likely to have permitted a sizeable expansion in forest cover.

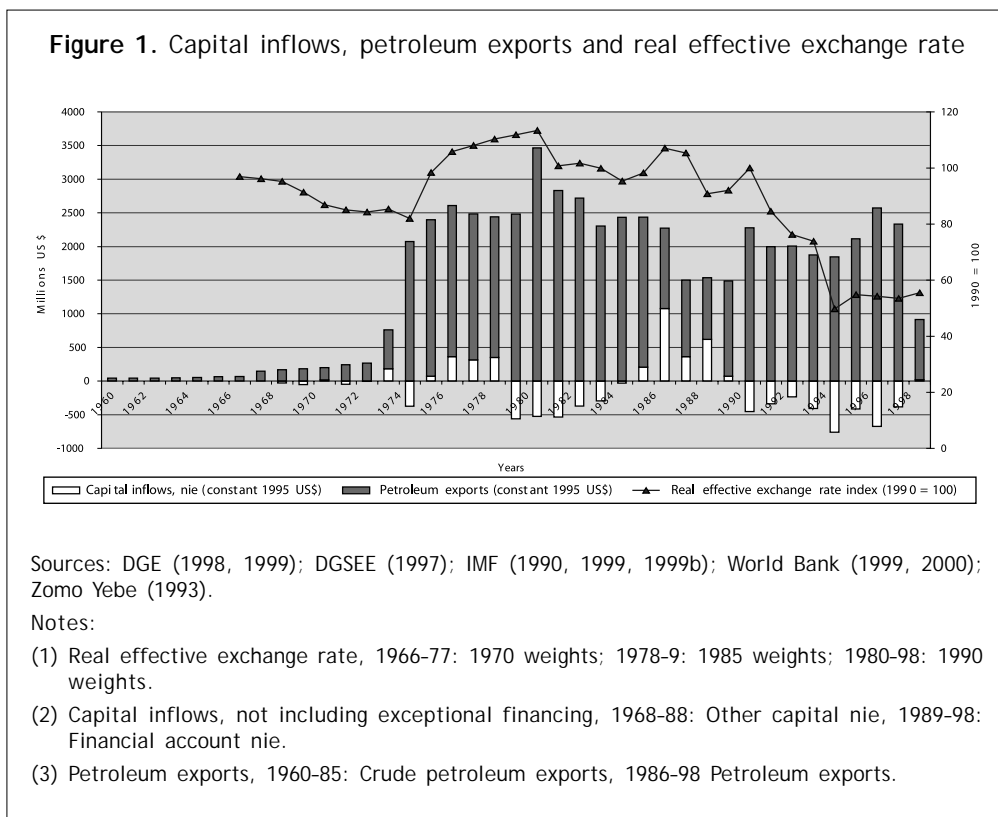
It is equally clear that the FAO-FRA model-derived figure of a current yearly forest loss of about 100 000 ha was completely unrealistic. It is indicative that the total accumulated zone under cultivation is roughly in the range of 100 000-150 000 ha, which makes an alleged yearly net increment of almost the same size meaningless. The new FRA 2000 estimate of 10 000 ha yearly forest loss is much



more realistic, although this author believes that net current loss over the last decade may actually have been close to zero. Exact levels are impossible to determine with the present state of knowledge, but for the entire period since 1970, there is likely to have been a minor net reforestation. This is the combined result of, on the one hand, a moderate trend towards increased periurban deforestation and, on the other, a significant forest regrowth on abandoned agricultural plots in the country's interior regions. We will now turn to an examination of the macroeconomic factors that enabled this unusual land use picture.

### 3 Macroeconomic trends

Over the last three decades, the rise in oil exports and the corresponding high inflow of foreign exchange per capita have created an economy specialised in oil exports and in the spending of oil rents. Figure 1 shows long-term trends for three key macroeconomic indicators: oil exports, capital inflows and the real exchange rate—a measure of relative prices.



The value of oil exports remained limited in the 1960s and early 1970s but rose dramatically from 1974 onwards, as a combined effect of the oil price boom on the world market and of rising Gabonese oil production. Inflow peaked in absolute terms with the second oil price boom in 1980, when export revenues reached a nominal value of US\$1.9 billion (US\$3.5 billion at constant 1995 prices). What is remarkable compared to other oil exporters is that increased oil production partly compensated for declining oil prices by the end of the 1980s. The discovery of important new fields, such as Rabi-Kounga on the coast, pushed export production levels up from 7.9 million t in 1987 to 14.7 million t in 1991 and 18.2 million t in 1995 (DGSEE 1997:19). This means that, in spite of less favourable prices during the 1990s, real oil revenues only declined by about 25% compared to the peak from the mid-1970s to 1985. In other words, the quantity element of oil discoveries gave a semipermanent element to Gabon's version of the oil boom.

Oil prices have fluctuated greatly. The peak of US\$22.25 per barrel for Gabon's Mandji crude in October 1996 (EIU 1999:17) was followed by a severe price slide to below US\$10 a barrel in December 1998 (DGE 1999:15). This brought down real export revenues to almost one-third. At constant 1995 prices, oil revenues fell from US\$2.6 billion in 1996 to US\$0.9 billion in 1998 (see Figure 1). As oil accounts for more than half of public revenues, this directly triggered corresponding declines in the government's budget. During 1998, falling oil prices meant that the fiscal budget had to be revised downwards by 15.1% (DGE 1999:15). Yet, during 1999-2001 world market oil prices again skyrocketed to above US\$30 per barrel (not shown in Figure 1), more than offsetting the decline in Gabon's production quantities in the short term. The balance of payments showed a surplus of around 20% of GDP in 1999-2001 (Söderling 2002:3).

A second element in capital inflows has been foreign borrowing, but in *relative* terms indebtedness has been less pronounced than for most high-absorbing oil countries. Gabon has accumulated some of the highest foreign debt per capita in Africa, but because of high income levels, total debt size currently corresponds to less than one year's GNP (95.7%), and the ratio of debt service to exports was only 13.1% in 1997 (EIU 1999:30). As can be seen from Figure 1, some borrowing against oil revenues occurred from 1975 to 1978 and especially between 1986 and 1988, compensating for the abrupt drop in oil prices. Gabon adopted several structural adjustment programmes with the World Bank and the IMF, but frequently failed to service its debts and accumulated arrears, especially in the 1988-93 period (Statistisches Bundesamt 1994:88). Gabon's capital account has a negative structural element because of oil-related financial transactions (EIU 1999:29). This element implies that there are few years with significant net capital inflows. But in terms of year-to-year fluctuations, Gabon's borrowing path was clearly counter-cyclical, as the country used foreign capital to smooth the unpredictable fluctuations in international oil prices.<sup>18</sup>

As Gabon has an extremely open economy, after 1973 this steady cash-inflow pattern was directly translated into growth and fluctuations in domestic demand. Following moderate but stable economic growth in the 1960s, higher oil production and the two oil price booms suddenly made Gabon an affluent country. This happened from 1972 to 1980, when the US dollar value of per capita GDP rose almost *eightfold*, from US\$803 to US\$6193. After 1983, the then highly oil-dependent economy did not, as in Cameroon, follow a sustained pattern of crisis and

dramatically falling per capita GDP, but rather suffered year-to-year oscillations, still at a highly elevated level of per capita GDP (US\$4200-6000). Variations over time have basically been determined by oil price and US dollar exchange rate fluctuations vis-à-vis the French franc. In Gabon, the entire quarter of a century after 1973 should thus be seen as one continuous boom period, even though oil price fluctuations created budgetary shortfalls and a series of 'mini-crises'.

These radical changes in the structure of the Gabonese economy are also reflected in relative price changes, as indicated by the real trade-weighted exchange rate index in Figure 1. This index multiplies the nominal exchange rate by the difference between domestic and foreign inflation, the latter being weighted among the major trading partners. The CFA franc (FCFA) is Gabon's national currency. It was for a long time held constant at 50:1 to the French franc, until it was devalued to 100:1 in 1994. The nominal exchange rate vis-à-vis the dollar zone is thus determined by changes in the dollar-franc exchange rate (from 2002 onwards, by the dollar-euro rate). Compared to other CFA countries, changes in competitiveness are set by inflation differentials. Gabon thus cannot independently devalue its currency in response to a bust in oil exports. This limits the degree of freedom in economic policy making, and tends to keep the real exchange rate overvalued in bust situations.

From 1970 to 1980, the oil boom caused a real appreciation of about 75% against the dollar: domestic inflation continuously exceeded US dollar inflation, and the nominal exchange rate of the French franc appreciated by 35%.<sup>19</sup> In the late 1980s, oil revenues declined, while in the early 1990s the real exchange rate depreciated by almost 50%. Note that this process had already got underway with the deflationary period of 1990-93 (IMF 1999b:447, line 64), that is, well before the nominal 50% devaluation of the FCFA against the French franc. Devaluation was followed by an instantaneous one-time inflationary surge to 35% in 1995, cancelling out much of the relative price effect (CIA 1999:5). Contrary to those favouring currency devaluation as a policy tool (e.g. the World Bank study by Poupart and Pilichowski 1997), it should probably be admitted that for a quasi single-commodity exporter like Gabon, the 1994 FCFA devaluation had much less real impact on competitiveness and economic structure than in CFA zone countries with a more diversified production base. It came at the wrong time for Gabon.

What were the criteria and priorities of the government of Omar Bongo—the man in power since 1967—in distributing the country's oil wealth? A number of main areas can be outlined:

- an increase in public employment, and in the salaries and benefits of public employees
- investment in transport infrastructure (Transgabonese railway, Owendo port)
- investment in urban infrastructure (construction, health, education)
- investment in and subsidies to large-scale parastatals

First and foremost, government bureaucracy swelled after independence, in a manner that would have been impossible without oil and mining rents. The number of public employees (excluding the para-public sector) grew from 3842 in 1965 to 9800 in 1970, 15 400 in 1975, 35 479 in 1980 and 42 664 in 1983 (Pourtier 1989b:205). The trend clearly underlines the link between rising oil income and higher public

employment. Until the IMF austerity plan of 1987, civil servants also received fringe benefits like free cars and housing (Yates 1996:207). During 1985-87, when oil prices fell sharply, total labour costs in the budget were reduced by 16.2% (Zomo Yebe 1993:37), while in 1989-90 fixed employment was reduced by 912 persons (Statistisches Bundesamt 1994:45). Yet these cutbacks were of short duration. Unpublished official data from the Direction Générale du Budget (not fully comparable to Pourtier's figures)<sup>20</sup> show that, even during the mini-crisis of the 1990s, public employment grew every single year. In 1994-5 the nominal public payroll grew less than FCFA inflation (IMF 1999a:30). But with the 1999 recovery of oil prices, public salaries were raised significantly, so that the total public payroll, including indemnification payments, grew from FCFA 149 billion in 1998 to FCFA 212 billion in 1999. In the revised 1999 budget, this corresponded to 34.4% of the budget (République Gabonaise 2000:16).

Between 1975 and 1990, public employment thus grew by 111% while private and para-public employment was reduced by 31% (Statistisches Bundesamt 1994:45). There are clear indications of overstaffing, and absenteeism is widespread among public employees.<sup>21</sup> Giving new employment opportunities to people from different regions and ethnic groups may generally be seen as a way of continuously buying balanced political support within an overall situation that Yates (1996) calls the 'allocation state'. In 1995, the public and para-public sectors employed no less than 70% of wage earners (Poupart and Pilichowski 1997:49-50). But the granting of oil-financed benefits to rent-seeking groups goes beyond the budgetary sphere. Examples of institutionalised corruption are the luxury goods and personal shareholdings that local political elites have acquired in Gabonese corporations in return for favours (Yates 1996:209-11). Zomo Yebe (1993:62) calls this the rise of a 'kleptocracy'. The borderline between 'public' and 'private' spheres is extremely fluid. The problem seems to have accelerated severely over time, as illustrated by the amazing extent of false invoices in the public sector.<sup>22</sup>

Secondly, a large share of the oil money went to what was at the time one of the largest construction projects in the world: the *Transgabonais* (Transgabonese) railway, linking Libreville's port of Owendo in the northwest to Franceville in the southeast, near the border with the Congo. Estimated total costs over the 1973-86 period vary from US\$3 billion (EIU 1999:13) to US\$4 billion (Yates 1996:181), the latter figure being close to the size of Gabon's total foreign debt. The main rationale of the project was to open up Gabon's interior to development and increase the extraction of natural resources, such as timber, manganese and iron ore.<sup>23</sup> However, the World Bank declined to support it because of a lack of profitability. Only the oil boom, combined with credits from mainly bilateral sources, made it financially possible for President Bongo to fulfil this personal ambition (ibid.:177-8; Pourtier 1982:116). Mismanagement and an absence of competitive tendering caused large cost overruns, which have indeed driven up investment to a level that cannot be justified by the modest current returns (Statistisches Bundesamt 1994:73). This has led one observer to call the Transgabonais railway 'a costly infrastructure through an empty space' (Pourtier 1982:127), while another commentator has called it 'a train that leads nowhere...an iron path to more rentierism and primary extraction' (Yates 1996:183). In spite of some undeniable benefits, the average share of 19.1% of public development budgets absorbed by the railway during 1972-85 appears extremely high.<sup>24</sup>

A third boom spending category refers to investments in urban infrastructure. In general, the bulk of oil revenues were consumed in the cities, especially in the capital. This included a series of urban prestige projects. The most extravagant were the works undertaken prior to the summit of the Organization of African Unity (OAU), held in Libreville in 1977. This included new hotels, theatres, convention centres, etc. (Richard and Léonard 1993:157). The number of employees in the construction sector grew from 17 252 in 1970 to 37 754 in 1975 (Statistisches Bundesamt 1994:45). In 1977, as much as half of the state's annual budget may have been committed to construction costs, contributing heavily to its fiscal crisis and the forced adoption of the first IMF austerity programme in 1978 (Yates 1996:196-8). Other lavish constructions of this type included the second presidential palace and several luxurious ministerial buildings.

Much was also invested in urban social infrastructure, such as schools, hospitals etc. By African standards, Gabon has achieved increases in school enrolment ratios and hospital bed capacity, although life expectancy and literacy ratios remain close to average (Statistisches Bundesamt 1994:18). In spite of stagnant per capita GDP, certain social indicators improved further in the 1990s (UNDP 1999b:21-2). This reflects both higher social spending and improved priorities as part of the IMF-sponsored structural adjustment programme (EIU 1999:11-2). Yet, within the subgroup of higher middle-income countries, Gabon still lags behind in terms of three of the four indicators of the 'human development diamond' applied in the World Bank (2000). In spite of high investments in the social sector, inefficiencies have impeded better human development results (S. Meyé, UNDP, personal communication, 30 May 2000).

The fourth major oil rent recipient has been Gabon's 65 parastatal companies in industry, services, transport and agriculture, which have received of both investments and subsidies to cover running deficits. In 1982, 24 of these companies alone generated a publicly subsidised deficit of FCFA 21 billion (US\$56.6 million—Zomo Yebe 1993:75; IMF 1999b:446). Agroindustrial parastatals also have a direct potential for deforestation, which will be discussed in the next section. For now, it may suffice to say that much of the parastatal investment was diverted or simply wasted, 'due to massive political interference in management, high operating costs, and gross overstaffing' (World Bank, cited in Yates 1996:210). This is also witnessed by the current poor financial state of most companies, some of them being forced into privatisation, others into bankruptcy (UNDP 1996:16; Marchés Tropicaux 1998:13-14).

On the whole, the combined price and production increases gave Gabon's oil boom a semipermanent feature, with substantial though unequally distributed wealth. Due to mining revenues (uranium, manganese), the real exchange rate had already appreciated in the 1960s, but this was greatly accentuated from 1974 to 1982 by petroleum revenues. Only in the early 1990s was there a substantial real currency depreciation. The Bongo government also indulged in foreign borrowing, especially for the construction of the Transgabonais railway. But borrowing remained relatively low and tended to smooth out fluctuations in oil revenues. In spite of elaborate multi-year development plans, macroeconomic policy has been dominated by discontinuous and reactive stop-go policies that have been held hostage to fluctuating oil prices.

A worrying recent trend, however, is that Gabon's economy has not grown in real terms during the last couple of years, in spite of a huge oil boom. After a deep recession in 1999 (GDP fell 9.6% in real terms), the economy did not recover in 2000, with a further 1.9% decline in real GDP. This coincides with a record high share of oil in GDP, reaching 47.6% in 2000, and also a 8.2% real growth in wood production (DGE 2001:90-1). In other words, the rent sectors grew, along with the service sectors that depend on these rents (+5.2% in 2000), but the rest of the economy declined so much that the net result was negative. This is a typical symptom of oversaturation in the absorption of rents, known from other specialised oil countries,<sup>25</sup> which indicates an extreme inefficiency in the economy and calls for a series of fundamental adjustments (see Section 8).

On the whole, market factors seldom operate independently in Gabon; the state is an omnipresent catalyst. Oil wealth was generally distributed with a strong urban bias, favouring prestige projects in urban construction, infrastructure, parastatal companies and social sectors. Except for the Transgabonese railway, all major public projects were 'forest-neutral' in their direct effects. Their indirect impact was to pull labour out of rural areas on a massive scale towards more remunerative employment options in the cities, as civil servants, in parastatal companies, in services or in construction (Section 6). As described in the following section, this urban development bias, and the corresponding neglect of agriculture, has grossly reduced pressures on the forests.

## 4 The competitiveness of agriculture and forestry

### 4.1. Agriculture

Prior to the oil boom, Gabon's agricultural base was already weak, due mainly to a combination of labour scarcity and extremely rich extractive resources. From ivory to slaves, from *okoumé* to manganese, uranium and oil cycles, the economic prospects of establishing a cash crop plantation economy could never compete with the here-and-now payoff from the extractive commodity that currently predominated. However, oil rents brought foreign exchange inflows that were much greater than in any previous extractive cycle. Adverse relative price effects further squeezed the agricultural sector. But the impact was different in each of the four subsectors of subsistence farming, import-competing food crops, export crops and parastatal agroindustries.

First, subsistence farmers in isolated rural areas mainly cultivate plantain and cassava, and to a lesser extent bananas and yam, using shifting cultivation. They probably suffered less direct impacts from relative price changes, as their produce was less exposed to foreign competition. A scattered population, restricted demand and bad road connections meant that many of these rural areas were poorly integrated into local markets, so that their products remained semisheltered from competing imports. An exception were those food items where consumer prices in the interior were subsidised (on trade policy, see below). But the decline of the subsistence subsector was due more to (forced) rural resettlement (Section 5) and to (voluntary) urban migration (Section 6). Rising wages in the urban non-traded sectors drove up labour opportunity costs, inducing many to leave the countryside.

The import-competing food sector was directly hurt by the oil-led loss of competitiveness. In 1960, Gabon was still self-sufficient in most foodstuffs; by 1988, about two-thirds of food items were being imported (H.F.Henner, cited in Zomo Yebe 1993:12). Rising domestic costs reduced the competitiveness of Gabonese enterprises in a number of ways. Zomo Yebe (1993:79-84) points to three main cost elements that hold back domestic production: high salaries, high transport costs and—particularly interesting from our perspective—the increased costs of the deforestation needed to expand agriculture.<sup>26</sup> Food imports multiplied by a factor of eight during the 1970s oil boom, from US\$12 million in 1970 to US\$102 million in 1978 (ibid.:58). Even during the period 1987-93, they still grew



at an impressive 8% per year in real terms (Marchés Tropicaux 1998). The European Union and South Africa have been two main suppliers, especially of meat (Section 6). In addition, there are large informal imports of food crops and their derivatives (plantain, cassava flour, fruit, legumes etc.), by ship or truck, from Equatorial Guinea, Congo and especially southern Cameroon.<sup>27</sup> Unfortunately, statistical evidence on food crops is extremely sketchy. Official reports give current production figures for cassava (250 000 t), plantains (240 000 t), yams (100 000 t), peanuts (10 000 t), rice (10 000 t) and bananas (9000 t—see Dauthuille 1996:39-46). As mentioned above, even these small figures are probably overestimates, but their marginal expansion during the last decade, led by a slightly more competitive real exchange rate following the 1994 devaluation, may have caused some deforestation.

The third subsector, the 'purely traded' export crops, cocoa and coffee, was the one that was most severely hit by declining competitiveness. In the 1950s, the northern Woleu-Ntem 'cocoa triangle' (Oyem-Bitam-Minvoul) experienced a period of prosperity. However, production stagnated with the development of mining sectors and the corresponding increase in labour costs and out-migration. Disease also played an increasing role. During the oil boom of the 1970s, this decline was aggravated, in spite of the fact that international coffee and cocoa prices experienced a price hike of their own. Many peasants simply stopped cultivating cocoa: from 5500 t in 1974, production fell to 3000 t in 1977 and 1600 t in 1987 (Pourtier 1989b:294). During the past two decades, these two export crops have been completely wiped out. Cocoa exports in 1996-7 were only 627 t, coffee exports a tiny 42 t (Marchés Tropicaux 1998:25). The combined planted area in the country today is reported to be less than 1000 ha (DGE 1999:32). This veritable economic extinction also implies that the two crops do not at present exercise any pressure on forests. Had it not been for the impact of the massive oil rents, the Woleu-Ntem province would probably have embarked on land use trends comparable to those in the adjacent Humid Forest Zone of southern Cameroon. This area has a similar natural endowment, and much forest was lost to cocoa, coffee and food crops.<sup>28</sup>

Only the fourth agricultural subsector profited from the oil boom, namely agribusiness. Large-scale parastatal chicken farms, oil palm, sugar and rubber plantations, cattle ranches etc. all received generous credits and subsidies from the government after 1975. As explained in Section 5, these companies were sheltered from the oil-induced competitiveness squeeze, as oil money was used to cover both high investment costs and recurrent deficits. In addition, this highly capital-intensive sector profited on the cost side from the appreciation of the real exchange rate, lowering expenditures for the imported inputs it depended on. But the sector was highly inefficient, which implies that it failed to boost output—or to expand cropped areas. Where it did succeed, much of the incorporated land was taken from savannahs. Hence, little forest was cleared for agroindustry; the TREES estimate cited in Wilks (2000:13-14) is 23 000 ha (0.1% of Gabon's land area).

On the whole, agriculture was the main loser from Gabon's oil bonanza, although it also declined from an already weak pre-boom base. Agriculture's share of the economically active population plummeted from 35% in 1969 to 15% in 1985 (Zomo Yebe 1993:56). Its share of GDP fell even more dramatically, from 32.2% in 1960 to 18.6% in 1970 and 6.5% in 1980. In the 1980s, the emphasis on agribusiness raised the share of GDP to 11% in 1987, before it fell continuously to 7.5% in 1998

(World Bank 1999), 4.9% in 1999 and only 3.9% in 2000 (DGE 2001:31). A number of factors worked against agriculture. State agencies' cocoa and coffee prices became increasingly adverse to producers (see below on trade policy). Inadequate road infrastructure impeded crop commercialisation (Pourtier 1984; Section 5). And, most of all, massive public spending pulled labour out of the countryside and into urban areas (Section 6).

## 4.2 Forestry

If deforestation is currently a negligible issue in Gabon, what about forest degradation? Has it been linked in any way to the oil cycles and macroeconomic changes that occurred? Timber extraction is the most obvious candidate. With its vast forest area and valuable species, Gabon has a clear comparative advantage for forestry. It is estimated that more than 90% of its forest area can be commercially exploited, the highest ratio in Africa (Marchés Tropicaux 1998:30). As explained above, one species, *okoumé* (*Aucoumea klaineana*), was historically Gabon's main export commodity. In 1960, timber made up almost three-quarters of Gabon's exports, but with the expansion of oil exports, this share was reduced to less than 10% by 1980 (Pourtier 1989a:191). *Okoumé* is used mainly for plywood, and Gabon is the principal producer of raw logs. It is found in about 70% of the forested area, that is, excluding the east and northeast regions. *Okoumé* still accounts for 60–75% of timber export value, complemented by *ozigo* (*Dacryodes buettneri*) and what are normally referred to as 'miscellaneous species' (*bois divers*). Only 4.3% of the extracted logs were processed in 1998 (DGE 1999:27, 41), but the government has recently changed policies so as to enforce existing legislation that should raise that share to 30% (EIU 2001). The development of value-added industries has been hindered by high domestic costs, as well as the fact that the largest logging operators preferred to feed their pre-installed mills overseas (R. Nasi, personal communication, Bogor, 21 August 2000; see also Section 8).

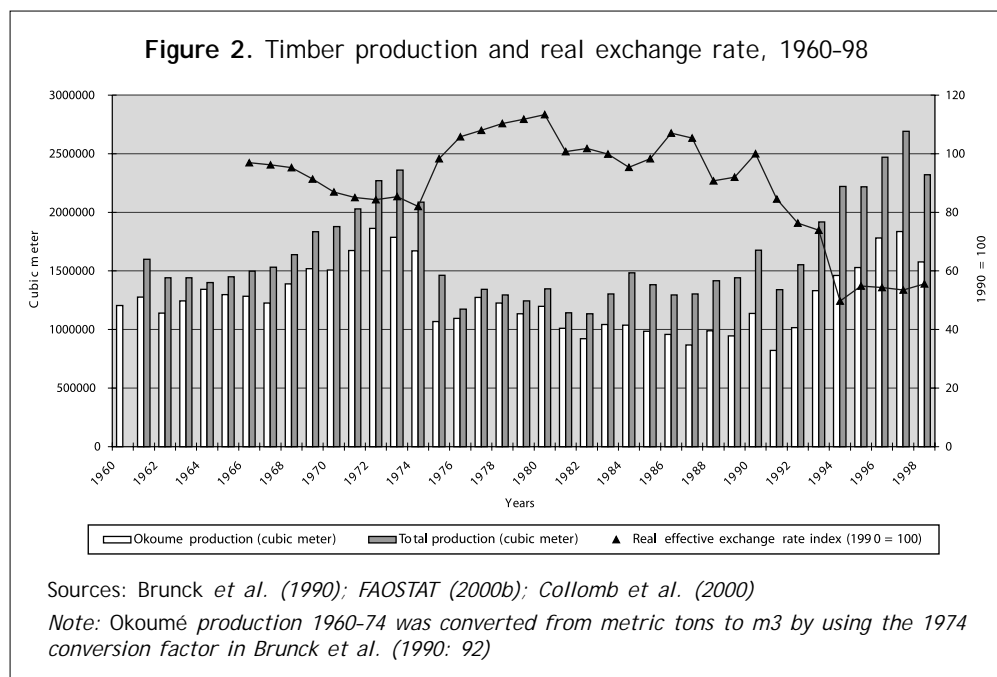
By FAO's (and our) definitions, timber extraction in Gabon does not cause deforestation. *Okoumé* is usually found at a density of 1–3 trees/ha sized above 70 cm diameter above breast height (dbh), the legal minimum (Larivière 1996:162–3), so that logging remains highly selective. It opens up 5–20% of the canopy, depending on the size and route of logging roads (Wilks 2000:11–13); the average may be 10% (IUCN 1990:29). Using the FAO's criterion of 90% crown cover loss, it is thus only at very fine resolution levels (e.g. 1–10m pixels) that deforestation from logging would be recorded (see discussion in Section 2).

*Okoumé* is known to regenerate fairly well in forest openings; for example, in previously cropped areas.<sup>29</sup> Logging inevitably changes the forest structure; up to 50% of the canopy may be ecologically altered (Collomb *et al.* 2000:10–11). In the coastal zone, easy access has meant that many forests have already been logged several times, but, as indicated by case studies of vegetation cover, this has not impeded forest regrowth. Rather, the genetic and commercial value of these forests may be diminished when the tallest and straightest trees are cut repeatedly.<sup>30</sup> Since 1957, two-thirds of Gabon's forests have been logged at least once, and concessions have increased sevenfold. A marked expansion occurred from 1994 to 1999 (Collomb *et al.* 2000:13). Whether logging causes forest degradation thus ultimately depends not only on the type and frequency of

harvesting, but also on the criteria applied to determine forest quality. *Okoumé* regrowth may be favoured by long-cycle harvesting. Some observers suspect that minor disturbances in the Gabonese forest from selective logging may also benefit large mammals such as elephants and favour a higher local biodiversity in the mosaic of regenerating secondary vegetation (Adams and McShane 1996:217).

Indirect forest impacts from logging do exist, since it eases access and raises demand for other forms of extraction, notably for hunting by logging workers, commercial hunters and local communities (Gami and Nasi 2001; Simons 1996; Sayer *et al.* 1992:172). Logging may also reduce the availability of non-timber forest products that are traditionally harvested by local people, such as fruits (Simons 1996:56). But with Gabon's low population density and an absence of agricultural pressures, there is no indirect 'opening-up' effect permitting further deforestation by land-hungry squatters. This distinguishes Gabon from many other countries in Africa. On the whole, logging causes forest degradation in some but not all cases, 'defaunisation' from the bushmeat trade being the most harmful of these impacts.

Concessions have expanded sharply during the past decade, but this does not give a reliable indication of changing activity levels, as many concessions remain underused (Simons 1996:37). It is more relevant to look at production data. Figure 2 shows the development of logging production over the last four decades (prior to 1986, only data for *okoumé* are available). Domestic demand is minor; over the past decade, export quantity shares were 95% for *okoumé* (1987-98) and 93.4% (1987-96) for all timber (Collomb *et al.* 2000:37). After expansion in the 1960s, in the oil era *okoumé* extraction fell by more than one third in 1975. Until the early 1990s, *okoumé* production then fluctuated around the much lower level of 1 million m<sup>3</sup> per year; total timber production was around 1.4 million m<sup>3</sup> a year.



Several factors appear to explain the decline and later stagnation. One was the crisis in international markets for Gabon's timber (Brunck *et al.* 1990:94). In addition, Gabon's coastal stocks gradually became exhausted, and no road construction was carried out to make new areas in the interior accessible (Barret-Lefevre and Dufoulon 1979:15, 33). Until 1998, the *Société Nationale des Bois du Gabon* (SNBG) had a monopoly of *okoumé* and *ozigo* timber exports. It applied high commercialisation margins, which made it less rewarding for private companies to expand exports (EDIAFRIC 1985:124-7; EIU 1999:24). In the wake of the Asian crisis, severe financial and management problems forced the SNBG to liberalise exports to Asia. But our core effect of oil-led rises in costs and lower competitiveness with an appreciated real exchange rate was also very important (Barnes 1992:78), and coincided with the period of lower timber exports (Figure 2).

The renewed expansion in timber exports from 1992 to 1997 was the result of a mixture of factors. The most important was the rapid rise of Asian markets. Exports to France, traditionally the largest buyer of *okoumé* and *ozigo*, remained rather stagnant after 1990, but China's imports rose exponentially from a tiny 12 300 m<sup>3</sup> in 1991 to 1 015 800 m<sup>3</sup> in 1997 (Collomb *et al.* 2000:38). Asian destinations accounted for 62% of Gabon's total timber exports in 1997 (Marchés Tropicaux 1998:36). The completion of the Transgabonais railway in 1986 was a key enabling factor, opening up new extraction areas in the interior with the help of cheap transport costs (Section 5). Last not least, the sharp real depreciation in 1990-94, induced by declining oil revenues (see Figure 1), made Gabon's timber exports more competitive (UNDP 1996:5) and encouraged sizeable investments by Asian firms (Marchés Tropicaux 1998:30-1). Dutch Disease factors were thus highly instrumental in explaining both the stagnation and rise of Gabonese timber production.

### 4.3 Trade policy impacts

Price competitiveness is not only a function of producers' pricing, but also of governments' interventions into that process, and their changing restrictions on international trade. Potentially, governments may apply price and trade controls (e.g. import quotas, tariffs or export subsidies) to try to protect domestic sectors that are exposed to the 'Dutch Disease'. In Gabon, the situation since the 1970s was mostly the opposite: trade policy and price control interventions exposed private producers in the traded sectors even further to competition from abroad, especially in agriculture. Although trade policies were not the decisive factor, they further revealed the low priority of agriculture in government policy. There is a degree of pride in the statement that 'Gabon has the means to provision abroad' (Richard and Léonard 1993:215): rising agricultural imports are seen as an achievement rather than a problem.

The most prominent example of discriminatory trade policies is Gabon's two export crops, coffee and cocoa. During the oil boom, international beverage prices also faced a boom, but private producers received little benefit. Government-controlled marketing agencies, mostly the *Caisse de Stabilisation et de Péréquation*, siphoned off the bulk of the profits. When prices turned around, these profits were not recycled back to producers. Rather than 'stabilising' producer prices, therefore, producers were further penalised by the scheme (Pourtier 1989b:294-5). In 1979,

cocoa producer prices were higher in Cameroon than in Gabon, and this gap widened during the 1980s (Zomo Yebe 1993:87).

Other interventions also had a bias against agriculture. Different price controls, for example on foodstuffs, were used both to control inflation and to ensure 'fair' prices for consumers in the interior of the country. The latter meant that certain processed food items would cost the same in a remote interior village as in Libreville or Port Gentil, where they were produced or imported (Zomo Yebe 1993:51). Obviously, by reducing prices, locally produced foodstuffs lose the *de facto* protection which high domestic transport costs for urban goods would otherwise have provided.

The government continuously used protectionist measures for larger processing industries, such as sugar, cement and bottled water (D. Young, personal communication, US Embassy, Libreville, 2 June 2000). However, helping these parastatal industries to stay alive or expand did not usually have any forest impact. The only protected sector to use land was sugar. Zomo Yebe (1993:76) reports that the sugar price of the *Société sucrière du Haut-Ogooué* (SOSUHO) before subsidies was FCFA 280 per kg, while the corresponding price on the European market was only FCFA 100 per kg, thus illustrating the vital role of subsidies. Sugar plantations were established in the savannah areas near Franceville, thus causing savannah conversion but not deforestation.

With the recent round of trade liberalisation in the Central African Economic and Custom Union UDEAC, Gabon's options in using protectionist measures have been greatly reduced. However, in the past, informal imports of low value food crops (plantain, manioc, etc.) from neighbouring Cameroon, Equatorial Guinea and Congo have also been *de facto* free of duty. Higher value food products, notably from France and South Africa, have paid tariffs, but not at a level that significantly restricted their import. On the whole, Gabon's fairly liberal trade policy has thus further discouraged domestic agriculture. Indirectly, this has provided an additional obstacle to the expansion of cultivated areas, thus contributing to the preservation of forest cover.

#### 4.4 A quantitative overview

How important is 'price competitiveness' to the long-term performance of Gabon's logging and agricultural sectors? Did rising costs and an appreciating real exchange rate seriously hamper the development of timber and agricultural exports? Did oil wealth thus indirectly protect, or at least delay, the loss and degradation of forests? And how effective was nominal devaluation in reviving growth in these sectors? These are some of the key questions in the Dutch Disease story.

As underlined in this section, competitiveness was a key factor. Zomo Yebe (1993:52-7) tried to estimate the typical Dutch-Disease effects for the 1969-85 period. He finds that higher oil-export revenues reduced both relative prices for farm goods and agricultural employment. Also, food imports significantly rose with higher incomes and the appreciation of the real exchange rate. In other words, the oil boom caused the relative price and 'deagriculturation' effects predicted by the theory. The new OLS regressions in Table 2 use an approach similar to Zomo Yebe's, but for a longer period (including the period of real depreciation) and for different variables. As expected, real exchange rate appreciation during 1966-97

was positively influenced by oil export revenues and capital inflows (both in 1995 US\$). Both coefficients are significant, at the 5% and 1% levels respectively (Regression 1). As an independent variable, the real exchange rate has the expected negative impact on agricultural output (in fixed 1995 US\$; Regression 2) and timber production (in cubic metres; Regression 3). Both coefficients are significant at the 1% level, but the competitiveness variable explains much less of the variation in agricultural output ( $R^2 = 44.26\%$ ) than in timber production ( $R^2 = 71.61\%$ ). This fits well with our observations above, that the decline of agriculture is a more complex phenomenon that does not depend only on relative prices.

As regards timber, a qualification must be made for *okoumé*, a species that has no perfect substitutes on the world market.<sup>31</sup> As mentioned above, SNBG's monopoly in marketing *okoumé* has also hampered competitive supply responses on behalf of producers. As shown in the disaggregated estimate for *okoumé* (Regression 4), just about one third of the variation in production of the species is explained by the real exchange rate ( $R^2 = 36.44\%$ ). For the miscellaneous category (Regression 5), that share is much higher ( $R^2 = 76.99\%$ ).<sup>32</sup> The similar size of the two marginal coefficients (both are highly significant at a level of 1%) implies that a real currency depreciation of 1% causes *okoumé* and the miscellaneous category to rise equally (10 287 m<sup>3</sup> and 10 218 m<sup>3</sup> respectively). However, the quantity of *okoumé* exports in 1997 was almost triple that of miscellaneous woods. *Okoumé* is thus somewhat less price elastic, probably because it contains a greater rent element than the miscellaneous category.

Where there are rents, rent-seeking behaviour is usually common too. Forestry rents are currently much less taxed in Gabon than in Cameroon.<sup>33</sup> Forestry taxes have lost their real value, as they have not been inflation-adjusted since the mid-1970s, that is, precisely since the rise in oil rents boosted state revenues. The abundance of oil rents accruing directly to the state has thus reduced efforts to use taxation as an instrument to cut into private sector timber rents. Hence, a good part of the rising private sector rents have been captured by a limited number of logging companies. SNBG allocates production quotas to the companies and then buys back the wood at a fixed price, a system that easily lends itself to a lack of transparency. SNBG also captured rents, which have frequently been diverted, to political campaigns among other things. The timber sector has thus adopted some of the oil economy's rent-seeking features (A. Karsenty, personal communication, Libreville, 26 May 2000).

On the whole, Dutch Disease impacts on real exchange rate competitiveness from oil wealth were a prime factor in the performance of other primary sectors, which in turn affected Gabon's forests. Policies tended to accentuate market factors rather than stabilise them, due especially to a pronounced anti-agricultural bias that hit small producers particularly. Our regression results show that price competitiveness was even more important for logging, which is almost entirely an export sector, though there are elasticity differentials between timber species. But the overall results clearly confirm the core hypothesis of this report: oil wealth has protected forests in Gabon from conversion and exploitation by shifting relative prices against these activities.

**Table 2.** Relating oil wealth to relative prices and traded sector production. Regression results, 1966-98

Independent variables	Petroleum exports (millions 1995 US\$)	Capital inflows (millions 1995 US\$)	Real exchange rate (1990=100)	R <sup>2</sup>	F-value	Years
1 Real exchange rate (1990-100)						
Coefficient	0.008	0.027		0.3103	6.3	1968-98
T-value	2.324 **	3.432 ***				
2 Agricultural value added (constant 1995 US\$)						
Coefficient			-2286191.1	0.4426	23.822	1966-97
T-value			-4.88082 ***			
3 Total timber production (m <sup>3</sup> )						
Coefficient			-20506.032	0.7161	78.186	1966-98
T-value			-8.842 ***			
4 Okoumé production (m <sup>3</sup> )						
Coefficient			-10287.36	0.3644	17.78	1966-98
T-value			-4.216 ***			
5 Miscellaneous timber production (m <sup>3</sup> )						
Coefficient			-10218.67	0.7699	103.713	1966-98
T-value			-10.184 ***			

**Note**

- \* Parameter T-value significant at the 10% level
- \*\* Parameter T-value significant at the 5% level
- \*\*\* Parameter T-value significant at the 1% level

## 5 Windfall impacts on government spending

### 5.1 Agriculture and forestry

Land use is not only affected by relative prices, but also by other policies that encourage or discourage it. In relation to agriculture and forestry, an additional question is thus whether oil wealth brought more resources to public regulatory and development agencies and, if so, what policies they implemented that had relevance for land use. In other words, did increased financing for agricultural and forestry agencies also increase their capacity to change the course of events on the ground, e.g. through technical support to expanding land uses, subsidised credits to small-scale farmers, or through better control of forestry practices that reduced degradation?

Following independence, increasing mineral wealth (manganese, uranium and oil) initially did not provide any more funding for agriculture: in fact the sector became marginalized in development planning. In the 1966-70 and 1971-75 plans, agriculture had a total budget of FCFA 5.3 billion; by comparison, FCFA 100 billion was allocated to the mining sector (Zomo Yebe 1993:69). There was little rural investment, most of the emphasis being on what Yates (1996:151) calls 'rural "welfare" policy', that is, distributing oil wealth to public consumption, employment and social spending, mainly in order to equalise benefits between different regions and ethnic groups.

When oil revenues multiplied in the mid-1970s, policymakers became more ambitious about the productive potential of rural areas. The overall idea in the 1977 Agricultural Master Plan was to create a modern sector that would be the complete opposite of traditional slash-and-burn agriculture in being 'sedentary, intensive, mechanised [and] salaried' (cited in Pourtier 1984:449), and, one could add, 'large-scale and state-controlled'. Capital-intensive technologies were meant to overcome rural backwardness, chronic labour shortages and deficiencies in food supplies to urban markets. Implementation of the strategy was halted by the financial crisis of 1978, but brought back on to the agenda when state revenues soared in the second oil price hike of 1979.

The revised plans for the 1980s included a multitude of regions and products, such as cattle-ranches, vegetable gardens, ricefields, integrated chicken farms and plantations of cocoa, coffee, sugar, plantains, banana, rubber and oil palm.



Many of these projects required new land, and the potential land-take involved in implementing the first project round would have been an area of 12 650 ha.<sup>34</sup> Some crops, such as plantains, rice and cocoa, would indeed have required the forests to be cleared, but others (ranching, sugarcane) would have drawn mainly on savannah areas, while tree crops (rubber, oil palm) would have involved replacing the natural forest with tree-crop plantations.

Subsidised credits were a main instrument used in channelling resources to agriculture: the sector's share in overall public investment rose from 1.2% between 1966 and 1975 to 4.5% between 1976 and 1980 and to about 10% in the period 1980-88, an impressive rise in terms of absolute figures. During the 1990s, agricultural investment was cut back. Following the downswing in oil prices in 1986, the agricultural development strategy also became more selective in terms of sectors and regions, based on a more rigorous assessment of profitability. Across-the-board rural welfare subsidies were being faded out (Yates 1996:167-70). Yet throughout the post-1970 period, the agroindustrial parastatal sector absorbed the lion's share of agricultural funding, including credits from abroad (Pourtier 1989b:281-2; Marchés Tropicaux 1998:20). The government also compelled oil companies to recycle some of their profits into agroindustries (Yates 1996:71).<sup>35</sup>

However, the master plan to turn the agricultural sector upside down by implementing a top-down technocratic strategy turned out to be a failure, mainly because of mismanagement in the parastatal companies (R. Vincent, personal communication, 30 May 2000). Overstaffing and rent-seeking flourished in the agroindustries, behind which a single clan of influential families concentrated more and more power and resources (Pourtier 1989b:292). Much funding was swallowed by the bureaucracy itself: 'these administrative and para-administrative offices consumed the vast majority of public monies earmarked for so-called "rural" development,' (Yates 1996:147). Funds were wasted, operations never reached their planned scale, and high running costs caused extreme deficits, such as for coffee<sup>36</sup> and cocoa.<sup>37</sup> Many agroindustrial parastatals are currently close to bankruptcy (UNDP 1996:16). Rural labour was successfully drawn out of the peasant sector, but was often insufficiently qualified for work on mechanised plantations.<sup>38</sup> There were political pressures to invest in rapidly created projects, where crucial feasibility factors like soil suitability or water scarcity had not been thoroughly evaluated beforehand. In other cases, vested interests deliberately sacrificed social profitability to private benefits or political and ethnic pressures.

There are thus two fundamental reasons why the policy-induced emphasis on agroindustry did not cause any notable deforestation. One was the capital- and land-intensive character of the planned production compared to traditional land-extensive agriculture. The second was the failure actually to implement the plans. Although some industries fared better than others,<sup>39</sup> most plantations lagged far behind the originally planned scale. It is estimated that all agroindustrial plantations covered about 13 000 ha in 1987 and 23 000 ha in the mid-1990s (TREES estimates from 1998; see Wilks 2000:13-14). The latter barely corresponds to 0.1% of Gabon's land area.

Oil-induced funding for agricultural development has thus been limited, unstable and ill employed over the last four decades; it proved highly inefficient in promoting production. As a consequence, it also caused little deforestation. The

next question is whether the reverse effect occurred: that is, was oil money made available to improve forestry regulation and to finance protected areas, thus helping to protect forests more efficiently?

For both areas, the question can be answered in the negative. Forestry regulation in Gabon remained extremely weak until 1996, when a process of legal reform was initiated, mostly due to external pressures. This has now resulted in the adoption of a new Forestry Code (per 31 December 2001), providing an important legal step towards sustainable forest management.<sup>40</sup> It can be argued that soaring oil revenues for a long period encouraged the government to neglect the regulation of the forestry tax and resource base. Oil money helped to improve human resources in forestry, for example, by financing the establishment of a National Forestry School (*École Nationale des Eaux et Forêts*). But post-colonial public forestry administration fell increasingly into the hands of a centralised bureaucracy, which maintained little presence or activity in the field (G. Dufoulon, personal communication, Libreville, 30 May 2000). Of the 310 agents employed by the Ministry of Water and Forests, more than half are Libreville-based. Two-thirds of the Ministry's vehicles are used in the capital; in 1997, only 18 cars were deployed outside Estuary Province (Collomb *et al.* 2000:21-2, 39-40). Poaching erodes wildlife resources near the most populated and accessible areas, but it has only been regulated halfheartedly (Simons 1996:41-2), and existing laws have generally not been enforced (IUCN 1990:3).

The situation concerning protected area management is similar: forest conservation has not been a priority in Gabon, either for policymakers or for civil society (Simons 1996:28-9; Adams and McShane 1996:Ch. 11). This is quite understandable, given the enormous forest wealth in Gabon. Most of the protected areas described by Brugière (1999) were created before or shortly after independence, many of them as hunting reserves. In the total protected area of 1.045 million ha (3.9% of land area), savannahs are thus over-represented and lowland forests under-represented (Sournia 1998:105-6). A large share of the total still consists of 'hunting grounds' (*domaines de chasse*) (Brugière 1999: Table 1). Except for the recently created Minkebé Reserve, Ipassa (near Makokou) and the southern part of La Lopé, in general protected forest zones have been logged over at least once (IUCN 1990:40; C. Wilks, personal communication, Libreville, 6 Oct. 2000).

Oil money has done little to improve public budgets for protecting forests. As in Cameroon, most finance for conservation has been left to international donors.<sup>41</sup> Recently, the government has shown more interest in actively conserving its tremendous biological heritage, but conflicts concerning protected areas were exemplified by the controversies surrounding logging in the biodiversity-rich Lopé Reserve, Gabon's oldest and most famous protected area (White and Oslisly 1998). The regional EU-financed ECOFAC project that assists Gabon's wildlife service in the management of Lopé at one point threatened to withdraw, as contradictory legal texts permitted the allocation of new logging concessions within the Reserve's boundary (Durieu *et al.* 2000). Yet, in financial terms, the ECOFAC project, with US\$520 000, has a yearly budget almost double the size of the entire Wildlife Department's operating budget of US\$280 000 (Adams and McShane 1996:224). This illustrates how little budgetary impact the country's oil wealth has had on protected area management in Gabon.

## 5.2 Roads and rail

### *Roads*

One of the most important direct policy measures affecting forests is the budget allocated to roads. Globally, the literature on the causes of deforestation unanimously underlines the prime role of road construction and, subsidiarily, the paving and improvement of existing roads, in bringing down transport costs and thus enabling a series of economic activities leading to increased forest degradation and deforestation (Kaimowitz and Angelsen 1998). A rentier economy has indeed the fiscal means to improve transport infrastructure, in order to facilitate the private sector's commercialisation of agricultural and other commodities.

Nevertheless, this was not the policy that was chosen in Gabon; on the contrary, roads were widely neglected. It is rightly argued that, in the long run, expanding the rural road network would most likely have been more efficient in promoting agricultural production than the government's one-sided emphasis on capital-intensive large-scale agroindustries (Pourtier 1984:451, 457-9). Yet, if the government had opted for this policy, investments in infrastructure would not only have stimulated an upswing in the rural economy, they would also have increased the pressures on Gabon's forests (Wolff *et al.* n.d.:10). But roads have always

been widely ignored in Gabon.<sup>42</sup> By 1935, a much more elaborate road system already existed in southern Cameroon and western Congo. Northern Gabon was connected by road to southern Cameroon for the commercialisation of cocoa and coffee, but basically the rest of the country had no roads, and Libreville was an island surrounded by the rainforest. River transport served to evacuate *okoumé* logs, the country's principal export commodity. Prior to independence, roads therefore had a low priority. In the 1960s, it became a principal aim to make Libreville a true capital in the economic sense too. Many bridges were built to replace ferries; in 1960, it was still necessary to take nine ferries to make the journey from Libreville to Franceville (G. Dufoulon, personal communication, Libreville, 31 May 2000).

Despite some improvements, the road network remains severely underdeveloped and poorly maintained. While Gabon had the densest air transport network in Africa, with 52



The Transgabonais Railway - the direct, lasting deforestation impact of its construction was in most places very limited (near Ndjolé) (Photo by Sven Wunder)

airports in 1998, in 1996 the road network covered only 7670 km, of which only 629 km were surfaced (CIA 1999:7). This situation has basically not changed since 1991, when the total was 7518 km, of which 614 km were surfaced (IFR 1994:14). The current Gabonese road density of 0.03 km per km<sup>2</sup> is among the lowest in the world (IRF 2000:11). Unpaved roads are often impassable during the rains, thus making the transport and commercialisation of products highly unpredictable. Lately, the government has given greater emphasis to roads and drawn up a plan to have 3580 km of asphalt roads in the long term (EIU 1999:12-3). Though donors have been slow to respond, there are several ongoing projects, some with support from the European Union.

It is thus clear that road construction has in no way been a national priority, nor has it been favoured by oil wealth. As far as passenger transport is concerned, oil wealth has made air transport the preferred option. For goods transport, river and rail have been better alternatives, while the generally limited interest in agriculture means that there is little lobbying for road construction (B.H. Voubou, UNDP, personal communication, Libreville, 30 May 2000). Limited competition in transport and commercialisation may also have driven up middlemen margins, providing further disincentives to rural producers who are receiving lower prices. Transport and distribution costs combined are thus reported to comprise up to 50% of the retail price of agricultural produce in Libreville, and as much as 80% of the retail price of staple crops like plantain and manioc (Poupart and Pilichowski 1997:69).

Will a greater future emphasis on road construction and improvement thus translate into more forest loss? The quantitative analyses of deforestation over the last three decades in the periurban zone of Oyem and Franceville shows clearly that forest clearing tends to occur in a 2-4 km range around roads, which are thus a significant spatial land use determinant of forest loss (Wolff *et al.* n.d.:29, 48, 53). Near the capital, the paving of roads has certainly eased agricultural commercialisation and expansion along the Libreville-Lambaréné axis, but not much along the stretch from Libreville to Ndjolé (A. N'Goye, IRAF, personal communication, Libreville, 29 May 2000). Remoter asphalt stretches, for example between Libreville and Oyem, have until now not brought about any land use changes. They may actually have facilitated the import of foodstuff from Cameroon to these areas, and thus have retarded local agricultural development (own observation, 1 June 2000; P. de Wachter, personal communication, Libreville, 26 June 2002).

It thus appears that road construction and improvement is a necessary but not a sufficient condition for forests to be cleared. Closeness to markets, soil suitability and labour costs and availability are also vital preconditions. However, if declining oil revenues and a true economic crisis were simultaneously to reduce labour costs in Gabon, then improved market access by surfaced all-weather roads are likely to lead to forest clearing for commercial agriculture. Although some newly built roads have not had a deforestation impact until now, the existence of these roads may well enable forest clearing in the future.

### ***The Transgabonese railway***

What Gabon did not invest in roads, it certainly put into railways. The single largest absorber of oil wealth was the US\$3-4 billion invested into the Transgabonese railway running from Libreville's port of Owendo to Franceville in the southeast.

The economic implications of this project have already been discussed in Section 3, but what were its impacts on the forests? To answer this question, we should distinguish between direct impacts, that is, the forest clearing associated with the physical railway construction itself, and the indirect ones, that is, the forest-related changes in human activities that the railway made possible.

Historical photographs of the railway construction (1973 to 1986) leave a dramatic impression: bulldozers navigate their way through the mud, stripping forest cover from large areas. How much forest disappeared as a direct impact of the railway? No thorough studies seem to have been made, but a thesis from Omar Bongo University deals with the impact of the first 182 km of rail, from Owendo to N'djolé (Ella Nguema Rolly 1979). This stretch mostly passed through flat, secondary forest areas that had previously been submitted to logging and shifting cultivation. The author estimated that the clearing of forest along the track had been in the range of 60 to 100 m, depending on topography. Using a simple average of 80 m, which would include some additional clearing for stations, workers' camps, etc., and multiplying this by a length of 182 km yields a cleared area of 1456 ha.<sup>43</sup>

The total length of the railway is 650 km, but forest clearing on some stretches was under the average of 80 metres, right down to zero in some places. This is mainly because the railway also crosses savannahs and other non-forested or transitional forest areas. Using an average of 60 m for the full 650-km length of the railway, the total cleared area would be 3900 ha. Adding some deforestation impact from the selective logging of wood for sleepers, a 'best guess' would be a direct deforestation impact of 4000-4500 ha, or about 0.02% of Gabon's land area. This accumulated impact was distributed over the construction period of fourteen years. However, not even this small figure represents *permanent* deforestation. As can currently be observed by travelling on the Transgabonais, there has been a remarkable degree of forest regrowth, almost covering the track in some areas. Using an overall average (including zero for previously cleared or non-forested areas) of 30 m (own observation), permanent direct forest clearing would only be about half of the figure given above, that is, 2000-2250 ha.

Indirect deforestation impacts refer to the 'opening up' of new areas for settlement and clearing, such as an expansion of agricultural production destined for the Libreville market. There is surprisingly little impact of this type. Some settlement has been encouraged around the train stations. Some food is sold to travellers, and some agricultural produce is transported to Libreville. But this seems to be the exception rather than the rule. Most cultivated products are destined for local consumption. Not even the area close to the railway around Libreville has experienced any major cash crop development (Ella Nguema Rolly 1979:54-7). This confirms the impression from the road section above that the provision of physical infrastructure is insufficient on its own to encourage commercial agriculture in Gabon, as long as better-remunerated activities are available.

Direct and indirect deforestation from the railway is thus negligible, but the impact on forest *structure* is significant. One effect of the railway has been to increase bushmeat supplies from areas made accessible to urban markets, notably Libreville (Trefon 1999:47). But more important is the fact that it has increased timber extraction significantly. Logging was from the outset one of the main economic rationales for building the Transgabonais. As the Minister of State remarked, in a contemporary internal document on the expected economic returns

from the railway: '[the transport] of wood in particular will make up a substantial part' (Boumali 1975:2, my translation from French). *Okoumé* forests in the area near the coast had been over-harvested, and the railroad cut through new *okoumé* zones in the interior that would open up 3 million ha to exploitation (G. Dufoulon, personal communication, 30 May 2000). Transport costs would be much reduced compared to road transport (Pourtier 1982:125). Today, 50% of the railway's revenue is generated by timber transport (EIU 1999:33). It is significant here that the recent tendering to privatise OCTRA, the company operating the railway, was won by a consortium with a strong representation of forestry companies (EIU 1999:13). However, as shown in Figure 2, logging only really increased in the 1990s, when there was the *combined* impact of higher competitiveness, increased demand in Asia and cheaper transport from new concession areas to the port of Owendo.

### 5.3 Directed settlement

In another oil-rich country, Indonesia, government spending on a transmigration programme that moved people from the densely populated inner islands to the forested outer islands was a factor that contributed to deforestation. Did this type of directed settlement programme also promote deforestation in Gabon? The question is clearly to be answered in the negative. On the contrary, the corresponding programmes in Gabon had an impact that actually curbed deforestation.

The resettlement (*regroupement*) of villages was an important historical factor in shaping the current uneven spatial distribution of Gabon's rural population (Richard and Léonard 1993:120-1). Both the stylised map in Raponda-Walker and Sillans (1961:8) and the population density maps from the 1920s and 1940s reproduced in Pourtier (1989b:106-7, 122) still show a rather even distribution of people in the rural, overwhelmingly forested area (see Figure 3). A somewhat higher human density only occurred in selected regions: the estuary, the north (Woleu-Ntem), the southeast (Franceville area) and around the Ogooué river. The contrast with the subsequent map from the 1970s is startling. Basically all the population was now concentrated along pre-existing roads and rivers, in what Pourtier (1989b:102) describes as a pattern of 'linear space'.

The policy of both colonial and post-colonial administrations was not, as in Indonesia, to bring people from overpopulated regions into the forest to colonise new space, but on the contrary, to get them *out of the forest* in order to concentrate them in larger sedentary agglomerations.<sup>44</sup> The aim of this top-down strategy was both to promote development objectives (providing social infrastructure, attaining economies of scale, increasing food production, etc.),<sup>45</sup> and to increase political control. As one might expect, these attempts to disrupt local livelihoods fundamentally often met with fierce resistance, though sometimes resettlement was negotiated. The colonial state embarked upon this policy from the 1930s onwards, but a nationwide and efficient linear concentration of the rural population was only achieved after independence, notably in the early 1970s. The means used to achieve this goal included both sticks (e.g. burning villages) and carrots (e.g. providing schools, transport facilities and housing).

To what extent was this policy related to oil wealth? Obviously, it formed part of a vision of 'modernisation' that already existed before the oil era. It might



Okoumé logs washed ashore on the coast (north of Libreville) (Photo by Sven Wunder)

be argued that, in indirect terms, oil revenues strengthened the ability of the state to implement this vision, providing the resources required both to force people to move and to build the social infrastructure in the newly created villages. However, most of this process was completed in the early 1970s, i.e. when oil revenues were only just beginning to increase. This implies that the link with oil is probably a weak one: revenues from timber and other mining sectors (uranium, manganese) may have contributed more.

What impact did rural resettlement have on land use and forests? Of course, whenever it was necessary to clear forests to create the new 'linear' villages, this caused immediate and permanent deforestation. But the seminomadic traditional lifestyle of rural Gabon<sup>46</sup> had also implied many (voluntary) resettlements. A more interesting question is to what extent the shift to sedentary settlement was accompanied by lasting changes in production patterns. Pourtier (1989b:114) suggests that there was little change in productive strategies, though agriculture became more intensified by shortening fallow lengths and sometimes shifting to perennial crops. Intensification reduced the clearing of forests over time. As an important economic side effect, abandoned cropped areas may have facilitated valuable *okoumé* regrowth (R. Nasi, personal communication, Bogor 21 August 2000). But perhaps most important of all was one particular unintended impact of the resettlement policy: relocation increased contact with urban areas and thus facilitated the rural exodus, especially of young people (see Section 6). This reduced both the rural population and the average size of cultivated plots. Therefore, resettlement policies evidently contributed to net forest regeneration, though oil revenues had a minor role in their implementation.

## 6 Structural changes in income and demand

In the previous sections, it has been argued that Gabon's transformation to a high-rent oil economy was accompanied by a loss of competitiveness and by a series of policy interventions, both of which favoured the conservation of forests. However, a third type of impact may occur through the rise in incomes, causing structural changes in income distribution, in aggregate demand, and in the spatial distribution of the population. These changes could potentially work for or against forests. For instance, in Latin America there has been a tendency for a richer and more urbanised population to consume more meat and dairy products, causing a rise in land-extensive cattle ranching that promotes deforestation. In this section, we will investigate these types of changes in Gabon, starting with changes in income distribution and poverty levels.

### 6.1 Poverty alleviation

In Gabon's dual economy, with its capital-intensive export enclave and a high concentration of power and assets, income distribution has remained extremely unequal over the last four decades. On the other hand, absolute poverty has been conspicuously reduced. Statistical sources on poverty and income distribution are scattered, and for rural areas mostly nonexistent. But Table 3 reproduces World Bank estimates from Poupart and Pilichowski (1997), which combine household expenditure and survey data with the national accounts.

The two first lines show measures of relative poverty, the third of absolute poverty. Each of these gives both the percentage of population living at or below the respective poverty line ('incidence'), and an indicator of the gap between the poorest and this line ('intensity'). For both the minimum-wage and the two-thirds-of-average-consumption lines, poverty incidence fell slightly until the mid-1970s, while its intensity was somewhat reduced. After 1975, there was little change in any of the relative poverty measures. However, the incidence of absolute poverty, indicated by the percentage of people earning less than US\$1 per day (at fixed 1985 prices), fell dramatically and continuously from 66% in 1960 to 11% in 1993. This fall was clearly strongest during the peak oil boom years. The intensity of absolute poverty was also much reduced. For comparison, the UNDP's Human Development Index, which takes into account both GDP and social indicators, also



**Table 3.** Poverty trends 1960-94

Indicators/Years	1960	1968	1975	1985	1990	1993
<b>Minimum wage</b>						
Incidence	87	83	86	85	84	81
Intensity	60	61	54	53	51	51
<b>2/3 of average consumption</b>						
Incidence	68	67	62	62	62	62
Intensity	39	35	30	30	30	30
<b>Dollar per day</b>						
Incidence	66	57	26	15	14	11
Intensity	38	27	8	4	3	2
<b>Human Development Index</b>	0.26	0.38 <sup>a</sup>	n.a	0.47 <sup>b</sup>	0.53 <sup>c</sup>	0.56

Source: Poupart and Pilichowski (1997:17)  
UNDP (1999b:22)

Notes:

- a. 1965
- b. 1980
- c. 1992

shows a continuous improvement over the same period (see Table 3, fourth indicator). On these grounds, the World Bank report seems far too hasty in concluding that 'the link between economic growth and poverty reduction is tenuous' (Poupart and Pilichowski 1997:19). Indeed, although income inequality is reproducing itself in the Gabonese economy,<sup>47</sup> it is doing so at a higher income and welfare level, where the number of absolute poor has experienced an extraordinary and sustained decline due to significant trickle-down effects.

This long-term decline has occurred overwhelmingly in urban areas: the main route for poverty reduction has been to move out of rural areas, as well as out of the traditional and into the modern sector. Although lagging behind urban remuneration, rural wages have also risen, due to remittances from urban relatives, government projects and employment in rural areas, and some marketing of crops and forest products in urban markets. Clearing forests in Gabon remains a highly labour-intensive activity, which in 90% of rural households is carried out by axe and machete, while only 10% possess a saw (ibid.:67). High labour costs are an important impediment to projects involving manual forest clearing (Zomo Yebe 1993:80, 83-4). Poverty alleviation thus raised the opportunity costs of rural labour, which *ceteris paribus* reduced forest conversion.

Urban unemployment emerged only after 1986, due to downswings in the oil cycle and structural adjustment involving cuts in public sector spending. In 1998, unemployment was 20%, mostly young people (UNDP 1999a:20). Private transfers play an important role in their survival strategies (DGSEE 1994a:10). Unemployment often reflects an increasing mismatch between labour demand and a Gabonese work force that is unaccustomed to the private sector. Job seekers often lack

skills, enterprise and a willingness to accept low-paid or informal jobs (*ibid.*:53-6; EIU 1999:23). This helps explain how an unemployment rate of 20% can coexist with an immigrant population that makes up 15% of residents (DGSEE 1993:18-9) and that continues to dominate key sectors like commerce, transport and fisheries (*ibid.*:44).

Unlike in countries with a more limited oil wealth, such as Cameroon, people seldom return to the countryside as a response to rising urban unemployment: the gap between urban and rural remuneration probably remains too high. Zomo Yebe (1993:82) found that in the 1980s an urban self-employed person in the informal sector typically had three times the salary of a rural poor person, and 17% more even than an independent agricultural producer. On the other hand, an urban salaried worker earned 37% more than a rural one. Although the proportions may have changed since, the figures make it clear why return migration to rural forested areas has not been a common response by people who have become marginalised in urban labour markets.

A more rational survival strategy may be to maintain urban residence while diversifying into periurban 'weekend farming'. Survey results indicate that 5% of households in Libreville and 27% in secondary centres have partly followed this path (Poupart and Pilichowski 1997: Annex B, p. 6). Another response to the mini-crises may have been to increase the extraction of open-access forest resources, such as game, timber, charcoal and non-timber forest products (Trefon 1999; Wolff *et al.* n.d.:48-52). Except for bushmeat (to be further discussed in Section 6), such mini-crisis impacts do not seem to have been widespread, nor to have caused anything more than 'point impacts' on forests in periurban areas.

In sum, the long-term reduction in absolute urban poverty and massive urban labour absorption suggests that rural-urban migration has been a principal (and predominantly successful) poverty-alleviation strategy, which at the same time has held back deforestation. This main mechanism of adjusting to oil wealth will now be analysed further. The lagging rural sector remained poor, with an increasing gap between it and the urban economy. Higher rural wages not only reduced poverty but also generally raised labour costs, adding to the disincentives against clearing forests.

## 6.2. Rural-urban migration

The single most important transformation of Gabonese society during the last half-century has been the accelerated urbanisation of a forest people. In 1950, Gabon still had the largest share of rural population among the six central African countries, far more than Congo or Cameroon. Yet after 1975 it has been the second most urbanised country, after the Congo (Wolff *et al.* n.d.:5, World Bank 1999: Table 3.10). Urbanisation estimates vary greatly according to how urban areas are defined. Gabon's population census criterion has been to consider agglomerations of more than 3000 inhabitants as 'urban' (Richard and Léonard 1993:152-3). Officially, urbanisation was thus 73% in the 1993 census (DGSEE 1993:2). International comparative sources like the World Bank (1999) yield the more conservative estimate of 52.1% for 1997. More interesting than variable static definitions are changes over time. Pourtier (1989b:237) reports a rise from 20% in 1960 to about 60% in 1985; Moriconi-Ebrard (1993, cited in Wolff *et al.* 77 n.d.:5)

from less than 5% in 1950 to about 45% in 1990, with a marked increase during the oil boom years (1970–80). The World Bank (1999) figures are 17.4% in 1960 and 52.14% in 1997, showing an almost linear urbanisation trend over the entire period.

The accelerated process of urbanisation is closely related to the creation of an independent state, strengthened gradually by the rise in rents from mining and especially oil. As Pourtier expresses it, cities and towns are 'the daughters of the state'. At the same time, they are also the most tangible direct product of Gabon's mineral extraction cycles: 'The rent has been converted into towns,' (Pourtier 1989b:237). This is most obvious for the exponential growth of Libreville, the modern capital, where the power to distribute publicly accruing rents is concentrated. Until recently, the city doubled its population every decade: 12 500 (1950), 31 000 (1960), 77 000 (1970), 185 000 (1980), 338 000 (1990), 450 000 (1998).<sup>48</sup> Port Gentil, the second-largest town and main port, has benefited from the export of both timber and oil. Finally, the urban triangle of Moanda-Mounana-Franceville in the southeast has been created by uranium and manganese mining, as well as by generous public projects that President Bongo has initiated in what is his home region.

Even in smaller administrative outposts in the interior—isolated 'forest towns' with little production and few trade links—the state has often become the 'leading sector', civil servants' salaries, public social infrastructure and construction projects proving decisive in stimulating a local urban economy (Richard and Léonard 1993:264–74). Sometimes the false impression prevails that this public spending has occurred in a geographically highly skewed manner. In fact, spending priorities seem to have been regionally fine tuned (*ibid.*:269), in order to mirror the distribution of population, and of votes.<sup>49</sup> In the 1980s, about half of this urban population, notably women, still practised urban or periurban agriculture, in spite of the rising density of the urban population: lack of space led to longer transport time to the fields and, in particular, a shortening of fallows. The latter was achieved, *inter alia*, by shifting to crops like manioc, which are more tolerant of reduced fallows (*ibid.*:271). In other words, rising crop production in and around towns went hand in hand with intensified cropping. At the same time, imported foodstuffs penetrated most urban areas massively, thus limiting the demand for periurban products (see next section).

The net result was that, even where periurban cropped area expanded at the expense of forests, as happened around larger agglomerations such as Libreville, Franceville and Oyem, this sort of expansion and forest loss was proportionately far below the rise in population. As mentioned in Section 1, from 1961 to 1990, although 5015 ha of forests were cleared near Oyem (25% of the area studied by Wolff *et al.* n.d.:17, 22), population increased sevenfold from 3000 to 22 404 (DGSEE 1993:88). In Franceville, 1699 ha of forest (about 30%) were cleared from 1953 to 1994 (Wolff *et al.* n.d.:18, 26–7), but just from 1972 to 1993 population rose sixfold, from 5000 to 31 183 (DGSEE 1993:86). Around Libreville, 9000–10 000 ha are currently being cultivated (BPDA 1998:18–26), for a population of up to 450 000 (Marchés Tropicaux 1998:17). This corresponds to 0.02 ha per inhabitant.<sup>50</sup> There can therefore be little doubt that urbanisation has been a highly 'land-preserving' undertaking on the whole.

Where did the urban migrants come from, and why did they move? Interprovincial migration flows up to 1970 (Pourtier 1989b:260) and 1993 (DGSEE

1993:62) document a continuous rural exodus from the interior to Libreville and, secondarily, to Port Gentil and the Franceville triangle. Up to 1970, Libreville-bound migrants originated mainly from Ngounié and Nyanga Provinces in the south and Woleu-Ntem in the north. By 1993, there had also been a large migration flow to Libreville from Haut-Ogooué Province in the southwest, as well as from abroad. 'Pull' motives such as urban job opportunities were the main motive for migration; there were no demographic or other pressures worth mentioning in the areas of origin (Pourtier 1989b:266). In some cases, such as Oyem in the mid-1970s, there was a direct causal link between oil boom revenues, new urban and labour-intensive projects being undertaken by the state, rural exodus and the abandonment of cropped areas.<sup>51</sup>

How were land use and forests in the sending areas affected? In the rural areas, population has either declined or stagnated since 1960. No historical rural census figures seem to be available at the provincial level. Yet, most rural provinces, like Ogooué-Ivindo, Ogooué-Lolo, Nyanga and Ngounié, have maintained their low 1960 densities of around 1-2 (rural and urban) inhabitants per km<sup>2</sup>; for others, there has been a moderate rise to 2.3 (Moyen-Ogooué) and 2.5 (Woleu-Ntem). More importantly, the age and sex structure has changed dramatically in the countryside (see Figure 4). Rural areas have built up a deficit in the most productive age groups (20 to 45), especially of men, who have migrated to the towns to find better job opportunities. Rural areas are thus rapidly ageing, with a lower share of economically active persons. This is perhaps the main factor behind the abandonment of cultivated areas and the increases in forest regeneration.



Oil revenues expanded service sectors and promoted rapid urbanisation (hairdresser in Libreville) (Photo by Sven Wunder)

### 6.3. The structure of consumption

In a country where per capita GDP rises eightfold in eight years, and remains for three decades at 4-5 times its inflation-corrected pre-boom level (Section 3), significant changes in the composition of demand are bound to occur. As a society grows richer, different goods are consumed, even if this wealth is distributed unequally. Production of especially higher calorie-intake food products may potentially lead to an extensification of land use and accelerate forest clearing. It will be argued that the demand structure in Gabon indeed changed dramatically, but that this had unimportant impacts on land use because food imports grew spectacularly.

From 1961 to 1973, per capita daily calorie consumption grew moderately from 1959 (208 from animal products) to 2141 (267), but petroleum wealth accelerated this increase to 2626 (425) in 1984 (FAO 2000). This reflects the fact that rising purchasing power also stimulated food sales, especially of animal products such as beef. Bovine meat consumption had already increased from 1459 t in 1961 to 2297 t in 1973, but with the oil boom it went up sevenfold to 13 474 t in 1984. The domestic share of beef production was 12% for both 1961 and 1973, and although production expanded by a meagre 105 t up to 1984, its relative share plummeted to 3%. Meat consumption levels stayed high until 1995, after which there was a sharp decline to 5094 t in 1998. For the first time since independence, the domestic market share has now reached 21%, though only because imports have declined sharply. Absolute domestic production levels have been stagnant since 1990. For comparison, Gabon's bovine production corresponds to 2% of the Central African Republic's, 1.2% of Cameroon's and 0.2% of South Africa's production in 1998 (*ibid.*).

In other words, basically all the rapidly rising demand for bovine meat from 1973 to 1984 was satisfied by imports, mainly from the EU and South Africa. In the second half of the 1980s, agroindustrial investment in cattle increased domestic production. The main ranches are Nyanga, Ngounié (both in the south), and Lekabi (near Franceville). However, these are almost exclusively situated in savannah areas (Dauthuille 1996:51; DGE 1999:34-5). With sizes of 100 000 ha, 65 000 ha and 50 000 ha respectively, all of them are underutilised in spatial terms, and even a fair rise in domestic production would probably not make it worthwhile to clear forest for pasture expansion. The deforestation impact of cattle ranching in Gabon is thus currently zero.

With oil wealth, Gabon also experienced an increasing 'westernisation' of food habits. At the luxury end, Gabon apparently has the world's highest per capita consumption of champagne, which was already known as *jus d'okoumé* in the heyday of timber exports. More importantly, the basic diet changed. In the coastal towns, maize flour and French breads replaced traditional tuber staples such as starchy manioc (Zomo Yebe 1993:56; Trefon 1999:43). Consumption of 'luxury' foods, such as fruit, vegetables, meat and cereals, generally increased (Marchés Tropicaux 1998:17). One source estimates that, during the early 1980s, Gabon imported as much as 96% of its food consumption value (*The Economist*, cited in Yates 1996:213). Hence, consumption shifts further reduced incentives for agricultural production, thus reducing potential sources of forest loss.

In the late 1980s, agriculture bounced back somewhat. There are indications that some tuber staples consumed in urban areas now increasingly come from

Gabonese sources, while other foods are still imported.<sup>52</sup> On the other hand, new trends are emerging, such as the massive penetration of Asian rice as a staple crop in Libreville and Port Gentil. In the towns of the interior, high transport costs from the ports have hitherto protected the predominant place of tubers and plantains (DGSEE 1994a:249-54). However, in the two main towns on the coast, rice and cereals together now provide 36% of calorie consumption, while tubers only make up 17% (DGSEE 1994b:20).

If a growing, richer and more urban population did not cause much land conversion, did it extract more forest products in a way that decreased forest quality? As mentioned, domestic demand for wood products (firewood, charcoal, timber) is unlikely to cause more than point impacts in a country with so much forest per inhabitant, especially for wood energy uses that tend to decline in urban areas. Bushmeat is the prime candidate for a form of extraction that diminishes forest *quality*.<sup>53</sup> Historically, hunting has provided the bulk of meat supplies in Gabon. As shown by beef consumption above, meat is also a foodstuff with a relatively high income elasticity (0.45 in Gabon's urban centres),<sup>54</sup> implying that it expands fairly rapidly when a society grows richer.

Bushmeat figures are very tentative, given the decentralised and semilegal nature of its exploitation. Indjieley (1998:2) quotes a WWF report to the effect that sales in three Libreville markets over twelve months (1992-3) equalled 500 t, corresponding to a yearly consumption of 1.2 kg per inhabitant. Steel (1994) estimates that, for all six urban markets in Gabon, yearly sales are 1105 t. But when extra-market roadside sources are included, extraction reaches 6900 t. Rural use is estimated at 11 000 t. The national result is a yearly bushmeat consumption of 17 900 t (17.65 kg per person). This is 57% higher than the 11 381 t estimate by Wilkie and Carpenter (n.d.:5), and it is claimed to be double the size of beef consumption (Steel 1994: Summary). Also, urban bushmeat use is said to be rising over time, as a cheap open-access resource that becomes attractive under conditions of economic crisis (Trefon 1999:46).

However, there seem to be several flaws in these arguments. An initial note of caution is that roadside sales and subsistence uses are extremely difficult to extrapolate on to the national scale from a limited set of observations, yet these uses make up 94% of Steel's estimates (1994). Even if the absolute figures reflected reality, their relative size is still highly exaggerated. It is not correct to say that bushmeat makes up double the quantity of beef consumption: the 17 900 t represents less than one-third of total meat supply.<sup>55</sup> Also, urbanisation reduces, rather than increases, bushmeat consumption. Using the population census estimates from 1993 (742 296 urban and 272 680 rural inhabitants; DGSEE 1993:6), Steel's figures imply an average urban consumption of 25 g per person per day, compared to 110 g in the countryside. The 'urban crisis' argument also seems dubious, as urban bushmeat is not very cheap, whether for suppliers to hunt, store, transport and sell, or for consumers to buy.<sup>56</sup> Urban consumers keep eating bushmeat to a limited but regular extent out of preference and cultural tradition, not as a specific response to economic crisis.

In general, a picture emerges in which urbanisation and changing consumption patterns have tended to favour food imports. This has helped to protect Gabon's forests by moving the 'ecological footprint' of swelling urban areas outside the country's borders. Of course, this factor works in tandem with the loss of

competitiveness of Gabonese agriculture. This trend was extremely pronounced from 1973 to 1985. Recent changes at the margin of these trends, which are related to a certain stagnation in oil wealth, produced only a vague revival of domestic food crops.

## 7 Conclusions

Following independence in 1960, Gabon was gradually transformed from a timber-exporting into a mineral-extracting economy, a structural change that, as a side effect, also created conditions extremely favourable to the preservation of forest cover. The oil boom was the driving force in the creation of a rentier state. During the price hike of the 1970s, GDP per capita rose sevenfold. In the mid-1980s prices dropped, but the simultaneous rise in oil production meant that since 1973 Gabon has remained a considerably richer country than before. Gabon's oil wealth has been unequally distributed, but absolute poverty has still been reduced dramatically. The government's spending of oil wealth has generally focussed on the following areas:

- more public employment, higher salaries and benefits
- transport infrastructure (railway, ports, but *not* roads)
- urban infrastructure (construction, health, education)
- large-scale parastatals.

The direct impact of swelling public employment and urban infrastructure was 'forest-neutral', but in indirect terms this triggered a rural exodus to urban areas, especially of young people in the most productive age groups. An ageing rural population thus lived more and more from private transfers and public projects, and reduced or abandoned crop cultivation. Together with iterative state policies of rural resettlement, this led to forest regrowth in many increasingly 'empty' parts of the interior. Several case studies of changes in vegetation cover show that cutbacks in extensive slash-and-burn systems led to a significant expansion of forest area. A quote from a village chief in northeast Gabon is illustrative of a situation in which a reduced human presence went hand in hand with forest rehabilitation: 'Nobody lives here any more... The young are leaving, and the elephants and gorillas run freely through our gardens, destroying what little we grow to eat'.<sup>57</sup>

Generally speaking, there are no motivations for large-scale deforestation in Gabon; rather, the decline in land-using sectors since the start of the oil era is likely to have triggered natural net *reforestation* over the past three decades. This evidently belies the FAO's FRA 1990, which had suggested there was an annual rate



of deforestation of around 100 000 ha. Net current deforestation is probably either zero or of negligible size. Land use has generally declined, and because of the greater concentration of the population, it has also become more intensive. Table 4 summarises how oil wealth has triggered a series of market- and policy-induced changes. Ten partial pathways are classified according to their economic intensity, and to the strength with which they are linked to forests. These two criteria then jointly determine the intensity with which deforestation is either curbed or accelerated by that pathway.

**Table 4.** Oil wealth and deforestation. An overview of the long-term impacts

Economic and productive impacts		Links to deforestation		Deforestation impact		
No.	Type	Intensity	Type	Strength	Type	Intensity
1.	Urban labour absorption in (para-) public sectors and private services	Very strong ● ● ●	Rural exodus; cultivated areas are massively abandoned	Close ➔	Forest regrowth in the country's interior	Very strong ▼▼▼
2.	Long-run loss of traded sector competitiveness	Strong ● ●	Export and food crops shrink, reduced timber extraction	Close ➔	Less forest conversion	Strong ▼▼
3.	Reduced absolute poverty	Strong ● ●	Higher opportunity costs of rural labour	Medium ⇔	Less forest conversion	Medium ▼
4.	Higher urban incomes shifts food demand	Medium ●	Imports go up, substituting local staples	Medium ⇔	Less forest conversion	Medium ▼
5.	New road and rail construction	Weak ○	Open up frontiers for product trade	Close ➔	Maybe more degradation, but no deforestation	Weak ↑
6.	Higher budgets of development agencies	Medium, unstable ●	Capital- and land-intensive agroindustries	Weak →	Deforestation point impacts	Weak ↑
7.	Oil and mining production	Medium ●	On-site direct and indirect forest loss	Weak →	Deforestation point impacts	Weak ↑
8.	Agricultural protectionism and subsidies	Close to zero	De-protection of food crops and unfairly-priced export crops	Medium ⇔	Reinforced decline in cultivated area	Weak ↓
9.	Rural resettlement	Weak link to oil ○	Spatial concentration of rural population	Medium ⇔	Reduced fallow length	Weak ↓
10.	Higher budgets of forestry/park agencies	Close to zero	Weak domestic policy priority	Medium ⇔	Improved law enforcement?	Close to zero

*Notes:* dark-shaded area - effect reduces deforestation; non-shaded areas - effect increases deforestation.

The dominance of shaded areas in Table 4 indicates that factors reducing forest loss factors made up most of the pathways (seven out of ten), particularly the strongest clusters. Urban labour absorption (1) was clearly the most important. This worked together with poverty reduction (3), mostly achieved in urban areas, and rural resettlement (9) towards the goal of rapid urbanisation. Jointly, these factors liquidated a fair share of traditional agriculture. A second group of factors clusters around demand substitution. This included real exchange rate appreciation (2), the increasing exposure to it, caused by adverse trade and pricing policies (8), and shifting urban consumption preferences induced by higher incomes (4). Domestic production could not compete within this scenario, and was increasingly replaced by imports. This put further pressure on agriculture, which declined dramatically in terms of production, employment and cropped area.

The Dutch Disease thus induced a long-term loss of competitiveness, which hurt agriculture and other non-mineral traded sectors. Timber was one of them. Exports have proved highly price elastic in recent decades, as implied by the regression results above. The extensive but highly selective type of logging in Gabon implies that it has an impact on forest structure but does not cause deforestation. For agriculture, the export crops, coffee and cocoa, were subjected to real economic extermination; import-competing domestic food crops were also hit and have only recently experienced a slight revival in periurban areas, as a response to urban mini-crises.

As regards the acceleration of forest loss, impacts remained weak. The agroindustrial sector (8), the state pet designed to replace traditional agriculture from the 1980s onwards, was much less land extensive and, above all, too inefficient to reach its planned output. Road building (5) was entirely neglected, while much money was put into the Transgabonais rail. This expanded logging, which may eventually accelerate forest degradation, but its impact in terms of deforestation has been negligible. And the booming oil sector (7), although being mostly onshore based, had an equally minor (and often exaggerated) impact on deforestation.

Gabon's development strategy in recent decades therefore looks in many ways like a sophisticated conspiracy against agriculture, which coincidentally has proved to be an involuntary but highly efficient forest conservation strategy! It seems to matter little that agencies responsible for publicly protected areas remain hopelessly underfunded or that forestry regulation is weak (10), as long as one follows 'the Gabonese recipe' in achieving maximum forest conservation:

- draw as much labour as possible out of rural areas by spending your money in the cities
- let your exchange rate appreciate, overtax export agriculture and favour food imports
- neglect demands for new road building in the interior
- force people to settle in concentrated roadside agglomerations
- deny credit and technical assistance to small-scale agricultural producers
- waste most of your agricultural budget on agroindustrial 'white elephants'
- nourish a rent-seeking environment in which few people find it worth while to produce.

Not only did the state discriminate against agriculture; the sector also has a generally compromised status among the Gabonese people themselves. Forest clearing for crops is carried out by men, but cultivation is exclusively relegated to women (Pourtier 1989a:194), and most commercial agriculture is left to foreigners. For instance, almost 75% of crop producers around Libreville are foreigners (BPDA 1998:32). However, once oil revenues decline the situation will gradually change. Even most observers who are sympathetic to forest conservation would probably admit that some rise in agricultural expansion will be inevitable in terms of Gabon's need to adjust to lower oil revenues, even if it will trigger some deforestation (see next section).

Although the development of agriculture is indeed a goal in development planning,<sup>58</sup> it may only happen once oil income seriously declines and forces the necessary shifts in relative prices and the allocation of factors of production. Beyond the question of cost competitiveness, the economy remains extremely interventionist (*'l'étatisation'*); no domestic entrepreneurial class has developed. In Gabonese society, consumption is still much divorced from production, a mentality that has been created by its rich extractive resources. In this sense, a quote from the classical work of Raponda Walker and Sillans (1961:31) is still valid: 'Why bother to cultivate in a country where everything is at hand?' While forests can contribute positively to economic development, it seems also obvious that they have constituted a default condition of 'non-development' in the countryside.



Constuction of modern government buildings in Libreville was a major item of oil-wealth spending (Photo by Sven Wunder)

## 8 Outlook and policy recommendations

This final section is dedicated to Gabon's development prospects in approaching the post-oil era. Its five subsections will sequentially provide tentative answers to five big questions:

1. How rapidly are oil revenues likely to decline?
2. To what extent can other rent sources take over the role of oil?
3. To what extent can value-added production sectors compensate for the oil decline?
4. What will happen to forests under the most likely of these development scenarios?
5. How should environmentally conscious development policies respond to the challenges?

### 8.1 What scenarios for oil revenues?

Because of Gabon's maturity as an oil country, it is statistically highly improbable that sizeable new fields should be discovered in the future. This means that Gabon's oil exports are eventually bound to decline.<sup>59</sup> But how quickly is this going to happen? Due to the paramount importance of oil revenues, a brief discussion of this topic is necessary. Some forecasts have foreseen a very rapid decline, based on a linear extrapolation of currently known reserves. For 2005, a production level of only about 6 million t has been projected, with a probable complete exhaustion of all oil resources in 2010 (Marchés Tropicaux 2000:1437). Correspondingly, the computation model by Söderling (2002) builds on a halving of oil production between 2000 and 2007, from 13.6 to 6.1 million t, triggering massive macroeconomic adjustment in the short term (ibid:15).

These decline scenarios are highly relevant for the medium run, but for the short run they are too pessimistic.<sup>60</sup> Gabon is likely to remain a significant oil exporter for at least about another 15 years. This is both because existing fields are declining more slowly than earlier predicted, and because the minor new discoveries have been more important than earlier believed:

- The decline phase of existing fields is not linear, rather the curve levels off over time, due to geological and physical characteristics. Hence, when an oil field's production starts to decline, the absolute impact will be largest in the beginning. The main field in Gabon, Rabi, has already passed its major decline phase. Over the next three years, the relative decline is only expected to be around 20%.
- New discoveries have been slightly larger than was expected a couple of years ago. Current development focuses on the onshore Atora and Toucan fields (near Rabi) and on offshore deep-water resources. Part of the relative success has to do with luck, but part of it is systematically related to the larger efforts in exploration over the last couple of years, even in the declining fields. These efforts have been triggered by high current oil prices<sup>61</sup> and by better conditions offered to the foreign oil companies by the government.<sup>62</sup>

Consequently, the grimmest oil scenario for Gabon seems to be one of declining international prices, reduced exploration and a production decline somewhat lower than over the past three years, with a marked decline of revenues, especially after 5-10 years. The most optimistic scenario would be the maintenance of fairly high prices, a stabilisation of production quantities over the next five years, followed by a gradual decline in both production and revenues. The medium-run outlook thus still looks worrying for Gabon, but in the short run the oil decline will be diminished. That buys more time in order to adopt rational policies preparing for a future without oil.

## 8.2 What prospects for other rent sources?

Gabon's *après-pétrole* (post-oil) period will thus come more slowly than previously expected. But it is still highly relevant to look at what will eventually happen to Gabon's economy and its forests, once oil does decline and economic alternatives have to be developed, either in terms of other resource extraction or of their processing. The country has never had large traditions for *any* processing or production. So, an obvious first question is: Is there other extraction of natural resources that could take over the place of petroleum rents? Currently, no outstandingly profitable options seem available in Gabon, but still a number of sectors are worth consideration:

**1. Natural gas:** Gabon disposes not only of oil, but also of natural gas deposits. In other countries, like Nigeria or Indonesia, heavy investments in liquified natural gas (LNG) plants have been made, making LNG a significant source of foreign exchange. This has until now not been considered worthwhile in Gabon, so the gas has been flared. However, potentially that could change in the future, depending basically on international energy prices and breakthroughs in the development of new extraction technologies (J. Bickerton, Amerada Hess, personal communication, Owendo, 28 June 2002).

**2. Mining:** South African miners have over the last few years been very active in open-pit gold mining in Gabon. Until now, they do not seem to have made large strikes. However, the growing mining investments over time would seem to indicate

that the expected probability of reasonably large deposits is significant, so this could become a future source of rents (C. Wilks, personal communication, Libreville, 29 June 2002). In addition, Gabon still exploits manganese. Its uranium production could be revived if international demand and prices rise. Gabon also has other known mineral deposits, such as phosphates.

**3. Timber:** Many look to wood extraction as a source of revenues once oil declines. Income generated by timber will never reach the heights of oil revenues, but its direct employment benefits can be significant. Three timber-related options spring to mind. First, some expansion in primary production values may be possible, through more rational silvicultural management of natural forests (e.g. enrichment techniques), greater acceptance of new species, and some establishment of plantations that allow for a higher per-hectare production. Secondly, the government may be able to capture a greater share of stumpage values by increasing taxation; the new Forest Code seems to be a step in that direction (see Section 4). Finally, efforts are currently being made to add more local value prior to exporting, which takes us from the rent-collection to the production sphere (see below).

**4. Fisheries:** This is a renewable natural resource which until now has been widely underexploited by domestic economic agents,<sup>63</sup> probably because the rents to be gained were not competitive compared to oil rents and their distribution. Once the post-oil era sets in, one would expect a larger exploitation of fisheries, including the danger of overharvesting this open-access resource. In any case, this sector is also likely to remain modest in terms of foreign exchange earnings, compared to the expected decline in oil revenues.

All of these four rent-providing sectors could potentially produce significant revenues that would mitigate a hard landing of the economy as oil revenues plummet. However, the sheer size of oil revenues today means that none of these sectors, alone or in combination, is in any way likely to fully compensate for oil declines. Consequently, we can conclude that Gabon is likely to become a less rent-driven economy over time.

### 8.3 What scenario for value-added sectors?

If the conclusion about declining rents holds, are there then any production and value-added alternatives that could provide alternative sources of foreign exchange to fill the gap? Are there productive sectors where Gabon would have, or could rapidly acquire, a comparative advantage? The outlook is rather bleak, due to a combination of high-cost, low-skill labour, absence of an entrepreneurial tradition, and lacking or deteriorating infrastructure. An economic crisis triggered by oil exhaustion inevitably will bring down exchange rates, prices and wages, but it is not clear how the structural deficiencies would be addressed. Nevertheless, let us discuss the main options:

**1. Adding value to extractive resources:** Perhaps the clearest option would be to aim for a larger extent of processing of the natural resources that are currently extracted, prior to their export. From the four sectors just described, the most

obvious candidate would be wood processing.<sup>64</sup> Since 1997, timber companies have rapidly developed new sawmills (Christy *et al.* 2002:312-3). Sawmill production rose steeply from 34 650 m<sup>3</sup> in 1999 to 49 193 m<sup>3</sup> in 2000 (DGE 2001:45-6). On the other hand, plywood production has experienced a sharp decline, from 64 006 m<sup>3</sup> in 1999 to 37 405 m<sup>3</sup> in 2000, mainly due to cutbacks in public subsidies and internal company problems, while further processing remains negligible (DGE 2001:46). One can thus say that Gabon currently is successful in raising primary processing, while widely failing to develop more sophisticated processing stages—which is where the value added per unit of output is highest. Various examples show that wood-processing industries in primary producer countries can be efficient in earning foreign exchange (e.g. the furniture industry in Indonesia) and in providing employment (e.g. the woodcarving industry in Southern Africa). For Gabon, the main challenges would be to bring down high cost levels, to develop the required labour skills, to advance physical infrastructure (communication, roads, etc.) and to improve management, including by continued privatisation.

**2. Promoting Gabon as a provider of international services:** Various proposals exist in that regard. One is to develop Libreville as a financial centre for Central Africa, taking advantage of its pleasant and (as yet) peaceful character,<sup>65</sup> another to make Port Gentil a Free Trade Zone. A third proposal is to develop Gabon as international tourism destination. At present, these options seem largely unrealistic. Again, main obstacles would be the high-cost, low-skill and little service-minded labour, the deteriorating communication sector, but in addition we have to consider the poorly maintained tourist infrastructure, the high costs of international air travel to Gabon and the country's anachronistic bureaucratic obstacles. The latter starts with the bothersome difficulties of getting a visa to visit the country. To prepare the country to become a competitive international service provider would certainly take many years.

**3. Develop intensive, high-value agriculture:** A land-intensive option is the periurban cultivation of high-input products, such as those perishable fruits and vegetables that can only be imported at relatively high costs. This route towards intensive and sedentary agriculture has been followed with some success by the IGAD (Section 4). Another recent example is the small-scale development of passion fruit in Woleu-Ntem province (*L'Union*, Wednesday, 17 April 2002, p.4). While this strategy is important, especially in terms of creating employment, it will almost inevitably remain a minor subsector of agriculture.

**4. Develop other commercial agriculture:** It seems that in the post-oil period, there will be an inevitable need for Gabon to redevelop smallholder cash crops like coffee and cocoa in order to generate foreign exchange. At present, state investment efforts aim at both rejuvenating cocoa plantations and at developing a high-quality cocoa variety,<sup>66</sup> but prospects for success on a larger scale seem poor indeed as long as labour costs remain prohibitively elevated: for most agricultural development, a decline in real wages is a necessary condition. From 1999 to 2000, overall production of coffee further declined by 56.4% and cocoa by 6.3% (DGE 2001:36-7). Estate crops are perhaps a more immediate option, as they tend to be

slightly less labour intensive. But the parastatals in both oil palm and rubber suffered from irregularities and mismanagement, which led to sharp production cutbacks during 1999 (EIU 2001:20). Cattle ranching might have been an option for a land-rich country like Gabon, but obstacles of the veterinary, cultural and management type restrict the prospects for expansion.

**5. Re-engage in food crops and forest extraction:** To the extent that the combination of all the aforementioned adjustment strategies to oil exhaustion fails, Gabon's population will have to turn back to what it did before the rise of rents: production of food crops and extraction of non-timber forest products. This 'default scenario' of low economic returns will be stronger the more accentuated is the economic crisis. Many people object to that vision, saying that Gabon lacks an agricultural tradition. But this underestimates the adaptability of a population with an empty stomach: if no other sector delivers significant income flows, shifting cultivation will become a main survival strategy. Probably foreigners would play a key role to start with. Probably most Gabonese would still want to retain links to the urban economy, so few of them would want to move back to the interior of the country. This means that periurban production of staples like plantains or manioc would tend to rise most markedly. If in the medium run the urban economy continues its decline, more people would start to occupy the forested interior part of the country, and more would turn to commercialise food crops.



Declining oil revenues will go hand in hand with expanding agriculture and greater pressures for forest conversion (market in peri-urban Libreville) (Photo by Sven Wunder)



## 8.4 What will happen to forests?

As shown in the last section, the medium-run prospects for developing Gabon's non-oil economy (both rent-collecting and production sectors) are all but rosy. If the basic assumptions hold water, what would it mean for forests? While per capita incomes now are still high and deforestation is negligible, living standards would eventually decline once the oil era approaches an end. Dutch Disease price effects will diminish—although the fact that the currency is tied to the Euro, hence making a national devaluation impossible, would delay the adjustment of relative prices. Yet, eventually non-tradable prices will have to come down, and a real depreciation of at least 50% is highly probable.<sup>67</sup> There will be a reorientation towards other rent sectors, if available, and towards processing and value-added activities, to the extent that these can be successfully developed. To the extent that these efforts are not successful, Gabon would need to do more to develop other, land-using sectors, such as cash, estate and food crops.

What effect would agricultural expansion have on forests? Periurban land-intensive production of vegetables and fruits causes only negligible deforestation,<sup>68</sup> but other cash and food crops would have a more significant impact. If the above scenarios imply that Gabon will become more like its neighbours, perhaps we should look to them for similar development scenarios. What experiences can we draw on? From Cameroon, we know that the severe economic crisis in the decade after 1986 halted the trend towards urbanisation and triggered some return migration to the countryside. This demographic change caused a large expansion in food crops, with a strong rise in forest clearing in the humid forest zone that was clearly related to the macroeconomic shifts (Mertens *et al.* 2000; Ndoye and Kaimowitz 2000). Nigeria, another Dutch Disease country, also experienced a strong reagriculturalisation once oil incomes dropped, and probably an upsurge in deforestation that was basically led by import-protected food crops (Wunder 2003:ch.9).

An important suggestion from these experiences, probably controversial to some, is that it is good for forest conservation (*and* for the economy) to develop some cash crop sectors for exports. This type of income generation is a preferable option, compared to a scenario where people massively fall back on the default survival strategy of growing food crops for themselves and for urban sales, with poor financial returns per hectare of employed land. The reason is not only that some cash and estate crops assimilate better to the forest environment than food crops. Most food crops are more land-using, due to their itinerant production systems that make large non-forest fallow areas necessary, thus triggering more extensive deforestation.

Does that mean that Gabon is facing the prospect of a massive rise in deforestation, which will reduce its forest cover to proportions comparable to the situation in Cameroon and, eventually, to a near-exhaustion of all closed forests outside protected areas, as happened in Nigeria? This vision would clearly be an exaggeration. First, oil rents will continue to protect forests considerably in the next 10-15 years, and it will take a substantial downturn of the economy for many of these effects to fully materialise. Second, the inertia of the process in Gabon fortunately lags many years behind in comparative terms. Notably, the low population density in Gabon will delay the process: Nigeria has a population of 124 million

people, living at an average of 136 persons per km<sup>2</sup>; Gabon has 1.2 million at a density of 5 persons per km<sup>2</sup> (Wunder 2003: Table 10.1).

However, we would expect to see a similar process of land occupation led by food crops in smaller proportions. In addition, a significantly devalued real exchange rate would give incentives for more logging, which could accelerate forest degradation—as has happened in Cameroon and in other tropical countries (Wunder 2003). One would also expect more (and less benign) extraction of ‘inferior’ non-timber forest products like medicinal plants or forest foods. Experience in Cameroon and elsewhere has shown that demand for these open-access products tends to rise in times of economic crisis, as it becomes too expensive for people to buy imported or synthetic substitutes (Ndoye *et al.* 1998). On the contrary, bushmeat is not an inferior product, so demand would probably not rise in response to a crisis. In addition, other factors like the recent Ebola outbreak in Ogooué-Ivindo province could dramatically depress bushmeat demand.<sup>69</sup> But to the extent that logging operations are intensified, this would tend to ease the access for hunters, so eventually the phenomenon of defaunation may be exacerbated from the supply side.

## 8.5 Some policy and strategy recommendations

If conservation concerns have not been centre stage in Gabon until now, they are likely to become even more sidelined as economic crisis hits the country in an *après-pétrole* period. The burdensome task of diversifying and developing new (or reviving old) productive sectors, including land- and forest-using ones, will become more and more urgent. This is a process we know from other high-rent oil countries exposed to a long-term crisis that forces economic restructuring, pushing conservation into an increasingly defensive position.<sup>70</sup> Conservationists should in that situation be well prepared for a strategy of safeguarding the richest forests by directing development pressures to those activities that do the least damage to forests. From the viewpoint of forest conservationists who also have to think responsibly about their crisis-hit country's economic development, some specific strategies and policy responses would be:

**1. Enhance the urban economy:** To avoid widespread deforestation pressures in Gabon, it is important to keep people tied to their urban employment. Limiting the decline of the urban economy through good macroeconomic management, thus safeguarding as much employment as possible to avoid mass return migration to the countryside, would be a ‘win-win’ strategy that can help both the economy and the environment. Present inefficiencies in that economy have gone over the edge, so that not even the oil boom during 2000-01 triggered real growth—on the contrary. It is thus important to deregulate the economy and give more space to economic competition, to reduce wastage and directly unproductive public employment, to provide effective incentives for urban production, and to privatise those state companies and parastatals that have failed on a long-term basis. It is also necessary to do a better job in the macroeconomic stabilisation of highly fluctuating oil revenues, keeping a stable real exchange rate (see also point 2).

**2. Reduce foreign indebtedness:** The foreign debt has reached levels that will probably no longer be serviceable once oil resources are exhausted. If debt levels

are not reduced prior to that, debt service requirements will create capital outflows that exacerbate the pressures on natural resources, in keeping with the factors listed above. An important pathway to impede that is to restructure and reduce the foreign debt as much as possible while the oil is still there. Clearly, this would also be a win-win strategy—and it would help to stabilise the economy if debt repayment is voluntarily raised under periods of high oil prices. Of course, an alternative, irresponsible strategy would be to let the debt escalate so much that, in the long run, debt forgiveness under the Paris Club and other international fora becomes the only feasible option. Apparently, Japan has recently written off a part of Gabon's bilateral debt to that country. Yet, that strategy seems dubious, as until now Gabon has simply been too rich a country to benefit from significant debt forgiveness. Under current creditor policies, the economy would need to first pass through a disaster stage before that strategy would become viable.

**3. Support efforts to develop new rent sources:** The more Gabon can manage to preserve of a functioning rent-driven economy, the less deforestation and degradation pressures are likely to increase. To the extent that other mineral rents (manganese, gold, uranium, etc.) and renewable rent sources (timber, fisheries, mining) can be developed as lasting, alternative sources of foreign exchange, this will help to keep down deforestation. In specific terms, this means for example that conservationists, though generally worried about the environmental impacts of mining, should not oppose open-pit gold mining in forested areas, but welcome it:<sup>71</sup> ultimately, the *derived* negative forest impacts of foregoing these mineral rents are much higher than the *direct* on-site damages of mining.

**4. Try to confine deforestation spatially:** In the post-oil period, agricultural production will inevitably have to increase, and yields will not increase dramatically. In a country where almost all unused land is forested, this means that natural forest cover has to shrink. The question is where that will happen, and how much forest will disappear. In spatial terms, one would probably have to live with increasing periurban deforestation as a necessary evil. But one could try to rationalise the foreseeable higher pressures for occupation of rural space, so that forest loss is minimised and particularly biodiversity-rich forests are not compromised (see also protected areas, point 8). That requires a process of spatial priority setting and land use planning, which organisations such as IUCN, WWF and WCS have apparently started to work on (C. Doumenge, personal e-communication, 26 October 2002). In addition, one should dedicate resources to increasing yields so as to make food crop cultivation more landintensive. Also, with a larger national role for agriculture, it would be almost impossible to impede additional investments in rural roads. But one could try to steer most of that towards the improvement of *existing* roads. This would help to bring down agricultural producers' costs of product commercialisation, give incentives to intensive land uses, and cause less forest loss than an emphasis on mainly building new roads through forested areas.

**5. Keep a liberal import regime for meat and food crops:** Many developing countries protect their food-producing sectors for the sake of national food security, and raise tariffs and quantitative import restrictions even further in times of crisis, inducing import substitution to save foreign exchange. However, these high

protection rates also often promote a lot of inefficient domestic production with high wastage of natural resources and a large 'consumption' of forested land. Trade policy is a powerful lever for land use in the tropics (Wunder 2003:ch.10). Gabon has until now generally maintained a more liberal import regime, and it is important for the sake of conservation to preserve that. Under a fairly liberal import regime, agricultural producer prices would rise only moderately. On the contrary, if imports are eliminated by trade policy in an overambitious effort to indigenise food production, forest impacts may be severe. For instance, it would be highly detrimental to forest cover to ban rice and wheat imports, forcing people to substitute that loss by producing more food crops in extensive shifting cultivation systems that would necessarily have to expand at the expense of forests.

**6. Accept some cash crop expansion:** Depending on foreign exchange gaps, Gabon will gradually have to develop or revive sedentary cash crops like cocoa and coffee, estate crops like rubber or palm oil, or other new emerging crops. From a conservation point of view, keeping in mind neighbouring countries' recent structural adjustment experiences, this strategy is preferable to one of a massive food-crop expansion for subsistence use and urban sales, because it occupies less forested land per unit of value added. However, it would be important that such an expansion focuses on the most land-intensive crops, and that it benefits smallholders, return migrants, unemployed labourers and other groups that may be hardest hit by an economic crisis, and thus exercise the highest potential pressures on land resources.

**7. Liberalise the timber commercialisation system, implement higher taxes and add more value:** There are two purposes in reforming the system towards a higher degree of competition and higher taxes that limit high profits on behalf of private companies. First, it is to maximise the state's appropriation of timber rents per output unit and, second, to reduce extraction quantities to a speed that is sustainable in production terms. This would make this sector a stable source of foreign exchange inflows, which at least can replace part of the declining oil revenues. Papua New Guinea is an example of a country that has recently taken steps in this direction. Yet, it requires a move towards true competition in the timber sector. Such a move would also help to reduce the derived degradation that tends to accompany an excessively rapid expansion of logging, in particular 'defaunation'. In any case, expansion speed is only one forest degradation factor to consider, and does not substitute qualitatively focused work with logging companies on reducing environmental impacts, such as limiting the bushmeat trade.<sup>72</sup> It is probably also a good idea to continue to diversify downstream into wood processing, which would seem one of the few productive sectors where Gabon has a true comparative advantage. However, that expansion should keep in mind two environmental dangers: the risk of capacity overexpansion that would subsequently 'justify' overexploitation, and the need to reduce high wastage in domestic industries that currently tends to consume more timber per final output unit than if the wood was processed abroad.

**8. Propose parks, conservation concessions and easements:**<sup>73</sup> Until late 2002, Gabon did not have a single national park—only an increasing number of reserves with variable use restrictions. Frequent clashes occurred with logging companies

that want to expand into these reserves, and government officials who may grant illegal concessions, for motives of personal ties and benefits. These pressures may mount once oil resources are exhausted. On the other hand, unlike the bleak prospects for tourism development in general, luxury ecotourism could be promoted in some international high-class areas such as Langoué (south of Makokou) or Petit-Loango (on the coast), as they provide first-class opportunities to view wildlife. This type of natural attraction can bring in some foreign exchange in the future, but it will also help to 'defend' marginal, highly biodiverse areas against degradation. It would be important to fully protect these special areas as national parks to restrict competing land uses. When this report was in its last revision (December 2002), in a surprise move President Bongo declared 13 national parks spanning 2.5 million ha, or a full 10% of Gabon's land area (see <http://gabonnationalparks.com>, accessed 4 December 2002). The decision was promoted by WCS, and was made with explicit reference to the ecotourism potential. It remains to be seen how effectively these areas will *de facto* be protected, including in the case where a sustained economic crisis generally increases pressures on forest resources. In addition, for newly created reserves, one could imagine the creation of conservation easements and, in particular, conservation concessions—i.e. to pay the government on a per-hectare basis in order not to log an area and to instead set it aside for conservation for an agreed time period. This concept is being applied in other countries by large international conservation organisations, but for Gabon, it has only been discussed until now. This may be an appropriate supplement, which could provide foreign exchange while directly paying for the protection of forests.

## 9 Endnotes

- <sup>1</sup> This report is based on two visits to Gabon, in May 2000 and in June 2002, respectively. From data gathered during the first visit (to Libreville, Oyem and La Lopé), a chapter was produced as part of a forthcoming five-country comparative book on oil wealth and its macroeconomic impact on forests (Wunder 2003). During the second visit, information was supplemented and streamlined to the framework and objectives of the CARPE research project in order to produce this report.
- <sup>2</sup> Comments on earlier versions of this report have been provided by Jean-Christophe Carret, Charles Doumenge, Steve Gartlan, David Kaimowitz, Benoît Mertens, Robert Nasi and Chris Wilks. I am grateful to Robert Solem and Nicodème Tchamou, coordinators of the CARPE project in 2000 and 2002, respectively, and Robert Nasi, CIFOR, for help in practicalities and logistics during my two visits to Gabon. In Libreville, I interviewed Clair Mborou, Prosper Obame Ondo, Ousmane Sissoko, Alain Karsenty, Chris Wilks, Stéphane Lombardo, Jean-Philippe Jorez, Filippo Saracco, Raphaél Vincent, Alfred Ngoye, Sylvain Meye M'eya, Bernard-Henry Voubou, Norbert Gami, Paul-Henry Nguéma Meye, David Young, Patrice Christy, Gérard Dufoulon, John Bickerton, Rose Ondo, S. Ziza, Sidi Touré and Modeste Mfa Obiang. During field visits to Oyem and La Lopé, I talked to Pauwel de Wachter, Victor Ebiang-Ebang, Michel Assoumou Mengué, Mme E. Ekuma, Evane Ndong and Louis Sosthère Ndong-Obiang.
- <sup>3</sup> Gabon's crude oil trades at prices that are US\$1-1.50 below the benchmark Dated Brent crude, so export price cycles closely follow those of the international market (EIU 2001: 22).
- <sup>4</sup> Using FAO's conservative 1995 forest cover estimate (see below), combined with the rather high 1995 population projection of 1.3 million, forest cover per capita is 13.5 ha (FAO 1997: 182), almost ten times higher than in Cameroon (1.5 ha per capita). Using the more cautious population figure of 1.15 million from the last census, combined with the more credible forest-cover estimates from TREES, the figure rises to as much as 20 ha forest cover per capita.
- <sup>5</sup> Descoing (1974) and Fontes (1978), cited in Sayer *et al.* (1992: 169).

- <sup>6</sup> An earlier draft of this paper was passed to FAO-FRA in December 2000, and is cited three times in the FAO FRA 2000 Gabon section on forest cover changes, which was available at <http://www/fao.org/forestry/fo/country/index.jsp> (accessed 31 July 2001).
- <sup>7</sup> Collomb *et al.* (2000:34) cite a higher TREES estimate (21 338 900 ha - see Table 1), which is the figure prior to the correction procedure applied by TREES and is thus less accurate.
- <sup>8</sup> Additionally, the region-specific TREES identification of deforestation hot-spots pointed only to the Oyem area in Gabon, and even here more degradation than proper forest conversion pressures were found (Achard *et al.* 1998:48).
- <sup>9</sup> Wunder (2002: chapter 3) discusses the scale factor's influence on deforestation estimates.
- <sup>10</sup> See Wilks (2000:5-10), and the previous section of this paper.
- <sup>11</sup> Sayer *et al.* (1992); updated French version by Larivière (1996).
- <sup>12</sup> This tentative conclusion is not only supported by the 109 662 ha (0.5%) higher 1970 estimate compared to the TREES estimate for 1990. Deforested areas in 1991-93 were more concentrated (periurban clearing, agroindustrial plantations) than in 1970 (slash-and-burn plots dispersed evenly in the interior). This implies that 1970 forest cover was probably overestimated, as the map scale was not sufficiently detailed to register small clearings—the same argument as used to caution against the high forest cover estimates in the IUCN Conservation Atlas (Sayer *et al.* 1992).
- <sup>13</sup> Personal comments by R. Vincent (IGAD) and S. Touré (Direction d'Agriculture), 30 May and 3 June 2000, Libreville, respectively.
- <sup>14</sup> Pourtier (1989a:278) notes that 'the statistical services of the Ministry of Agriculture are, so to say, non-existent, or they are limited to vague estimations' (my translation from the French). This certainly seems true for the 1999 figures provided by Mr S. Touré (Direction d'Agriculture, personal communication, 3 June 2000). According to reports from the provincial offices for agriculture, cultivated areas in Gabon add up to the high (and suspiciously round) figure of 170 000 ha. However, validating these figures for Estuary Province, which has been studied in detail by BPDA (1998), it turns out that the official figure is 70-80% higher: the official report is 16 150 ha, while BPDA finds a cultivated area of 9000 to 10 000 ha (*ibid.*:23).
- <sup>15</sup> For instance, see the description of Rippert (1997:11) for the area around Franceville.
- <sup>16</sup> This excludes fallows. The total for the three towns mentioned may be 40 000 ha, to which one should add other towns such as Port Gentil, Lambaréné and Lastoursville.
- <sup>17</sup> These assumptions are also rather conservative. Fallow length was probably longer in 1961, as agriculture near urban areas has intensified over time. Area decline (45 000 ha) in our calculation is comparable to the difference in cropped area between the 1961 and 1975 censuses, but may actually be much larger, as

indicated by the Africa Forest case studies.

<sup>18</sup> This claim is supported by the Pearson correlation coefficient between real oil revenues and real capital inflows (- 0.44); the negative coefficient is significant at the 5% level.

<sup>19</sup> In the 1960s, real exchange rate levels appreciated relatively, *inter alia* due to other mining exports (manganese, uranium). These might be analysed as another source of 'Dutch Disease' wealth, but for the sake of simplicity only oil and financial inflows were included.

<sup>20</sup> Apparently, the classification of nonpermanent employees and military personnel varies. I am grateful to Mr S. Ziza (Ministry of Finance) for making these unpublished figures available to me.

<sup>21</sup> Yates (1996:212), and my own observations.

<sup>22</sup> In a 1999 audit of government liabilities, 18% had to be cancelled due to double, triple or fictitious invoicing while another 29% corresponded to debt paid but still recorded as due (Söderling 2002:5).

<sup>23</sup> Originally, it was planned to connect the port of Owendo to Booué and to the iron ore deposits of Bélinga in the northeast. With the poor world market prospects for iron ores, the Bélinga link was postponed in favour of the connection with Franceville in the southeast. Formerly, the manganese exploited in nearby Moanda had been transported by cable car and rail to the Congo for shipping (Richard and Léonard 1993:207). The *Transgabonais* now brings the manganese directly to the port of Owendo. In addition, Franceville is in President Bongo's home region, and the rerouting of the railway considerably strengthened his political position internally (Yates 1996:180).

<sup>24</sup> Calculated from yearly shares given by Alexandre Barro-Chambrier, and cited in Yates (1996:182). On the first stretch from Owendo to Booué, construction costs came out at twice the budget (*ibid.*: 179). The World Bank has claimed that the cost of the railway amounted to six times the comparable international standard costs (*ibid.*:182).

<sup>25</sup> For instance, Venezuela, another high rent oil country, experienced a similar trend during part of the 1980s (Wunder 2003: chapter 5).

<sup>26</sup> The author compares the cost of traditional and bulldozer-operated forest clearing. Due to the high labour costs, the latter tends to be a cheaper option, but high fixed costs hinder its adoption by small-scale farmers (*ibid.*:83-4).

<sup>27</sup> M.Mfa Obiang (Director of Macroeconomics, DGE), Libreville, 8 June 2000, personal communication, and own observations.

<sup>28</sup> See Wunder (2003: ch. 6) for a detailed analysis.

<sup>29</sup> As a light-loving species, it seems to grow well in previously cultivated plots, where it can develop high densities in the early stages of regrowth, especially on sandy soils on the coast, where it has few competitors (Fuhr *et al.* 1998). This ability also explains why locally *okoumé* has often been called 'the son of manioc' (Aubreville 1948).



- <sup>30</sup> See the Africa Forest case studies referred to above, such as Christy *et al.* (1990a), Christy *et al.* (1990b), Basquin *et al.* 1991, Christy *et al.* (1991a), Christy *et al.* (1991b) and Wilks (1992).
- <sup>31</sup> Apparently, the Asian *meranti* and Cameroon's *ayous* species are the closest substitutes.
- <sup>32</sup> For the sake of simplicity, *ozigo* was included in the miscellaneous woods category.
- <sup>33</sup> Many taxes have not been inflation-adjusted over time and have therefore lost their real value. With US\$30.8 million, Gabon's forestry tax revenue is only half that of Cameroon's (Collomb *et al.* 2000: 26).
- <sup>34</sup> Estimated by adding up the individual project figures given in Yates (1996:164-7)
- <sup>35</sup> For instance, the IGAD, mentioned above, receives part of its funding from Elf Gabon; the same was true for the now failed Sogacel project to clear land for eucalyptus and pine plantations, and the legume-producing Agripog project (R. Vincent, IGAD, and C. Wilks, Africa Forest, personal communications, Libreville, 30-31 May 2000).
- <sup>36</sup> Coffee plantations were projected to achieve a production target of 10 000 t in 1978-9, but actual production was only 234 t (Yates 1996:161).
- <sup>37</sup> The parastatal for coffee and cocoa, *Socagab*, produced cocoa on 635 ha and coffee on 95 ha in 1998, but its annual costs are three times the size of sales revenues, and it relies on state subsidies to cover its recurrent deficits (Marchés Tropicaux 1998:25).
- <sup>38</sup> For instance, this was a main problem for the *Société sucrière du Haut-Ogooué* (SOSUHU) near Franceville. Public investments in SOSUHO ran to around CFAF 17 billion in 1975-81. A shortage of skilled labour encouraged increases in mechanisation and in the proportion of highly paid foreign employees (Pourtier 1989b:284-5). A 6000 ha sugar plantation was planned for an over-sized processing plant of 60 000 t/yr, but production never reached even half the intended production (24 000 t in 1997 - Marchés Tropicaux 1998:26).
- <sup>39</sup> The most successful agroindustry has been rubber-producing *Hévégab*, with a reported rubber plantation area of 8396 ha in 1997 in the centre-north, mainly near the processing plant in Mitzic (Marchés Tropicaux 1998:25; Ovono-Edzang 2001). But even *Hévégab* was recently hit by severe mismanagement; production plummeted from 10 963 t in 1998 to 2 363 t in 2000 (DGE 2001:38).
- <sup>40</sup> See *HEBDO Informations* no. 452, 16 March 2002, for a reprint of the official legal text.
- <sup>41</sup> C. Wilks (Africa Forest) and P.O. Ondo (WWF), personal communications, Libreville, 28 and 31 May 2000.
- <sup>42</sup> This paragraph draws on Pourtier (1989b:219-28)
- <sup>43</sup> Using the same parameters, the author actually reaches a total deforestation of 15 000 ha, i.e. ten times this figure. This seems to be an error produced by placing the comma in the wrong place (*ibid.*:32).

- <sup>44</sup> This paragraph draws on Pourtier (1989b: 102-22).
- <sup>45</sup> In the 1980s, efforts to combine resettlement with agroindustrial complexes were made in the so-called Integrated Operations Zones (OZI), but the idea was later abandoned (Poupart and Pilichowski 1997: 68).
- <sup>46</sup> Pourtier (1989a: 230-7) analyses the frequent shift of village sites in traditional rural systems in Gabon. He finds that there is no agricultural motivation for high mobility, that the exhaustion of forest products and disease may provide partial explanations, but that many movements are seemingly irrational ways of responding to the opportunities provided by open, unoccupied space.
- <sup>47</sup> For instance, inequality of urban consumption in Libreville and Gentil basically remained unchanged between the censuses of 1962 and 1994 (DGSEE 1994a:156).
- <sup>48</sup> See (Richard and Léonard 1993:152, 156) and Marchés Tropicaux (1998:17).
- <sup>49</sup> For instance, P. Michaud (cited in Yates 1996: 206) puts forward the inequality argument that, by the mid-1980s, no less than two-thirds of public spending occurred in three provinces (Estuaire, Ogooué-Maritime and Haut-Ogooué). However, this distribution mirrors almost perfectly their corresponding share of the national population (665 401 people and 65.6% - DGSEE 1993:5).
- <sup>50</sup> In spite of the short transport distance, high labour costs reduce product competitiveness vis-à-vis imports from Cameroon, thus limiting the scale of crop production (ICRA and IGAD 1996).
- <sup>51</sup> Prior to the independence celebrations in 1978, public construction projects in the capital of Woleu-Ntem Province seemed to be paying such high salaries that many people abandoned their cocoa plots completely to move permanently into town (Pourtier 1989b:294).
- <sup>52</sup> In the 1993 household survey for Libreville and Port Gentil, it is estimated that 76% of the total volume of road-transported staple crops (40 000 t) comes from Gabon, a share that seems high. Cameroon remains the biggest supplier of vegetables, fruit (except for bananas) and manioc flour, i.e. products with a higher value per weight unit (DGSEE 1994a: 275-93).
- <sup>53</sup> See Wilkie and Carpenter (n.d.) for a summary of the ecological impacts of bushmeat.<sup>54</sup> The figure is from the 1993 household survey for Libreville and Port Gentil (DGSEE 1994a: 234). This linear elasticity coefficient tells us that, with a 1% rise in household income, meat consumption rises on average by 0.45%.
- <sup>55</sup> For the year in question (1993), the FAO (2000b) reports a bovine meet ('beef') consumption of 19 207 t, which is larger than the alleged 17 900 t of bushmeat consumption. The FAO's total meat supply figure for 1993 is 56 176 t. Assuming that this already *includes* an estimate for bushmeat in the category 'other meat' (20 275 t), Steel's estimate would correspond to 31.9% of total meat supply. If bush meat were *additional*, the meat supply share would be 24.2%.
- <sup>56</sup> Most urban people in Gabon live near ports, where imported meat is relatively cheap, while transported bushmeat is more expensive. The aggregate value figures given in Steel (1994) suggest an average urban bushmeat price of US\$2.71/kg, compared to US\$1.91/kg in rural areas.

- <sup>57</sup> Chief Mboula Thaopile, Nioungou village, cited in Adams and McShane (1996:207).
- <sup>58</sup> Future priorities were defined in the Law of Agricultural Orientation (*Loi d'Orientalion Agricole*) of 1998, where agricultural production is planned to increase by 45% until the year 2010, mainly for reasons of food security, import substitution and export promotion and to raise rural living standards (Marchés Tropicaux 1998:17).
- <sup>59</sup> John Bickerton, Amerada Hess (personal communication), Owendo, 8 June 2000.
- <sup>60</sup> This paragraph draws on a second interview with Mr. John Bickerton, Operations Manager of Amerada Hess, Owendo. It was carried out two years after the first interview, on 28 June 2002.
- <sup>61</sup> The time lag between exploration and production is short enough for the companies to base their investment decisions on current, rather than expected future prices.
- <sup>62</sup> One reason for offering better conditions is that Gabon faces increasing regional competition countries that have far more promising oil deposits, such as Equatorial Guinea and Angola.
- <sup>63</sup> Gabon's fish catch in 1997 was 44 700 t, and is dominated by foreigners. An agreement with the EU also currently allows 70 foreign trawlers to operate in Gabon's waters (EIU 2001:20).
- <sup>64</sup> Liquified natural gas would also be an option whenever production becomes commercially viable, while value-added opportunities for mining and fisheries perhaps seem less evident.
- <sup>65</sup> Considering the violent articulation of previous scattered political conflicts, one might well fear that the security situation would deteriorate markedly with a major economic crisis, generating motives for, *inter alia*, ethnic conflicts between Gabonese nationals and immigrants.
- <sup>66</sup> See *L'Union*, 11 January 2002 and 15 January 2002 (Special section on cash crops, pp.1-4).
- <sup>67</sup> For the (exaggerated) scenario of hastily declining oil revenues up to 2007, Söderling (2002:19) predicts in his model that a real depreciation of 35-55% would occur, prior to oil exhaustion.
- <sup>68</sup> Land intensity is high; cultivated area in 1999 was only 50.4 ha; total land use was 204 ha (R. Vinchent, IGAD, personal communication, Libreville 30 May 2000).
- <sup>69</sup> The notion that the Ebola virus could be transferred through physical contact with bushmeat, in particular monkeys, has currently brought bushmeat sales in both the Libreville and the Makokou markets to almost a complete halt (*L'Union*, 27 February 2002, p.5; P. de Wachter, personal communication, Libreville, 26 June 2002).
- <sup>70</sup> An example is Venezuela in the 1980s and 1990s, which due to its economic crisis has started to develop the previously untouched, forested region south of the Orinoco river for timber harvesting and gold and diamond mining (Miranda *et al.* 1998; Wunder 2003:ch.5).

<sup>71</sup> Of course, one may still *minimise* the environmental impacts of ongoing mineral extraction.

<sup>72</sup> A WWF project in Minkebé has over the last years collaborated actively with the Malaysian timber giant Rimbunan Hijau, and seems to have achieved a reduction in logging workers' annual bushmeat extraction from 200 t a couple of years ago to only 4-5 t now (P. de Wachter, personal communication, Libreville, 26 June 2002).

<sup>73</sup> The factual information presented in this paragraph builds mainly on C. Wilks, personal communication, Libreville, 29 June 2002.

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