

## Project Profile



# Investment Opportunities in the Guinean Coffee Industry

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## SECTION I

### THE INTERNATIONAL COFFEE INDUSTRY

#### Production And Trade

International trade is a fundamental feature of the coffee sector. About 45 countries produce coffee, and together they account for less than 25% of coffee consumption. All coffee is grown in tropical latitudes, while as much as 95% of exported coffee is consumed in temperate countries. More than 50% of producing countries earn more than 10% of their foreign exchange from the sale of coffee.

Another feature is the concentration of both production and consumption. The three largest producers--Brazil, Colombia and Indonesia--usually account for more than 50% of global production, while the USA and the EEC consume about 75% of traded coffee. The other basic feature of the coffee sector is the fact that in a normal year production exceeds consumption, and stocks held by producers are therefore a significant factor in price developments.

	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>
	(million bags of 60 kg each)			
World Production	88.7	90.6	95.8	78.0
Consumption (Producers)	21.3	23.6	21.9	22.0
Exportable Production	67.4	67.0	73.9	56.0
Disappearance	65.0	65.5	68.0	69.0
Balance	+2.4	+1.5	+5.9	-13.0
Stocks (Beginning)	43.1	45.5	47.0	52.9

Annual coffee production varies to a great extent, primarily as a result of weather factors in the principal producing countries. In 1986/87, for example, a frost in Brazil resulted in a reduction in that country's output of more than the 18% net decline in global production that year. Frosts in Brazil have coincided with the three price peaks in international coffee trade in the last twenty years. The International Coffee Agreements, and the International Coffee Organization (ICO) established to administer these agreements, are an attempt to stabilize coffee prices, and despite serious implementation problems over the 25 years since the first agreement, prices have been less volatile

than in prior years. The agreements work basically on a system of quotas, which restrict the volume of coffee producers can place on the international market (see section IV). The total of export quotas in effect for the 1985/86 season was 63.030 million bags, of which 16.1 million bags or 25.5% was allocated to robusta exports.

Total world trade in robustas among ICO members is 15 - 17 million bags per year. Guinea's official exports last year were 85,000 bags, up from about 30,000 two years earlier. The country's quota of 83,000 bags reflects most recent official export performance, and is equivalent to about 0.5% of robusta trade or 0.13% of total coffee trade. Thus, improving coffee production in Guinea in the next few years will not have a noticeable effect on the international market.

### Consumption Patterns

Historically, the United States has accounted for more than one third of total coffee consumption outside producing countries. The USA and EEC together have net imports of coffee equivalent to almost 75% of total traded coffee. In recent years there has been a change in this pattern, however. Consumption in the USA declined at the rate of 2.6% per year between the mid-1970's and early 1980's, and consumption in the EEC rose at 1.5% per year. Other importing countries have also been experiencing consumption growth, led by Australia, Japan, and Austria. The only area of significant decline outside the USA has been Scandinavia, where declines have been slightly less than 2% per year.

Overall, consumption continued to rise through the early 1980's, but only slightly (0.2% per year). Declining coffee consumption as a result of changing dietary habits in the USA and Scandinavia have by now probably exceeded growth in demand in other countries, and global demand is probably currently experiencing a very slight downward trend. Declines have been in markets that have traditionally preferred arabica coffee. Countries that prefer the stronger, more aromatic flavour of robustas, such as France (62% robusta) and Italy (43%), continue to experience growth in consumption. Fifty-five percent of the coffee consumed in the United Kingdom is also robusta, but this is principally in soluble form.

Offsetting this slight shift toward robustas in brewed coffee consumption, technological developments have enabled the producers of soluble coffee to use greater proportions of arabica, or even complete arabica blends in their processes, whereas robustas traditionally held a large share of this market because of their ability to withstand processing without developing off flavours.

In summary, the international coffee market is a mature market, with gradual developments in response to changes in diet and technology, but a well-established basic consumption pattern. The major problem is the volatility of production and the overhang of supply from year to year. The supply regulation mechanisms installed under the ICO are far from perfect, but they have proved effective in preventing market breakdown. The range of prices recorded between January 1986 and March 1987 (\$1.72 per lb and \$0.98 per lb, respectively, in New York for Ivory Coast grade II) probably represents upper and lower limits well beyond what will be seen in the next five years in constant terms. Analysis of investments proposed in this report will be based on prices in the lower end of this range, using a best-guess average of \$1.35 per lb., delivered Rotterdam.

## SECTION II

### THE COFFEE SECTOR IN GUINEA

#### The Development of Coffee Production

Coffee cultivation in Guinea began in 1914 with the introduction of arabica in the Fouta Djallon--the high altitude area around Labe. Arabica and robusta varieties were planted in the forest region to the southeast in the 1920's, and exports began in the following decade. By 1940, production had reached about 1,000 tons, but the Second World War reduced resources available for coffee production, and more favourable prices for palm oil led to some replacement of coffee by palm plantations, aimed at satisfying export demand through Liberia.

Between 1949 and 1953, coffee prices tripled and the expansion of area began again. Coincidentally, a series of bad years for arabica production in the Fouta Djallon led to a concentration of 93% of all coffee trees in the forest region. The lower altitudes in this zone are not conducive to good arabica production, and robusta was planted almost exclusively after 1950. (It is interesting to note that one of the continuing problems, especially in N'Zerekore, is the mix of robusta, arabica, liberica and excelsior that appear in lots sold by smallholders.)

Good transport links to Abidjan and Monrovia were critical to expanded coffee production in the forest region because they offered cost-effective access to foreign markets. With Independence in 1958, difficulties developed with respect to continued use of these routes, and the alternative of transport to Conakry has always been much more costly.

An infestation of tracheomycosis between 1938 and 1948 wrought serious damage in the coffee plantations of other West African territories. (Infected trees, as well as those adjacent to them, had to be cut down and burned.) Consequently, when a large program to build up Guinean production was begun in 1951, one of its important features was the introduction of a resistant variety from Ivory Coast, Robusta INEAC. Other features of that program are still relevant when assessing the needs of the industry today:

- Vegetative propagation
- Nurseries (10 in 1950; 58 in 1957)
- Mobile teams to prune trees and apply insecticides
- Training in quality control
- Lower export taxes on higher quality shipments

During this period of expansion, some plantations that were no longer maintained were nevertheless left standing, and it is estimated that the total area under coffee reached as high as 100,000 hectares, although by the end of the 1950's, 60 million trees on 60,000 hectares were considered to be productive. The total production in 1960/61 reached 15,000 tons.

Unfortunately the growth in production after 1958 was a matter of momentum, as Independence brought reduced attention to coffee production needs, and the closing of Guinea's borders. The cost and difficulty of shipping via Conakry were compounded by the introduction of official prices that were not remunerative to producers. Although they were part of a program to keep domestic prices down, they were also designed to capture a share of the export revenue for government (see table, page 9). Producers were also obliged to sell their production exclusively to a government buying agency, l'Entreprise regionale de commercialisation des produits agricoles, and it is likely that there were problems in receiving payment, even at the low official price levels.

Plantations fell into neglect, and many were uprooted for the production of food crops, notably upland rice, manioc and oil palm. By the middle of the 1970's, the area under coffee had fallen to around 40,000 hectares, and much of this had been thinned out and interplanted with food crops or otherwise neglected. Yields, though very mixed, probably averaged less than 200 kg/ha. By the early 1980's yields had further declined, and it is the conclusion of the present study that, while yields have recovered in the past three years, they have not yet returned to 200 kg/ha. (Under optimal industrial plantation conditions, these same varieties can produce as much as 1,500 kg/ha.)

### Structure of the Coffee Sector

As a labor-intensive crop, coffee is typically grown by smallholders. In Guinea, there are more than 40,000 families harvesting coffee from plots ranging from less than 0.5 ha. to about 3.5 ha. There are a few larger holdings, but these do not account for more than 1 - 2% of total production. The price and monopoly policies of the government between 1958 and 1984 added to the diffusion of the sector by creating a virtual necessity for producers to enter the parallel market. Producers avoided delivery quotas by not disclosing their coffee tree holdings, and sold their coffee to a large number of both itinerant and well-established traders who arranged for shipment to nearby countries. Commerce in much of the forest region was only

different from outright barter by virtue of the existence of a high value, portable commodity of recognizable value, namely coffee. Coffee became in effect a medium of exchange.

With the changes in price and market policy in recent years, the share of production that goes through licensed channels has increased significantly, but the pattern of a large number of traders and middlemen remains. The number of times coffee changes hands between producer and exporter or processor is both an efficiency and a quality control problem. One company, SOGUICAF, has embarked on a development program designed to integrate the production, processing and marketing of coffee. This approach is of relevance to the conclusions of the present study, and aspects of SOGUICAF's experience are discussed in several sections of this report.<sup>1/</sup>

The domestic coffee market is small, and most coffee consumed in Guinea is in soluble form imported or smuggled from Ivory Coast (Nestle's). There are two roaster-grinders supplying the local market: PROSECO--a government company of which majority interest has recently been sold to Swiss interests; and a company owned by a local businessman, Mr. Moukarim Ossam. The latter produces a superior product, and is the dominant supplier. In an attempt to increase local consumption and to secure his position in the market, Moukarim is about to introduce a smaller (250 gm) sack and to identify his product with a brand label.

Although some trading back and forth across neighbouring borders continues in response to price differentials, there is significant smuggling in the supply of Guinean coffee to Senegal for roasting and re-export to other African countries. In any year, legal exports may be carried out by as many as 30 individuals and companies, but four or five of these will account for the majority of export volume. Almost all official exports are shipped to Europe. Some trans-shipment may take place out of Rotterdam, but the great majority is consumed in Europe where robustas are suited, singly or in blend, to the preference for a stronger coffee. Guinean coffee enjoyed a premium during the colonial period because of its aromatic character. As harvesting and processing improve, this feature could again be expected to distinguish Guinean coffee in international markets.

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<sup>1/</sup> SOGUICAF is a joint venture, principally of British and Peruvian interests together with a minority interest of the Government of Guinea. The company began operations in 1985 to produce, buy, process and export coffee.

### Present Condition Of Plantations

Despite favourable growing conditions in the forest region, neglect and the absence of improved inputs have taken a severe toll on production.

- Plantings are sparse.
- Trees are not aligned.
- Trees are old, most having been planted in the early '50's.
- Trees are overgrown with brush.
- There is too much shade cover, much of it from the unpruned coffee trees themselves.
- There has been no pruning or trimming of the coffee trees.
- Robusta varieties are mixed in some areas with small quantities of arabica, liberica, and excelsior, each with different growth patterns and fruit characteristics. This is particularly a problem in the southern prefectures.

### Estimated Coffee Production

The current level of coffee production in Guinea is not known. Comprehensive field surveys have not been conducted for many years, and producers have not maintained their plantations sufficiently to permit the use of data from earlier periods when field information was more accurate. Even though the level of local consumption is very low, the volume of exports through official channels is not a good indicator, because there is a large volume of "informal" exports via neighbouring countries.

While the potential for efficient production is of greater importance for investment decisions than present production levels, some indication of deterioration since the peak years of the early sixties is useful. An estimate was developed for the present study on the basis of available data from recent studies, the assessments of people working in the sector, and a sampling methodology that accounts for the sparsity of trees in the areas that may be officially designated as planted to coffee. Annex 2 presents the details of four estimates reviewed for this study. It also presents a methodology developed during the course of this study to estimate the production of individual plots, and an extrapolation of that analysis applied to the forest region.

The four estimates, and their sources, are as follows:

- Foreign Agr. Service/USDA	4,800 MT	(1985/86)
- World Bank	8,000	(1983/84)
- SOGUICAF	7,200	(1986/87)
- SOCFINCO-et al (Min.Rur.Dev)	12,430	(1985/86)

### Assessment of Various Estimates

The estimated production of 12,430 tons in the Belgian study is about 140% greater than the USDA/FAS estimate, and 77% greater than the figure used by the SOGUICAF representatives. The World Bank data are difficult to review because they appear to combine different sources without explanation.

The difference between the USDA and SOGUICAF estimates are essentially the informal exports. The authors of the Belgian study were confident that the same factor of smuggled production accounted for the difference between their figures and others for the same period. This implies smuggling of the order of 7 - 8,000 tons per year. Irrespective of the likelihood of smuggling at this level, the production estimate seems high because it is about two-thirds the level of the early 1960's. In view of the decline in the condition of coffee trees that took place in the intervening period, this level of production would have been unlikely in 1984/85 when the field work for the study was conducted.

### Conclusion

After comparing official statistics in two of the larger-producing prefectures with interview accounts of unofficial trade, and applying that interpretation to the above study data, we conclude that production is presently in the range of 8,000 to 9,000 metric tons. The estimate resulting from the sampling technique developed in annex 2 is 8,300 metric tons for the current crop year.

If production were about this level last year, it would imply smuggling on the order of 3,200 tons, or 38% of total production, which is consistent with anecdotal evidence. Last year's official purchases included 2,000 tons by the Islamic Bank of Guinea, about four times larger than the next largest

purchases. It is rumored that the bank will not enter the market again this year, in which case the "surplus" production will soften prices from informal buyers, and a larger quantity of coffee will enter sanctioned marketing channels at prices nearer the floor price.

### Impact Of Prices On Coffee Production

Official prices, monopoly market channels and occasionally strict enforcement characterized much of the period from 1960 to 1984. In the 83/84 season, the support price, which at that time was the only legal price, was set at Syllis 45/kg of green coffee. Converted at the official rate, this was \$2.25/kg, but no goods were available for the farmer to purchase at the official rate in return, so he had to think in terms of the value of the Syli in the market. The real exchange rate was 280:1, with the result that the buying price for his coffee was equivalent to \$0.16/kg. This price was equal to only 17% of the concurrent price in Ivory Coast, when converted at the parallel rate. It is not surprising that production was not being maximized, and that much of what was produced found its way onto neighbouring markets.

<u>Year</u>	<u>Producer Price Per Kg Green Coffee</u>			<u>Parallel Price as % Ivory Coast</u>
	<u>Official</u>	<u>\$ at Off'l Rate</u>	<u>\$ at Parallel</u>	
1980	40 Syllis	\$2.11	\$0.18	13%
1981	45	2.15	0.18	16
1982	45	2.01	0.17	19
1983	45	1.95	0.16	17
1984	45	1.86	0.16	19
1985	70	2.91	0.24	27
1986	400 GF	1.31	1.31	115
1987	450 GF	-	-	-

Source: CCCE, Appraisal Report, Coffee Project, 1987

By contrast, the official producer price for the 1986/87 season was 450 GF. This was a floor price, and sales at some times and locations exceeded this level. Nevertheless, the floor price was more than 6 1/2 times higher than the level of three years earlier. During that three-year period, official exports increased from less than 2,000 tons to more than 5,000 tons.

The price for 1987/88 has not yet been announced, but the first deliveries by producers this year were bought at 530 GF. At the rate of 440:1, this equates to \$1.20/kg. The significant flow of coffee from producers starts in late November and continues

until March. About half the crop is harvested in the month of December, and enters the market two to four weeks after picking.

### Local Processing

#### Drying

All coffee in Guinea is dry-processed. Producers spread the cherries on flat open ground in the village, typically separated from paths and common areas only by sticks or poles laid around the perimeter. The cherries are turned several times each day, and they may be collected and covered each night. Depending on cloud cover, fog or rain in the first several days of drying, there may be some fermentation of fruit under these conditions, but not enough to contaminate the beans. Rotting of damaged cherries also occurs and is more likely to affect the beans. The dirt and sand that collect on the wet cherries in the early stages of drying fall off at later stages as the fruit hardens, and do not pose a serious problem.

On the whole, the risks to quality inherent in this form of drying are not nearly as serious as they are from the practice of harvesting immature, over-ripe and damaged cherries together with those that are ready to be picked. The results are uneven drying, rotting, and a high percentage of small or black beans, all of which are immediate limitations on the processing and saleability of Guinean coffee. The intentional adulteration of the dry product with small stones is also a common annoyance.

The conditions in most areas of the forest zone are satisfactory for sun-drying and, as yields are increased, selective harvesting will become more attractive, especially when price differentials can be introduced to reward producers of uniformly mature and uncontaminated cherry.

#### De-Hulling

At the present time, the great majority of coffee is dehulled by the producer, using a pestle and mortar. This results in a high percentage of broken beans and, particularly with the uneven moisture content that results from the range of maturities in the cherry, de-hulling is not complete. The subsequent separation of hull and bean by winnowing is therefore not thorough. SOGICAF has introduced Brazilian equipment that is simple and easy to maintain but performs the de-hulling, cleaning, and separation functions very well. These were the only dehullers that could be identified in the forest zone. Most coffee exported from Guinea that has been

processed under traditional methods is subject to hefty quality discounts when sold on a coffee exchange, but that processed by SOGUICAF is sold through the London Exchange, with discounts below grade of less than 1%.

An important early part of the recovery of Guinea's coffee industry will be to stop village de-hulling in favour of mechanical de-hulling. With a fair conversion factor, and the introduction of quality differentials in price, producers can be encouraged to deliver dry cherry to merchants and processors.<sup>1/</sup>

### Cleaning and Separation

In addition to the SOGUICAF equipment at two locations in the forest region referred to above, INDEX--a Greek-Guinean joint venture--has one small cleaning and separation unit in the producing area, and there are two cleaning and separation plants in Conakry owned by the former government monopoly trading company, PROSECO. The larger and newer of the two PROSECO mills is described in annex 2, as is the equipment used by SOGUICAF. These are all screen and air separators, with the more modern Brazilian equipment incorporating cleaning, de-hulling and separation into one unit.

### Conversion Factors

The conversion factor between dry cherry and green coffee in common use in Guinea is .55. That is, 100 kg of dry cherry will yield 55 kg green coffee. For robusta coffee, .52 is internationally accepted and, given the quality of dry cherry that is presently produced, is it likely that a much lower figure would be appropriate if one were to consider the green coffee yield that is tenderable on the London Exchange. Sampling was not done in the

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<sup>1/</sup> Up to and including the 1986/87 season, the competition for coffee from smugglers has been too high to permit any quality differentials in price offered by legal buyers. Smugglers not only pay no taxes, they are subject to no quotas, and, for the most part, they sell directly to roasters in Senegal, thereby reducing the number of margins to be accommodated between producer and consumer prices. This may change in 1987/88 (See "Conclusion," page 8). There is an apparent economic dilemma in the smuggling of coffee inasmuch as it results in some market efficiencies and greater producer payments, although the gains do not accrue to producers as much as they do to local authorities and traders who tend to usurp relations with the informal buyers.

context of this study, but visual inspection would suggest that, for project analysis purposes, a coefficient of .45 would be appropriate for coffee de-hulled in the village, and .50 would be reasonable for machine-processed cherry. (See annex 9 for other conversion factors.)

### Local Consumption

Coffee is not traditionally consumed in Guinea. Even households that achieve above-average affluence or adopt a degree of international custom are more likely to consume citronelle or chocolate beverages than coffee. USDA/FAS estimates local consumption presently to about 6,000 bags per year (360 tons), and does not indicate any imports. No serious effort was made in the context of this study to estimate local consumption because of its relative unimportance in the volume of production and trade.

It is the author's conclusion, however, that total consumption is less than 300 tons per year, and that more than half of this amount is in the form of instant coffee, imported primarily from Ivory Coast. The market is too small to support soluble production, and there two roaster/grinder plants already in operation (page 6 and annex 3).

### Exports

In 1961/62, Guinea officially exported 233,000 bags of green coffee. (14,000 tons). In 1983/84, official exports were less than 2,000 tons. By 1986/87, changes in prices and marketing policies had begun to have an effect, and official exports had risen to over 5,000 tons, which was still less than 38% of the performance of 25 years previous. To further illustrate the decline in exports over this period, the five-year average of exports between 1960/61 and 1964/65 was 11,600 tons, while in the five-year period 1982/83 - 1986/87, exports averaged only 3,400 tons (source: USDA). Estimates of smuggled coffee range from 1,500 tons per year to 8,000 tons. Recent policy changes have reduced the proportion of production that is smuggled, if not the absolute amount.

### Structure of the Coffee Export Trade

The bulk of coffee legally exported from Guinea is bought by local traders based in Conakry. Some have set up buying points of their own in the forest region; others buy from merchants who in turn have purchased coffee from producers. Variations on this theme see coffee change hands several times before it comes into

the possession of the trader who will actually contract for the export.

N'Zerekore, which is in the forest region near the Liberian border, is a "poste fixe," that is a legal port of export. It has the advantage of being only about six hours from the Liberian port of Buchanan, in contrast to the two days it takes under the best of conditions for coffee to get to Conakry from at least four of the producing prefectures. The difficulties in the use of this shorter route lie in making arrangements to handle the coffee once it enters Liberian territory. One exporter, SOGUICAF, has begun to ship coffee via this route (120 MT in 85/86 and 335 MT in 86/87). The company plans to expand the share of its total exports that go through Buchanan.

The number of coffee exporters in 1986 was large, but five accounted for about half of the total volume of shipments.

The Islamic Bank of Guinea was the largest exporter, shipping 2,000 tons of coffee. For reasons as yet undetermined, the total cost in the warehouse in Conakry was \$2,700/ton at a time when the New York price was \$1,700. The coffee was eventually shipped under a counter-trade agreement with Hungary.

SOGUICAF, which exported about 550 tons in 1986, or a little over 10% of official exports that year.

INDEX, a Guinean/Greek joint venture, which exported about 150 tons in 1986.

The other two exporters, each shipping smaller quantities, were private companies: Babugui, owned by an El Haj Cisse, and a company owned by Mr. Moukarim Ossam, coincidentally the British consul.

## SECTION III

### ROLE OF THE GOVERNMENT IN THE COFFEE INDUSTRY

#### OVERVIEW

There are a number of ministries and agencies that have responsibility for some facet of the coffee industry. In addition to fiscal authorities such as Customs, infrastructure agencies such as Public Works and PTT, and regulatory bodies such as Commerce and Industry, several interventions are particularly important for coffee in Guinea, whether resulting from the requirements of the International Coffee Organization (ICO) or the Government of Guinea.

- PROSECO (annex 4): Uncertain role re: ICO documents.
- Bureau de Conditionnement (annex 5): Quality control.
- Foreign Trade, Min. of Commerce: Oversees ICO functions.
- Resident Ministry, Forest Region: Replicates national ministry functions at the regional level. Headquartered in N'Zerekore.
- Ministry of Rural Development: Responsible for agricultural and village support functions. Also the supervising ministry for all private and mixed companies in the agriculture sector.

#### Export Procedures

Many of the functions outlined above are encountered in the course of establishing an enterprise as a coffee exporter, the process that is outlined below. Some of these procedures are particular requirements of the Government of Guinea; others result from Guinea's membership in the ICO.

#### 1. Import/Export License

Exports are only permitted by licensed import/exporters. Application must be made to the Ministry of Commerce for that license.

#### 2. Coffee Merchant License

At the time of this writing, November 1987, the government has announced its intention to introduce another licensing

requirement: in addition to their regular import/export license, those wishing to export coffee must now apply for a special license expressly for that purpose. This license will be valid for only one year, and will be renewed on the basis of "capacity, seriousness, compliance, and actual use of the license in the previous year."

The reason given by the Ministry of Commerce for this new license is to facilitate the control of illegal exports. They argue that since only "coffee" merchants will be authorized to buy and possess coffee, the movement of the product can be more easily tracked by monitoring the movement and records of these merchants. In addition to the obvious motive of capturing the various duties and levies applicable to coffee, the government wants to ensure that coffee goes first to quota countries so as to protect their existing quota and to begin to establish a case for future increases in the quota.

There was a similar announcement last year, but the requirement was not enforced in the coffee growing areas, with the result that it became an additional burden on legitimate exporters, but had no deterrent effect on smuggling.

### 3. Registration in the Forest Zone

Beginning with the 1987/88 season, merchants will also have to register with the resident minister of the forest zone in N'Zerekore before they can purchase and possess coffee.

### 4. Central Bank Account and Price Approval

The exporter must open and maintain a foreign exchange account with the Central Bank. The minimum balance is currently GF 2.5 million equivalent. Thereafter, each time he wishes to export a shipment, the exporter must present the sales contract to the bank for approval. The purpose is to monitor prices of exported and imported goods to ensure that they reflect fair market value and are not used as a means of repatriation/outflow of capital. This system is also a means for the Central Bank to monitor the flow of foreign exchange into and out of the country.

Central Bank permission to proceed with a particular shipment is given in the form of an approval of a "Demande d'exportation."

## 5. Quality Control

Before actual shipping arrangements can be initiated for a particular shipment, a certificate of verification must be obtained from the Bureau de Conditionnement, confirming that the coffee in question conforms to the standards of the sales contract (see coffee standards in annex). The Bureau de Conditionnement is responsible for the quality control of all exports, and it is also the agency that issues the certificate of origin required by the ICO for all coffee shipments among member countries.

The bureau does not perform any "conditioning" of the product it certifies. The exporter has his own facilities or contracts the work to another private processor or PROSECO. The bureau samples and tests shipments at each port of embarkation (i.e., N'Zerekore and Conakry), and issues the verification, for which a tax of 5% of the merchant's purchase price is levied.

In each prefecture, there is a chief of service of the Bureau de Conditionnement who must conduct a visual inspection of a shipment and issue a preliminary certificate that is to accompany the coffee when it leaves the prefecture. The purpose of the first inspection is to ensure that the coffee is saleable, whereas the second is to certify that it is of export quality. Although enforcement is mixed, and the nature of the relationship of the inspector to the merchant is often a factor in final assessments, the inspectors are competent, the sampling procedures are correct, and the standards applied are those of the ICO.

## 6. Shipping Permit

With Central Bank and Bureau de Conditionnement approval, the exporter applies to the Ministry of Commerce, Foreign Trade Office for an "Ordre de transit," with which he can proceed with actual shipping formalities.

## 7. Customs

An export tax of 2% is levied on all exports from Guinea, and collected by Customs at the "poste fixe" which is to be the port of embarkation.

## 8. Shipping Arrangements

At this stage, documentation and logistics become quite complex, and exporters normally engage the services of a shipping agency (see annex 6).

9. ICO Documentation

When shipping arrangements are complete, and the exporter has a bill of lading, he must then secure the ICO documents. In addition to the certificate of origin issued by the Bureau de Conditionnement these include stamps issued to the producing country on the basis of its quota, and a detailed statement of quantities, types, carrier and destination for the particular shipment (Form EUR 1).

This year, because of the changes in the status of PROSECO described elsewhere, the control and distribution of ICO stamps will probably be administered directly by the Ministry of Commerce. The details have not as yet been worked out, but it is likely that the task will be given to the director of foreign trade in the Ministry of Commerce. As of the date of this report, the stamps for the 1987/88 season had not been received from the ICO.

## SECTION IV

### GUINEA AND THE INTERNATIONAL COFFEE AGREEMENT

#### The Regulation of International Coffee Trade

The international coffee market has historically been characterized by very high price volatility, and attempts were made by producers as early as the late 1800's to stabilize prices through controls on production and marketing. It was not until 1962 that an agreement was reached that encompassed all significant producers and importers. The first International Coffee Agreement was approved that year, and came into effect in early 1963. Since then, re-negotiated agreements have come into effect in 1968, 1976, and 1983.

The agreements are administered by the International Coffee Organization (ICO), located in London. All member countries belong to the Council of the ICO that usually meets twice each year. An Executive Board consisting of eight exporters and eight importers, elected by the council, meets more frequently to attend to the business of the organization. Power within the ICO is distributed in terms of voting rights related to the "volume of interest" of each member. Volume of interest is proportionate to the export or import volume of the member. Guinea has 0.25% of total votes, and an export quota that presently equals 0.5% of the total quota of all members.

Quotas are negotiated each September, for the trading year that begins in October. The quotas of exporters of more than 100,000 bags per year are further broken into quarterly shares to smooth out deliveries onto the market. Overall quotas, as well as quarterly shares, are automatically adjusted during the year in response to changes in a 15-day moving average price. Values of this average above an agreed belt result in automatic increases in member quotas, for the type of coffee in question. Prices below that belt trigger decreases in quotas. In 1986, prices rose significantly above the prescribed belt, and quotas were suspended. Although prices fell precipitously into early 1987, it was not until September of '87 that renegotiated quotas were put into effect.

The control system of the ICO uses stamps affixed to export certificates as a means of monitoring coffee movements and the compliance of members with terms of the agreement. Exporting members are issued stamps in amounts equivalent to their export

quotas, and importing members agree not to purchase coffee that is not accompanied by the appropriate stamps. Members may sell coffee to non-members outside their quota restrictions, but the price is not to be more than an agreed percentage below the member-to-member prevailing prices.

### Export Quota

Guinea's ICO quota was reduced by 20% in September 1987, from 103,000 bags to 82,000 bags (5,000 tons), which was approximately the volume of official exports from the country in the preceding year. (As recently as 1983, Guinea's quota was 15,000 tons, and the failure to ship even a significant share of that amount officially made the quota vulnerable to attack by better-organized producers.

Guinean representatives at the ICO meetings did not have the analysis of stocks, production capacity, etc. necessary to resist or counter pressures from more organized producers to shift overall allocations. The result is that the 1987/88 export season is going to see a real test of export regulation: first, how the equitable distribution of stamps will be assured; second, whether the informal exports will increase simply because of the absence of stamps.

The objective criteria on which ICO quotas are allocated among member countries include: stocks, exports, production capacity, and production, all of which must be verifiable. In addition, there are the inevitable political criteria, but without the data for objective negotiation, Guinea was at a disadvantage even in the political debate.

### Exports To Non-Member Countries

Exports to non-member countries of the ICO are permitted under the rules of the organization, and are not counted against the producer's export quota, but the discount below ICO prices is not to exceed 10%. In fact the discount can be much greater under conditions of low quota and surplus coffee stocks. These discounts are in forms such as overshipments, which are difficult to verify or police. The price differential is another aspect of the market that will bear watching this year in light of the reduced quota.

## SECTION V

### CURRENT COFFEE DEVELOPMENT EFFORTS

The liberalization of trade in agricultural products has had a stimulating effect on coffee production, and a number of development efforts have been undertaken to assist producers to increase their output.

#### SOGUICAF

SOGUICAF is a joint venture of English and Peruvian investors together with the Government of Guinea, licensed to produce, buy and trade coffee. The enterprise was established in 1985 and began nursery operations and the buying of smallholder coffee that year. A program of technical assistance to smallholders was also started that year, based on cutting back old trees, cleaning up plantation areas, and in-filling with new trees.

The company has been given a 99-year lease on a tract of land near Boa in N'Zerekore Prefecture on which it has begun to establish its own 600 hectare plantation. Another plantation is being sought in Macenta Prefecture, and the company has nurseries and small plantations in N'Zerekore and Kissidougou and a nursery in Macenta. Planting material has been imported from Ivory Coast and Peru. About 50 hectares have been planted to date, and the three nurseries have sufficient planting material for the 300 ha of new area to be planted this year.

SOGUICAF has established warehouses at Kissidougou, Macenta, and N'Zerekore. The units at Kissidougou and N'Zerekore are equipped with dehulling/cleaning/sorting machines imported from Brazil. Because of the problems with village-hulled coffee, the company is trying to encourage producers to deliver whole dry cherry, but this will take some time. In the meantime, the equipment is used to clean the purchases of coffee bean. Despite the poor quality of the purchased coffee, this process renders most of SOGUICAF's output saleable on the London Exchange. The company uses Peruvian and Paraguayan technical assistants in all phases of its operations in the forest zone.

#### Caisse Centrale de Cooperation Economique

CCCE has a \$4 million equivalent project, administered under the Ministere du Developpement Rural, which is intended to improve

the production of smallholders in the prefectures of Macenta and N'Zerekore. It involves the production of selected planting material, agricultural extension, research and adaptive trials, and logistical support to producers. Cuttings and seed will be imported from the IRCC in the Ivory Coast. With respect to replanting/new planting, there is an area limit of .25 ha per participant. The project will begin physical operations in January, 1988, and its four-year target is to replant 800 hectares.

#### World Bank

The agricultural development project in Gueckedou (PAG) includes the planting of coffee as part of a program to develop the small water courses (the bas-fonds) which are the center of agricultural activity in much of Guinea. The project has a nursery that will produce 78,000 plants for transplanting this year (sufficient for about 100 ha). The objective, over four years beginning in 1986, is to plant 1,000 ha of new coffee. (This figure apparently includes the area of existing coffee which is to be infilled with new plants.) The project is the successor to a rice improvement project started in the same area in 1981.

#### GTZ

The West German government had planned to begin implementation of an integrated rural development project in Kissidougou (DERIK) in January, 1988, but difficulties in planning and negotiations have delayed the start-up by one year. Coffee is one of the crops to be included in the project, and local personnel selected to be technical agents have been sent for training to the World Bank project at Gueckedou and to the Coffee and Cocoa Research Institute (IRCC) in Lome.

#### FAC - Pipeline

FAC has signed a letter of intent to finance a coffee research facility at Seredou, in Macenta Prefecture, on the site of a similar facility established during the colonial period.

#### Government of Guinea

The government is a participant in all of the above projects. In addition, it has established a National Coffee Program, with coordinators in each of the producing areas. The program has extension workers at the sub-prefecture level, and is designed to address a range of technical assistance issues. However, without resources and follow-up there is little evidence of accomplishments to date.

## SECTION V

### POLICY ISSUES IMPINGING ON DEVELOPMENT

There are a number of policy issues that need to be addressed by government and other participants in the coffee industry if the recovery and growth of the sector are to be realized to their fullest extent. While they are all interrelated, the issues are presented below in what is felt to be their order of priority.

#### 1. Strengthen Guinea's Position vis-a-vis The ICO

The absence of data, analysis and informed representation with which to defend the country's interests in the international coffee arena contributed to a 20% reduction in its quota in September 1987. Officially, there is no room for expansion beyond last year's level of exports except by sales to non-members of ICO at lower prices. There will be, for a number of years, resistance by some parties in Guinea to the maintenance and presentation of accurate data, but this will diminish with reduced government restrictions on the sector. Even now, a basis exists for better analysis and strategy for Guinea's participation in ICO negotiations.

#### 2. Enforce Consistent And Moderate Regulation Of Commerce

Although there have been quite remarkable strides toward liberalizing commerce in Guinea in the past four years, there remains an instinctive tendency in government to see control as the solution to problems. New economic policies are less apparent as one moves down the administrative ladder, or away from Conakry.

The problem that preoccupies public officials in the coffee sector is smuggling, because it deprives government of its taxes and other levies. Smuggling is a problem, and not just for government. It contributed to Guinea's failure to meet its past ICO quota, and hence the reduction in quota; and it creates unfair competition for legitimate buyers, who must consider their tax burden in determining what they can offer to producers. However, the solution to date has been to increase the licensing and procedural requirements for merchants. The fees and administrative distractions that result from these measures are to no avail because they are not enforced with sufficient rigour to discourage any but the most conspicuous and legitimate traders.

Licenses and regulations are a part of all trade regimes, but their overall impact on serious entrepreneurs must be kept under review, and, above all, they must be enforced for all participants.

3. Export Procedures

With the change in function of PROSECO from monopoly public sector trader to a competing merchant with majority shares held by the private sector, its role in the administration of export procedures must change. Government recognizes this need, but has not as yet determined, in particular, how ICO documentation will be handled for the crop year that has already begun. It is beyond the competence of the present report to recommend how it should be administered, but a prompt and clearly enunciated resolution is needed.

4. Improve Coordination Among Levels Of Government

Lending institutions and private businesses both experience problems in securing decisions at various levels of government, or in satisfying one level that regulations or payments have been properly met at a different level. There is no doubt that it is in the short-term interest of officials to try to have these obligations met at their particular level, but policy changes, improved infrastructure and communication, and broad investor interest in Guinea have all brought the country to the point where a consistent and respected treatment of these issues is in order.

5. Improve Coordination and Consultation Among All Participants In The Coffee Sector

Many countries have made very effective use of a consultative group made up of representatives of the various facets of a commodity sector. Some of the issues raised above would benefit from periodic discussion among producers, merchants, processors, shippers, technical specialists, and financiers, as well as regulators, who make up the coffee sector in Guinea. Several proposals have been put forward to establish a National Coffee Office, or a National Coffee Council, including fairly detailed outlines by SOGUICAF and the Caisse Centrale. Such a body would meet twice each year, or more often as needed, to review performance in the sector, contribute to the resolution of current policy issues, resolve conflicting objectives or practices among its various facets, and advise government on such matters as producer prices, regulation and taxation, and the strategy to be taken vis-a-vis the ICO.

## 6. Introduce Quality Incentives

The serious quality problems experienced at the present time can be resolved by changes in producer and processor practices, without significant capital outlays. But the effort needs to be rewarded. Allusion is made elsewhere in the text to the fact that smugglers now offer higher prices to producers than do legal buyers, and this situation limits the scope for price differentials at the producer level. However, there is nothing to prevent government from introducing differentials in the floor price as a signal to producers that quality will increasingly be taken into account. Furthermore, a differential in export fees and taxes levied on traders would not only encourage them to improve their processing and handling of coffee; it would also provide them some added margin with which to introduce their own differentials in producer prices. Moisture, foreign matter, maturity, and brokenes are the quality factors that should first be taken into account.

## 7. Other Issues

There may eventually be a role for some form of price stabilization, but it is not a matter of urgency. The level of capital intensity in development efforts should also be reviewed, as some organizations are pursuing credit programs for smallholders that do not appear to be compatible with the producers' management or financial capability.

## SECTION VII

### A STRATEGY FOR INVESTMENT IN THE COFFEE INDUSTRY

#### Coffee Production

There is significant scope for increasing coffee production in the forest region by working with smallholders and, initially, with existing trees. Interplanting and gradual replanting would progressively add to productivity. Growers have shown themselves to be responsive to price incentives, and there is a history of coffee production that could be called upon, with updated technology, to improve productivity in the short term, despite the age of most trees. There are also opportunities for the establishment of commercial plantations, since population pressure on the land is not a major factor in the forest region, and Guinea has a system of 99-year leases which can be applied to agricultural lands. 1/

This is the kind of situation that lends itself to a nucleus estate/outgrower approach to production. Initial emphasis on working with existing smallholders would generate growing volumes of marketable coffee while the nucleus estate is being established. Thereafter, the estate can be depended upon to produce a certain share of the desired volume, under conditions that are much more under the control of the enterprise than are smallholder operations, while continued association with smallholders generates additional volume without land and labour costs. The nucleus estate can also be the site of any centralized or common facilities, such as parent stock gardens, nurseries, and primary processing facilities. The estate becomes a demonstration farm for outgrowers, and can reduce the cost of technical assistance to outgrowers by providing additional productive employment for technical staff.

This is the approach that is recommended for future investment in coffee production in Guinea. The alternative of a strictly merchant-type buying relationship with existing growers

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1/ All lands belong to the state. There can be complications arising out of claims by local communities for which solutions may need to be negotiated in addition to the national-level agreement. Producers will have an opportunity, through dependable sales of their product, to realize modest cash surpluses, and to gradually acquire the planting material and improved inputs that would otherwise have to be financed up front.

does not provide the stable relationships that will be necessary to promote improved quality of production, particularly since there is no alternative system through which growers can get the support required to achieve the desired level and type of output. On the other hand, straight commercial plantation production will require a lengthy development period of negative cash flow, and will not involve enough of the existing social and economic community in the effort to assure commitment and support.

Another feature of the proposed approach is that it does not depend on large credit flows to subsistence producers. The enterprise will need to exercise discretion in the extent to which it incurs infrastructure and support costs on behalf of its suppliers until the commercial relationship is proven, but producers will have an opportunity through dependable sales of their product, to realize modest cash surpluses, and gradually to acquire the planting material and improved inputs that would otherwise have to be financed up front.

### Processing and Marketing

Many of the inefficiencies and quality problems experienced by the Guinean coffee industry can be traced to the fact that various aspects of processing between harvest and green bean are performed at different locations under circumstances that are not conducive to good processing. While the problem starts with indiscriminate harvesting of cherry, post-harvest issues include:

- Smallholders often drying their coffee under conditions where decay and adulteration can occur, and where uniform drying is difficult to insure.
- Decortication by primitive means, resulting in a high percentage of broken, and inadequate shell/bean separation.
- The frequent bagging and rebagging of coffee as it changes hands on the way to port, with the attendant losses and adulteration.
- Excessive transport costs and unnecessary damage to equipment because of failure to remove foreign material at an early stage.
- Delays in moving coffee through the marketing system, and quality deterioration as a result of holding it in poor storage conditions.

Quality control and efficiency dictate that the trend of future investment in coffee processing and marketing must be in

the direction of integration. The investor in coffee production need not also be an owner of transport and storage infrastructure, but contract relationships should be established with allied enterprises so that the coffee moves from the plantation or buying point to the export market under conditions controlled by the enterprise. Primary processing--cleaning, decortication, separation and grading--should be done by the enterprise.

### Corporate Strategy

There are substantial opportunities in the Guinean coffee industry because it is in the early stages of recovery after a long period of technical and political neglect. But the circumstances that create this opportunity also pose difficult organizational and start-up problems for investors, and it would not be realistic to anticipate quick returns to a venture in this market. The proposed strategy of an initial focus on smallholders and market links will generate a cash flow from the early stages of investment, but a sustained effort of five to ten years will be required to realize the benefits of a serious production effort.

Guinea's commercial and regulatory systems are not yet well codified or transparent. It is therefore recommended that an investor not familiar with Guinea seek a corporate relationship with a firm already established in the country. Many of the development and start-up costs can also be significantly reduced by association with a firm established in the coffee industry.

SECTION VIII  
INDICATIVE INVESTMENT PROGRAM

General Description

The range and nature of investments in the coffee sector can vary a great deal according to the interests and resources of the prospective investor. To illustrate the potential of the sector, an investment package has been selected with the following characteristics:

1. The establishment of a nucleus estate of 400 ha.
2. The improvement of 500 ha of smallholder coffee.
3. The establishment of two principal buying centre/warehouses, each with primary processing equipment.
4. The operation of 10 secondary buying points.

Together with the necessary support facilities, these investments are expected to generate a volume of 1,000 metric tons of green coffee per year, including open market purchases from smallholders. (Calculations are actually based on 1,008 tons per year, equivalent to 60 containers of 16,800 kg net weight of coffee each.)

Initial investment would be approximately US\$ 620,000 and US\$ 700,000 in the first two years, respectively, although coffee trading would significantly reduce net cash outflow. By year 4, the project would show a return of 17% on sales before interest charges, and this return would rise steadily to 31% in year 10. The project would generate a positive cash flow in the third year, and cumulative cash flow, without interest charges, would turn positive mid-way through the fourth year. Assuming a 10% cost of capital, the payback period would still be less than four years.

Industrial Estate

In the first year, the investor would identify the site for a coffee plantation, and negotiate for its lease. This estate would become a nucleus for coffee production and trade for the enterprise. The estate would provide common services to surrounding smallholders wishing to avail themselves of

assistance, and would enter into straight buy/sell relationships with other smallholders. For purposes of this analysis it is assumed that planting material would be purchased from existing nurseries at 100 G.F. per tree. Although raising this material would require about 1-1/2 years lead time, the price used in the analysis would be adequate to compensate for nursery investment, should the enterprise prefer to establish its own source of planting material.

The model assumes a cost of land of \$35 per hectare, a one-time cost for a 99-year lease on undeveloped land, which is then written off in equal parts over the first four years.

Planting is phased so as to be manageable over a three-year period, beginning in the second year of the overall program. Like all new plantation investments, there is a gestation period before production reaches sufficient levels to generate a positive cash flow. In this proposal, cumulative outflow would reach about \$391.5 before positive annual flows start in year 7. The yield assumptions used for this component are intentionally very conservative: 750 kg/ha compared to conventional yields on industrial plantations of 1,500 kg/ha. Although such yields are themselves well below genetic potential, and are realized on well-managed estates, infrastructure and input supply problems as well as communication and coordination difficulties are likely to limit the performance of estates in the forest region of Guinea.

#### Smallholder Coffee Rehabilitation

The rehabilitation of smallholder coffee as part of an investment program has two advantages: it facilitates increased production in an area of interest to the investor; and it establishes a relationship with producers that can be expected to influence their marketing decisions in favour of deliveries to the investor, prices being equal. There are also technical assistance dimensions to such a relationship that will contribute to improved quality of coffee, and the association with large numbers of local producers has a positive effect on dealings with authorities on policy and regulatory issues that impinge on the operations of the enterprise.

There is a controversy surrounding the rehabilitation of smallholder coffee, specifically whether the response of these old trees will be sufficient to justify the investment in time and money. During the course of the present study, trees that had been cut back one to two years earlier were examined, and found to

be growing with vigour and producing fruit in good quantities. It is the conclusion of this exercise that the debate centres on the extremes of projected performance of rehabilitated and newly planted coffee trees. Certainly not all old coffee trees should be cut back and rehabilitated; but it is also apparent that the argument against any such "reception" is based on excessively pessimistic performance projections and, on the other hand, overly optimistic expectations as to the performance of newly planted trees under the husbandry and input supply conditions that prevail in the forest region.

Two factors need to be taken into account when considering whether or not to cut back a particular stand of coffee. First, is the stand dense enough to produce a good cover when it re-establishes, or are there open spaces that can be interplanted with new trees? Either case is preferable to a sparse stand, or one under large shade trees. Second, is the producer willing and able to perform the weeding and care necessary until the stand is re-established? Of particular importance is the selection of shoots during regrowth; if this is not done, dense vegetation will develop, but there will be little or no fruit production.

One other issue to be considered when planning the rehabilitation of smallholder coffee is the fact that coffee is probably the producer's principal source of cash. It is neither constructive nor realistic to propose cutting back all the trees of a producer at one time. The work should be done in four annual phases so that the majority of the pre-project cash flow can be maintained during the rejuvenation period.

With these factors in mind, a five-year program to cut back and rehabilitate 500 ha of smallholder coffee has been proposed. Costs will be shared, with the producer providing his own labour and the investor cutting back the old trees, using a team of workers with chain saws. The estimated cost of this team, including investor overheads, is 70,000 GF per hectare (\$159.10), which the producer would be expected to repay in coffee over a four-year period after production exceeded pre-project levels.

## Coffee Purchasing

Two principal buying facilities, with warehouses and primary processing equipment, are proposed. <sup>1/</sup> In addition, buyers equipped with motorcycles would be engaged to establish at least ten secondary procurement points. These would not have any facilities in place, but would each have a schedule for coffee collection and payment, and buyers would "recruit" suppliers in surrounding villages. The capital cost of this operation is included in overhead items, and warehouse leases as well as operating costs related to collection, processing and storage of coffee are presented as part of the cost of coffee purchases.

These buying facilities would handle all coffee purchased or produced by the investor. The principal locations would also be assembly points for shipments to ports of export. One should probably be located in the prefectural capital nearest the estate, and the other in a capital either where there is a large quantity of coffee produced, or where the enterprise identifies a competitive advantage in acquiring a large share of whatever coffee is produced. The installation near the estate would probably prove to be a good location for the enterprise's management and administrative offices in the forest region.

## Marketing and Overall Management

The coffee produced or purchased by the proposed enterprise will be destined almost exclusively for export markets. Contact with foreign markets is one reason the enterprise must plan to have an office in Conakry. Regular contact with government officials in Conakry is also important. The capital and operating costs of this office have been included in the overhead figures. (If the enterprise's regional management office is not located at N'Zerekore, special efforts will have to be made to keep regular contact with officials of the regional government headquartered in that city.)

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<sup>1/</sup> Initially, primary processing should consist of decortication, cleaning, and grading for size and brokenness. Equipment for those functions is included in the financial estimates. To increase saleable bean recovery, and the quality of the final output, investors should also consider adding driers, and work tables or conveyor lines for visual separation of off-colored beans.

### Summary of Investment Costs

The trading of coffee is the largest cash flow item in the proposed investment program. Nevertheless, there are significant investment costs with respect to trading facilities and the plantation and smallholder work. These, together with business development costs, are summarized below.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Total</u>
			(US \$ '000)			
Smallholder Rehab.	8.0	19.9	19.9	19.9	11.9	79.6
Plantation	-	34.5	109.8	163.9	51.4	359.6
Business Development	125.0	50.0	25.0			200.0
Equipment	100.0	200.0	23.0			223.0
Leasehold	<u>20.0</u>	<u>10.0</u>				<u>30.0</u>
Total	253.0	314.4	177.7	183.8	63.3	892.2

As shown in the Summary Cost and Benefit Table at the end of this report, there are significant inflows during this first five year period, so the full \$892,000 need not be provided as investment funds. See the table for details.

### Financial Performance Indicators

As might be expected from a venture that has a large trading component, the internal rates of return for the investment package as a whole are high. Under the best assumptions, the rate for the first ten-year period is 107%. The sensitivity tests on this data also show attractive results. At a 10% cost of capital, the switching value for the benefits is 21% below best estimate, and, for the costs, is 26% above best estimate. If benefits were to be 10% less than projected, and costs 10% greater, the return over the 10-year period would still be 21%.

The industrial plantation, like all projects with a longer development period, is less attractive than the overall package when evaluated in the first ten years. Taken at 15 years, the results are as follows. The best estimate data give a return of 28%. An increase in benefits of 10% (better yields or prices) would raise the rate of return to 31%. If, at the other extreme, benefits were 25% less than projected, and simultaneously costs were 25% greater, the return would be 15%. Finally, if all assumptions were at "best estimate," except that costs were increased by 25% simply to absorb a share of corporate overheads, the return would remain at the respectable level of 22%.

Finally, to test the attractiveness to smallholders of cutting back their old coffee trees, a test was run on the model presented in the annex. As estimated, the rate of return is 29%. Switching values at 10% capital cost occur at -15% of benefits, and +104% of costs. This is a wide margin for fluctuation while retaining adequate returns. Ten percent better yields or prices would result in a 32% return, and 10% poorer benefits combined with 10% higher costs would still show a respectable 24% return.

## ANNEX 1

TABLE 1

Coffee Supply and Distribution  
(million bags of 60 kg)

World

<u>Crop Year</u>	<u>Begin Stocks</u>	<u>Prod'n</u>	<u>Imports</u> <u>1/</u>	<u>Total Available</u>	<u>Domestic Use</u>	<u>Exports</u>	<u>End Stocks</u>
1960/61	58.9	65.4	.3	124.6	16.4	42.9	65.3
65/66	71.6	82.1	.4	154.1	17.8	50.0	86.2
70/71	65.5	59.4	.5	125.4	19.4	51.9	54.1
75/76	44.4	73.1	.4	117.9	19.2	59.7	39.0
80/81	25.5	86.2	.7	112.4	20.6	59.8	32.0
85/86	37.3	95.4	.5	133.2	21.6	69.8	41.8
86/87	41.8	77.1	.3	119.2	22.2	67.6	29.4
87/88est	29.4	97.8	.4	127.6	23.4	69.1	35.2

Africa

1960/61	3.0	14.0	.0	17.0	1.1	11.6	4.4
65/66	8.3	18.0	.0	26.3	2.3	15.3	8.8
70/71	11.4	19.3	.0	30.8	2.3	17.0	11.6
75/76	13.1	18.8	.1	32.0	2.4	20.1	9.5
80/81	8.5	21.2	.2	29.8	2.4	15.1	12.2
85/86	10.7	20.1	.1	30.9	2.4	18.3	10.2
86/87	10.2	19.9	.1	30.2	2.8	17.1	10.3
87/88est	10.3	20.6	.1	31.0	2.7	18.0	10.2

Guinea

1960/61	-	0.20	-	0.20	-	0.20	-
65/66	-	0.17	-	0.17	-	0.17	-
70/71	0.03	0.13	-	0.16	-	0.10	0.05
75/76	0.02	0.02	-	0.04	-	0.03	0.01
80/81	-	0.11	-	0.12	-	0.08	0.04
85/86	-	0.09	-	0.09	-	0.07	0.02
86/87	0.02	0.08	-	0.10	-	0.08	0.02
87/88est	0.02	0.08	-	0.10	-	0.08	0.02

1/ Imports into producing countries

Source: Adapted from Foreign Agr. Service, USDA; August 1987

ANNEXES

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## ANNEX 2

### ESTIMATES OF COFFEE PRODUCTION IN GUINEA

Four estimates of coffee production made in the last three years were reviewed for this study. They are summarized below. During field work for the present study, a methodology was developed for estimating production on individual plots of coffee, primarily as a preinvestment tool. This approach is described below, and another estimate of production is made by applying the model to the forest zone.

#### Estimate I

In informal discussion with SOGUICAF officials, they offered the following estimates on the basis of their experience in three of the producing prefectures. Total production in 1986/87 is thought to have been 7,200 tons. The condition of plantings is such that a yield of 300 kg/ha is probably the top of the range of actuals. It should also be remembered that trees are not for the most part planted in exclusive stands, but are interplanted.<sup>1/</sup> Nevertheless, a rough indication of area actually under coffee trees, based on the above, is between 20,000 and 40,000 hectares. In the same spirit of ballpark figures, the distribution of production by prefecture is as follows:

Macenta	2,000 tons	N'Zerekore	1,000 tons
Lola	1,000 tons	Gueckedou	1,000 tons
Kissidougou	1,000 tons	Yomou	1,000 tons
		Beyla	200 tons

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<sup>1/</sup> In an exclusive plantation established twenty-five years ago or more, there will be 900 - 1,000 trees/hectare, depending on terrain, with a normal spacing of 3 metres by 3 metres (10 ft x 10 ft). Current practice is to plant trees at a greater density: 1,333/hectare (3 m X 2.5 m); 1,600/ha (2.5 m x 2.5 m); or, 1,666/ha (3 m X 2 m).

## Estimate II

In 1985, a Belgian study of coffee 1/ included detailed field work in the production area, and their estimates are somewhat higher:

<u>Prefecture</u>	<u>Trees</u> (million)	<u>Yield</u> (kg/ha)	<u>Production</u> (Present)	<u>Production</u> (Potential)
Kissidougou				
North	7.6	50		
South	8.1	150		
Total	<u>15.7</u>		<u>4,725</u>	<u>9,450</u>
Gueckedou				
North	5.0	300		
South	2.0	300		
Total	<u>7.0</u>		<u>2,100</u>	<u>4,200</u>
Macenta				
North	2.6	600		
South	4.6	200		
Total	<u>7.2</u>		<u>2,880</u>	<u>5,040</u>
N'Zerekore	6.9	250	1,725	3,450
Yomou	2.0	250	500	1,000
Lola	<u>2.0</u>	<u>250</u>	<u>500</u>	<u>1,000</u>
TOTAL	<u>40.8</u>	<u>217 2/</u>	<u>12,430</u>	<u>24,140</u>

It is estimated that there are also about 50,000 trees in Beyla Prefecture, well within the rounding error of total population estimates.

## Estimate III

The Foreign Agriculture Service of USDA does not record data below the national level. Export figures do not include provision for informal shipments, production appears to be derived from these official exports, and engineered figures are used for stock and consumption. Guinea's performance is of no consequence either for the global coffee trade or USA interests in coffee. Therefore it is not surprising that USDA should take a disinterested position vis-a-vis the accuracy of this data. Nevertheless, for comparison, selected production data from the August 1987 bulletin are as follows:

1/ Unpublished, for The Bureau of Strategy and Development, Ministry of Rural Development, Government of Guinea.

2/ Weighted Average.

<u>Year</u>	<u>'000 Bags</u>	<u>Metric Tons</u>	<u>Year</u>	<u>'000 Bags</u>	<u>Metric Tons</u>
1960/61	200	12,000	1983/84	50	3,000
61/62	235	14,100	84/85	30	1,800
62/63	215	12,900	85/86	85	5,100
			86/87	80	4,800

#### Estimate IV

In its Agricultural Sector Report of 1984, the World Bank examined the impact of low producer prices on production and also on deliveries to official buying agencies. In discussing coffee, it felt that the existence of an alternative outlet in the form of smuggling permitted the maintenance of production levels above official estimates and certainly above official receipts.

	<u>Est. Production</u>	<u>Off'l Exports</u>
1972	20,000 tons	4,400 tons
1975 <sup>1/</sup>	14,000	3,400
1983/84	8,000	less than 2,000

These estimates are difficult to reconcile with other data because they are not based entirely on crop year. No data sources or methodology are offered for the production estimates, and the official export figures do not tally with data from other sources. Nevertheless, they do present a picture of contrast between production and official exports, and of declining production. Good producer prices are not enough to maintain production over time if inputs are not available, as was the case in the forest region.

#### A Methodology For Estimating Plot Yields

Field samples and observations during the present study indicate the following factors:

1. A fully set whorl on a coffee branch has 16 cherries.
2. While as many as 7 or 8 whorls on a branch may have fruit, the best branches seen had the equivalent of 5 full whorls.

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<sup>1/</sup> The report says elsewhere that the area under production in 1974/75 was 41,000 hectares.

3. Five full whorls of mature fruit have a volume of 100cc.
4. Therefore, it takes 10 very good branches to yield a litre of mature fresh cherries.
5. Applying this measure to stands observed in the field, only exceptional trees showed yields of 3 litres. One of the best plots seen had about 600 trees per hectare, and an average production of about 2 1/4 litres per tree.
6. One litre of fresh cherries weighs about 800 grams.
7. Using the average conversion factor from ripe fresh cherry to green coffee of 5:1, a litre of cherry will yield 160 grams of green coffee.
8. The relatively good stand described above had an estimated yield of green coffee of (600 x 2.25 x .16) or 216 kg/ha.

#### Estimate of Production Using Above Observations

	<u>Trees With Yield Of (lt)</u>							<u>Wtd.</u> <u>Average</u>	<u>Production</u> <u>1/</u>
	<u>0.0</u>	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>		
	(percent of all trees)								
Pes'tic	15	20	40	20	3	2	0	.910	146 gm/tree
Opt'tic	5	10	20	30	20	5	2	1.285	206 gm/tree
Best Estimate	10	15	30	30	10	4	1	1.155	185 gm/tree

The estimates of tree population are also quite varied in Guinea, but three recent estimates (German and Belgian consultants and the Government's own estimate) are all within 20% of each other and average 45.05 million trees. Based on the average yield derived in the above table, this tree population would give a current annual production in the entire forest region of 8,334 metric tons.

#### Estimating Plot Yields

The following table is based on the relationship between yield per tree of ripe cherries, the number of trees per hectare, and the final area yield of green coffee. The total volume of cherries is converted to green coffee yield using the factor, 1 litre mature cherry = 160 gm green coffee.

1/ Based on 1 litre yielding 160 gm green coffee.

<u>No. Trees/ Hectare</u>	<u>Litres Ripe Cherry Per Tree</u>									
	<u>.25</u>	<u>.50</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>3.0</u>	<u>4.0</u>	<u>5.0</u>	<u>7.5</u>	<u>10.0</u>
10	.4	.8	1.6	2.4	3.2	4.8	6.4	8.0	12.0	16.0
25	1.0	2.0	4.0	6.0	8.0	12.0	16.0	20.0	30.0	40.0
50	2	4	8	12	16	24	32	40	60	80
100	4	8	16	24	32	48	64	80	120	160
250	10	20	40	60	80	120	160	200	300	400
500	20	40	80	120	160	240	320	400	600	800
750	30	60	120	180	240	360	480	600	900	1200
900	36	72	144	216	188	432	576	720	1080	1440
1,000	40	80	160	240	320	480	640	800	1200	1600
1,333	53	107	213	320	427	640	853	1066	1600	2133
1,660	66	133	266	398	531	797	1062	1328	1992	2656

## ANNEX 3

### LOCAL COFFEE PROCESSING

#### PROSECO Factory

This facility is located on the main road into Conakry, at Km 9, near the airport. It is housed in a concrete building about 35m x 135m (100ft x 400ft). The factory consists of two cleaning and separation lines and a roasting and grinding plant.

#### Cleaning and Separation

Each of the two lines consists of screens and air separators. They are fed by bucket conveyors to the vibrating box screens. The offtake of dust and extra large beans is by sack, and the main sort drops by chute to a conveying trough that distributes the beans to the six aspirators, where again it is bucket-lifted into a hopper, and fed into a rotating drum at the top of the separator. The trash gradually moves to the end of the slightly inclined drum and falls, outside the unit, by chute to separate sack collectors. The coffee passes through the screen and falls through a chamber of about eight feet in length through which air is forced from a fan at the bottom of the unit. Weight separation of broken beans and whole beans occurs at this point, and small stones are also isolated in the bottom of the unit.

The systems described above consist of West German equipment installed in 1968 and made operational in 1972. Each line has a rated capacity of 50 MT input per day. At the end of the building, there are two slow belt lines on which sorted beans are spread for manual removal of off-colored beans and remaining trash.

At the time of this study, new equipment and ducting was being unloaded for rehabilitation and expansion of the plant, including machines that perform the cleaning and grading functions at one time. This investment is being made in the context of the sale of majority shares of PROSECO to Swiss interests.

#### Roasting and Grinding

There are two roasting and grinding plants in Guinea, both in Conakry. One is owned by a private businessman, the other by PROSECO. The following description is of the PROSECO plant.

From a receiving hopper, green coffee is air-lifted to a reservoir above the roaster. The oven is a forced air and rotating basket design with a capacity of 120 kg per charge. At full operation, it can roast five batches per hour, or 600kg. The temperature is held at 220 degrees C, and a sample taken as the roasting progresses, for visual inspection. When completed the batch is emptied onto a rotating horizontal cooling screen, with fixed bats to mix the coffee for even cooling. Ambient air is forced up through the coffee, and it drops to acceptable temperatures in about five minutes.

From the cooling screen, the coffee is air-lifted under controlled velocity, so that only the beans rise to a holding hopper, while stones are separated at the bottom of the chute. Coffee is then metred into the top of the grinders, a series of parallel grooved rollers housed in a single unit. The entire unit is water-cooled.

From there, the ground coffee is belt-lifted to the top of a fully automated bagging machine, with adjustable bag size capability.

The roasting and grinding plant was installed in 1982 and became operational in 1983. There have been constant problems, mainly with the electronic panels controlling the bagging equipment. In addition, the plant has not worked much for the simple reason that the local demand for coffee is too low to keep the unit busy. It typically will do a run of 50 kg to several hundred kg, and then be idle for days or weeks.

The plant, including the roasting and grinding unit, is wired for 380 volts, and apparently requires about 70 kva when in full operation. There is a 150 kva Mercedes generator on site which is apparently in working order.

In the years since this equipment was installed, technological improvements have been introduced which increase the efficiency of these processes, and it is now common to find the screening and air separation activities performed in one more compact machine. One such machine is currently being installed at PROSECO, and others, of Brazilian design, are used by SOGUICAF in the forest zone.

## SOGUICAF Processing Equipment

In 1986, SOGUICAF imported a de-hulling, cleaning and separation machine from Brazil, and installed one unit in Kissidougou and another in N'Zerekore. In Brazil this equipment is mounted on a truck and taken to coffee collection centres, but in Guinea it is operating on the floor of two of SOGUICAF's warehouses. Using only 15 kva of power, and costing about \$20,000, this unit is simple and easy to maintain. Its performance can be assessed from the fact that SOGUICAF coffee is acceptable on the London Exchange with little or no discount below grade. Briefly, the process is as follows.

### Cleaning

Dry cherry is dumped into a wooden hopper from which it drains to a sump at the bottom of a bucket belt lift. The belt discharges the coffee onto the first of two vertically-stacked screens which are vibrating, and the bottom of which also has forced air to enhance particle separation. This arrangement separates stones, very small coffee beans, sand and dust, as well as leaves and twigs. The cherry thus cleaned drops to the sump of another bucket lift that raises it to a horizontal archimedies screw for delivery to the decorticator (de-huller).

### Decortication

This unit consists of a stationary outer ring of steel approximately eight inches wide, with precisely sized perforations through which only beans can pass, and, inside that ring, a high-speed wheel with paddles around its perimeter set at a distance from the outer ring slightly more than the diameter of the cherry. The entire unit is enclosed in a sheet metal housing. The cherries are delivered into the central axis area of the unit. The rotating paddles drive the cherries repeatedly against the outer ring and against themselves, and the hull is ruptured and broken up, releasing the beans. Forced air in the chamber drives the lighter hulls out of the unit along its central axis to an exhaust duct, while the beans are continuously agitated until they pass out through the holes in the outer ring of the unit, where they collect in a duct in the bottom of the housing.

### Separation

The first stage of separation is to isolate hulls and undecorticated beans that escape the first pass through the

decorticator. This is accomplished by dropping the beans from the decorticator onto an oscillating screen that is slightly funnel-shaped. Air passing through the bottom of the screen facilitates the process of graduating the hulled beans to the perimeter of the screen and the cherry and hulls to the centre. A duct at the centre of the screen takes the cherry and hulls back to the bottom of the last bucket lift, whence they are returned to the decorticator, while the clean beans are released from a door at the outside edge of the screen.

The second stage is the separation of beans according to soundness and their whole or broken state. A bucket belt collects the beans below the oscillating screen and raises them to the top of a chamber through which air is forced from near the bottom. The chamber is about six inches deep, four feet wide, and eight feet tall. The beans are released into one corner of the top of the unit, and the air is jetted upward from the base of the same side, but at an angle toward the opposite side of the unit. The result is that the sound beans, which have a greater density, tend to fall straight to the bottom of the unit, whereas poorly developed or decayed beans, as well as broken, are more affected by the air, and move across the width of the unit as they fall. Spouts at two, three, or four locations at the bottom feed the respective fractions into waiting bags.

### Assessment

Low initial cost and operating cost are attractive features of this equipment, as well as its ease of maintenance and operation. Capacity is rated at about 700 kg of dry cherry per hour, or about 360 kg green bean output per hour.

This equipment does a good job of decorticating without significant bean damage or breakage, and a good job of separating foreign matter and light or damaged beans. It does not size-grade particularly well, and of course does not have color separation capability. In other words it is a very good basic treatment plant that, combined with visual removal of black beans, will deliver "superior" grade coffee (see grades, annex 5).

## ANNEX 4

### PROSECO

Until 1984, PROSECO, which is a commercial company of the Ministry of Commerce, had a monopoly for the export of coffee and other dry agricultural products. Its counterpart in fresh produce was Fruitex. PROSECO carried out its purchases of coffee and other products through EPECOA's (Entreprises prefecturales de Commercialisation des produits agricoles), which had buying points in the producing areas.

PROSECO has two cleaning and grading facilities in Conakry, from which all shipments were assembled. The newer and larger of these facilities is described in annex 3. It has apparently not operated for the last one or two years, but the older unit has continued operations, and has apparently been adequate for the lower level of shipments by PROSECO in recent years. That mill also does custom cleaning for private traders.

As a government agency and the sole exporter of coffee, PROSECO was also the administrator of ICO membership procedures, including the handling of export stamps. Under the new policy of allowing private exports, a fundamental question arose as to the role of PROSECO, and for the last two years it has been both an exporter of coffee and the controller of ICO stamps. Negotiations are now under way for the sale of majority or full interest in PROSECO to private foreign coffee interests, and the government recognizes the problem of having it continue to administer ICO documentation. No final decision has been taken concerning this function, but it may be given to the Foreign Trade Office of the Ministry of Commerce.

## ANNEX 5

### BUREAU DE CONDITIONNEMENT

This bureau of the Ministry of Commerce is responsible for the certification of quality of products for export.<sup>1/</sup> Coffee cannot officially leave the prefecture of its production without the approval of the prefecture level representative of the bureau, and no export of coffee can be made without the approval of the national-level office at the port of embarkation.

Inspection is required with respect to physical condition, packing, and weight. Grading is according to ICO standards. No coffee at present qualifies for the top grade (Extra Prima); a small share is graded at each of the second (Prima) and third (Superieure) levels; and the majority of exportable coffee is currently graded regular (Courante). The discussion of harvesting and local processing methods in section II indicates the principal reasons for the poor average quality of coffee exported from Guinea at the present time.

The official procedure as described by Bureau de Conditionnement, is roughly as follows:

1. A preliminary inspection is performed by the officer of the bureau located at the level of the prefecture in which the coffee is produced. This is a visual inspection, checking for excess foreign matter and off-coloured beans. This officer must issue a preliminary certificate before the coffee can legally leave the prefecture, and that certificate is supposed to remain with the coffee until it reaches the final wholesaler in the case of local consumption, or is replaced by a certificate of verification in the case of exports.

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<sup>1/</sup> Coffee comes under the jurisdiction of the Dry and Oilbearing Products Section. The other significant product for this section is palm kernels, whose exports in 1986 exceeded those of coffee, by weight (palm kernel, 5,400 MT; coffee, 5,100 MT).

2. The national-level inspectors are assigned to each of the cleaning and grading mills, and they take samples on a regular basis. (The office in N'Zerekore, which monitors primarily the one plant of SOGUICAF, takes up to 80 one-kilo samples per week.)

3. Two certificates must be issued by the bureau before the shipper can proceed with other export formalities: the certificate of verification, and the certificate of origin.

### Export Standards For Coffee

The standards adopted by the ICO are applied by the Bureau de conditionnement. These include three exportable grades--Extra Prima, Prima, and Superior--and other lower grades that cannot be sold to member countries without further treatment. As the grade descriptions below indicate, upgrading can be done by removing the undesirable material that is in excess of the specified limits.

(All figures pertain to a 300 gram sample)

<u>Extra Prima</u>	-less than 15 gm of total faults; -no black beans; -less than 4 brokens of less than 4 mm; -less than 1.5 gm of stone.
<u>Prima</u>	-15 to 30 gm total faults; -4 black beans or less; -4 or less brokens of less than 4 mm; -1.5 gm or less of stone.
<u>Superior</u>	-total faults between 30 and 60 gm; -50 or less brokens of less than 4 mm; -4 or less black beans; -1.7 gm or less of stone.

At the height of the coffee improvement program in the 1950's, 27% of Guinea's exports graded in the top two categories. Today, none reaches those grades, and only a portion of the "superior" is of acceptable quality to be traded without discount on the London Exchange.

## ANNEX 6

### EXPORT TRANSPORTATION STRUCTURE AND COSTS

#### Structure of Export Transportation Sector

There are at present seven lines that operate scheduled service into Conakry. On average, there are two departures per week.

- Deep Sea Shipping (Denmark)
- Delmass (France)
- SCADOA (France)
- Grimaldi (Italy)
- Vanuden (Belgium)
- Ligna Transmar (Italy)
- Rheinmass (West Germany)

Four of these lines--Deep Sea Shipping, SCADOA, Grimaldi, and Rheinmass--have recently formed a local shipping company called SOGUICOM (Societe guineenne de cooperation maritime). There also several other lines presently at various stages of negotiation to begin regular service.

Service to Le Havre is as fast as 7 days in the case of direct container service, but 14 days is normal. Service to other European ports averages 12 - 15 days.

There are several multi-purpose shipping agencies located in Conakry. GETMA, for example, represents both the SOGUICOM group and Delmass. It acts as a freight forwarder, stevedoring firm, customs agent, and local transport service including the supply and storage of containers. The other shipping agencies that provide similar services are SATA and MORI. A fourth firm, one of the largest in Abidjan, is about to start operations in Conakry.

One of the international inspection services, VERITAS, has an office in Conakry. It will inspect shipments on behalf of buyers and issue certification that may be required as part of clearance or finance arrangements at destination. Another small Guinean firm offers similar services. Societe generale de surveillance is not represented in Guinea at the present time, but it is expected to open an office in the near future.

## Costs Of Export Transportation

A) Inland Transport. The following quotations are indicative of costs in 1987 for road transport to Conakry from the coffee-producing area.

		<u>GF/MT</u>	<u>US \$/MT</u>
From Kissidougou	614 km	30,000	67.55
Gueckedou	707 km	34,000	77.75
Macenta	807 km	40,000	88.75

Rates are not quoted for N'Zerekore, Lola, Yomou or Beyla. Because road conditions are so poor, charges must be negotiated on an individual shipment basis.

B) Shipper's Warehouse In Conakry Area To FOB The following details were provided by one of the shipping agencies currently providing the costed services.

- Delivery of container to shipper's warehouse, and loading	GF 4,500/ton + TPS	<u>1/</u>
- Transportation to port	60,000/ctr + TPS	
- Storage at port	3,000/ctr/day	
- Transit formalities, port fees, stevedoring, and loading	9,800/ton	
- Fumigation	3,000/ton	
- Sealing and security	5,000/ton	

C) Ocean Freight This varies with service, line, destination, and quantity. Quotations ranged between FF 10,000 and FF 15,000 Conakry/Le Havre, for a 20 ft. container.

D) Other Costs To Be Taken Into Account These include:

- Insurance (3/4 to 1.0% of shipment value)	
- Export fee	2% FOB
- Quality verification (conditionnement)	5% FOB
- ICO membership fee (as of '86)	GF 3,240/ton
- Port fee (introduced 9/87)	GF 3,780 - 30% <u>2/</u>
- Stamp tax	5% FOB

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1/ Taxe de Prestation de Service. A 10% tax on services.

2/ These new charges apply to all imports and exports. For all exports, 30% is deducted from the flat per ton or per unit rate. To illustrate the range of charges, the levy on kraft paper is GF 2,500 per ton; metal, GF 765; Vehicles, GF 5,800; fresh fruit, GF 630; and, miscellaneous, GF 4,950.

Another company presented an estimate of the shore services outlined in B, above, at about GF 220,000 - 250,000 per container. Some of these costs could be reduced for a shipper able to arrange the various services himself, but the complexities and the vagaries of the system in Conakry are such that most shippers should use a reputable agent.

Shipment Via Liberia This alternative is not sufficiently developed to have a regular cost structure. However, the company presently using this route saves more than 25% on the cost of getting coffee to FOB status.

## ANNEX 7

### AGRICULTURAL ASPECTS OF COFFEE PRODUCTION

#### Agronomic Conditions For Coffee Production

Coffee, as a crop, is sensitive to temperature, rainfall, humidity, wind, and sunlight.

Temperature. The optimal range of mean daily temperatures is between 22 and 26 degrees C. Minimum temperatures should not average less than 15 degrees C; and maximum average daily temperatures should not exceed 30 degrees C. Robustas are susceptible to damage if temperatures go below 8 - 10 degrees C; they are therefore seldom found above 800 metres altitude.

Rainfall. The optimal rainfall is 1.5 to 2.0 metres per year, evenly distributed. There should be a dry period before flowering, but a second dry period of a month or more will trigger flowering again, and production of a poor off-season crop of small beans. A dry period in excess of two months is unfavourable. (With respect to Map No. 2, note that occasional rains extend predictably beyond the period designated as the rainy season.)

Humidity. Relative humidity in the 80 - 90% range is best for coffee.

Wind. Coffee is susceptible to wind damage of two sorts: first, mechanical damage in the form of broken branches; and second, damage as a result of the drying effects of wind, especially when combined with low humidity.

Sunlight. Coffee should have at least 2,000 hours of sunlight per year.

#### Conditions in Principal Growing Areas in Guinea

In general, the conditions in the forest zone of Guinea lend themselves very well to coffee production. It is the length of the dry season that is typically the constraint to performance. There is of course some variability, as well as a graduation of

conditions as one moves across the region. (For rainfall and wet season patterns, see maps.) Key characteristics or limiting factors in the most important prefectures are summarized below: 1/

Kissidougou/Gueckedou/Beyla. Lower rainfall in some years and dry periods that occasionally exceed 3 months are the limiting factors here. These factors may adversely effect production in one year out of three. Young trees will be especially susceptible to these problems.

Macenta. This is a particularly good area in terms of the climatological factors. Average low temperatures in January may occasionally pose a problem, perhaps affecting production one year out of four or five.

N'Zerekore/Lola/Yomou. With a temperature pattern like that of Macenta, this area has slightly less rainfall, but with good distribution and a two-month dry season. Inadequate total rainfall may effect yields in one year out of four.

With respect to soil conditions, several factors in addition to nutrient content are important. Organic content affects water retention and therefore the ability of particularly young plants to withstand periods without rain. In general the drainage of soil alters the rainfall range within which coffee will grow satisfactorily; better percolation rates increase tolerance to higher rainfall and moisture retention reduces the rainfall requirements for the same level of performance. Coffee does not perform well in acidic soils, and increasing the pH is often necessary in nurseries in the forest zone.

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1/ Drawn principally from the SOCFINCO - Van Lancker study, 1980.

### Recommended Varieties

Although no sources approached during the course of this study cited current evidence of tracheomyces, there may still be varieties in the region that are susceptible. The Belgian study identified four varieties that are resistant to this disease, and are also of commercial interest because of other characteristics.

Robusta INEAC Very productive, but vulnerable to drought and "scolyte".

Robusta CONGO Also known as KISSI; Especially suited to Kissidougou and Gueckedou.

Robusta LULLA Very good except if rainfall is lower than normal.

Yangambi L 147 Originated in Macenta; Needs further research.

The genetic potential of these varieties is in the range of 2.5 - 3.0 tons per hectare, but under industrial plantation conditions both Belgian and French studies indicate a yield of 1.5 tons/ha.

Whichever variety is selected, multiplication by cuttings is preferred over the use of seed. Trees produced in this manner come into production one year before seeded trees, and typically yield 25 - 30% more. However, the availability of cuttings or parent trees, and the cost and logistic requirements may preclude the use of cuttings, or dictate a combination with seed. Seed may be used for the development of parent stock gardens, from which cuttings will subsequently be taken for rearing and distribution.

ANNEX 8

CONVERSION FACTORS

	<u>Kg/Cubic Metre</u>	<u>Moisture</u>
Fresh Cherry	645	60%
Fredried Cherry - 40%	558	40%
Dried Cherry - 20%	440	20%
Dried Cherry - 13%	400	13%
Green Coffee	750	12%

100 kg fresh cherry = 67 kg Cherry at 40%  
 = 44 kg Cherry at 20%  
 = 40 kg Cherry at 13%  
 = 20 kg Green Coffee

## ANNEX 9

### DETAILS OF INVESTMENT PROPOSALS

To illustrate the investment possibilities in the coffee sector of Guinea, a package of plantation, smallholder and marketing investments has been proposed which would generate approximately 1,000 tons of green coffee per year, calculated as follows:

-400 ha estate with 750 kg/ha mature yield	300 tons
-500 ha rehabilitated smallholder coffee yielding 400 kg/ha	200 tons
-Two principal buying point/warehouses each buying 125 tons/year	250 tons
-Ten secondary buying points each buying 25 tons/year	250 tons

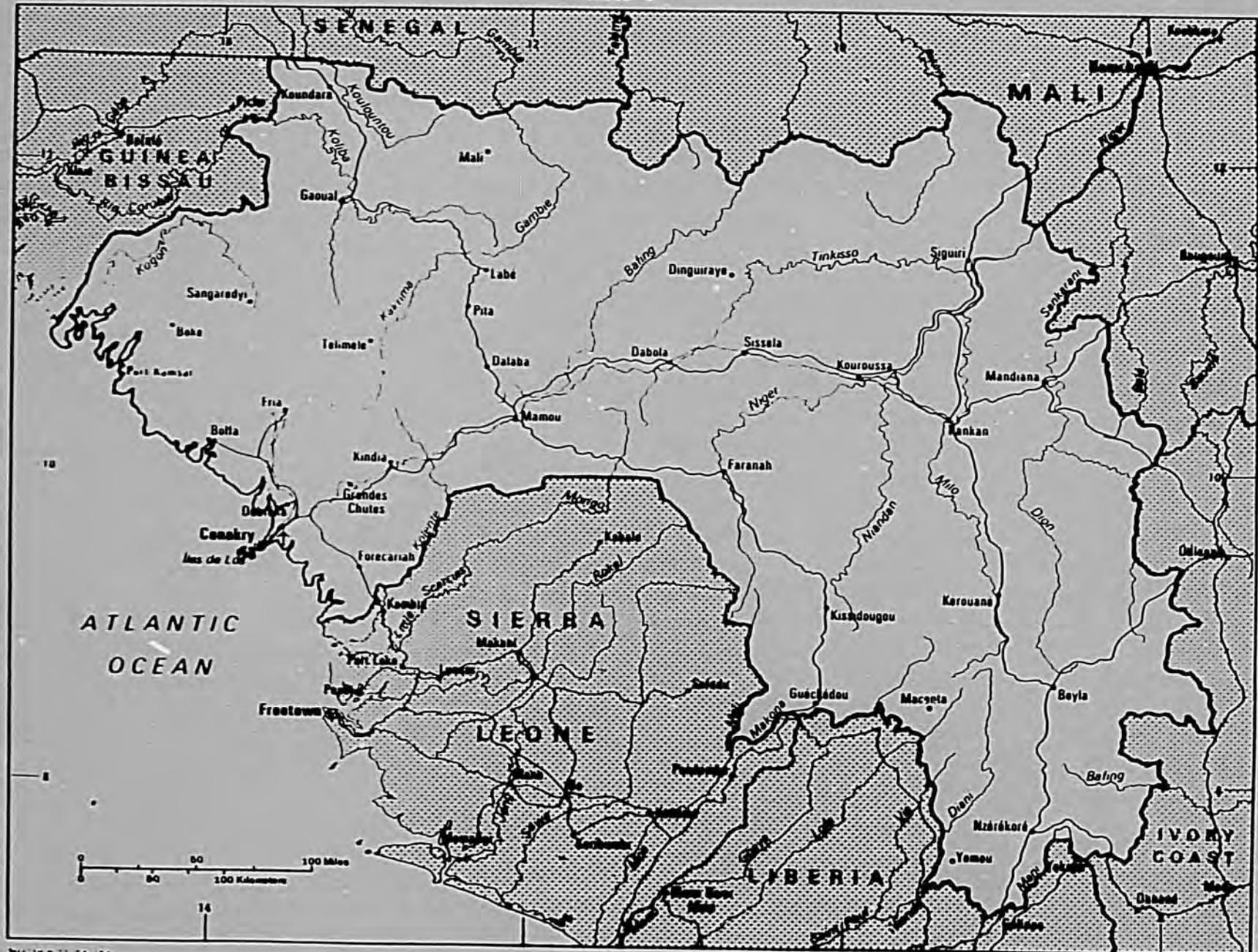
To simplify calculations, total production and purchases are assumed to be 1008 tons per year, equivalent to 60 twenty-foot containers of 16.8 tons each. (Each container holds 280 bags of 60 kg.)

MAPS

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# Guinea

MAP 1

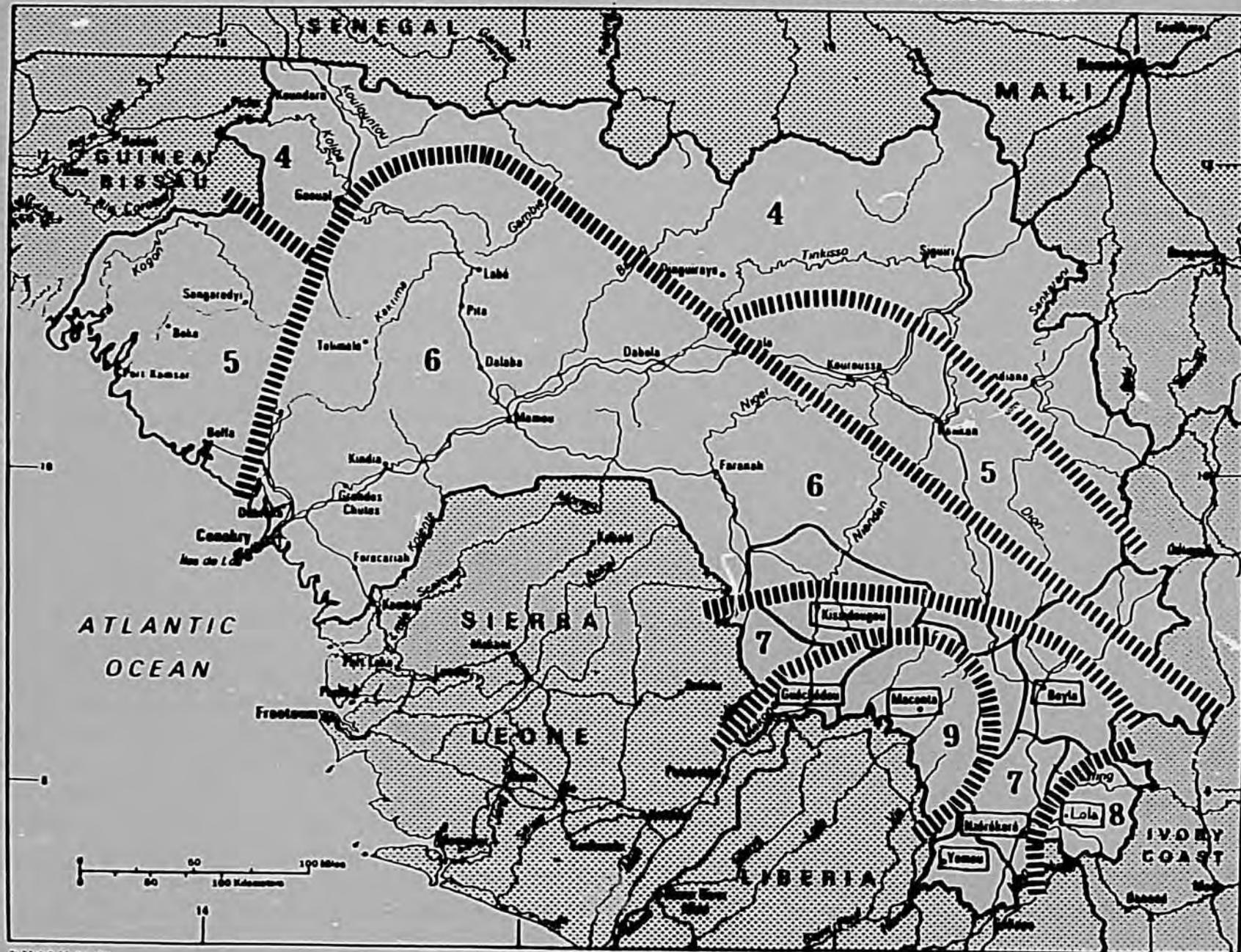


Scale: 0 50 100 Miles  
0 50 100 Kilometers

- Railroad
- Road
- ↑ Airport

# Guinea

MAP 2: MONTHS OF RAINY SEASON



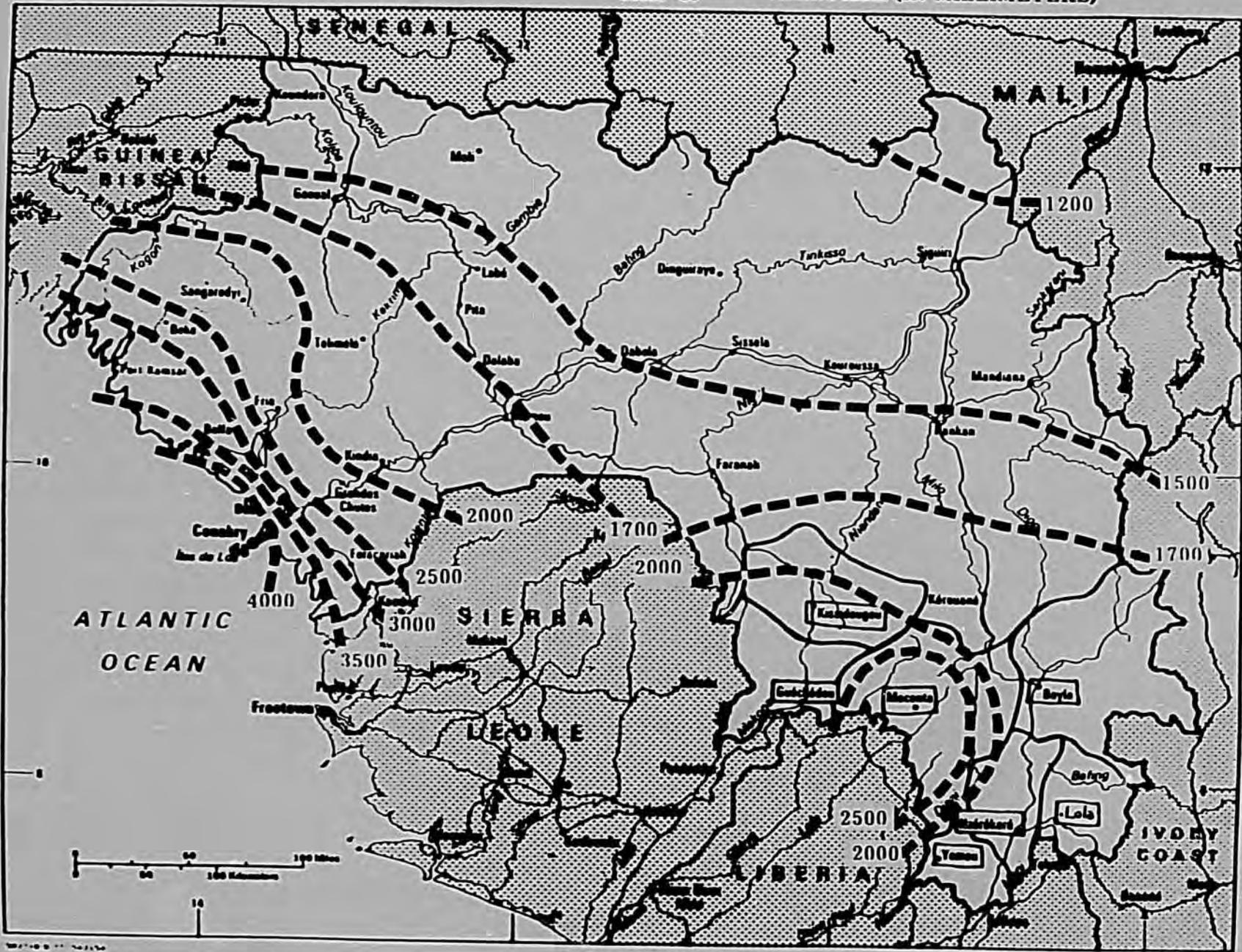
56

Scale: 0 to 100 Miles / 0 to 100 Kilometers

- Railroad
- Road
- † Airport

# Guinea

MAP 3: RAINFALL (IN MILLIMETERS)



Legend:  
 - - - - - Rainfall  
 - - - - - Road  
 - - - - - Railroad  
 ↑ Airport

— Railroad  
 — Road  
 ↑ Airport

CHARTS

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Establishment of New Coffee Plantation  
(Cost per hectare in '000 FG)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>	<u>Year 7</u>	<u>Year 8</u>	<u>Year 9</u>	<u>Year 10</u>
<b>Labour (days)</b>	97	23	34	32	33	48	52	44	48	52
<b>Costs</b>										
Labor	72.8	17.3	25.5	24.0	24.8	36.0	39.0	33.0	36.0	39.0
Land	4.0	4.0	4.0	4.0	-	-	-	-	-	-
Tools	70.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Plants	140.0	15.0	5.0	-	-	-	-	-	-	-
Urea	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
NPK	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pesticides	2.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
<b>Total</b>	<b>303.3</b>	<b>58.8</b>	<b>57.0</b>	<b>50.5</b>	<b>47.3</b>	<b>58.5</b>	<b>61.5</b>	<b>55.5</b>	<b>58.5</b>	<b>61.5</b>
<b>Production</b>										
(Kg green coffee)	0	0	50	250	400	650	750	550	850	750
<b>Revenue (at 450/kg)</b>	0	0		112.5	180.0	292.5	337.5	247.5	292.5	337.5
<b>Costs - Direct</b>	<b>303.3</b>	<b>58.8</b>	<b>57.0</b>	<b>50.5</b>	<b>51.3</b>	<b>62.5</b>	<b>65.5</b>	<b>59.5</b>	<b>62.5</b>	<b>65.5</b>
- Overhead 1/										
<b>Total</b>										

Coffee Investment Program  
Central Investment and Operating Costs

<u>INVESTMENT ITEMS</u>	<u>US\$ '000</u>	<u>GF million</u>
1. <u>Business Development</u> <u>1/</u>	200.0	88,000.0
2. <u>Equipment</u>		
- Coffee Processing Machines (2)	50.0	22,000.0
- 4wd Trucks (3)	87.0	38,280.0
- 4wd Pickups (5)	71.0	31,240.0
- Sedans (2)	21.6	9,504.0
- 30 Kva generators (3)	36.0	15,840.0
- Office Equipment	20.0	8,800.0
- Radios	8.0	3,520.0
- Contingency (10%)	29.4	12,936.0
Total	323.0	142,120.0
3. <u>Leasehold Improvement &amp; Installation</u>	30.0	13,200.0
4. <u>Total General Investment Expenditures</u>	553.0	243,320.0
 <u>RECURRENT COST ITEMS</u>		
- Equipment Operations <u>2/</u>	32.3	14,212.0
- Office in Conakry (150 M2)	15.0	6,600.0
- Warehouse/Offices in Interior (2)	5.0	2,200.0
- Management/Admin. Personnel		
-2 expats at \$85,000/year <u>3/</u>	170.0	74,800.0
-6 Guineans at 45,000 GF/month	7.4	3,526.0
- Technical Staff		
-5 expats at \$65,000/year <u>3/</u>	325.0	143,000.0
-15 Guineans at 45,000 GF/month	18.8	8,272.0
- General Service Personnel		
-10 Guineans at 20,000 FG/month	5.5	2,420.0
Sub-total	579.0	254,760.0
- Depreciation of Equipment <u>4/</u>	88.3	38,852.0
- Write-Off of Bus. Dev't Costs <u>5/</u>	66.7	29,348.0
<u>Total Overhead Charges</u>		
- Years 1 to 3	734.0	322,960.0
- Year 4 and Beyond	667.3	293,612.0

- 1/ Includes travel of investor personnel during first three years, licensing and lease costs and general costs of establishing financial, commercial and regulatory relationships.
- 2/ Equipment operation equivalent to 20% of acquisition cost.
- 3/ Expatriate costs are inclusive of housing and benefits.
- 4/ All items written down to 25% residual value in three years.
- 5/ Business development costs written off in first three years.

Cost of Guinean Coffee Delivered Rotterdam 1/

(One container, originating in Macenta)

	<u>GF '000</u>	<u>US\$ '000</u>
Buy Coffee <u>2/</u>	8,400.0	19.09
Cleaning	40.0	.09
Bagging/Warehousing 3/	135.0	.31
Loading	<u>18.0</u>	<u>.04</u>
Total Cost 16.8 tons, loaded	8,593.0	19.53
Transport, Macenta/Conakry	<u>672.0</u>	<u>1.53</u>
Total Cost delivered Conakry	9,265.0	21.06
Load Container	75.6	
Container to Port	60.0	
Formalities and Stevedoring	120.1	
Fumigation	50.4	
Sealing	<u>84.0</u>	
	390.0	.89
Export Tax	193.1	
Quality Verif'n	482.8	
Stamp Tax	482.8	
ICO Membership	54.4	
Port Fee	44.5	
Insurance	<u>96.6</u>	
	1,354.2	<u>3.08</u>
Total Cost FOB Conakry	11,009.2	25.02
Shipping Conakry/Rotterdam	<u>1,001.0</u>	<u>2.78</u>
Total Cost FAS Rotterdam	<u>12,010.2</u>	<u>27.30</u>
Equivalent to:	US\$ per MT	1,624.75
	US\$ per lb	0.74

1/ Macenta is chosen because it is about the midpoint of the route through the forest region. This table is based on a container of green coffee, consisting of 280 bags each weighing 60 kg., or a net weight of coffee of 16.8 tons.

2/ For purposes of this estimate, procurement cost of coffee is put at 475 GF, and it is assumed that there will be a five percent loss of weight in cleaning.

3/ Up country warehouse space is not expensive at the present time. For this estimate, an annual cost of \$3.00 per ton of throughput is used.

Coffee Investment Program

Summary Costs and Benefits Before Interest And Depreciation

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<u>Smallholder Rehabilitation</u>										
Hectares -	50	125	125	125	75					
Cost 1/ Benefit 2/	8.0	19.9	19.9	19.9	11.9					
	-----	-----	-----	-----	0.2	7.0	12.0	20.0	18.0	13.0
Net Benefit	( 8.0)	(19.9)	(19.9)	(19.9)	(11.7)	7.0	12.0	20.0	18.0	13.0
<u>Industrial Plantation</u>										
Hectares	-	50	150	200						
Production (m tons)	-	-	-	-	.3	13.3	58.5	142.5	215.0	270.0
Costs 3/ Benefits 4/	-	34.5	109.8	163.9	51.4	48.8	46.1	49.1	54.1	54.3
	-	-	-	-	.3	13.8	59.8	145.8	219.9	278.2
Net Benefits	-	(34.5)	(109.9)	(163.9)	(51.1)	(35.0)	13.7	96.7	165.8	221.9
<u>Central Investments</u>										
Business Development 5/	125.0	50.0	25.0							
Equipment 6/	100.0	200.0	23.0							
Leasehold 7/	20.0	10.0	-----							
Net Benefit	(254.0)	(280.0)	(48.0)							
<u>Operating Costs</u> 8/	(231.6)	(347.4)	(483.2)	(579.0)	(579.0)	(579.0)	(579.0)	(579.0)	(579.0)	(579.0)
<u>Coffee Trading</u>										
Metric tons	168	504	756	1008	1008	1008	1008	1008	1008	1008
Cost FOB Conakry 9/ Cost of Sales 10/ Total Cost	(216.4)	(568.2)	(987.3)	(1316.4)	(1316.4)	(1316.4)	(1316.4)	(1316.4)	(1316.4)	(1316.4)
	(53.5)	(160.5)	(240.8)	(321.0)	(321.0)	(321.0)	(321.0)	(321.0)	(321.0)	(321.0)
	(272.9)	(728.7)	(1228.1)	(1637.4)	(1637.4)	(1637.4)	(1637.4)	(1637.4)	(1637.4)	(1637.4)
Revenue From Coffee 11/	502.0	1507.0	2260.4	3013.9	3013.9	3013.9	3013.9	3013.9	3013.9	3013.9
Net Benefit	229.1	778.3	1032.3	1378.5	1376.5	1376.5	1376.5	1376.5	1376.5	1376.5
<u>Total Costs and Benefits</u>										
Total Benefits										
Total Costs										
Net Benefits										

1/ Cost of cutting back old trees @ 70,000FG per ha.

2/ Repayment of cut-back costs, in coffee @ 450 FG /kg

3/ Costs per model

4/ Value of production @ 450 FG/kg built up over model and planting rate

5/ From table of central costs.

6/ From table of central costs

7/ From table of central costs.

8/ From table of central costs; built up at rate of 40, 60, 80, 100% in yrs 1 - 4.

9/ From table of central costs

10/ See table of coffee costs

11/ @ US \$ 1.35 per lb; Superior, CIF Rotterdam