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## CASHEW OF GUINEA-BISSAU POTENTIALS AND CONSTRAINTS

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## 1. INTRODUCTION

The Guinean cashew production has increased in terms of importance among the primary activities of the country. It is presently responsible for 6% of the world production of cashew nuts "in natura", ahead of traditional producing countries such as Mozambique, Tanzania, and Kenya.

This activity generates income and foreign currency. In 1993, the producers' income was of around US\$9.3 million, and the exporters' income was of around US\$ 24.5 million in foreign currency. According to BCGB (1994), the exports of cashew resulted in 81.3% of the country's foreign currency in 1993 and, for 1994, it is estimated that this percentile will go up to 89.0%. Even more relevant is its social character as a great generator of jobs and keeping people in the rural areas.

All the production of cashews is exported to India, the sole final buyer, therefore, there is no local processing of cashew. The false fruit is largely used, at the rural area level, where it is processed into non-industrial wine and "aguardente". Presently, this activity has been undergoing a period of growth in production, of high prices, and of great euphoria from the part of the agents of the sector.

The objective of this document is to know the dynamics better and to present the basic guidelines so that such growth becomes sustainable and ever growing.

In this paper, therefore, an initial characterization of the cashew culture of Guinea-Bissau is presented, including its insertion in the international market. Following, the potentialities and constraints which permeate the activity are shown. In the third part, the cultivation system is presented and an analysis is made of the production costs of cashew vis-à-vis rice, the income and jobs generated, as well as some indicators of financial performance which are most relevant.

The fourth part is dedicated to the analysis of the logistics of the growth for this activity, with an emphasis on the growth of the area in relation to prices for cashews and rice, which is used as a means of exchange in the sale of cashews.

In the fourth part, a scenario for the Guinean cashew culture is shown and, finally, the most relevant recommendations are made.

## 2. CHARACTERIZATION

The cashew tree (*Anacardium occidentale*.L.) is an arboreous plant from Brazil, introduced in this country in the XVI century by the Portuguese, and disseminated throughout its entire area.

Only after the Independence War, the Guinean cashew culture began to show in the balance of payments since, until then, only the false fruit was used in the production of wine and 'aguardente' which were sold in the domestic market. Nevertheless, due to the scarcity of the cashew nut in the international market as a result of the abrupt fall of production from

Mozambique, the demand for the Guinean cashews began, and at good prices. NOMISMA (1994) shows that in 1976 the country already produced 1,500 tons of cashews nuts.

With price incentives and, more recently, the liberalization of the market, there has been an increase in the area harvested, which has gone from 7.9 thousand hectares in 1983 to 35.7 thousand hectares ten years later (see Table 1). The area covered with cashew trees not yet in production is estimated at ten thousand hectares.

Based on NOMISMA (1994) and on primary data, Guinea-Bissau was responsible from 1991-93 for 4.7% of the world production, and it is estimated that this year this percentile will be of 6%. Such a performance denotes that the country is already an expressive producer in the world. Figure 1 situates the country among the great producers, while India and Brazil appear as first and second biggest world producers.

What stands out in Figure 1 is the presence of new countries with expressive production of cashews nuts, among them: Indonesia, Vietnam, Nigeria, and Guinea-Bissau. Beside these countries, it is important to notice the emerging countries which have not yet reached significant volumes of production, but show a growth in the production of cashews nuts, among them: Malaysia, Sri Lanka, Trinidad, Ivory Coast, Australia, Philippines, and Madagascar. All this makes us believe that these countries will be, in a very near future, the greatest world producers of cashew nuts.

As it was the case of Guinea-Bissau, the growth in production of cashew nuts in these countries occurred as a function of various factors, among which are: the attractive price, aguaranteed demand, and the support of the international organizations for the agricultural growth of poor countries which came from colonial, dictatorial, and war regimes.

In general, in all these emerging countries, there are several favorable factors which contribute to the competitiveness of their cashews. They have good quality soil, stable and ideal climatic conditions, the use of adequate technology, more skillful producers, abundance of low cost labor, and small orchards, among others.

The production of cashews in Guinea-Bissau has been above the records year after year. Table 1 shows that from 1990 the cultivation of cashews stampeded, going from 10.0 thousand tons in 1989 to 19.4 thousand tons in 1990, reaching the high magnitude of 34.3 thousand tons in 1994.

It is important to notice that such a growth has a strong qualitative component, considering that the productivity (productivity kg/ha) has experienced substantial increases. From 1989 to 1994, the growth in productivity was of 28.0% a.a., while production grew to 17.3%.

Considering that the highest levels of productivity obtained in commercial plantations registered in the literature of the area are inferior to 600 kg/ha, the position reached by Guinea-Bissau of more than 900 kg/ha is auspicious, giving it more competitiveness in the international market. This exceptionality is a result of the excellent edaphoclimatic of the country, the growing process of technological modernization of plantations (rational spacing), the size of plantations, and the homogeneity of the genetic material.

Still based on Table 1, we can observe that there is not a good relationship between production and exports within a same year. In 1983, the production was superior to exports, allowing a stock of 2,700 tons of cashew at the end of the year. The following year the inverse occurred, with exports being higher than the 2,000 tons of production for that year, and the stocks being reduced to 700 tons. During the subsequent years, the differences were lower.

From 1990 on, a period of great differences between production and official exports started. A large part of this difference was stocked by exporters as a function of the low external prices (see Figure 1) and the other part was probably smuggled.

The volume of cashews smuggled out of the country is estimated to be superior to 3,000 tons/y and, about this, CROWLEY (1993) states that "although the commercialization of cashews is still highly centralized, this problem is partially solved through the multiplication of the cross-border channels from Bissau, where the taxes are more easily avoided".

In 1994, the exports until July reached the volume of 55,7 thousand tons of cashews, with an estimate of 70.7 thousand tons until the end of the year. Although prices are low, the exports were made because a great volume of cashewnuts in stocks from the yields of 1991 and 1992 were already losing their quality, and also because the price tendencies were at a low (see Table 1, Figure 1).

It is of around 90% the amount of cashew nuts produced by small producers, approximately 37 thousand, from the traditional 'tabancas'. The other 10% comes from larger producers, more modern and with more capital called 'ponteiros'.

An analysis of Map 1 shows that the production of cashews in Guinea-Bissau is geographically distributed throughout the entire country, with a higher concentration in the North and Center regions of the territory. The areas with the lowest concentration of trees are the South and East regions. Therefore, the highest producing cashew nut sectors are Cacheu, Oio, Quinara, and Biombo, and the lowest are Bafata, Gabu, Tombali, and Bolama.

In the four regions with a low population density, an accelerated process of expansion of cashew tree plantations is also occurring. It is in these regions that the most fertile and available land is available.

The importance of cashew nuts to the primary sector of the country is recent, about one decade. Although it is new, it is probably the major culture of the country. As for generation of foreign currency, the cashew nut already occupies the first place, with 81.3% of the total value of the 1993 exports (BCGB, 1994).

Guinea-Bissau does not process its cashew nuts yet, in order to export the kernels instead of the cashew 'in natura'. It has, nevertheless, one unit for the processing of cashew nuts with Italian technology (OLTREMARE), with a capacity to process 2,000 tons/y, but it has not yet started its operations and does not know when it will start. There is yet another smaller processing unit which is also not operating.

As for the use of the false fruit, the situation changes. The false fruit is used to make wine and 'aguardente', by the women, at the local level. This process is highly crude, needing more efficiency in terms of a better use of the raw material and the quality of the final product.

The two initiatives of industrial use of the false fruit that exist are the "Titina" Fruit Processing Enterprise, presently not under operation, whose plans include the processing of cashew, and the other one is the Agricultural Association of C6, which possesses a small unit for fruit juice, where the cashew false fruit is also processed, though at a small scale. The most modern in this area are the small distilleries belonging to 'ponteiros' who buy the cashew or wine to make 'aguardente'.

In terms of social benefits, the cashew has been establishing itself as the most important culture for the rural population since it is the cash crop which makes it possible to acquire goods and services not produced by the farmers. It is estimated that, from the survey done at the production zones, 19 thousand persons work during the period of planting/cleaning of cashew trees (July and August), 28 thousand in the harvest, and 45 thousand in the production of wine (April to June).

The average income per worker (cashew nuts and wine) is of around US\$8.76 per work day. By separating the two activities, we have US\$ 7.73 from the sales of cashew nuts and US\$ 10.00 from the sale of wine. As for rice, the producer makes only US\$ 4.52 per work day (see detail on item 6).

The prices received by producers of cashew are reasonably stable if compared to those of cocoa and coffee. The larger amplitude observed was between 1982 and 1992, when the prices were US\$ 370/ton and US\$ 146/ton. Presently, the prices of cashew nuts is rising going beyond those of 1992, reaching US\$ 310 in 1994. Figure 2 shows the behavior of prices received by producers, the export prices of Guinea-Bissau, and the prices at the international level for raw cashew nuts.

Figure 1 denotes that there is a great syntony among the price levels. Until 1991, the relationship among the three levels of prices was striking. The price for the exporter averaged 87% of that of the exporter from India, and the price received by the producer was 26% the price of the Guinean exporter. Nevertheless, the dynamics of these relationships was highly perverse for the local producer. For example, from 1983 to 1984, the price received from the exporter fell 10% and that of the producer fell 28%. From the opposite side, the expropriation is even higher. From 1984 to 1987, the export price increased 59% against only the 17% received by the producer.

The low level of the prices paid to producers was possible due to the reduced costs of production, the absence of a system of information of prices and markets, the lack of organization of producers, and the economic system of the country (closed). In Brazil, where production costs are higher, the average price paid to producers (US\$ 0.35/kg) in 1994 was 20% higher than that of the Guinean producer.

From 1992, there has been a change in the percentiles of the margins of prices in favor of producers, going from 26% to 33% of that of the exporters during the period of 1992-94.

The margin of the exporters went from 87% to 80% of the price paid by the importers of the Guinean cashew nut.

The phenomena which is happening now is a result of the intensification of the opening of the local market which has increased the competition among the exporters. This phenomena is one of the justifications for the euphoria of the producers, a fact that should be observed with great care, since this situation corresponds to a period of adjustment of the economic agents to the open market. Therefore, the exporters will soon find mechanisms to return to the profit earnings of the past.

There is no doubt that the most sustainable way to increase producer's income and internalize more income in the country is the industrialization of the cashew nut in Guinea-Bissau with the objective of exporting the kernels to consumer countries.

In order to demonstrate how much the country is losing by not industrializing its cashew nuts, Table 2 was elaborated to demonstrate the percentiles going to the producer, the government, the exporter, and the processor of the final price of the kernels exported.

As we can see on this table under analysis, the Guinean producer receives only 21.9% of the FOB exporting price of his cashew nuts, 21.7% goes to the exporter, while the government keeps 12.8%, totaling 56.4% which is kept in the country. If the cashew nuts were processed in the country, this percentile would go up to 100%.

TABLE 2

Distribution of Annual Gain in the Cashew Nut Production Chain  
by Guinea-Bissau, average of 1993-94

Discrimination Value(US\$1,000) (US\$/kg)	Nuts Exported		Percentage
Price received by producer at the farm gate	21.9	10.018	1.30
Price received by the Government (taxes)	18.8	5.883	0.70
Price added by exporters to raw cashew nuts	21.7	9.967	1.30
Price added by processing plants (India)	43.6	19.995	2.50
TOTAL	100.0	45.863	5.80

Sources: EDIBLE NUT MARKET REPORT (1994), NOMISMA (1994), FRANÇA (1991), GUINEA-BISSAU CENTRAL BANK (1994).

Data Base: Production of 1993-94= 33,310 tons equivalent to 7,900 tons of kernels.  
Average price of kernels exported by India US\$ 5.80/kg.

### 3. POTENTIALS

#### 3.1. Agricultural Sector

Presently, it is in the agricultural sector where the country has more comparative advantages for the cultivation of cashew trees. The conditional factors of these advantages are

substantiated on Chart 1, where a comparison between the edaphoclimatic demands of the cashew tree vis-à-vis the existing conditions of the areas adequate for the cultivation of cashew.

According to SCET INTERNATIONAL (1987), Guinea-Bissau has 1.34 million hectares which can be used for agriculture. Together with this generic availability, there exist other natural factors which are presented on Chart 1 and analyzed below.

The soil where agriculture is feasible in Guinea-Bissau are flat, of deep clay/sand type, well drained, and of average fertility, ideal characteristics for the cultivation of cashew trees. Besides, the country is situated on the latitudes 12°20' and 10°59'N, with altitudes inferior to 300 meters, two factors which meet the demands of this tree.

As for the climatic factors, all of them are within the demands (Chart 1) for the normal development of the cashew tree. Added to these advantages is the fact that the cultures of the major producers (India and Brazil) are located in low fertile lands, submitted to low and irregular rainfall with periodic droughts.

CHART 1

Edaphoclimatic Conditions Recommended for the Cashew Tree  
and Existing Conditions in Guinea-Bissau

Specifications	Edaphoclimatic Conditions	
	Recommendations	Prevailing in Guinea-Bissau
Pluviometric Precipitation	1,000 to 2,000 mm/y	1,300 to 1,800 mm/y
Pattern of Rainfall	5 to 7 months	5 months (June Oct.) with no water deficit
Average Temperature	23°C to 27°C	27°C
Air Humidity	Less than 80%	70%
Altitude	Less than 600m	Less than 300m
Latitude	Between 15°N -15°S	Between 12°20 and 10°59N
Soils: Topography	Flat and slightly undulated	Flat
Depth	Deep	Deep
Draining	Well drained	Well drained
Fertility	Average	Average

Sources: SOARES, 1986; LIMA et al. 1988; SCET INTERNATIONAL, 1978; MDRA, 1992.

Still as relevant advantages, the areas adequate for cashew are subject to the influence of sea winds<sup>1</sup> which, besides furnishing the sodium chlorate necessary to the plant, contribute to a higher pollination level.

In terms of ecology, the cashew tree has advantages over the annual cultures for it serves to substitute well, and with economic returns, the native forest cover and lessen the environmental unbalance. About this fact, the MDRA (1992) registers that "in 1959, on the scenario of the regeneration of the green covering of the, then, Portuguese Guinea, the cashew

<sup>1</sup> According to VASCONCELOS (1987), "the cashew tree is halophytic plant (likes salt) which searches for high concentrations of sodium chlorate".

tree was chosen for its rusticity and resistance as a major culture for the recuperation of the land exhausted by the cultivation of peanuts”.

Below are some other potentials as important as the ones presented above:

#### a) Genetic characteristics of the Guinean Cashew Tree

The two varieties of cashew trees in Guinea-Bissau have maintained their phenotypic characteristics, the reason for which there is a uniformity of the trees as to its height, architecture of its covering, small difference in size of the nut and the false fruit, and resistance to plagues and diseases.

In fact, the cashew trees are of medium height with a compact covering, which facilitates the harvesting of the false fruit and trimming, producing more medium size and uniform nuts<sup>2</sup>. According to CROWLEY (1993), “exporters state that the cashew nut from Guinea-Bissau are, after the ones from Brazil, among the ones of best quality in the world. Although smaller than those from Brazil, the cashew nuts from Guinea-Bissau have more value due to the quality of the oil produced from the shells and to the fact that the nut can be easily removed from its shell in whole”.

There is no incidence of plagues or diseases in plantations, even on those continuous and large areas, maybe due to the fact that the tree is resistant or because, in general, in exotic plant cultures the incidence of diseases is minimum. About this issue, the head of the National Research Center for the Brazilian Cashew states that “small orchards impede the falling of the ecological equilibrium and the consequent absence of plagues and diseases”. PRATAGIL (1991).

#### B) Availability of Labor

80% of the population of the country lives in the rural area where the main economic activity is agriculture, done without any resources for mechanization and modern inputs. Therefore, the major resource used in the Guinean agriculture is labor, especially family labor.

Although there is intensive use of labor, there is enormous surplus<sup>3</sup> of rural workers able for the cultivation of cashews.

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and from then on will have an asset which will give him profit for decades, as opposed to temporary cultures which need to be implemented every year and, many times, with costs which are higher than those for cashew. Therefore, the cashew tree is a reserve of capital (savings) for the farmer, with no natural risks, few market uncertainties, and the guarantee of monetary returns or equivalent products. Those who own a cashew plantation have guarantees, credit in the market. It is for these reasons that 63.4% of the cashew plantations of the country are no more than eight years old. (MDRA,(1992).

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<sup>2</sup> The average esize of the cashew nut from Guinea-Bissau is of 5.76g, the largest ones weight 8.08g, and the smallest ones weight 3.99g, which shows a low deviation pattern (MDRA,1992)

<sup>3</sup> The great availability of labor is helped by the contribution of women in agricultural work, whi match that of men in terms of work time.

### 3.2. The Processing Sector

In this segment the potential is also promising, and that is the reason why it becomes necessary to take advantage of the opportunities during this period of domestic euphoria from the part of the agents of the sub-sector under analysis and of the favorable external market. Below follows an analysis of the most relevant opportunities the country has now for the domestic processing of the cashew nut. They are:

- a) availability of enough raw material, and of good quality and competitive price;
- b) low cost for transportation of the raw material to the processing unit, especially if it is in the interior where the costs with transportation would be even lower, as well for transportation of the processed kernels from the processing areas to the port in Bissau since this would eliminate 65% of the weight of the nuts "in natura" at the producing zone;
- c) elimination of the present risk of no demand for the nuts "in natura" because, with the processing being carried out in the country, the sale of the kernels would be guaranteed;
- d) promising external market for the Guinean kernel since it is presently repressed due to the high prices and limited supply. With a small reduction of prices for kernels, the market is open. The competitiveness of the Guinean cashew culture allows the practice of prices lower than those of the market;
- e) low costs for the non-mechanized processing as a result of the lower prices for the raw material, of the low costs with transportation from the processing units to the port, and from the port to the consumer markets, of the low cost of labor and the reduced industrial capital employed;
- f) effective way to aggregate the value of the local nuts in larger proportions than India and Brazil. Returning to Table 2, we can verify that if the cashew nut is processed internally, the additional aggregate value would be of around 43.6% which, added to the percentile already being internalized in the country, would reach 100% of the FOB value of the cashew nut kernel in the international market. Today, only 56.4% stays in the country, of which 21.7% goes to the exporter, 21.9% belongs to the producer, and 12.8% goes to the government. In Brazil, where the nut produced is processed in the country and where the producer sells directly to the agents of the industries, its margin is of 40.3% of the FOB price of the exported kernel (DIÁRIO DO NORDESTE, 1994).
- g) the non-mechanized and domestic processing is the way India works and, for this reason, it obtains prices 20% higher than those of Brazil as a result of more of whole and quality (white) of the kernel exported (FRANÇA, 1994). Besides, the local processing brings extraordinary social benefits since it reduces the idleness of the labor between harvests, makes the rural worker a professional, and prevents the rural exodus. This processing technology is also a great generator of work because it is labor intensive, making it possible to occupy part of the 36 thousand families that live in the rural areas of the country, raising, significantly, the income per capita of this population which is below the poverty line.

- h) The cashew processed in Guinea-Bissau will not put pressure in the market with an increase of supply; in reality, the country will export the kernels being processed and sold now by India, a reason for which it is one less obstacle for putting the local production in the external market;
- i) there is information, not yet confirmed, that the Guinean cashew nut shows a yield of 32% of kernels after all industrial processing, while the world average is 23%, and the percentage of broken kernels at the end of processing is the lowest in the world. The decentralized manual processing tends to maximize this percentage;
- j) an effective action is being undertaken for the processing of nuts in the country. The TIPS/USAID Project has installed a pilot unit for the manual processing of cashew nuts in Quinhamel. This unit is to introduce this new skill which is characterized by the technological independence with economic competition, and is in harmony with the culture of the Guinean people.

### **3.3. The Marketing Sector**

The endogenous factors which favor the marketing of cashew nuts are the size of the country, which allows for a faster flow of production, and the low transportation costs, together with the good road structure and the existence of ports at strategic locations in the country.

The price information system for cashews meets well the needs as the existing market prices are known throughout the various means of communication such as: ANAG Information Bulletins (National Producers Association of Guinea-Bissau), broadcasting on radio stations, truck drivers, and the producers themselves.

Still in relation to prices, during the recent years ANAG has been maintaining negotiations with the government and with producers with the objective of establishing a minimum sales price for cashew nuts, which seems to be satisfactory to both producers and buyers since it has reduced the common conflicts in these markets.

Taking into account that the Guinean economy is going through a process of adjustments as a result of more economic opening in the last few years, the marketing of cashew nuts is also going through those improvements which are imposed by market mechanisms.

It is noticeable the reduction of entrepôts for acquisition of cashew nuts, which are the intermediaries between producers and sellers, in favor of exporting company employees. This evolution of the buying process of the nuts is eliminating the intermediary, still very frequent today.

The exogenous factors which make the exporting of Guinean Cashew nuts a potential refer to a higher preference, from the part of India, for the local cashew nuts due to the fact that the product makes industrial profits very high.

Another relevant potential is the existence of a demand higher than 100 tons of cashew nuts "in natura" in the external market, where the nut from the country is one of the most competitive.

The good frequency of ships at the port of Bissau is also a potential which gives the local product more competitiveness (nuts or kernels).

Some factors which are favorable to the marketing of processed nuts, that is, the kernel of the cashew nut (CNK), are the fact that the country is close to the larger consumer center and can export the CNK with no danger or risks of breach of contract because production is stable, a fact which cannot be observed in the larger kernel exporting countries.

The kernel is a noble and healthy exotic product, with a demand from high income persons to be consumed as a snack, in the confection of various food products. Besides the conventional consumption, two new uses are becoming popular for the CNK, one as food to reduce cholesterol levels in the blood due to its composition of ..... , and the other is as raw material for the production of parenteral feeding used through a tube (medical use) at low costs and more efficiency.

Furthermore, with the fall of the tax barriers in the international market, the local CNK will benefit from the appearance of the non-tax barriers related to the ecological equilibrium and with the distribution of income, since the local cashew is explored in perfect harmony with the environment (it reforests, does not need agricultural inputs or chemical products), and it is explored by the rural population of one of the lowest income per capita countries in the world.

Finally, the fall of the custom's taxes and the gradual reduction of the agricultural subsidies planned for the next few years should, in the long term, provoke two favorable effects at the CNK market. The first one would be the elevation of the foreign exchange reserves of the CNK exporting countries and even the viability of exports of toasted and salted CNK, a phase at which most of the value is aggregated before reaching the wholesaler; and the second would be the loss of competitiveness of some of the competing nuts of the CNK, whose producers would not have the subsidies to produce anymore.

#### **4. Constraints and Dangers**

##### **4.1. Agricultural Sector**

The constraining factors to the maintenance and expansion of the cashew nut production in Guinea-Bissau are of little relevance. In fact, what is analyzed below is more in the area of conjectures than of concrete possibilities.

This way, the most striking constraint is the risk for the culture becoming the sole source of monetary income for the producer, leaving him at the dependency of the fluctuations in the external market. The recent economic history registers that Mozambique used to be the biggest world producer of cashew nuts, with a volume of 200 thousand tons a year, and today must be producing less than 40 thousand tons. Brazil had, in the past, a productivity of around 500ks/ha, and today it does not amount to more than 250. In Mozambique, the fall was caused by the prolonged war and the consequent rural exodus, and the abandonment of the orchards and, in Brazil, it was due to the overuse of the soil and the aging of the trees.

From the macroeconomics point of view, a country should not base its economy on one exporting product only. There are the risks of plagues and diseases in cashew trees, still of

unknown origin, of the competition of other producing countries which are emerging with comparative advantages similar to those of Guinea-Bissau, and of boycotts/contingencies of exports due to political and sanitary issues.

As for the weak points in the area of agronomy, the only ones which are of relevance are the use of inadequate spacing, the few resources available for the maintenance of the plantations and for the implementation of new areas, the absence of experimental research with the cashew tree, the possibility of a small fall in production of cashew nuts due to the dust from Sehal when this coincides with the time from pollination to flowering, and the absence of communication of those experiences which are successful.

Finally, the incidence of high export taxes for cashew nuts which, besides not bringing any benefits to the sector, is preventing a more accelerated expansion. The absence of formal associations to represent producers prevents this activity from receiving the support for those actions which depend on the government, at the level of its importance, nor it has the strength to act in the market at the same level as the other agents of the producing chain.

#### **4.2. The Processing Sector**

Apparently, there are a few constraints or difficulties which the sector face in the second link of the cashew chain, the processing, due to the fact that the cashew nut is not yet being industrialized in the country. For this reason, the TIPS/USAID Project will start, very soon, the artisanal processing of cashew nuts, on experimental basis, when it shall introduce and spread this new technology among the Guinean producers at a level compatible with the local culture, but which assures the quality demanded in the foreign market. It should be noted that the generalization of the processing of the local cashew nut will not happen in the short run due to the need for training rural families in the various phases of the processing process of nuts, and stable markets for the Guinean CNKs.

In terms of the use of the false fruit, it is necessary that the technological process which results in wine and "aguardente" are improved in order to rationalize the use of the raw material and the quality of the final product.

Another constraint for the growth of the cashew nut economy which apparently exists is the absence of legislation related to the processing phases and the exports of the nuts, which is both a source of conflicts and waste of resources.

#### **4.3. Marketing Sector**

As for the marketing of the nuts "in natura", the obstacles or dysfunctions refer to:

- a) real possibility for the formation of a cartel of Guinean cashew nut exporters, as it has already happened in Brazil. As it is known, with the cartel buying their product, the producer remuneration tends to be lower, to the point of making him not motivated to plant the cashew tree. This phenomenon was accentuated in Brazil after 1986-87, with high prices for the nuts, at the producers level, at an average of US\$1.21/kg, falling to US\$.26 in 1989. Now the price is around US\$.40/kg due to the pressure made by the cashew nut producers association, created after the formation of the industry's cartel.

which has even succeeded in stopping the legislation which prohibited the exportation of nuts "in natura";

- b) a demander (India) could, at any moment, refuse the Guinean nuts or lower their price since, besides having the monopoly of the market, it counts on the supply of 150 thousand tons a year produced by emerging countries in Asia and Oceania which are closer, if compared to Guinea-Bissau;
- c) conflicting relationships among the agents of the domestic marketing system (producer/exporter/government), showing a market structure based on inadequate legislation, on non-written codes, lack of trust among the agents and, consequently, the loss of efficiency of the system. This phenomenon characterizes a market under adjustments and, therefore, anxious for clear and objective regulations in terms of essential points;
- d) absence of knowledge from the part of producer about the dynamics of an inflationary economy such the Guinean. In this environment, the marketing agents raise their profits through inflationary gains over the acquisition of nuts;
- e) lack of knowledge of the future negotiators of the Guinean CNK, of an information system of prices and foreign markets, and of the divulgation among the world importers of the recent participation of Guinea-Bissau in the club of CNK exporting countries

## 5. CASHEW PRODUCTION SYSTEM

This chapter is based on the results of the field work done by MDRA in 1992, which generated an study called "Fruit Inquiry, 1991-93 - Cashew and Mango", and of a survey among the producer groups of more than twenty "tabancas" of the most significant producing zones, besides interviews with the producers' representative organizations and cashew nut exporters. The survey was carried out during October 1994 when, besides the questionnaire, other types of information were collected during the trips.

### 5.1. General Aspects

The Cashew tree (*Anacardium occidentale*, L.) is an arboreous plant, originated from Brazil and disseminated in all regions of the tropical world. Today, there are twenty-eight countries which produce the cashew nut commercialized in the international market.

In Guinea-Bissau, this culture was introduced by the Portuguese, in the XVI century, but started having economic significance about three decades ago. At first, its importance was restricted to the use of the false fruit in the manufacturing of wine and "aguardente", but "the cultivation grew significantly after the Independence, particularly with the 1975 policy of "Armazéns do Povo" of exchanging non-processed rice for cashew nuts", CROWLEY (1993). Such a system of incentives to the growth of the cashew nut production prospered and was well absorbed by the market and nowadays a great part of the cashew nuts commercialized is exchanged directly for rice.

The cashew nut is produced by two well defined categories of producers. Approximately 90% of the volume produced originate from small resident producers in the "tabancas", where

family labor is the major way, and the rest of the percentile is produced by “ponteiros”, who have more financial resources, are more modern, and have more area planted with cashew trees and where the dominating labor is contracted.

According to Table 3 and Map 1, the regions of Cacheu, Oio, Biombo, and Quinara are the major producers of cashew nuts, followed by Bafata. Still, but with low production levels there are: Gabu, Tombali, and Bolama, areas which are undergoing expansion of plantations.

**TABLE 3**

Guinea-Bissau - Quantity of Traditional Producers and Corresponding Level of Production, according to the Sector, 1991

	Producers		Production		Production per capita em t	
	Quantity (A)	Percentile (B)	Quantity (C)	Percentile (D)	(C/A)	
Cacheu	6,298	17.01	3,388	31.27	0.54	
Oio	6,885	16.62	6,511	18.61	0.94	
Quinara	2,962	18.01	3,876	17.04	1.31	
Biombo	4,628	12.51	1,617	16.27	0.35	
Bafata	5,537	14.98	850	7.77	0.15	
Gabu	6,909	18.68	3,548	4.08	0.51	
Tombali	3,012	8.15	741	3.56	0.25	
Bolama	755	2.04	293	1.41	0.39	
TOTAL	36,979	100.0	20,824	100.0	0.56	

SOURCE: MDRA, 1992

Still based on Table 3, it can be deduced that the production levels per orchard are quite varied. In Quinara, the average production is of 1.308 kg, while in Bafata it is only 153. This variation of average production levels is a result of the existence of many new producers who have not yet produced, or whose productions are still small. For example, about 80% of the plantations in Bafata and Gabu are between 0 and 8 years old.

What is of relevance on this table is the observation of an extremely high number of producers, which demonstrates that they are small, with an general average production level of about 563 kg per producer. The “ponteiros”, which are responsible for more or less 10% of the total, have an average production much superior to those of the traditional producers.

The traditional producers have an average of ten agricultural activities, cashew being the most important one, from the economic point of view and of growth in terms of importance. The “ponteiros” are also giving privilege to other cultures, such as: mango, lemon, orange, and cuava, which they consider as much or more important than cashew.

As for the traditional producers, these are initiating a diversification with other market oriented cultures, besides cashew, and these are: mango, banana, orange, lemon, and avocado. But they think that the best culture still is cashew, a reason for which they plan to increase it more than the other cultures.

On the survey conducted, it was not observed the feared process of monoculture of cashew, since all producers stated that they will continue to explore the subsistence cultures which, on average, are seven or more.

## 5.2. Cashew Culture Agricultural Calendar

The agricultural calendar of the cashew tree in Guinea-Bissau is presented on Chart 2 below, where "x" means the occurrence of the event, its quantity, and degree of intensity. Note that the periods corresponding to the phases of the cultivation are well defined, besides being also concentrated during a period of three to five months. The period and intensity of the harvest and commercialization coincide, denoting the absence of capital and/ storage capacity of the producer, given that in commercial cultures of non-perishable products, there is always a period between the harvest and the sales with the objective of avoiding a concentration of supply with a consequent reduction of prices.

CHART 2  
Cashew Culture Agricultural Calendar

Months	Plantation	Cleaning	Harvesting	Marketing
January	...	...	...	...
February	...	...	...	...
March	...	...	X	X
April	...	...	XX	XX
May	...	...	XXX	XXX
June	...	...	XX	XX
July	XX	...	X	X
August	XXX	...	...	...
September	X	X	...	...
October	X	XXX	...	...
November	...	XX	...	...
December	...	X	...	...

Source: Survey done by author.

## 5.3. Spacing

According to the survey which was carried out, it was observed that the spacing adopted was quite varied, both the one adopted by the "ponteiros" and traditional farmers. Aware of the fact that the information below does not have scientific accuracy, due to the fact that they were collected during a survey with a few producers, they will be presented here since they are similar to those registered in some documents on the agricultural sector of Guinea-Bissau, as well as the opinion of some experts in the area.

Therefore, among the farmers interviewed in all areas of the country, the results obtained were the following:

- a) "Ponteiros": 6x6 spacing: two producers;  
8x8 spacing: two producers;  
10x8 spacing: one producer;  
10x5 spacing: one producer.

They all know the importance of adequate spacing for cashew plantations. The fact is that the ones who use a 6x6 spacing have already started cutting down the extra trees, with the

objective of going to a 10x6 spacing. The other producers informed that their spacing was adequate.

- B) Traditional Farmers: 2x2 spacing: eight producers;  
 5x5 spacing: four producers;  
 8x8 spacing: one producer.

Among all the traditional producers, three are cutting down those extra trees to come to one with a 5x5 spacing, two with 6x6; two with 7x7, four to 8x8; one with 10x10, and one who is going to leave things as they are due to the lack of resources to face the annual expenses required after more spacing.

As for the timing to cut down the trees, several answers were collected. Some stated that it happens on the sixth year, others only cut down the trees when all the grass around the cashew trees is dead, in order to avoid expenses with labor, and there is no burning. All of them, nevertheless, informed that even with a 5x5 spacing, there is need to clean the plantations, even if it means a little. One producer affiliated to ANAG informed that the best spacing for Guinea-Bissau is 10x5. Many of those producers which are increasing their spacing were oriented by rural extension organizations which work in the areas.

Still in relation to the spacing to be utilized, Table 4 shows that the increase in the number of trees per hectare results in a proportionally greater increase in nuts produced. With a smaller spacing, the production per tree increases, but the yield per hectare decreases. Table 3 shows that the spacing which results in the greatest volume of production per area planted is that of 6x6, which proves that the Guinean producers are right when they plant or thin their plantations to obtain the spacing similar to the best shown on Table 4.

**Table 4**  
 Demonstration of the Relationship Between Spacing and Production  
 of Cashew Nuts

Nº OF TREES PER HECTARE	SPACING	PRODUCTION OF NUTS IN KG PER TREE*	PRODUCTION PER HECTARE
278	6X6	2.16	600
139	8.5x8.5	3.90	541
136	8.6x8.6	2.40	332
111	9.5x9.5	2.83	314
69	12x12	7.07	489
44	15x15	8.68	382

Source: NOMISMA (1994), p.22

\* ON THE TENTH YEAR OF THE TREE

#### 5.4 Handling of Cultivation and Harvest

The preparation of the area is done almost totally by hand, through labor contract. There are areas in the country with secondary green covers where there has already existed plantations, especially of "mancarra" (peanuts), and there are also native forests which demand a high degree of work to be cut down. During the recent years, the expansion of the cashew culture has been done by the incorporation of land which has been used in the past, since the costs

with deforestation are lower. The more dense forest are concentrated in the South of the country, where the cashew tree culture is presently under expansion.

It is estimated that the expansion of the cashew culture on those areas of native forests will happen at a slower rate, due to the high costs to prepare the area and the low availability of resources for producers who depend, essentially, on their own personal means.

Plantations are preceded by the demarcation of the lot and opening of the holes where the planting is done directly, a lower proportion, or through the planting of young trees. The direct planting is done with two or three nuts of high size and weight to, at the correct time, allow for the thinning to leave on the land the tallest and best tree.

The cleaning of the lot, done manually, consists of the cutting of the "mato" (grass) which grows around the plantation the whole year, and which constitutes the most expensive item after the deforestation. Taking into account that the soil is of excellent quality, and that it rains a lot in Guinea-Bissau, the grass grows very fast. Therefore, with the few resources, human and financial, the farmer has to do the cleaning. The strategy which he utilizes is to plant the trees with very little spacing (2x2 to 5x5) to avoid the growth of grass and the occurrence of fire.

When the grass does not grow any longer, the farmer performs the thinning to increase the spacing. Nevertheless, nowadays the great majority of the cashew producers already plant the trees with a relatively bigger spacing (6x6 to 8x8), thinning the plantation on the eighth and tenth years after implementation.

During the two first years after the cashew trees are planted, the local farmers make a consortium of peanuts, manioc, corn, and beans. After this period, it is not possible to do this anymore since the spacing does not allow for it.

The trimming of the cashew trees is done with the objective of allowing them to be taller and to preserve their cover, which are well formed, low, and dense.

The cleaning of the land is done annually by the family of the farmer. This consists, in general, of very little, since the density of the trees does not permit that medium to tall grass grow. On those plantations with great spacing, there is more work, but farmers think that the greater volume of cashews compensate the higher costs. The great majority of the producers do not do the cleaning simply because of lack of resources to pay for the additional labor required.

The harvest of cashews is done by the women and children who are part of the producer's family, and of other people hired on a contract basis, receiving as a form of payment for this work the false fruit with which they make wine, or a third of the total nuts collected. There is a reasonable loss of nuts in the field due to no collection as a result of the negligence of the collectors, of the difficulties with the remaining grass, or when the prices for cashew nuts are low. Also, there a great loss of the false fruit, estimated in 30% caused, especially, by the lack of containers to deposit the juice which, after fermentation turns into wine.

### 5.5. The Production Curve of the Cashew Tree

There is information, not confirmed scientifically, that there are in the country only two varieties of cashew trees, very similar, the difference being only more visible in the size of the nuts. Either variety, with a 8x8 spacing (156 trees) and with adequately managed plantation, starts producing on the second year, becomes stable on the eighth, and starts reducing production after twenty years.

The information presented on the table below is not the result of experiments, but it pictures the consensus of the numerous producers and experts interviewed, therefore it was considered proper to present them here:

YEAR	NUTS IN KG	FALSE FRUIT IN KG
1	0.00	0.00
2	0.50	5.00
3	0.75	7.50
4	1.12	11.20
5	1.70	17.00
6	2.60	26.00
7	4.00	40.00
8	6.00	60.00
9	6.00	60.00
10	6.00	60.00
.	.	.
.	.	.
.	.	.
20	6.00	60.00
21	5.50	55.00
22	5.22	52.20
23	4.96	49.60
24	4.71	47.10
25	4.24	42.40
.	.	.
.	.	.

## 6. COSTS, GAINS, AND FINANCIAL EVALUATION

In this section the various components of costs and gains from cashew nuts and cashew wine are presented, as well as those from rice, which is the main means of exchange utilized in the marketing of the nuts. The relationship among the three activities is shown, as well as the degree of profitability of each one. Some criteria of financial evaluation are adopted, and an estimate of the labor used in the cashew culture is done.

### 6.1. The Nuts "In Natura"

Chart 3 substantiated all the data relevant to the preceding analysis, which were collected from several official sources, and from the survey carried out by the author with several producers in the country.



## 6.2 Cashew Wine

For this item, Chart 4 presents the data referring to the production of wine originated from the processing of the raw material from one hectare of trees, that is, 9,400kg of false fruit.

The cost of production of 4,700 liters of wine are US\$ 67.14 for the false fruit, plus US\$ 192.00 for labor, totalling US\$ 259.14. The gains reach the amount of US\$ 671.43, which results in a gross margin of US\$ 412.29.

As the whole processing is done at the family unit level, the income per person working is of US\$10.00 per worker/day, very superior to that obtained with the exploration of nuts.

The good level of rentability reached with the wine is a result of the use of almost the total false fruit, and the way it is commercialized and consumed. The sale of wine is disseminated through the whole country, and done directly by the cashew producers. It is avidly consumed by the rural population due to its low cost, of its need in some native rituals, and of the addiction of a good part of the rural population.

## 6.3. Rice Production

The following analysis was done keeping in mind that there is a deep relationship between the cashew and rice, since this cereal is the major means of exchange used in the commercialization of nuts. In this sense, Table 5, below, measures the importance of rice in the marketing process of nuts.

CHART 4

Financial Indicators and Economic Outcomes of the Processing of the  
Production of One Hectare of the Cashew False Fruit in  
Guinea-Bissau

Yield per hectare: 9,400 kg

Discrimination	Value in PG (1,000)	Value in US\$ (1,000)
# Cost of raw material corresponding to the production of one hectare: 9,4 t x PG 100	940	67.14
# Cost of labor necessary to process 9,4 t of false fruit: 67.2 h/day x PG 40 =	2.688	192.00
Total:	3.628	259.14
# Gains from wine produced with the raw material from one ha of cashew trees: 4,700 liters x PG 2 =	9.400	671.43
# Gross margin (gains-operational costs) 9,400 - 3,628	5.772	412.29
# Income of wine producer per h/day: total gains: labor 9,400 : 67.2 =	13.99	10.00

Observations: 1. In order to produce one liter of wine, two kg of false fruit are used, including the loss in the field.  
2. In general, the payment for the collection of nuts is done with the false fruit to the collectors contracted, therefore existing an identity between the value of the false fruit collected with the cost of the collection of nuts.

**Table 5**

Guinea-Bissau - Season of Cashew Campaign and Rates of Exchange

PHASE	Period	% of product obtained	Means of exchange	Terms Rice/Cashew
I	March to mid-May	25%	Rice	1 kg/1 kg
II	mid-May to mid-June	50%	80-90% cash. 10-20% Rice	1 kg/1 kg
III	mid-July to September	25%	Rice	2 kg/1 kg

SOURCE: CROWLEY (1993)

Chart 5 shows that the production of the rice cultivated in Guinea-Bissau is of US\$ 130.71, against US\$ 278.71 for gains. The gross margin is, therefore, of US\$ 145.00, and the income of a worker in the culture is of US\$ 4.52 per worker/day.

#### 6.4 Relationship Between Costs and Gains with Nuts, Wine, and Rice

Of the three cultures the most profitable is that of wine, which generates an income of US\$ 671.43 per hectare, followed by that of nuts, which reaches US\$ 335.71. Rice is in third place with US\$ 275.71.

Besides gains, Chart 6 shows also that wine is the activity that pays the worker better because it generates US\$10.00 per worker/day against US\$ 7.73 for nuts, and US\$ 4.52 for rice.

Chart 5

Financial Indicators and Economic Outcomes from the Processing of 1 hectare of Rice in Guinea-Bissau

Determination	Value in PG (1,000)	Value in US\$ (1,000)
# Work days: 91 (= 61 m/d)	-	
# Productivity: 1,930 kg/ha or rice in shell	-	
# Price of rice in shell (Nov.94)	2	0.14
# Gains of 1 ha with rice (1,930 x PG 2,000 = 3,860,000)	3,860	275.71
# Cost of Labor (61 x PG 30,000 = 1,830,000)	1,830	130.71
# Gross Margin (Gains-Costs) MB = 3,860 - 1,830	2,030	145.00
# Income of Producer per m/day	63	4.52
# Income of Producer per day	42	3.03

Observations: The source of the technical coefficients is CLAUDE (1979).

Chart 6

Operational Costs and Gains from One Typical Hectare  
of Cashew Trees and Income per Worker

PRODUCTS	Operational Costs (Labor x Work day) US\$	Gains (Price x Quantity) US\$	Income per Worker	
			Work day	Man/day
Nuts	152.57	335.71	4.35	7.73
Wine	259.14	671.43	7.46	10
Nuts + Wine	411.71	1,007.14	6.03	8.76
Rice	130.71	275.71	3.03	4.52

Source: Author's own research

These indicators are the major motivators of the preference and euphoria of the Guinean farmer for the cultivation of cashew.

### 6.5. Occupation of Labor

Based on the technical coefficients and on the survey carried out by the author, it was possible to estimate the quantity of workers used in the activities linked to the cashew culture as follows:

- Cashew: Maintenance of plantation (three months)	19,000 work days
- Wine	<u>28,000 work days</u>
Total	92,000 work days

### 6.6. Indicators of Financial Performance

A cost and gain flux resulting from the cultivation of one hectare of cashew, with a 8x8 spacing (156 trees), and with an expected production of 946 kg/ha of cashew and 9,400 kg of false fruit was elaborated. This flux was elaborated based on the production curve of the cashew tree of Guinea-Bissau, presented on 5.5.

As it can be observed on Table 6, it is from the eight year that the cashew tree stabilizes its production, continuing to do so until the twentieth year. From the twenty-first year, the marginal receipt decreases until it reaches the point where costs are superior to gains, that is, on the thirty-first year. Therefore, the Guinean cashew tree produces economically until the thirtieth year.

**Table 6**

Flux of Costs and Gains of the Cultivation of One Hectare with Cashew  
Trees in Guinea-Bissau

Spacing: 8 x 8 (156 Trees)

Production: 946 kg of nuts and 9.400 kg of false fruit

Below are some analyses which permit the evaluation of profitability of the resources utilized, following the updating technique. Table 7 shows that the Cost/Benefit relationship was superior to the unit on the three different discount rates selected. The criterion of decision for the indicator consists in concluding that the enterprise is viable when the Cost/Gain relationship attributed, based on the opportunity cost of capital, shows a coefficient higher or equal to one.

The indicator called Net Present Value (NPV) indicates that the cultivation is viable when this indicator is higher than zero, as long as the discount rate applied reflects the opportunity cost of capital.

Table 7 shows that the NPV for the three discount rates used is higher than zero, denoting the high profitability of the plantation of cashews in Guinea-Bissau.

At last, the Internal Rate of Discount (IRD), which is the discount rate for which the value of all costs is equal to the gains of plantation, was of 11%. Such a percentile is expressive due to the fact that 28 years of flux were considered, when the gains are already very low (116% of cost and 43% of gains during the years of stabilization).

Table 8 presents the same indicators from alterations of cost over gains. From the four simulations, (c) stands out and it was where a reduction of 20% on the gains with unaltered costs was foreseen. This situation is the most probable of happening, because a fall of the prices of nuts is predicted, resulting from a substantial increase in the world supply of nuts "in natura" and a fall of the quotation of nuts in the international market. Even so, the three indicators demonstrate that the culture continues to be profitable.

**Table 7**

Cost/Benefit Relationship, Net Present Value at Different Discount Rates, and Internal Return Rate for the Financial Fluxes of the Cultivation of One Hectare of Cashew in Guinea-Bissau

Discount Rate	C/B Relationship	Present Net Value (in .000PG)
1	1.77	35,401
5	1.68	18,757
10	1.53	8,804
Internal Discount Rate (%)		11.0

**Table 8**

Cost/Benefit Relationship, Net Present Value at a Discount Rate of 5% and an Internal Rate of Return for the Financial Fluxes of Cultivation of One Hectare of Cashew in Guinea-Bissau

#### Analysis of Sensitivity

Discrimination	C/B Relationship	Present Net Value (in .000PG)	Internal Rate of Return (%)
a) Receipts and normal costs	1.68	18,757	11.0
b) Receipts - 10 and normal costs	1.52	14,142	11.0
c) Normal costs and receipts	1.87	21,496	12.5
d) Receipts - 20 and normal costs	1.35	9,526	11.6

## 7. Dynamics of Growth of the Guinean Cashew Culture

### 7.1. Functional Relationships Among the Variables of the Sector

For this sub-item, fifteen variables related to the productive chain of cashew of Guinea-Bissau were selected, in order to identify the functional relationships among them, through econometric methods.

After several adjustments, the variables which showed to have more significance were identified, and the three models were chosen. The results to be analyzed below are part of Annexes I, II, and III, and the basic data of Annex IV.

Despite the short period of the series and of the need to make some estimates to fill the gaps existing in the data, the adjustments were satisfactory given that:

- a) there is coherence between theory and practice of the three models chosen;
- b) the signs of the estimators were those expected;
- c) the statistical tests were satisfactory.

To initiate the analyses of the results, we used the model, in Annex I, which shows the coefficients of response of the increment of the area harvested to price variations of cashew nut and imported rice (not current for three years). From the results, the price-elasticity of the increment of the area harvested with cashew, which was equal to 0.48, was calculated, denoting that for an increase/reduction of 10% in the price of cashew nuts at the producer level, the increase/reduction is of 4.8% in the increment of the area in three years. From this coefficient one can state that, with a 50% reduction of the export taxes (from 20 to 10%), the price received by the producer would increase in 52% (1993) and this, in turn, would allow an additional 25% over the increment of the area harvested three years from now.

In relation to the cross-elasticity between the increment of the area harvested and the price of the imported rice, the coefficient obtained was of 0.72, meaning that when there is an increase of 10% in the price of the imported rice, the increment of the area, three years from now, suffers a reduction of 7.2%. This observation strengthens the need the country has to reduce the existing inefficiencies in the commercialization of rice and cashew nuts, aiming at bettering the prices for both products. One evidence of the dysfunction in the marketing process is the fact that the prices at the producer level decreases from a high of US\$ 416/t in 1976/77 to US\$ 110/t in 1993/94. On the other hand, the imported rice has maintained itself stable throughout the last two decades (US\$ 280/t).

The second line of approach (Annex II) refers to the response of nut production to variations of the price for rice at the producer level and the variations on the area harvested. Therefore, it was of -0.61 the coefficient of cross-elasticity between the production of cashew and the price of rice, implying that for variations of 10% in the price of rice, the inverse variation in the production of cashew nuts is of 6.1%. Once more it can be confirmed the great relationship between the sub-sectors of cashew and rice, implying that there can be no agricultural policies adopted, in isolated form, for these two products.

The other indicator obtained on the model part of Annex II refers to the response of the production of nuts to variations in the area harvested, which is translated by the coefficient equal to 1.66. Such indicator suggests that for an increase of 10% in the area harvested, the response of production is an increase of 16.6%.

Finally, the third adjusted model (Annex III), has as a dependent variable of the price of the nuts exported, given that Guinea-Bissau is a price taker, that is, the price of the nuts exported depends on other variables. So, the exporting price is strongly influenced by the international prices, by the amount of taxes, and by the export price of rice. Therefore, any policy which has the aim to act over the export price of nuts will have to take into account the independent variables of the present model.

An estimate was done about the rate of response of the price of exported nuts in relation to variations on the price of nuts in the international market, on the export tax, and on the price of imported rice, which were respectively 0.72; 0.13; and -0.25.

## 7.2. Forecast for the Period 1995-2005

Table 9 shows the forecasts for production of area of cashew harvested in Guinea-Bissau, resulting in a quantitative tendency scenario.

The results show that the production of cashew nuts will be of 67.3 th./t in 2005, which is double that of 1994. As for the area harvested, it will go up to 49.6 th./ha, showing a growth inferior to that of production, which is an indication of the modernization of the culture since there will a substantial increase in productivity which will go from 960 hg/ha (1994) to 1,355 kg/ha (2005).

The increase of productivity is a fact, considering that the cashew producers of Guinea-Bissau are already increasing the spacing of their plantations, besides the implementation of new ones, already with the adequate spacing.

This extraordinary increase of activity shall be followed by actions which make feasible the internalization of more income in the country. It is necessary, therefore, to improve the marketing system, to process the nuts in the country, to modernize the processing of the false fruit, and train all the agents of the sector.

Considering that the population growth of Guinea-Bissau is very below the level of cashew nut production, we can foresee, even in a tendency scenario, an increase in jobs, of income "per capita", and of foreign exchange of the country.

If we consider the real possibility of reduction of the tax over the nuts exported and its domestic processing, it becomes unimaginable the mensuration of the economic and social effects which the activity will produce.

It is time to work so that Guinea-Bissau gets out of the club of the most poor countries in the world.

**Table 9**

Forecast\* of Production and the Area of Cashew Nuts Harvested in Guinea-Bissau  
1995-2005

YEARS	PRODUCTION (t)	AREA HARVESTED (ha)	YIELD (kg/ha)
1995	37.319	37.027	1.007
1996	40.318	38.290	1.052
1997	43.317	39.554	1.095
1998	46.316	40.817	1.135
1999	49.315	42.081	1.171
2000	52.314	43.345	1.207
2001	55.313	44.608	1.240
2002	58.312	45.872	1.271
2003	61.311	47.135	1.300
2004	64.310	48.399	1.329
2005	67.310	49.663	1.355

SOURCE of the historic series: Table 1

\* The forecast model used was "Holt's Exponential.....", which is the most adequate model to provide forecasts of short term temporal series with a tendency. For more details, please consult MORETTIN & TOLOI (1979).

## **8. Quantitative Scenarios for Cashew**

### **8.1. World Level**

- a) Accelerated increase of the world production of cashew nuts "in natura" (348,000t in 1988) provoked by the appearance of more than fifteen emerging producing countries (600,000t in 1992). For two decades, the world production was the same, at a 350,000t level, but from the late eighties, the world production has been having high growth rates, reaching a volume estimated at 650 Th./t in the present year. Another new fact in the world cashew nut market is the tendency for a greater stability in the supply of nuts due to the fact that the production of the emerging countries is stable, because their plantations of cashew do not suffer from the attack of plagues and diseases, not even with abnormal climatic variations.
- B) Less oscillations and stabilization of the prices of the cashew nut kernels at low levels as a result of the increase and regularity of supply, as well as more competitiveness of the increments of production originates from the emerging producing countries. The price of the CNK of the type "Count 350", at the London Exchange Market is at a rate of US\$ 4 to 5 per kg. In August of this year, the quotation for this type of kernel was of US\$ 4.81 kg. At this price level, it becomes necessary that the traditional producing countries drastically reduce their average costs of production and of processing in order to remain in the market;
- c) A high increase of the world demand, at the medium term, as a result of lower prices, of the end of recession of the major consumer countries, of the entrance of new consumers (Asian tigers), of new uses of CNK, and the loss of competitiveness of some of the nuts which compete with the cashew nut.
- d) Stagnation and loss of international competitiveness of the traditional producing countries, that is, India, Brazil, Mozambique, Kenya, and Tanzania. The Cashew production of these countries is fragile, with frequent droughts, incidence of plagues and diseases, besides the advanced age of the plantations, of the exhaustion of the soils cultivated with cashew trees, and the increase of domestic consumption of kernels (Brazil and India);
- e) The emerging countries area initiating the processing of their nuts with intensive technology and labor, which secures a higher yield and quality of kernels and low costs with more competitiveness;
- f) The latest agreements of GATT established the reduction of subsidies and the gradual elimination of tax barriers in the international commerce, which will reflect in the external market of CNK, and that will result in more competitiveness of the CNK in relation to some nuts contemplated with subsidies. Furthermore, the arrival of non-tax barriers, such as the "green stamp", and the "social barrier", shall increase even more the competitiveness of the CNK from the emerging producing countries.

### **8.2. Tendency Scenario of the Cashew Culture of Guinea-Bissau**

In this sub-item, the tendencies most probable of occurring with the Guinean cashew culture will be presented, if none of the structural changes which this activity requires occur. Being so, the major inert tendencies of the cashew culture activity of the country are:

- a) Accelerated increase in supply of nuts "in natura", and reduction of prices at the producer level;
- b) A very stable demand for the Guinea-Bissau nuts because there is only one buyer (India) at a distance superior to two thousand miles;
- c) A low internalization of income with the exploration of cashew because the nut are exported "in natura", and a lowering in the quality of the natural resources of the country as a result of overuse of the cultivated soils with cashew without a compensation in other economic activities;
- d) A high dependency of the producer, and consequently of the country, on cashew, which brings high risks of collapse on exports as a result of external contingencies due to the forces of political/sanitary events or production provoked by plagues and/or diseases;
- e) Formation of a cartel of exporters of nuts "in natura" to reduce the prices paid to producers;
- f) Perpetuation of the incipient technical and scientific knowledge of agronomy of the various segments of the Guinean cashew culture;
- g) Reduced bargaining power of producers due to the absence of associations, which facilitates the manipulation of cashew prices from the part of the buyers, the inefficiency of the government support services, and the high incidence of taxes;
- h) Perpetuation of conflicts among agents of the activity - producer, intermediary, exporter, and government - with a clear less advantage for the producer.

### **8.3 Scenario Expected for Guinea-Bissau**

In order to make its cashew culture modern, competitive, and strategic for its sustainable development, Guinea-Bissau should concentrate its efforts in the sense of carrying out the processing of nuts domestically, create cooperatives and associations of cashew and wine producers, as well as establish an export tax which does not become an obstacle for the growth of this activity. With these three factors being implemented simultaneously, the cashew culture of Guinea-Bissau would be characterized by the following aspects:

- a) Increase of production with increase of productivity due to the low risk and the high yields by producers;
- b) Substantial increases of income and jobs in the rural area as a result of the decentralized processing of nuts, and the better quality of the wine produced;
- c) Lowering of the dependency of the country on the exports of nuts "in natura", resulting in a less vulnerable producer, exporter, and government;

- d) Political and economical strength from the cooperatives and producers associations.
- e) Significant increase of income per capita and the professionalization of the rural man.
- f) High competitiveness of the Guinean kernel and integration of the furnishing agents of the production chain of cashew.

## **9. RECOMMENDATIONS**

- a) Establishment of objective rules and criteria for marketing and norms;
- b) Definition of an agricultural and agroindustrial policy for the sector;
- c) Development of agronomic studies of the cashew tree;
- d) Thorough study of the domestic and external marketing process;
- e) Elaboration of a bulletin of prices and markets (domestic and external);
- f) Strengthening of the support system for the cashew culture, especially technical assistance;
- g) Fostering for the creation of producers associations and cooperatives;
- h) Promotion of the professional capabilities in all segments of the productive chain of cashew;
- I) Dissemination throughout the entire country of the technology of cashew nut processing.

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## ANNEXES

## Annex I

### Annual Distribution of Income from the Production of Cashew nuts in Guinea-Bissau, average 1993-94

Type	Value of the Kernels		
	Percentage	Value-US\$1,000	US\$/kg
Farmgate Income received by the producer	6.3	10,018	1.3
Income received by the government from taxes	3.7	5,883	0.7
Additional value to the exporter of "In Natura" Cashew nuts	6.3	9,967	1.3
Additional value to processing industry (India)	12.6	19,995	2.5
SUBTOTAL -----	28.9	45,863	5.8
Additional value to importers, processors and distributors	71.1	112,137	14.2
TOTAL -----	100.0	158,000	20.0

**SOURCES:** Edible Nut Market Report (1994), NOMISMA (1994), Franca (1994), Central Bank of Guinea-Bissau (1994), Peter Justesen (1994).

**Basis for the data:** Production in 1993/94 = 33,310 tons, equivalent to 7,900 tons of kernels.  
Average price for kernels exported to India = US\$5.80/kg.  
1 kg of kernels:  
-average price of the kernel at producer level is:  
+/- US\$0.30 x 4.3 kg = US\$1.30;  
-tax paid on 4.3 kg of "in natura" cashew is:  
+/- US\$0.16 x 4.3 = US\$0.70  
Average price for cashew nut retail (EC and USA) = US\$20.00/kg.

## ANNEX II

Estimated \* Values of the Parameters of Function Referring to the Incrementation of the Area Harvested with Cashew in Guinea-Bissau (INACT)

### Linear Model

VARIABLE	ESTIMATE COEFFICIENTS	"STUDENT" STATISTICS
Intercept (A)	2.617.30**	4.4
Price of Nuts at the Producer level (CPI1 - 3)	3.98***	1.99
Price of imported rice	-5.54**	-5.39
R <sup>2</sup> = 0.73	F(2.13) = 17.5	DW = 1.38 (ACS)

SOURCE OF ORIGINAL DATA: Annex IV

Note: \* No. Of observations = 16  
 Degree of freedom = 13  
 \*\* indicates that the coefficient is significantly different than zero at a 1% probability.  
 \*\*\* Ibidem at 10% probability

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ANNEX III

Estimated \* Values of the Parameters of the Function Referring to the Production of Nuts in Guinea-Bissau  
(Cqt)

Linear Model

VARIABLES	ESTIMATED COEFFICIENTS	"STUDENT" STATISTICS
Intercept (A)	-14.626.000**	-3.48
Area Harvested Cat)	1.234**	10.29
Price of Rice at the Producer Level (APII)	29.422***	2.88
R2 = 0.94	F = (2.16) = 123.9	DW = 1.22 (INC)

SOURCE OF ORIGINAL DATA : Annex IV

Note: \* No. Of observations = 19  
 \*\* indicates that the coefficient is significantly different than zero at 1% of probability  
 \*\*\* lbdem at 2% of probability.

ANNEX IV

Estimate Values of the Parameters of the Function Referring to the Price of Nuts "In natura" Exported by Guinea-Bissau (CPEt)

Linear Model

VARIABLES	ESTIMATED COEFFICIENTS	"STUDENT" STATISTICS
Intercept (A)	363.420**	2.15
Price of Nuts in the World (CPMut)	0.555***	2.80
Export Tax (IMEX)	0.035****	5.88
Price of Imported Rice (APIt)	0.844*****	-1.87
R <sup>2</sup> = 0.75	F(3,15) = 15.17	DW = 1.45 (ACS)

SOURCE OF ORIGINAL DATA: Annex IV

Note: \* No. Of Observations = 19  
 Degree of freedom = 15  
 \*\* Indicates that the coefficient is significantly different than zero at 5% of probability  
 \*\*\* Ibdem at 2% of probability  
 \*\*\*\* Ibdem at 1% of probability  
 \*\*\*\*\* Ibdem at 10% of probability

## ANNEX V

Statistical Information Used to Estimate the Functions Presented in Annexes I, II, and III, 1976-94.

ANO	CQ	CA	CPI	API	INAC	IMEX	CPMU	CPE
1976	1.500	2.700	135	468	300	336	747	449
1977	1.680	3.000	190	365	300	569	1.074	615
1978	1.850	3.200	200	319	268	600	850	510
1979	2.350	4.111	180	433	843	496	650	422
1980	2.900	5.076	310	436	966	1.305	1.631	900
1981	3.500	6.042	280	363	966	1.540	1.571	880
1982	4.100	7.008	370	352	966	1.886	1.443	920
1983	4.700	7.973	320	325	966	842	915	842
1984	6.000	8.939	230	181	966	3.296	1.275	824
1985	8.000	11.784	240	200	2.845	3.198	1.187	966
1986	7.000	14.629	250	237	2.845	3.375	1.368	1.126
1987	9.000	17.475	270	112	2.845	6.854	1.561	1.313
1988	10.000	20.320	360	93	2.845	5.192	1.000	1.047
1989	10.000	23.165	210	108	2.845	4.182	840	889
1990	19.450	26.010	220	111	2.845	5.172	900	788
1991	28.080	28.855	160	114	2.845	4.632	810	739
1992	30.160	31.700	140	96	2.845	1.235	1.000	846
1993	32.240	34.870	290	107	3.170	3.985	881	752
1994	34.320	35.750	310	112	880	9.088	700	643

SOURCE: Table I, NOMISMA (1974) and BCGB (1974)

CQ - Cashew nut production in Guinea-Bissau (t)

CA - Area harvested with cashew in Guinea-Bissau (ha)

CPI - Producer price for nuts in GB (US\$/t)

API - Price of imported rice by GB (US\$/t)

INAC - Increase of area harvested with cashew in GB (ha)

IMEX - Value of export tax (US\$Th.)

CPMU - Price per ton of nuts "in natura" in the world market (US\$)

CPE - Price of nuts exported by GB (US\$ - FOB/t)

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