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**CURRENT SITUATION OF FOOD SECURITY IN THE D.R. CONGO:
DIAGNOSTIC AND PERSPECTIVES**

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1. Introduction

Food insecurity in DRC is daily experience for the population and a major concern for the government as well as for the non-governmental organizations and the international community. According to "The State of Food Insecurity in the World 2001" (FAO, 2001), DRC recorded the greatest proportional increase of undernourished people in the world over the period of 1990-92 to 1997-99, i.e. 29% or 17 million of people. This represents 22% of the increase in the world over this period. The number of undernourished in DRC has been multiplied by 3 over this period (FAO, 2002). According to the same report about 70% of people in DRC are currently undernourished. DRC should therefore be the most important target in order to halve the number of undernourished people in the world by no later than 2015, the objective of the World Food Summit (WFS).

In DRC food crisis is the most felt during the seasonal food shortage period extending from January to February. In this country, food insecurity is a daily experience which severely jeopardizes the life of a third of the population. Civil war, not only continues to be a hindrance to food production, but is also one of the direct causes of the generalized poverty experienced in the country and the major source of chronic food insecurity. Poverty-related problems will not miraculously disappear with the end of the war. In fact, without high and sustained economic growth, poverty will persist as well as food insecurity in spite of the fact that DRC's agricultural potential is among the highest in the world. We should recall here that according to the report of FAO-UNFPA-IIASA (1984) on "Potential Population Supporting Capacities of Lands in the Developing World" the DRC can, under the hypothesis of a high level of inputs,

produce enough to feed about 2.9 billion people, i.e. almost half of the world population.

Our first objective here is to establish a diagnostic of the current state of food security in DRC. Next, we will discuss future prospects and mostly policies and actions to undertake in the short, medium and long term in order to improve the situation and eradicate food insecurity once for all from DRC. In the past much has been said about the (scandalous) enormous agricultural and mineral potentials of DRC. In fact no single reason can justify the existence and persistence of food insecurity in DRC.

There are signs almost everywhere indicating that the situation on the ground is very bad, but only very few recent and reliable data are available to make a more robust diagnostic. We have therefore tried to present only what, in our view, seems the most reliable and most pertinent in order to elucidate the situation.

In the following, we will successively discuss the general situation of food security and recent changes in the production and commercialization of food products, food balance sheets, food imports, and food consumption according to household budget and nutritional surveys.

2. Current and past food insecurity

Food insecurity refers to food supply as well as to the demand for food products. While food supply is mostly a function of local food production and food imports, the demand for food products depends on the number of people and their purchasing power. Access to food is determined by the latter factor through income. Therefore,

the generalized poverty of the population is a serious impediment to food consumption.

2.1. General situation of food security

The information presented below is borrowed from the general report of "Ateliers Thématiques Nationaux" held at Kisangani from 07 to 09 of May 2002 - "Atelier no. 2: Sécurité Alimentaire dans un contexte de crise" (OCHA, 2002).

"Agricultural production in DRC is still traditional and has been declining since 1998; in general the decline has been estimated at -20% for cereals, -12% for roots and tubers and -6% for vegetables. The most striking case of decline is that of cassava, a staple food crop that covers about 50% of arable land and supplies 70 to 80% of Congolese' food intake. Overall, cassava production has decreased by more than 20% as a result of pests and diseases.

The general trend of fishing activities is equally negative. The number of boats has significantly declined passing from an average of one canoe for 2 to one canoe for 6 fishermen. The availability of fishing material has also significantly decreased (between 25 and 60%). In general the distance covered by fishermen has declined from 400 to 50 km. The average reduction of fishing production is estimated at 45%.

The general trend of animal production is also declining. For instance, the provinces of Nord Kivu and Sud Kivu as well as the district of Ituri, traditionally pastoral regions, have lost about 80% of their livestock. In the province of Bandundu, the promising and rapidly-developing rearing of cattle and small ruminants has been

wiped out by the 1997 war. The dioceses of Kikwit and Popokabaka, major suppliers of meat in this area, have been severely stricken and the effects are felt until today.

Supplies of foodstuffs and other agricultural products have become very unstable; the nature of instability varying from province to province. For instance, the deterioration of the national road Matadi-Kinshasa-Kikwit has significantly reduced the flux of supplies to Kinshasa of agricultural products from the provinces of Bas-Congo and Bandundu. Supplies from the zones under military occupation (Equateur, Nord Kivu, Sud Kivu, Province Orientale) have been disrupted which has affected the supply in beans, palm oil, maize, rice, plantain and cassava leading to a food deficit estimated between 100,000 and 150,000 tons. As a result, food security will never be reached in the medium term without supplies from the zones under military occupation.

The general situation of insecurity experienced in the country has led to the abandonment of agricultural and marketing activities and has resulted in a shortage of food commodities. The lootings of 1991 and 1993 and the incapacity of the public and private sectors to pay the salaries have caused the unemployment of many Congolese, the crumbling of their purchasing power and reduced access to food.

Overall, the number of vulnerable persons in DRC has reached about 20 million, which can be grouped into 2 million of internal displaced people, 330,000 refugees, 700,000 households hosting the displaced population, and more than 16 million victims of economic crisis and natural calamities. In the district of Ituri, for instance, about 200,000 people, mostly farmers, had to flee and abandon their land because of

ethnic conflicts between Hema and Lendu. This has caused substantial losses of harvests and livestock and mostly a diminution of manpower.»

This sad account deals mostly with the availability of food commodities, the first dimension of food security, though other aspects are also worthy of analysis.

The stability of food supplies usually experienced in Kinshasa as a result of the alternance of seasons between the north and the south has been seriously affected and no longer exists; as a result, Kinshasa has suffered from a shortage of maize and palm oil from the province of Equateur (Mongala) and Maniema, vegetables and beans from Kivu, meat from Ituri, etc. All this instability in food supplies has resulted in a great instability of prices on the markets and substitutions of one food for another.

However, the greatest incidence of the civil war is the dramatic reduction of household incomes following the general impoverishment of the national economy. As a consequence, access to food is the dimension of food security that has suffered the most. The disappearance of remunerated work in the formal sector, the lack of payment of salaries (mostly for civil servants), the erosion of purchasing power due to inflation and monetary erosion, the quasi interruption of investments, etc have made the DRC to be among the five poorest countries in the world, with a GDP per capita of 80 US\$ (1985 base) in 2000. Almost all the classes of society have become vulnerable. Absolute poverty of the population seems to be the major cause of chronic food insecurity in DRC.

2.2. Changes in field crops

We do not have reliable statistics on cropped land area and crop yields. However, anecdotic information at our disposal suggests that important changes in cropping habits are taking place. The most important is the emergence and development of urban and peri-urban agriculture in all the cities, especially based on garden vegetables and small livestock rearing. The FAO/Belgium horticultural project in DRC has had a great impact on those activities. The small livestock rearing targets laying hens/chickens, ducks, doves and even pigs. The development of these activities has benefited MIDEWA which has increased its sales of animal feed by 80% over the last two years. They even had to open a new factory of compound feed in 2001. Farming has become a major means of struggle and an important survival strategy in the cities.

The production of cowpea (a grain legume) has tremendously increased in drier areas of the province of Bandundu where it is most often planted in the second cropping cycle. The frequent presence in the markets of food gap bridging crops like millet and sesame are a good indicator of the deteriorating food situation in the country. Irrigated rice is increasingly planted in inland-valleys of Bas-Congo, Kwilu and Pool Malebo in Kinshasa. The production of palm oil from wild palm trees has expanded during the period when the province of Equateur was almost entirely cut off from the south of the country.

It is believed that maize production destined for Kinshasa markets must have seriously increased given that its relative price with cassava has greatly decreased. This is the case for some savannah and transition zones like Idiofa zone where rural

roads have been repaired by the PAR project. Undoubtedly, the province of Bandundu currently produces more maize than 5-10 years ago. This has helped to compensate for the deficit from the province of Equateur. MIDEA now sells more maize seeds in Bandundu than before.

We do not have information on the situation inside the country and in the zones under military occupation. But we can affirm that cassava has played the greatest role in averting famine among displaced populations. It is pre-eminently the best food security crop (and war crop) as it can be harvested at any time and because of its extended in ground storability (up to 24 months). However, cassava yields have decreased as a result of pests and diseases.

No need to recall that soil fertility in DRC has decreased everywhere because of lack of fertilizers and the diminution of the fallow period in favour of short cycle crops like cowpea and millet and crops that can be harvested anytime like cassava.

2.3. Food balance sheets

From the food balance sheets found on the FAO website (the last year being 2000) information on daily apparent consumption per person has been derived and expressed in calories and grams of proteins (Table 1). They indicate that the situation has been more or less normal until 1992-93 and since then it has been deteriorating and reached only 1,514 calories and 24.3 grams of proteins in the year 2000. It is hard to imagine how a population can survive with such a low level of food consumption! The same balance indicates a yearly level of consumption of cassava of 288 kg per person per year in 2000, i.e. 15,959,000 tons for the whole country, or 859.5 calories

(57%) and 4.9 g of proteins per day. Over the same period cereals provided 274 calories (18%) and 7 g of proteins. This confirms again the enormous weight of cassava in the nutrition of the population (Goossens et al., 1994; Goossens, 1996; Kankonde et Tollens, 2001).

In this context, the incidence of African cassava mosaic disease, in particular the combination of the Gemini virus type of East Africa with the endemic virus type of West Africa, has greatly affected cassava production and its price. Fortunately, resistant cultivars of cassava have been introduced and are being diffused with the assistance of FAO, USAID, INERA, SECID, IITA and other partners; however, it should be noted that at least 10 years are required to replace the existing cultivars because of the low rate of multiplication through cuttings.

Table 1: Daily food consumption per person in calories and proteins (g) in DRC, according to the food balance sheets

<u>Year</u>	<u>Calories</u>	<u>Proteins</u>
2000	1514	24.3
1999	1578	25.4
1998	1683	27.8
1997	1699	27.9
1996	1707	27.2
1995	1741	28.6
1994	1964	32.1
1993	2044	33.5
1992	2132	33.8
1991	2159	33.8
1990	2200	34.7
1985	2192	35.9
1980	2153	34.5
1970	2235	38.0
1961	2291	38.3

Source: FAO web site 01305795.csv, 2003

N.B.: The consumption of fat has decreased from 34.3 g in 1961 to 24.0 g in 2000

One of the signs of scarcity is the expensiveness of cassava in the markets and the fact that during certain periods maize flour and even rice is cheaper than cassava flour or has the same price (Table 2).

Table 2: Retail prices of maize, cassava, and rice on the markets of Kinshasa in 2000

Product	March 2000		August 2000		December 2000	
	FC	\$	FC	\$	FC	\$
Maize flour (kg)	12	0.34	25	0.36	90	0.69
Cassava flour (kg)	18	0.51	34	0.49	47.5	0.36
Rice (kg)	18	0.51	30	0.43	70	0.53

Source: FAO, 2000

It should be noted that statistics of agricultural production in RDC on which food balance sheets are based are very poor and often of dubious quality due to lack of resources for the official services in charge of agricultural statistics. In this respect, in 1987-89, we carried out sample surveys in the provinces of Bandundu and Bas-Congo with the aim of collecting firsthand and reliable information on production and marketing of food products. According to our results in Bandundu, cassava production was 37.6% higher than in the official statistics and 72.2% higher in Bas-Congo (Table 3). Similar results have been obtained for maize, groundnut, rice and beans, except for plantains for which official statistics were 59.5% higher (Tollens, 2002).

Table 3: Cassava production (tons of fresh roots) according to official and project statistics in Bandundu (october 1987-september 1988) and in Bas-Congo (october 1988-september 1989)

Province	Project statistics	Official statistics	Difference (%)
Bandundu	3.975.634	2.890.000	+ 37.6
Bas-Congo	1.498.300	870.000	+ 72.2

Source: Tollens, 2002.

It can be concluded that food balance sheets probably underestimate apparent food consumption.

2.4. Food imports

The contribution of food imports to food security of Kinshasa has been increasing since the 1980s (Goossens et al., 1994), especially with cereals (wheat, rice) and frozen animal products (fish and meat). The imports of the latter (especially « chinchard », mpiodi) are particularly substantial and are estimated at 200,000 tons per year; however, they have been reduced (especially frozen chicken) by the war and the economic crisis. ORGAMAN, which has been the leader in the food import business in DRC, has particularly suffered from competition of Lebanese companies (CONGO FUTUR, SOCIMEX), newly established in the country, which equally import a lot of dry foodstuffs, wheat flour and rice. In spite of a 35.6% import tax on wheat flour, they import more than 100,000 tons at the expense of MIDEMA ; as a result MIDEMA's wheat mill at Matadi operates only at 40% of their full capacity. Rice imports have tremendously increased, especially as a result of low prices in the international market since 2-3 years.

The consumption of bread has become common not only in Kinshasa, but also inside the country, and constitutes the first response to hunger because of its low price (a 150

to 200 g «baguette » costs about 35 to 40 FC, i.e. about 0.10 US\$. In addition, it does not require any preparation and can be kept several days. Even though we do not have reliable data on wheat and wheat flour imports, we can ascertain that they are ever increasing. We wonder how the major bakeries (Quo Vadis, B.K.T.F., UPAK, PANICO, etc) in Kinshasa can make a profit on such cheap bread.

It can be concluded that the overall quantity of imports (in calories) has probably not decreased, but its content has changed: more cereals, less quality meat (chicken, beef meat), same quantity of fish (mpiodi), and more of 5th quarter (offals). The consumption of meat has become very rare since the destruction of most of the livestock breeding herd (cattle, sheep, goats) inside the country, even in Bandundu. Most of the time when cooking, a few tiny pieces of meat added in the sauce are enough to satisfy hungry children who do not even know what real meat is.

2.5. Changes in the commercialization of food products

The most striking change observed since the loss of the provinces of Equateur, province Orientale and Kivu in September 1998 is the shift of the fluvial traffic towards Bandundu and the two Kasai. This is illustrated by the Bescoplan/GRET study¹ of September 2000 (based on OFIDA data) from which tables 4 to 6 are taken. Since the rebellion in 1998, the quantity of food products arriving from Bandundu through river traffic has more than tripled (from 3,500 to 11,000 tons per month). Between 1990 and 1999 the quantity of food brought to Kinshasa via the river, has doubled from 107,000 tons to 200,000 tons. In 1990 the two-thirds of the traffic was

¹ This study was carried out for the European Commission in 1999-2000. It involved several original surveys and the collection of primary data. Its major aim was to evaluate the impact of investments in the repair and improvement of roads of Bandundu and Bas-Congo financed by EDF funds.

performed by ONATRA, while in 1999/2000 95% of the traffic was by the private sector (Kupay, 2001).

Table 4: Food supply (% of tonnage) of Kinshasa through river traffic, per province

Province	January-May 1996	January-May 1999	January-May 2001
Province Orientale	12	0	0
Equateur	52	13	5
Bandundu	18	80	91
Kasaï	18	7	4

Source: Bescoplan/GRET, 2000

Another major change observed is the development of wooden whale-boats. Every month between 100 and 120 whale-boats arrive in Kinshasa loaded with 10 to 200 tons (with an average of 40 tons) of foodstuffs. According to GRET, 150 to 200 whale-boats operate in Kinshasa. These boats were rare in the 1970s and 1980s. Currently they are locally made by local craftsmen in the ship-yards of Eolo, in the district of Idiofa and of Nioki, in the district of Inongo (former Forescom). In the late 1980s, USAID funded the construction of wooden whale-boats as part of a project aiming at improving the marketing of food products in Bandundu. Local carpenters were trained in this respect by an expatriate naval architect. At that time, the project experienced a lot of skepticism from local transporters as trucks were commonly used. Has this project found an unexpected success today?

Table 5: Number of boats enlisted at arrival in Kinshasa in 1996 and 1999

Province	1996	1999
Bandundu	130	246
Equateur	162	51
Kasaï	30	29
Province Orientale	42	0

Source: Bescoplan/GRET, 2000

N.B.: 62% of the tonnage was cassava, 19% maize, 5% palm oil and 9% coffee.

Table 6: Arrival of food products (%) in Kinshasa according to origin and mode of transport: April 1999 to May 2000

Origin and mode	%	Products	%
Equateur-River	7	Cassava	58
Bandundu-River	43	Maize	17
Kasaï-River	5	Others	<u>25</u>
			100
ONATRA-River	3	Others: Palm oil	7,9
Bas-Congo-Railway	2	Beans	4,8
Road Bas-Congo	22	Vegetables	3,6
Bandundu-Road	<u>18</u>	Fruit	3,3
	100	Coffee	3,7

Source: Bescoplan/GRET, 2000

Another striking change observed especially since Laurent Désiré Kabila came to power and since the resumption of foreign assistance is the maintenance and the repair of the main road-transport axes and rural roads including those leading to shipping ports (Bandundu in particular). Although the task of repair and maintenance is still enormous, a lot has been done or is in process (PAR project by the EU, rural roads by the Belgian cooperation, etc.). From every point of view the restoration of road-transport axes and communications has enabled a safe and regular food supply to cities, and Kinshasa in particular, without catastrophes during the crisis.

Other major developments observed mostly on the markets of Kinshasa are:

- the introduction (the first in Africa) and diffusion of cellular phones (TELECEL) since 1985. Currently there are at least 8 private companies competing, and phone shops are found everywhere making their services accessible even to the poorest. This situation has greatly improved communications among economic agents and reduced transaction costs, especially the asymmetry of market information and commercial risk;
- the development and generalization of all kinds of commission-agents and middlemen whose major role is to facilitate commercial transactions. They intervene particularly in the collection of food products, grouping of travelers according to destination, remittances of funds and operations in foreign exchange, grouping of buyers (*mamans-manoeuvres*, *mamans-bipupula* or *maman-kabola*), search of market information (*chayeurs*, *khadaffis*, *éclairieurs*, *ngundeurs*, *drogadeurs*) etc. All these middlemen might have already existed in the 1980s or 1990s but they have become the mainstream in the late 1990s in order to cope with the inefficiency of official services and the absence of a formal private sector.
- the construction of large retail markets like "Marché de la Liberté" at Masina launched on 16 January 2003, probably the largest in Africa (21 ha, 7300 stands of 2m each) and in Lubumbashi, though much smaller, the result of a collaboration between the government and the private sector, in this case M. FORREST. It seems that more markets of this kind will follow. However, nobody knows why those markets are so large, nor how they are managed, nor their impact on the food distribution chain, nor their place in the food marketing chain, ...

In August 2002 food product prices (in dollars) in Kinshasa were at their lowest level. The real causes of this situation are unknown but it might have been the result of a better food supply (in the dry season during the midst of the main food marketing campaign) from Bandundu and Bas-Congo, combined with a stagnation and even a deterioration of incomes in Kinshasa. It is expected that this situation will continue to prevail on the markets of Kinshasa.

Table 7: Prices (US\$/kg) of maize and cassava (chips) in August on the markets of Kinshasa

<i>Product</i>	<i>2002</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>
Maize	1,12	0,53	0,40	0,35	0,14
Cassava	0,69	0,29	0,21	0,19	0,14

Source: Enquêtes GRET, 1999-2000; Le Voyageur, 2000

Table 8: Prices (US\$/kg) of maize and cassava (chips) in November and December (food shortage period) on the markets of Kinshasa

<i>Products</i>	<i>1999 2000 2001 2002</i>				<i>1999 2000 2001 2002</i>			
	<i>November</i>				<i>December</i>			
Maize	0,85	0,58	0,63	0,20	0,64	0,81	0,64	0,22
Cassava	0,31	0,27	0,35	0,17	0,32	0,40	0,40	0,20

Source: Enquêtes GRET, 1996-2002; Le Voyageur, 2002

During the last food shortage period (November and December 2002) prices of cassava and maize ("parking prices") were at their lowest level relative to the three previous years (Table 8). They are significantly lower than the "normal average" of 40 US\$ cents observed between 1993 and March 2000 (Le Voyageur, 2002). This is interesting because it makes the two basic carbohydrates much more accessible to the population of Kinshasa. This situation is the result not only of the increase of food

production in Bas-Congo, Bandundu and even in Kinshasa, but also of the resumption, though still limited, of the river traffic between Kinshasa and the province of Equateur (remote) (seven boats arrived in November and ten in December 2002). But the Bumba-Kisangani stretch is still not open to commercial traffic.

3. Food consumption

Here we present food consumption data using information collected through household budget surveys. It is important to mention that in spite of the generalized state of poverty in the country, incomes are higher in Kinshasa; as result, the population of Kinshasa enjoys better access to food products. The last household budget survey was organized in Kinshasa in the year 2000 by PNUD-SOCOMEG² and covered a reliable sample of 1225 households. Other surveys were organized in 1975, 1986, 1990 and 1995 and were equally based on statistically acceptable samples. The results are presented in Tables 9 to 11³.

The first remark is the fact that the level of calorie consumption is quite lower than that estimated through food balance sheets and that as far back as 1975 the daily consumption per person was only of 1797 calories. On the contrary, the consumption of proteins is always higher than that of balance sheets. Nevertheless, the average consumption of both calories and proteins has been decreasing over the years and has reached 1368 calories and 38.5 g of proteins in 2000. Can this be possible? It should be noted that in the specialized literature household budget surveys have the reputation of being very reliable and precise. One no more talks about apparent

² Source: Nkwembe Unsital (2002)

consumption (like with balance sheets) but rather (real) consumption. Specialists in human nutrition and physiology contend that it is not possible unless physical effort is reduced to its lowest level, for instance by sleeping or laying in a chair under the sun most of the time. It seems that the « minimum minimorum » has been reached!

Other pertinent observations drawn from the tables are as follows:

- cassava is still predominant, but its importance is decreasing probably because of production problems due to cassava (African) mosaic disease, cassava bacterial blight, etc. Most often, cassava cosettes are as expensive as cereals (maize, imported rice);
- wheat (flour) equally decreases in importance;
- the importance of vegetables (fresh leaves) remains unchanged probably because of urban and peri-urban agriculture and the support (FAO project) given to vegetable gardening in Kinshasa;
- the importance of rice (both local and imported) has significantly increased. The consumption of local rice has been multiplied by 2.7 since 1975 and the imported by 2.4. Since the traditional rice producing areas of the country (Bumba and surroundings, Maniema) cannot supply Kinshasa, the rice consumed is supplied from Bas-Congo (Mawunzi), Kwilu (Idiofa) and mostly from Pool Malebo with the assistance of FAO and Italian cooperation (which has probably had a great impact). Increasing imports of rice have obviously been favored by the current low prices on the international market;

³ Nutritionists recommend a minimum daily consumption of 2300 calories and 70 g of proteins in order to lead an active and healthy life.

- a significant diminution of alcoholic beverages (beer) because of the diminution of purchasing power;
- the level of consumption of fresh and frozen fish (mostly chinchard-mpiodi) is remarkably unchanged;
- the consumption of plantains has tremendously increased (2.3 times since 1975). Plantains are supplied exclusively from Bas-Fleuve, partly through the railway. Would this suggest a tremendous increase of plantain production in the forest zone of Bas-Fleuve? Plantains are ordinarily very expensive;
- a significant decrease of consumption of palm oil and other fats; this has probably caused some deficiency diseases (vit A, D, E) in the population. A better supply can soon be expected with the opening up of the province of Equateur;
- a spectacular increase in the consumption of maize (x 2.35 since 1975) in spite of the deficit from the Equateur (Ubangi and Mongala). The district of Kwilu (from Kikwit to Idiofa) is the major supplier of maize as well as the two provinces of Kasai. It is surprising to see that these provinces are now supplying maize to Kinshasa! Where is all this maize coming from? It has been noted that during certain periods maize flour is only as expensive as cassava flour, a situation which has never happened before as cassava flour has always been cheaper than maize flour. Can this situation be attributed to the impact of the improved varieties of maize developed in the 1980s by PNM (funded by USAID)? It has been equally noted that most households are currently mixing maize flour and cassava flour (bidia);
- the consumption of milk is also steadily increasing (x 3.7 since 1975). However, the question is to know the nature and origin of the milk consumed; is it from imported milk powder or from local Soya milk (produced in Kingabwa);

- the consumption of chickens has decreased since 1995 by 25%, probably because of low purchasing power;
- the consumption of sugar has fallen by 41% since 1975 also probably because of low incomes;
- the consumption of beef meat has collapsed by 50% since 1975 for the same reason;
- the consumption of beans decreases continually; beans were produced mostly in Bas-Congo and Kivu, but supplies from Kivu have stopped since the outbreak of the war;
- the consumption of groundnuts has decreased by 70% since 1975; groundnuts are expensive;
- the consumption of smoked fish, salted fish and dried fish is also on decline: from 6.13 kg in 1975 to 0.67 kg in 2000! As early as 1986 the consumption was only around 1.72 kg. In the past a lot of dried and salted fish (makayabo) was imported, although it was an expensive product;
- in terms of energy, cassava provides 32% of calories, followed by wheat (bread) with 20%, rice with 16%, and palm oil with 10%;
- the average daily consumption of proteins per person is only 39.5 g and keeps on decreasing. The major source of proteins is wheat (33%), followed by rice (11%) and fresh and frozen fish (11%), cassava (9%), fresh vegetables (8%), chickens (6%), etc.

It can be concluded from the information contained in Tables 9 to 11 that the food situation in Kinshasa is deteriorating. The situation was already bad as early as 1990 with a daily consumption of only 1797 calories and 46 g of proteins. Currently the

situation is probably lower than the levels of 1368 calories and 38.5 g of proteins recorded in 2000. An urgent program for the food security of Kinshasa (and the rest of the country) is really needed!

Table 9: Annual food consumptions (kg/person) in Kinshasa

N°	Products	Years				
		1975	1986	1990	1995	2000
1	Cassava (tubers)	176,71	165,39	161,84	156,52	145,31
2	Wheat (flower)	37,92	32,08	30,37	28,36	26,48
3	Vegetables (fresh leaves)	24,73	25,03	25,12	24,24	24,35
4	Rice	8,41	12,81	15,41	19,43	21,51
	- local rice (grains)	4,91	7,62	9,26	11,82	13,09
	- imported rice (grains)	3,50	5,18	6,15	7,61	8,42
5	Alcoholic beverages	31,90	18,42	15,76	12,98	10,69
6	Fresh and frozen fish	11,40	10,97	10,81	10,62	10,43
7	Plantains	3,85	5,39	6,22	7,43	8,89
8	Oils and other fats	14,78	10,18	9,08	7,88	6,83
9	Maize (grains)	2,84	4,02	4,64	5,57	6,68
10	Milk	1,72	2,83	3,56	4,74	6,32
11	Seasonings (salt, pepper)	3,46	4,06	4,33	4,70	5,09
12	Chickens	1,90	4,51	7,23	6,03	4,48
13	Sugar	6,59	5,12	4,72	4,27	3,86
14	Beef meat	6,53	4,67	4,21	3,70	3,26
15	Beans	5,02	3,97	3,68	3,34	3,03
16	Tomatoes (tins)	1,39	1,57	1,69	1,74	1,85
17	Lemons	1,12	1,25	1,30	1,38	1,45
18	Onions	2,29	1,64	1,48	1,30	1,14
19	Sweet bananas	1,91	1,48	1,37	1,24	1,12
20	Groundnuts (in hulls)	2,79	1,52	1,87	1,05	0,85
21	Smoked, salted, dried fish	6,13	1,72	1,32	0,94	0,67
	Other products	14,41	3,50	2,75	2,10	1,62
Total		367,80	322,13	318,76	309,54	295,91

Sources: Houyoux,(1986), PNUD - SOCOMEG (2000) and Nkwembe Unsital (2002).

Table 10: Annual food consumption per person (kg, calories and g of proteins) in Kinshasa

N°	Products	Year 2000		
		Kg	calories	proteins
1	Cassava (tubers)	145,31	433,9	3,6
2	Wheat (flower)	26,48	268,2	12,9
3	Vegetables (fresh leaves)	24,35	33,3	3,2
4	Rice	21,51	212,0	4,4
	- local rice (grains)	13,09	-	-
	- imported rice (grains)	8,42	-	-
5	Alcoholic beverages	10,69	9,6	0,2
6	Fresh and frozen fish	10,43	21,7	4,4
7	Plantains	8,89	20,7	0,4
8	Oils and other fats	6,83	132,6	-
9	Maize (grains)	6,68	65,0	1,7
10	Milk	6,32	14,7	0,7
11	Seasonings (salt, pepper)	5,09	13,9	0,4
12	Chickens	4,48	24,9	2,5
13	Sugar	3,86	36,1	-
14	Beef meat	3,26	21,1	1,6
15	Beans	3,03	27,9	1,6
16	Tomatoes (tins)	1,85	2,7	0,2
17	Lemons	1,45	1,1	0,0
18	Onions	1,14	1,1	0,0
19	Sweet bananas	1,12	2,6	0,0
20	Groundnuts (in hulls)	0,85	6,9	0,4
21	Smoked, salted and dried fish	0,67	7,6	1,3
	Other products	1,62	10,0	-
Total		295,91	1.367,6	38,5

Sources: Houyoux,(1986), PNUD - SOCOMEG (2000), Nkwembe Unsital (2002) and our own estimates.

Table 11: Annual food consumptions per person (calories and g of proteins) in Kinshasa, 1975-2000

Year	Calories	Proteins
1975	1.797	59,8
1986	1.506	46,8
1990	1.471	46,3
1995	1.438	44,0
2000	1.368	38,5

Sources: Houyoux,(1986), PNUD - SOCOMEG (2000), Nkwembe Unsital (2002) and our own calculations.

A household consumption survey covering 2000 households selected from the center and the periphery of Kinshasa was organized by FAO in August 2002 (FAO, 2002). The average daily consumption is 1,349 calories and 36 g of proteins. Therefore, the inhabitants of Kinshasa consume about twice less calories than the average of sub-Saharan Africa (2,150 calories) and the world (2,750 calories) averages. In the center of Kinshasa, the averages are 1,579 calories and 46 g of proteins against 1,165 calories and 27 g of proteins in the outskirts. In the center, rice is the first carbohydrate, followed by bread, cassava, maize, and sugar while in the periphery maize is predominant followed by cassava, rice, bread and sugar.

On the average, 64.5% of the inhabitants of Kinshasa spend less than 0.5 US\$ per day for their food; 27.5% spend between 0.5 and 1 US\$ and 8% spend 1 US\$ or more. The dwellers of the periphery are significantly poorer than those living in the center. And this is reflected in the food consumption patterns. Most often the quantitative aspect of food consumption is more important than any other food consideration.

The results of a similar survey carried out in Lubumbashi (over a sample of 1250 households selected from all the 42 districts of the city) indicate an average daily food consumption of 1,335 calories and 40.5 g of proteins per person (the average household size is 7.5 persons). In Lubumbashi, maize flour is the major source of calories (75%) while cereals provide 70% of proteins. Cassava leaves are the major vegetable of the population. Apparently, 80% of maize flour is imported from the south of the continent, as well as beans (90%) and groundnuts (70%).

In Kikwit, the results of a similar survey revealed a daily consumption per person of 1,835 calories and 32.6 g of proteins. Cassava provides 49% of calories and maize 18.3%. Palm oil is very important and provides 16.5% of calories.

In the region of Kindu under military occupation (mayi-mayi), results from a small survey indicate a daily consumption of only 1,116 calories and 22.4 g of proteins (the average household size is 10 persons). The food intake (eaten once per day) is made up mainly of cassava paste and leaves of cassava.

4. Nutritional surveys

Additional information on food security is obtained from surveys organized particularly on women's and children's nutritional status, mostly by the Ministry of Health, donors and NGOs. In general, those studies are organized in the city of Kinshasa or one of its districts. But more and more surveys of this kind are being organized in the regions previously under military occupation.

These surveys are usually undertaken on (small) samples that do not adequately represent the population under study. Nonetheless, they provide "instantaneous images" on the status of food security in a given group of population (in general vulnerable) at a given point in time and can be used to obtain indicators that are alarming enough to launch an intervention or justify its continuation. The only synoptic information at our disposal describes the situation in 2000 and 2001; it is presented in Table 2. The main results are :

- global rate of malnutrition among children under 5 years ranges from 10 to 20% for the districts of Kinshasa, while it is higher in the zones previously under

military occupation. This indicates the existence of serious nutritional problems; but this situation has been already like this in Kinshasa for 5 to 10 years

- severe malnutrition is the most alarming indicator as it negatively affects children's growth as well as their future intellectual capacity. In Kinshasa, the rate of malnutrition is less than 3%; though unexpectedly low, this rate is still alarming. However, it has not changed since 10 years suggesting the existence and efficacy of coping strategies against malnutrition (Kankonde and Tollens, 2001). Inside the country about 25.8% of children are experiencing severe malnutrition. The situation is even more dramatic in the zones formerly under military occupation. But the situation can be rapidly improved if the communication ways are opened up and if the economic activity recovers to its former rhythm.

Nonetheless, a certain assistance is certainly needed to start up and give new impetus to the economy. Without a minimum of basic capital, vulnerability will persist and the population will remain very susceptible to external changes and shocks. The challenge is mostly to make a harmonious transition between humanitarian aid and aid to development.

The last nutritional survey at our disposal is part of MICS2 for 2001 (Ministère du Plan et de la Reconstruction et al., 2000) which covers the entire national territory (9454 children) and whose objective is to determine the nutritional status of children and women. It has been carried out under the supervision of UNICEF and substantially funded by USAID. The results are compared to those of the similar "Enquête Nationale sur la Situation des Enfants et des Femmes (ENSEF)" of 1995. Three conventional anthropometric indicators have been selected: growth retardation

(height/age) (chronic malnutrition), emaciation (acute malnutrition) (weight/height) and weight insufficiency (weight/age).

From the analysis of the data collected, it can be said that the nutritional situation in the DRC remains very critical. The estimated indicators show either stagnation or a deterioration of the situation.

Concerning the nutritional status of children under age 5, a profound deterioration in terms of acute malnutrition and stagnation in terms of growth retardation and weight insufficiency has been observed.

- the predominance of moderate and severe chronic malnutrition (or growth retardation) is 38.2%, of which 20.3% is severe growth retardation;
- the predominance of moderate and severe acute malnutrition (+ oedema) is in the range of 16.9%, of which 6.6% is severe malnutrition (almost a million children);
- moderate and severe weight insufficiency affects 36.1% of children, of which 9.4% are severely affected, i.e. 976,706 children.\

Table 12: Survey results on malnutrition in D.R.C.

Province	Localisation	Age	Global	Severe ⁴	Date	Source
City Kinshasa	of Kimbanseke Commune	<5	12.2 %	2.6 %	Feb 2001	ACF-USA
	Selembao Commune	<5	12.0 %	2.6 %	Feb 2001	ACF-USA
	Kisenso Commune	<5	9.4 %		Feb 2001	ACF-USA
	Masina (Tshimungu)	commune <5	11.3 %		Ap 2001	SC UK
	Kimbanseke (Lobiko)	Commune <5	18.3 %		Ap 2001	SC UK

⁴ Severe malnutrition : children at <-3 standard deviations of the median of the reference population

Bas-Congo	Luozi	<5	4.6 %	1.3 %	Mar 2001	MSF-B
	Mangembo	<5	5 %	0.8 %	Mar 2001	MSF-B
Bandundu	No data					
Kasaï Occidental	Demba	<10	30 %	10 %	Dc 2000	Demba Hôpital
Kasaï Oriental	No data					
Equateur	No data					
Province Orientale	Rimba (Ituri)	<5	8.57 %	2 %	Mar 2001	COOPI
		>5	3.2 %	1.28 %		
	Nioka	<5	10.4 %	15.12 %	Mar 2001	COOPI
		>5	12.6 %	22.78 %		
	Kisangani	<5	9.1 %	1.7 %	Not known	MSF-H
Nord Kivu	Goma Health Zone	<5	9.3 %	0.9 %	Dec 2000	SC UK
	(6 Health zones)		29.3 %	11.9 %		
	Kayna	<5	29.4 %	14.3 %	Mai June 2001	Solidarités
	Kibabi (Masisi)	<5	5.7 %	1.3 %	Sept 2000	SC UK
	Kirolirwe (Masisi)	<5	6.7 %	0.3 %	Nov 2000	SC UK
Sud Kivu	Bitobolo/Bunyakiri (*)	12-59 Mths mois	41.1 %	17.1 %	Dec 2000 Jan 2001	SC UK
Maniema	Kalima	<5	14.1 %	8.1 %	Jan 2001	Merlin
N. Katanga	Kalemie town	<5	7 %	4 %	Aug 2000	Nuova Frontiera
	Nyunzu	<5	21.7 %	12.2 %	Sep 2000	Nuova Frontiera
	Kioko	<5	14 %	9.2 %	Sep 2000	Nuova Frontiera
	Manono	<5	23.23 %	19.87 %	Mar 2001	Nuova Frontiera
	Kiambi	<5	32.07 %	25.79 %	Mar 2001	Nuova Frontiera

This represents the majority of nutritional surveys carried out in DRC in 2000 and 2001

(*) Global malnutrition rate recorded by SC UK during a vaccination campaign in Bunyakiri, South Kivu. The methodology used was a first screening using MUAC and oedema detection. No anthropometric measurements were taken.

Source: Anonymous, 2001

When considering the weight insufficiency as the simplest and the most classic indicator of global malnutrition (which reflects both past and present effects), it can be said that there is a slight diminution of the magnitudes of its rates since 1975. This is confirmed for two rates (severe level) as indicated in table 13. There has been a significant deterioration of the acute malnutrition since 1995 as the rate (severe level) passed from 3.5 to 6.6. For the moderate level, the rate has increased from 6.1 to 10.3. The proportion of children with oedema (sign of kwashiorkor -lack of proteins in the diet) is currently of 3.7% against 2% in 1995.

Table 13: Rates of severe malnutrition in DRC in 1995 and 2001

<u>Type of malnutrition</u>	<u>1995</u>	<u>2001</u>
Chronic malnutrition (height/age)	24,6	20,3
Acute malnutrition (weight/height)	3,5	6,6
Global malnutrition (weight/age)	10,2	9,4

Source: Ministère du Plan et de la Reconstruction et al., 1992

The distribution of global malnutrition (weight insufficiency) according to province and residential area is presented in Table 14.

Table 14: Distribution of global malnutrition according to provinces and areas of residence (children <5 ans - ratio weight/age)

Province/area of residence	Malnutrition		
	Mild	Moderate	Severe
Province			
Kinshasa	29,0	14,2	4,2
Bas-Congo	33,2	13,7	10,8
Bandundu	31,8	23,7	10,7
Equateur	30,8	22,6	8,8
Province Orientale	32,7	19,2	7,1
Nord Kivu	30,7	25,7	7,9
Sud Kivu	31,3	21,8	13,3
Maniema	24,6	28,4	9,1
Katanga	28,9	21,4	11,5
Kasaï Oriental	28,1	20,4	9,5
Kasaï Occidental	28,6	23,6	10,1
Area of residence			
Urban	29,0	16,9	5,1
Rural	30,8	24,0	11,5

Source: Ministère du Plan et de la Reconstruction et al., 1992

The provinces of Sud Kivu and Katanga are the most affected (severe level) while Kinshasa is less affected with a rate of 4.2. Rural areas are much more affected for the three levels of malnutrition.

In conclusion, acute malnutrition (weight/height) is predominant and much higher (almost twice) in 2001 than in 1995. Most children are affected by the resurgence of kwashiorkor - lack of proteins in the diet. This is certainly linked to the war as well as to insecurity and the increasing poverty among parents who cannot afford to buy proteins (groundnuts, beans, meat, fish, and milk) for their children. The total number of children suffering from acute malnutrition (moderate and severe rates, and with

oedema) is close to 2 millions. This calls for urgent interventions for their recuperation and recovery.

Other indicators estimated show that:

- the nutritional status of mothers is also critical; about 17.6% of them are suffering from insufficiency of body mass index (BMI);
- no progress has been observed about the nutrition of new-born babies and infants; the weight insufficiency at birth is critical denoting a problem of public health. About 10.7% of new-born babies weigh less than 2.5 kg;
- significant progress has been realized concerning the consumption of iodized salt ; here the objective of the world summit has been achieved. About 92.9% of households consume iodized salt though for 21.42% of them, the salt is not sufficiently iodized;
- efforts are being made (though still insufficient) concerning the supplementation in vitamin A;
- only 20% of women are supplemented within 8 weeks after delivery ;
- the proportion of children between 6-59 months supplemented within the last six months preceding the survey is 11.5%.

In conclusion, except for the consumption of iodized salt for which spectacular progress has been achieved, the nutritional status has deteriorated especially concerning the level of acute malnutrition, mothers' BMI insufficiency and weight insufficiency at birth. Rural areas are the most affected and families are paying a heavy price.

5. Conclusions

Eating in DRC is a daily challenge for Congolese, more now than ever before. It is more a problem of generalized poverty and low purchasing power rather than the failure of the agricultural sector. The situation on the ground is undoubtedly more difficult than indicated by statistics and surveys. But Congolese have become specialists in devising coping strategies and facing unexpected shocks and hazards. Recourse to the informal sector and coping abilities of Congolese are apparently an inexhaustible source of means of survival in the DRC. This is often beyond the understanding according to the Cartesian way of thinking which characterizes European cultures. But with the end of the war, the time has come when all efforts must be put together towards sustained development in order to reach acceptable economic growth rates.

At the current stage of economic development in the DRC, agriculture is still the sector which offers the best perspectives for sustained economic growth which benefits the majority of the population. No other sector can employ as many people and provide as much real wealth as the agricultural sector. Relatively few means are relatively needed in order to relaunch the agricultural sector and make it contribute significantly to economic growth: a favorable macroeconomic context, free circulation of persons and goods, transport infrastructure, improved planting material, a minimum of agricultural extension,.... A general consensus on policies and actions to be taken arrived at through a debate among Congolese would be the best guarantee for successful economic growth. But the international community must also express its solidarity and share a little bit of its wealth in order to consolidate peace and

stability in Central Africa and make a new beginning possible in this part of the continent.

We should recall that according the commitment of the international community and following the 2015 SMA objective, DRC is the first country for which the food security situation has to be improved as it is the country where food security has the most deteriorated since 1990-92. This can leave no one indifferent.

References

Anonymous, “No End in Sight-The human tragedy of the conflict in the Democratic Republic of Congo”, Save the Children-Oxfam-Christian Aid, Kinshasa, August 2001.

BESCOPLAN/GRET, Analyse des effets de l'état des routes de desserte agricole sur l'économie alimentaire à Kinshasa, Programme d'Appui à la Réhabilitation, Volet 1 - Infrastructures de Base, Rapport Final, Fonds Européen de Développement, septembre 2000.

CEPLANUT, Enquête nutritionnelle et de consommation alimentaire dans la ville de Kinshasa, Enquête réalisée avec l'appui financier de la Coopération Italienne, juin 2000.

DE HERDT, Tom, Surviving the transition - Institutional Aspects of Economic Regress in Congo-Zaire, Proefschrift, UFSIA, Faculty of Applied Economics, Antwerp, May 2000.

FAO, Informations sur la sécurité alimentaire en RDC, Nr. 20 et 21, 2001 et Nr. 25, 26 et 27, 2002, Kinshasa.

- FAO, Crop and Food Supply Situation in Kinshasa and the Provinces of Bas-Congo and Bandundu of the Democratic Republic of Congo, Special Report, GIEWS, 8 November, 2000, Rome.
- FAO-UNFPA-IIASA, Potential Population Supporting Capacities of Lands in the Developing World, Rome, Project INT/75/813, 1984.
- FAO, The State of Food Insecurity in the World, 2001 and 2002, Rome.
- FRESCO, L., Cassava in Shifting Cultivation, A Systems Approach to Agricultural Technology Development in Africa, Royal Tropical Institute, Amsterdam, 1986, 240 p..
- GOOSSENS, Frans, Cassava Production and Marketing in Zaïre, Leuven University Press, Leuven, 1996, 178 p..
- GOOSSENS, F., B. MINTEN and E. TOLLENS, Nourrir Kinshasa: L'approvisionnement local d'une métropole africaine, L'Harmattan, Paris, 1994, 397 p..
- HOUYOUX, Joseph, Budgets ménagers, nutrition et mode de vie à Kinshasa, Presses Universitaires du Zaïre, 1973, 300 p..
- HOUYOUX, Joseph et N. KINAVWUIDI, Kinshasa 1975, B.E.A.U., Département des travaux publics et de l'aménagement du territoire, Kinshasa, 1975, 287 p..
- HOUYOUX, Joseph, Consommation de produits vivriers à Kinshasa et dans les grandes villes du Zaïre, B.E.A.U., Département des travaux publics et de l'aménagement du territoire, Kinshasa, novembre 1986, 59 p..
- HOUYOUX, Joseph, KINAVWUIDI, N. et O. OKITO, Les budgets des ménages à Kinshasa, B.E.A.U., Département des travaux publics et de l'aménagement du territoire, Kinshasa, 1986, 69 p..
- IFAD, Assessment of Rural Poverty - Western and Central Africa, Rome, 2001.

- KANKONDE, Mukadi et Eric TOLLENS, ed., Sécurité Alimentaire au Congo-Kinshasa, Production, Consommation et Survie, L'Harmattan, Paris, 2001, 478 p..
- KUPAY, Félix, Approvisionnement de Kinshasa par le Fleuve, Etude des manifestes de navigation entre 1996 et 2001, non-publié, GRET, 2001.
- LE VOYAGEUR, Prix à Kinshasa au plus bas: Disponibilité des produits agricoles dans les marchés de gros de Kinshasa, Bulletin de l'UACTB no 04, Kinshasa, 20 août, 2002 et no 07, Kinshasa, 6 décembre 2002.
- Ministère de la Santé, Ministère du Plan et de la Reconstruction, UNICEF, USAID, Enquête MICS2 sur la situation des enfants et des femmes en R.D.C. (2001), Vol. III, Rapport provisoire, février, 2002.
- NACKERS, F., sous la direction du Prof. M. MALENGREAU, La sécurité alimentaire dans les ménages de Kinshasa, Rapport final, Université Catholique de Louvain, Ecole de Santé Publique, Unité d'Epidémiologie, Louvain-la-Neuve, décembre 1999.
- NKWEMBE Unsital Guy-Bernard, Evolution de la consommation alimentaire au Congo-Kinshasa pendant la période de transition: Essai d'une analyse pour une sécurité alimentaire durable, Mémoire du Diplôme d'études spécialisées en Economie Rurale, Louvain-la-Neuve, septembre, 2002, 79 p..
- OCHA, Chronicles of a humanitarian crisis-year 2000, Democratic Republic of the Congo, Office for the Coordination of Humanitarian Affairs, March 2001.
- OCHA, Ateliers thématiques nationaux; Atelier no 2: Sécurité Alimentaire dans un Contexte de Crise, Kisangani, 07-09 mai, 2002 - Rapport Général, Kinshasa, juillet, 2002.

- SHAPIRO, David and Eric TOLLENS, *The Agricultural Development of Zaïre*, Avebury, Aldershot, 1992, 201 p..
- TOLLENS, Eric, *Estimation of Production of Cassava in Bandundu (1987-1988) and Bas-Congo (1988-1989) Regions, as compared to official R.D.Congo Statistics*, FAO expert consultation on root crop statistics, Statistics Division (ESS), Harare, 3-6 décembre, 2002.
- TOLLENS, E., *Cassava Marketing in Zaïre, An Analysis of its Structure, Conduct and Performance*, in *Traditional marketing systems: proceedings of an international workshop*, ed. Georg BOKELOH, Norma LANGE, Stefan SCHAD, Feldafing, July 6th to 8th, 1992, pp. 113-127.
- TOLLENS, Eric, *Food Security: Incidence and Causes of Food Insecurity among Vulnerable Groups and Coping Strategies*, CTA Seminar on Food Insecurity in ACP countries: Policy and Program Interventions Affecting Vulnerable Groups, Leuven, 26-30 October, 1998.
- TOLLENS, Eric, "Food Security in Kinshasa: Coping with Adversity" in: "Re-inventing Order in Kinshasa", T. TREFON, ed., forthcoming.

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(Deuxième version, septembre 1996, 32 p.)
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