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MAIZE COMMODITY ASSESSMENT AND WORKPLAN RELATED TO MAIZE

KINSHASA, JULY 31, 2011

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FOREWORD

This report is part of a larger round of diagnostic studies being done under the framework of the USAID Food Production, Processing and Marketing Project (FPPM). It addresses the grain legume value chain, covering the main grain legume crops in the FPPM focus areas of Bas Congo and Bandundu Provinces. The purpose of this study is to present a rapid assessment of the major dynamic trends and constraints in the grain legume value chain to aid in the targeting of FPPM project interventions. The study focus on a subset of the principal grain legume crops in the Kinshasa market shed, in particular beans (*phaseolus vulgaris*), groundnuts and soybeans.[1]

The field work for this study was completed during a three week period in June 2011 with short trips into Bandundu province (Kikwit and Idiofa) and the Bas Congo (Mbanza-Nhungu, Kisantu and Luozi-Nkundi) and market visits in Kinshasa to interview a subsection of farmers, seed multipliers, traders, NGO extension workers, and agricultural research scientists. The methodology followed is that of a rapid appraisal, combining expert and participant interviews with analysis of available secondary sources and statistics. The report format follows the classic value chain outline. In contrast to most value chain studies, however, there is less attention focused on the quantitative analysis of end markets due to the absence of reliable statistics on grain legume production, prices and flows of product within the Kinshasa market shed focus of the FPPM project. Normally a study of this type would present an estimate of total annual consumption of grain legumes in Kinshasa, with calculations showing the percentage of that consumption coming from the main areas of production. Due to a lack of household consumption studies showing grain legume consumption in Kinshasa,[2] along with reliable regional production/consumption/surplus estimates, we are simply unable to provide such an estimate.

[1] Cowpeas (*niebé*) are also an important grain legume crop, especially in Bandundu Province. Although these were not a principal focus of this study, many of the main conclusions for beans and groundnuts can also be applied to cowpeas.

[2] The most recent consumption survey of households in Kinshasa, the Enquete 1-2-3, Phase 3 in 2004 did not collect data for any grain legumes. Annual food availability calculations from the Food Availability Balance Sheet would indicate an annual average consumption per cap of XXX Kg per year.

ABBREVIATIONS

ADB	African Development bank
ADEC	Association pour le Développement Coopératif (in the ISCO project)
BCC	Banque Centrale du Congo
BM	Banque Mondiale
CARG	Conseil Agricole et Rural de Gestion
CATALIST	Projet de IFDC dans la Région des Grands Lacs
CDI	Belgian NGO; Centre de Développement Intégral Bwamanda
CDF et FC	Franc Congolais
CIALCA	Consortium for the Improvement of Agricultural Livelihoods in Central Africa
CIF	Cost, Insurance & Freight included
CIMMYT	International Maize and Wheat Center
CLER	Comité Local d'Entretien Routier (supported by CTB)
CNONG	Conseil National des ONG
COPROSEM	Conseil Provincial de Sermences
CRONG	Conseil Regional des ONG
CTB or BTC	Coopération Technique Belge
CVD	Comité Villageois de Développement (projet ISCO)
DGD	Directorate General for Development Cooperation (Belgium)
DRC	Democratic Republic of Congo
EC	European Commission
FAO	United Nations Organization for Food and Agriculture
FC	Franc Congolais ; 930 FC = 1 US$
FFS	Farmer Field School
GOZ	Government of the DRC
GRET	Groupe de Recherche de Transfert de Technologie
ICA	Impôt sur le Chiffre d'Affaires
ICRAF	World Agroforestry Center

IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
INERA	Institut National d'Etudes et de Recherches Agronomiques
INS	Institut National de la Statistique
IRM	Innovative Resources Management
ISCO	Italian NGO (Impresa Servizi Coordinati) based in Venise active in Bandundu
ISFM	Integrated Soil Fertility Management
MIDEMA	Minoterie de Matadi
MIS	Market Information System
MLDK	Marché de la Liberté Mzée Laurent Désiré Kabila
MONUSCO	Mission des Nations Unies au Congo
MYD	Mama Yedu Développement
NGO	Non Governmental Organization
OCC	Office Congolais de Contrôle
OFIDA	Office des Douanes et Accises
OP	Organisation Paysanne
PAB	Programme Agricole Bandundu (financed by the EC)
PAM	Programme Alimentaire Mondial (WFP)
PARSAR	Projet d'Appui à la Réhabilitation du Secteur Agricole et Rural dans les provinces du Bas-Congo et Bandundu (financing of ADB)
PIC	Programme Indicatif de Coopération (DGD Belgium)
PDDAA	Programme Détaillé pour le Développement de l'Agriculture en Afrique
PRSP	Poverty Reduction Strategy Paper (DSRP in French)
QPM	Quality Protein Maize (high in lysine and methionine)
RDC	République Démocratique du Congo
PRRO	Protected Relief and Recovery Operations (WFP)
SENAFIC	Service National des Fertilisants et Intrants Connexes
SENASEM	Service National Semencier
SNSA	Service National des Statistiques Agricoles
SNV	Service national de Vulgarisation

UE	Union Européenne
UNIKIN	Université de Kinshasa
USD ou $	Dollar des Etats-Unies
WFP	World Food Program

EXECUTIVE SUMMARY

This report concerns a maize commodity assessment in the FPPM project area (Bas-Congo, Kinshasa and Bandundu) and a proposed outline of a workplan related to maize. Maize is by far the most important cereal crop produced and consumed in the DRC. Maize has many advantages: a short 3 to 4 month growing period, easy harvesting and processing, easy conservation, responsive to fertilizer applications, no major diseases or pests devastating the crop. Moreover, together with the major food staple in the DRC which is cassava, maize flour is now commonly mixed in the main dish ("fufu"). Maize is also consumed fresh as a snack food (on the cob). It is roughly estimated that maize consumption per capita has tripled in Kinshasa since a decade. In addition, maize is the main cereal used in animal feed, especially for poultry, for which the market is growing fast in the DRC. Maize imports for the Kinshasa market are also growing, especially from the major (wheat) miller and animal feed manufacturer, MIDEMA, and from the WFP for food aid (corn-soy blends).

Maize in the project area is mainly produced for the market without any external inputs by smallholder farmers in Kwilu district on the more fertile soils, especially in the Karroo valleys. Maize is also grown more and more on the Bateke plateau near Kinshasa by often large commercial farms, which usually use some external inputs (seeds, fertilizers). The focus of the project is however on the many resource poor smallholder farmers (mainly women). Unfortunately, very little maize research was carried out in the DRC in the last decades. No multilocational variety or fertilizer trials were done in farmers' fields. Thus, no on-the-shelf technologies ready for large scale extension are available. The two dominant composite varieties which are grown (Kasai I and Samaru) were released from the P.N.M. (USAID financed) more than two decades ago and are probably degenerated. No commercial seed firms selling maize seed in the project area exist, although there are now SENASEM supervised and accredited agro-multiplicateurs which produce on demand. Lack of improved seeds and appropriate fertilizers are a major constraint on improving maize growing. Post-harvest problems are mainly insufficient drying which lowers the quality, weevil problems and lack of smallscale maize mills. There are some farm organizations in the project area but they are still poorly organized and weak.

The primitive "sui generis" marketing system relies on thousands of par-colis traders which buy 10 to 20 sacks of maize in the villages, rent a place on a truck or a boat with their colis and travel for several days from Bandundu or from Bas-Congo to Kinshasa semi-wholesale markets where they sell to women retailers, sack by sack. No weights are used and no grading takes place. There is a lot of risk in trading maize, there is lack of commercial credit, lack of specialization and lack of economies of scale. It is a real challenge to introduce institutional innovations in that system that improve efficiency and market performance. This is a major challenge for the project.

This report presents at the end input for the finalization of the workplan related to maize. Priority actions are listed which follow from the assessment. However, it appears that no quick wins or fast impact actions are available as maize production and marketing in the project area has been neglected by the government of the DRC and donors for more than two decades.

RÉSUMÉ EXÉCUTIF

Ce rapport concerne l'évaluation de la situation du maïs dans la zone du projet FPPM (Bas-Congo, Kinshasa et Bandundu) et les grandes lignes d'un plan de travail par rapport au maïs. Le maïs est de loin la céréale la plus importante produite et consommée en RDC. Le maïs a plusieurs avantages: une période de croissance de seulement 3-4 mois, une récolte et traitement post-récolte facile, une conservation aisée, une bonne réponse aux applications d'engrais, pas de maladies et pestes majeures. De plus, ensemble avec la nourriture de base qui est le manioc, la farine de maïs est maintenant couramment mélangée dans le plat principal («fufu»). Le maïs est aussi consommé frais comme épi de maïs bouilli ou grillé. Il est estimé grossièrement que la consommation par tête a triplé à Kinshasa depuis une décade. En plus, le maïs est la principale céréale utilisée dans l'alimentation animale, spécialement pour les poules, pour lesquelles le marché croit très vite. Les importations de maïs pour le marché de Kinshasa augmentent également très rapidement, particulièrement pour la principale meunerie (surtout du blé) et usine d'aliments de bétail, MIDEMA et pour le PAM comme aide alimentaire (maïs et soja).

Le maïs dans la zone du projet est principalement produit pour le marché, sans intrants externes, par des petits paysans familiaux dans le district du Kwilu sur les meilleurs sols, surtout dans les vallées du Karroo. Le maïs est aussi cultivé de plus en plus sur le plateau des Bateke près de Kinshasa par des fermes commerciales de moyenne à grande dimension, qui normalement utilisent des intrants externes (semences, engrais). La cible du projet est néanmoins la grande masse de petits producteurs sans ressources (majoritairement des femmes). Malheureusement, très peu de recherches sur le maïs ont été faites en RDC depuis deux décennies. Il n'y a pas eu d'essais multilocaux sur des variétés ou d'engrais en milieu paysan. Il n'y a donc pas de technologies prêtes à être diffusées en milieu rural. Les deux principales variétés composites qui sont largement cultivées (Kasaï I et Samaru) ont été introduites par le P.N.M. (financé par l'USAID) il y a plus de vingt ans et ces variétés sont probablement dégénérées. Il n'y a pas de firmes commerciales qui vendent des semences dans l'aire du projet, mais il y a maintenant des agro-multiplicateurs qui produisent des semences sur commande, supervisés et contrôlés par le SENASEM. Le manque de semences améliorées et d'engrais appropriés sont une contrainte majeure pour l'amélioration de la culture du maïs. Les problèmes post-récolte concernent surtout le manque de séchage adéquat, qui mène à une mauvaise qualité, et le problème d'attaque de charançons et le manque de moulins à maïs dans les villages. Il existe des organisations paysannes dans la zone du projet mais elles sont généralement mal organisées et faibles.

Le système de commercialisation «sui generis» qui existe dépend de milliers de petits commerçants par-colis qui achètent 10 à 20 sacs de maïs dans les villages, louent une place sur un camion ou bateau ensemble avec leur colis et voyagent sur Kinshasa, pendant au moins 3-4 jours pour Bandundu et un jour pour le Bas-Congo, où ils vendent sac par sac à des femmes détaillantes dans des marchés demi-gros. Ils n'utilisent pas de poids ou mesures et il n'y a pas de classification de qualités. Le commerce est caractérisé par beaucoup de risque, manque de crédit commercial, manque de spécialisation et d'économies d'échelle. C'est un vrai défi pour le projet d'introduire des innovations institutionnelles dans ce système afin d'améliorer la performance du système de commercialisation.

Le rapport présente également à la fin une introduction pour l'élaboration du plan de travail sur le maïs. Des actions prioritaires sont listées qui proviennent de l'évaluation précédente. Néanmoins, il apparait qu'il n'y aura pas de gains rapides ou d'impacts majeurs à court terme sur la production et la

commercialisation du maïs. Ceci est due à la négligence du secteur du maïs depuis plus de deux décennies par le gouvernement et les bailleurs.

FIGURE 1: POPULATION DISTRIBUTION IN THE DRC

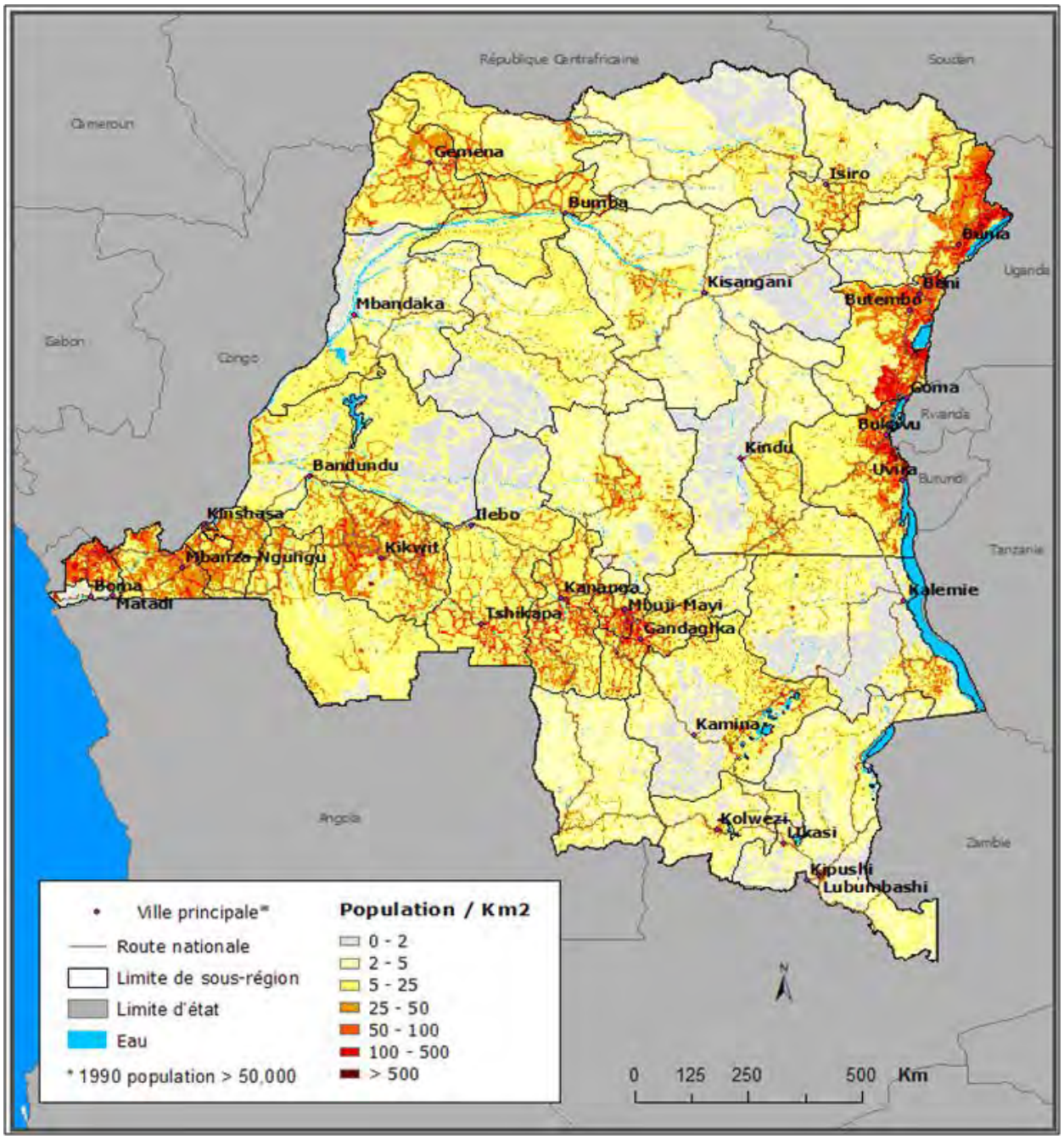


FIGURE 2: VEGETATION MAP OF THE DRC

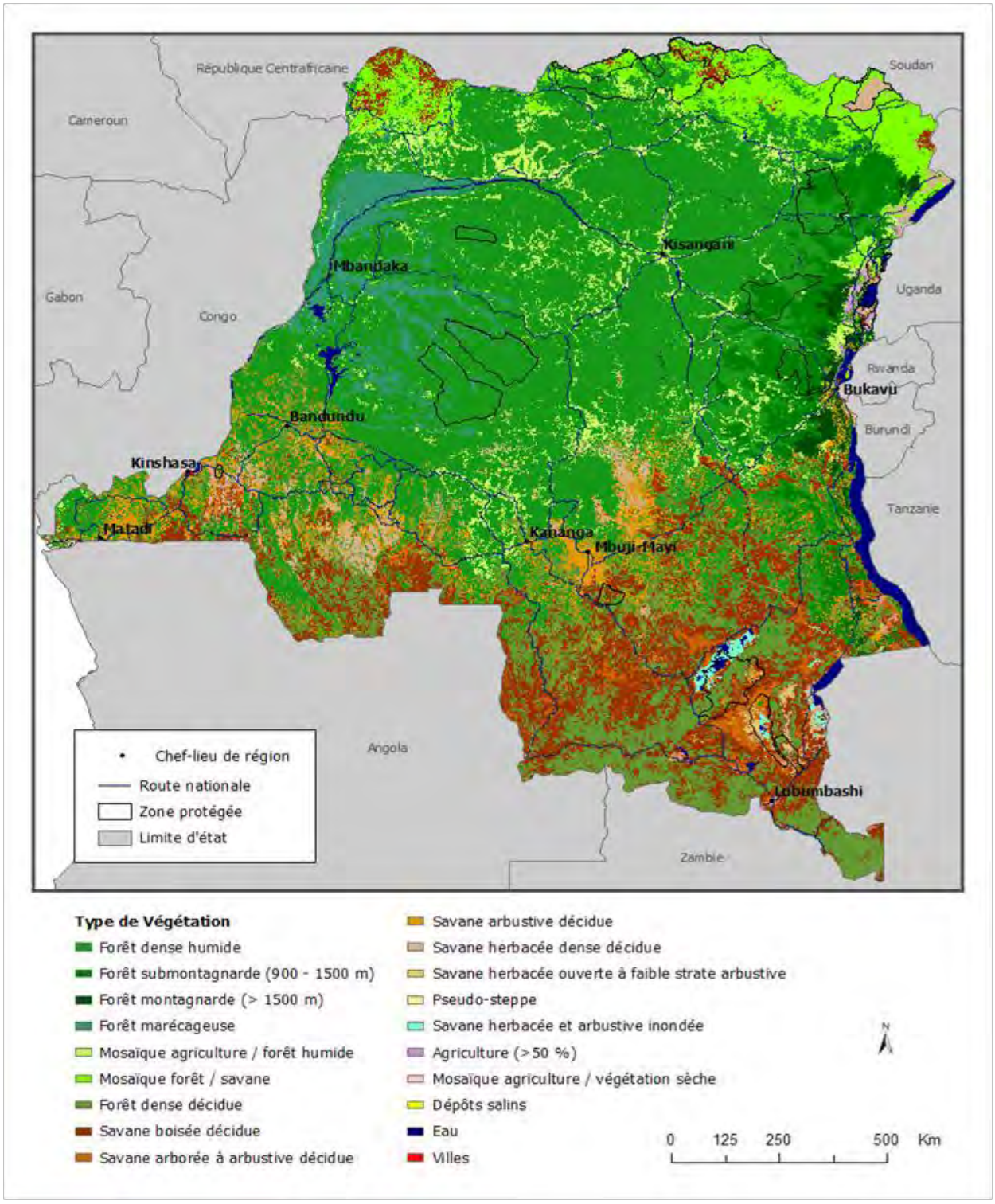
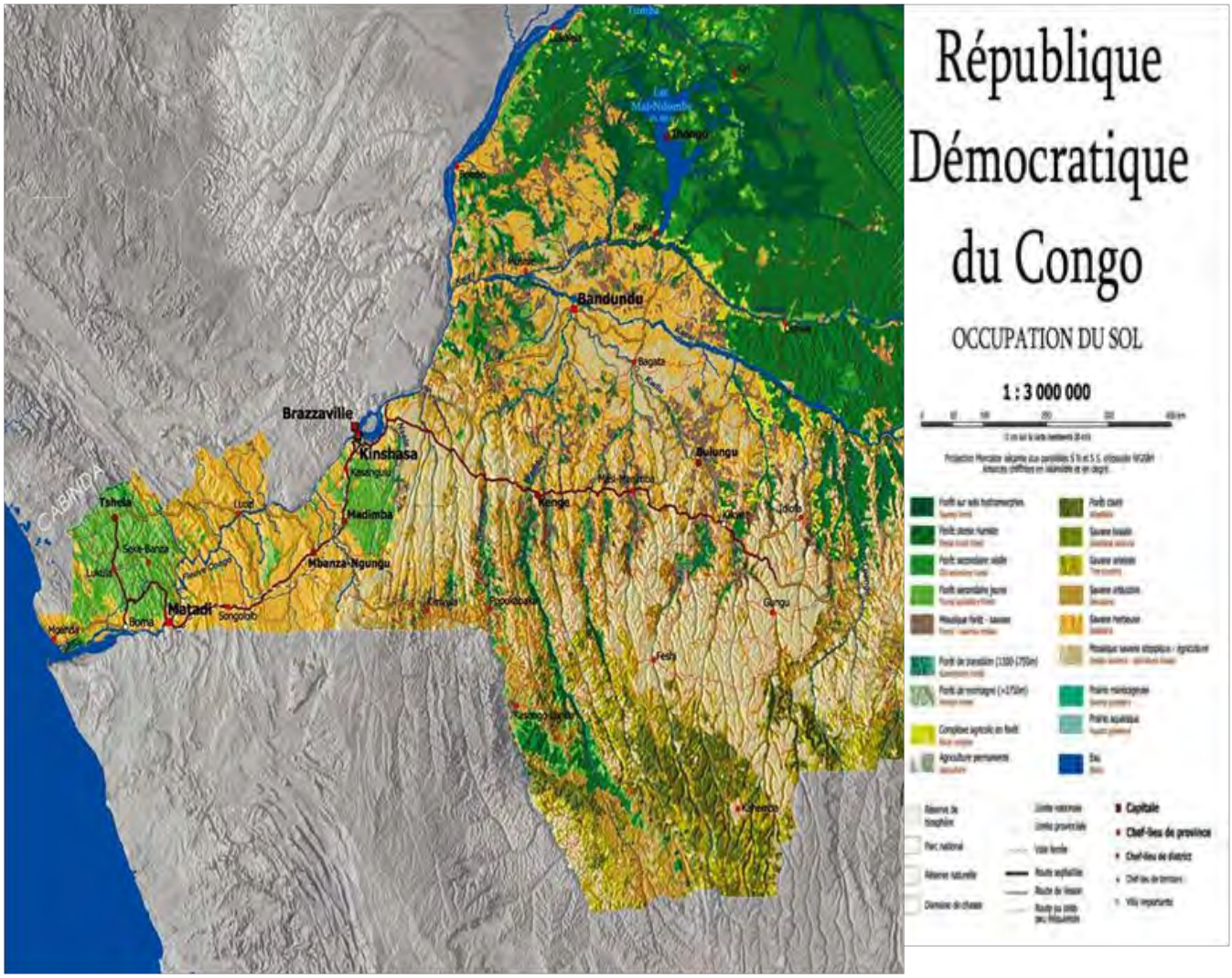


FIGURE 3: MAP OF THE PROJECT AREA (LAND USE)



1. IMPORTANCE OF MAIZE IN THE PROJECT AREA AND IN KINSHASA

Maize is the most important cereal grown in the DRC, far ahead of rice. Over the last two decades, all indications are that maize has been gaining in importance in Kinshasa food and feed markets. Nowadays, the main food dish - fufu- is usually a mixture of cassava and maize flour. Even to the point that fufu that does not contain maize flour is stigmatized as being from very poor people. Twenty years ago, fufu was pure cassava flour. Why have consumption habits changed so much? What are the driving forces? There are several factors.

- people from Kasai and Katanga usually have as major food staple white maize prepared as a porridge or pasta known as bidia. As people from that origin are everywhere in Kinshasa and intermarry with people from other regions, maize flour in the main dish has become accepted;
- during certain periods of the year when cassava prices are seasonally high, e.g. October-December because of the major wet season which makes drying of cassava cossettes difficult and costly, with a lot of spoilage, maize flour is cheaper than cassava flour in Kinshasa markets. This is a recent phenomenon;
- cassava production is nowadays subject to many constraints, including recent pests and diseases such as cassava mosaic disease (Uganda type - very virulent) anthracnosis, brown streak, root scale, etc.;
- maize has many advantages as compared to cassava. Maize can be harvested after 3 months and in two seasons per year in Bandundu, season A + B, as compared to cassava which has a 12-15 months growing period. Harvesting maize is much easier than uprooting cassava roots, which need processing such as soaking, breaking into cossettes and drying. Maize is often conserved on the cob, after sun drying and can be conserved over long periods of time. A cassava crop with a yield of 8 t fresh roots/ha yields about 1.6 t of cassava flour. A maize crop with a yield of 1.5 t/ha gives you 1.3 t of maize flour, which contains more protein and fat and is thus nutritionally much better than cassava, which is almost pure starch, but still rich in calories;
- maize is very fertilizer responsive and with adequate N-P-K fertilizers, 3-4 t/ha can be easily obtained. Thus, doubling and tripling yields with good soil fertility management is easily achieved. Cassava also responds to fertilizers, but in a much less pronounced, and more unpredictable way. Yields can be doubled or tripled, depending on the variety and soil type;
- one advantage of cassava is that it also produces cassava leaves, which are the major vegetable in the DRC, and an important source of proteins in the diet. Trials by IITA show that three times leaves harvesting during the growing period reduces root yields by 50%. Some cassava is only grown for leaves harvesting, particularly in Bas-Congo. According to official statistics, which are not reliable but may still give a trend, cassava production in the DRC has been stagnating around 14 -15 million tons of fresh roots, and even declining in Bas Congo and Bandundu, increasing its price in Kinshasa markets. This is despite large efforts to introduce new varieties by IITA and large efforts since 2003 to distribute

these varieties, financed by major donors (USAID, EC, Belgium, Sweden, etc. via NGOs such as SECID and others). IITA now estimates that about 15% of cassava area is under improved varieties. This is because the multiplication factor for cassava is only about 1:10, i.e. 1 ha of cassava for cuttings allows planting of 10 ha. For cereals such as maize, the multiplication factor is 1:40 to 60 (25 kg of maize seed/ha; yield of 1 tot 1.5 t/ha);

- maize allows transport over long distances; Sizeable quantities of maize arrive at Kinshasa with river boats from Equateur province, particularly from Lisala and Bumba ports (SOCAM, a Greek owned company based in Bumba, sends a lot of maize to Kinshasa). Once maize is properly dried, it can keep for years as grain maize. Cassava cossettes last only a few weeks and cannot be transported from Equateur province to Kinshasa by boat. Cassava from Mai-Ndombe district in Bandundu cannot be transported as cossettes by boat to Kinshasa. It is transported as a wet paste in bulk called bimpuka, which can be processed directly into chikwangue.

White maize such as the Kasai I variety is preferred for mixing with cassava flour although yellow maize such as the Samuru variety is also acceptable, resulting in a creamy colored flour mix. A lot of cassava flour made from cassava chips originating from Bandundu is in any case yellowish, although a premium is paid for white flour, usually originating from Bas-Congo or the Bateke plateau.

Maize is also used in animal feed, particularly for poultry. The largest feed mill is MIDEMA in Kinshasa; the largest and only wheat mill is also MIDEMA, based in Matadi. Compound animal feed production for Kinshasa is increasing as there are a lot of small - and medium scale poultry operations in the vicinity of Kinshasa, mainly for egg production.

In terms of the localization of maize production, official maize production statistics are purely projections for over a decade. Nevertheless, it is believed that about 1/2 to 3/4th of the maize in Kinshasa markets comes from Bandundu, and particularly Kwilu district which is by far the most important, relatively densely populated, with a lot of feeder roads (now being maintained by CTB), and relatively good soils (in Karroo valleys[3]).

The last major SNSA production survey in the provinces was in 1996/1997. The last agricultural census was in 1970. In 2002, 2003 and 2004, FAO financed (TCP/DRC/0168 & TCP/DRC/3001) pilot surveys in Bas-Congo, Bandundu and Kinshasa province on a sample of 100 households per province. See table 1 with the results of these surveys.

TABLE 1: AGRICULTURAL PRODUCTION IN TONS IN BAS-CONGO AND BANDUNDU

	Saison A 2002/2003		Saison A 2003/2004	
	Bas-Congo	Bandundu	Bas-Congo	Bandundu
Manioc amer	405 765	3 520 802	303 881	2 023 754
Manioc doux	247 384	766 872	164 852	1 042 290
Arachide	42 515	129 361	48 382	84 824
Riz paddy	29 979	7 002	26 682	0
Maïs	18 540	250 628	25 960	176 731
Haricot	8 983	21 994	9 496	3 612
Banane plantain	24 762	53 872	14 510	99 253

[3] See Louise O. Fresco, Cassava in Shifting Cultivation – A systems approach to agricultural technology development in Africa, Royal Tropical institute, Amsterdam, 1986.

	Saison A 2002/2003		Saison A 2003/2004	
	Bas-Congo	Bandundu	Bas-Congo	Bandundu
Banane douce	121 539	74 661	126 978	71 989
Feuilles de manioc	0	0	49 539	171 660
Igname	122	11 813	3 178	1 415
Courge	5 368	41 544	1 271	24 563
Patate douce	4 212	10 912	2 552	1 474
Voandzou	0	12 286	0	13 606

Source: Résultats de l'enquête 'Evaluation des récoltes des principales cultures vivrières', campagne agricoles 2002/2003 et 2003/2004, SNSA, Novembre 2004

Figure 4 below shows the same production for Bas-Congo and Bandundu for the same years.

SNSA did conduct small scale sample surveys on production in all provinces of the DRC in 2007/2008, financed by FAO. The results are available for Kinshasa province and Bas-Congo as in Table 2 below, and the results for Bandundu are being corrected as an error was found in the data.

FIGURE 4: PRODUCTION IN TONS OF THE MAIN FOOD STAPLES, BAS-CONGO AND BANDUNDU, 2003/2004

Productions en tonnes de Quelques principales Cultures: Campagne Agricole 2003/2004

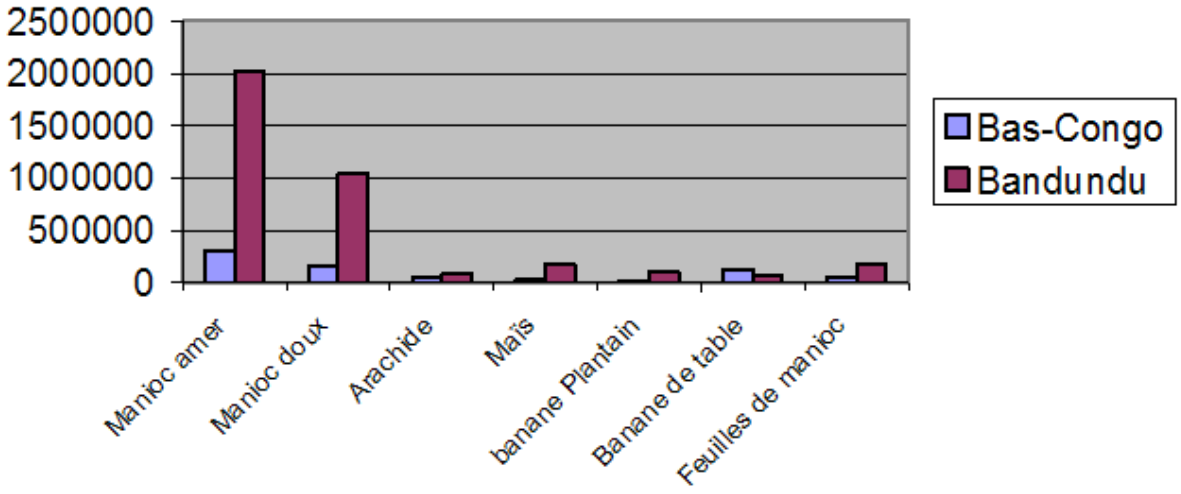


TABLE 2: MAIZE PRODUCTION IN TONS IN KINSHASA PROVINCE AND BAS-CONGO, 2007/2008

	Area	Production
Kinshasa province		
	dense humid subeq. Rainforest	14 755
	savannah – plateau des Bateke	17 587
	Total	**32 341**
Bas-Congo		
	dense humid subeq. Rainforest	6 685
	secondary forest with savannah islands	10 496
	gallery forests	11 686
	Total	**28 867**

Source: SNSA and FAO Urgences OSRO, Kinshasa, December 2008

Sizeable quantities of maize also arrive in Kinshasa from northern Equator province, particularly from small ports such as Mogalo or Akula near Gemena via the Ubangi river, and Lisala and Bumba on the Congo river.

Regarding maize consumption, hereafter follow food consumption data in table 3 from household budget surveys for Kinshasa from 1975 to 2000. Table 4 shows for the year 2000 the contribution of maize in calories and proteins. Maize consumption went from 2.84 kg per capita in 1975 to 6.68 kg in 2000. There are no recent houseld budget consumption data available for Kinshasa, except the Enquête 1-2-3 phase 3 which was conducted by the INS with the support of AFRISTAT in all provinces in preparation of the PRSP document (DSRP in French). In Kinshasa, this survey was conducted in 2004, and we have detailed results for each of the four per capita consumption quartiles (table 5). According to table 5, maize consumption in Kinshasa (36 kg/capita) is more important than cassava consumption (34.9 kg/capita), which is hard to believe.

TABLE 3: ANNUAL FOOD CONSUMPTION IN KINSHASA (KG/CAPITA), 1975-2000

N°	Produits	Années				
		1975	1986	1990	1995	2000
1	Manioc (tubercules)	176,71	165,39	161,84	156,52	145,31
2	Blé (farine)	37,92	32,08	30,37	28,36	26,48
3	Légumes (feuilles fraîches)	24,73	25,03	25,12	24,24	24,35
4	Riz	8,41	12,81	15,41	19,43	21,51
	• riz local (grains)	4,91	7,62	9,26	11,82	13,09
	• riz importé (grains)	3,50	5,18	6,15	7,61	8,42
5	Boissons alcoolisées	31,90	18,42	15,76	12,98	10,69
6	Poissons frais et conserves	11,40	10,97	10,81	10,62	10,43
7	Plantains	3,85	5,39	6,22	7,43	8,89
8	Huiles et autres matières grasses	14,78	10,18	9,08	7,88	6,83
9	Maïs grains	2,84	4,02	4,64	5,57	6,68
10	Laits	1,72	2,83	3,56	4,74	6,32
11	Condiments (sels, piments)	3,46	4,06	4,33	4,70	5,09

N°	Produits	Années				
		1975	1986	1990	1995	2000
12	Poulets	1,90	4,51	7,23	6,03	4,48
13	Sucres	6,59	5,12	4,72	4,27	3,86
14	Viande bovine	6,53	4,67	4,21	3,70	3,26
15	Haricots	5,02	3,97	3,68	3,34	3,03
16	Tomates en boîtes	1,39	1,57	1,69	1,74	1,85
17	Citrons divers	1,12	1,25	1,30	1,38	1,45
18	Oignons	2,29	1,64	1,48	1,30	1,14
19	Bananes douces	1,91	1,48	1,37	1,24	1,12
20	Arachides (coques)	2,79	1,52	1,87	1,05	0,85
21	Poissons fumés, salés, séchés	6,13	1,72	1,32	0,94	0,67
	Autres produits	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) et Nkwembe Unsital (2002)

TABLE 4: ANNUAL PER CAPITA FOOD CONSUMPTION (KG, CALORIES, G PROTEINS), KINSHASA, 2000

N°	Produits	Années 2000		
		KG	Calories	Protéines
1	Manioc (tubercules)	145,31	433,9	3,6
2	Blé (farine)	26,48	268,2	12,9
3	Légumes (feuilles fraîches)	24,35	33,3	3,2
4	Riz	21,51	212,0	4,4
	• Riz local (grains)	13,09	-	-
	• Riz importé (grains)	8,42	-	-
5	Boissons alcoolisées	10,69	9,6	0,2
6	Poissons frais et conserves	10,43	21,7	4,4
7	Plantains	8,89	20,7	0,4
8	Huiles et autres matières grasses	6,83	132,6	-
9	Maïs grains	6,68	65,0	1,7
10	Laits	6,32	14,7	0,7
11	Condiments (sels, piments)	5,09	13,9	0,4
12	Poulets	4,48	24,9	2,5
13	Sucres	3,86	36,1	-
14	Viande bovine	3,26	21,1	1,6
15	Haricots	3,03	27,9	1,6
16	Tomates en boîtes	1,85	2,7	0,2
17	Citrons divers	1,45	1,1	0,0
18	Oignons	1,14	1,1	0,0
19	Bananes douces	1,12	2,6	0,0
20	Arachides (coques)	0,85	6,9	0,4
21	Poissons fumés, salés, séchés	0,67	7,6	1,3
	Autres produits	1,62	10,0	-
Total		**295,91**	**1 367,6**	**38,5**

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

TABLE 5: ANNUAL PER CAPITA CONSUMPTION IN KG, LITER OR UNITS IN KINSHASA OF THE PRINCIPAL FOOD ITEMS ACCORDING TO FOUR INCOME QUARTILES IN 2004

	Quartiles de consommation par tête				
	1er quartile	2ème quartile	3ème quartile	4ème quartile	Ensemble
Maïs secs décortiqués	5,7	11,2	23,3	39,7	17,6
Riz importé	16,0	21,4	30,5	53,5	27,8
Farine de maïs	16,8	19,2	19,4	18,5	18,4
Pain baguette	7,5	13,3	16,1	24,3	14,2
Mpiodi (poisson chinchard)	6,7	12,3	15,1	25,3	13,6
Huile de palme	13,0	16,7	21,0	22,9	17,7
Pondu (feuilles de manioc)	3,2	3,8	4,7	5,9	4,2
Cossettes de manioc	1,5	3,5	10,9	26,4	8,9
Farine de manioc	21,3	28,7	27,8	27,5	26,0
Sucre cristallisé	4,9	9,3	12,4	19,1	10,5

Source: Enquête 1-2-3, phase 3, 2004, Indice des prix à la consommation, INS - Kinshasa, République Démocratique du Congo

Since 1997 when the 3rd Republic started, maize consumption in Kinshasa has about tripled, from about 3 kg/capita/year to 9-10 kg/capita/year and continues to increase. MIDEMA sells 5 kg and 20 kg sacks of maize flour, brand Bonne Etoile, at respectively 4.50 and 17.34 US$ retail (in July 2011). One factor that has stimulated maize flour consumption is that all food aid, including in Kinshasa, is based on maize flour, together with beans and other foods, as cassava flour is never used as food aid.

Chausse J.C., a world bank specialist working on DRC agriculture, estimates that maize consumption in the DRC will increase at 5% per year, as follows: 3% population growth, 3% per year income growth with an income elasticity of demand for maize of 0,33 and the increase in poultry, egg and pork consumption, particularly in cities.

Maize is also consumed a lot on the cob, either boiled or roasted. Along all major roads, fresh cobs are sold and it is an important snack food. In Kwango, maize is often mixed with millet, called mpondo. In Kwango district, millet is even more important than maize. In the DRC, nobody has ever worked on millet improvement.

2. THE PRICE EVOLUTION OF MAIZE AND MAIZE FLOUR SINCE MAY 2008 IN THE PROJECT AREA

We could obtain monthly retail market price data for maize grains and maize flour in the most important cities ("Observatoire urbain") of the project area at FAO Urgences unit[4] (OSRO) for the period May 2008 – May 2011. FAO collects this price data as part of its Early Warning system on food security ("Alerte précoce - enquête de suivi postes sentinelles"). The cities we have are Boma, Matadi, Kinshasa, Bandundu ville and Kikwit. For each city and each market, prices effectively paid by consumers are registered in at least three markets, not the prices listed. Local volume measures are converted in weights by weighing. Every week, prices are recorded. At the same time, the exchange rate FC/$ is noted in these markets. Thus, we have prices in FC and in US$. But as the figures will show, the price evolution is generally the same in local currency FC as in US$. Hereafter, we present the price evolution for maize grains and maize flour in the various cities.

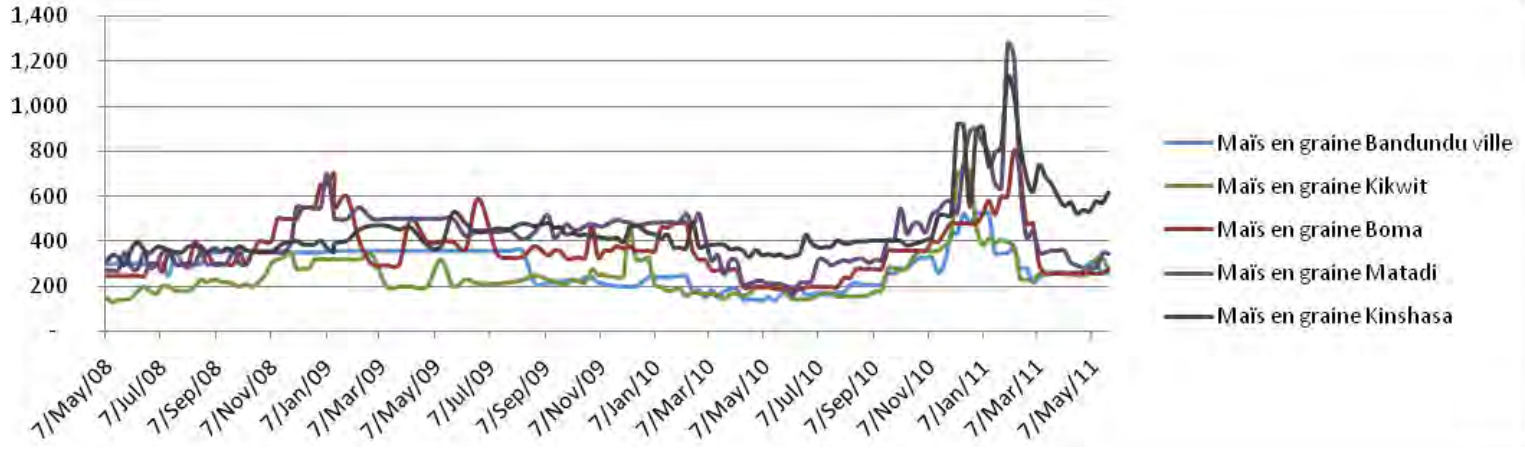
Figure 5 shows the maize grains prices and Figure 6 the maize flour prices. As can be expected, both show exactly the same evolution. Figure 7 shows everything together in one figure for the project area. As can also be expected, maize prices are the lowest in Kikwit, which is in the middle of the main production basin. One would expect maize prices to be the highest in Kinshasa, the main consumption center, but sometimes the prices in Matadi and even more in Boma are higher than in Kinshasa. This is particularly the case around December-January, which is just before the main harvest in February-March. This shows that the port cities of Matadi and Boma must be supplied with maize from other provinces during that period. In fact, maize prices in Matadi and Boma (Figures 9 & 10) are not that different from prices in Kinshasa. Prices are lowest in Kikwit and Bandundu from March to September. It is also during that period that large amounts of maize arrive in Kinshasa from Equateur province (June, July and August). Every year, we see peak maize prices in Kinshasa and in all other cities in the project area in December-January. Prices start to rise in November and remain high till January. On January 5, 2011, maize grain prices in Kikwit reached 0.42 $/kg, 0.58 $/kg in Bandundu, 0.94 $/kg in Matadi, 0.57 $/kg in Boma and 0.99 $/kg in Kinshasa. Thus, around Christmas 2011 and New Year 2011, consumers paid one $/kg for maize grains and 1.14 $/kg for maize flour in Kinshasa. The price for cassava flour during the same time was 0.89 $/kg.

When one compares the prices for maize grains in Kikwit as compared to Kinshasa (Figure 8), in 2011, Kikwit retail prices were on average 43 % of those of Kinshasa, with however wide fluctuations, going from 29 % to 57 %. One can state that Kinshasa prices are on average a little more than double those of Kikwit.

[4] Unité de Coordination des Opérations Agricoles d'Urgence et de Réhabilitation de la FAO en RDC

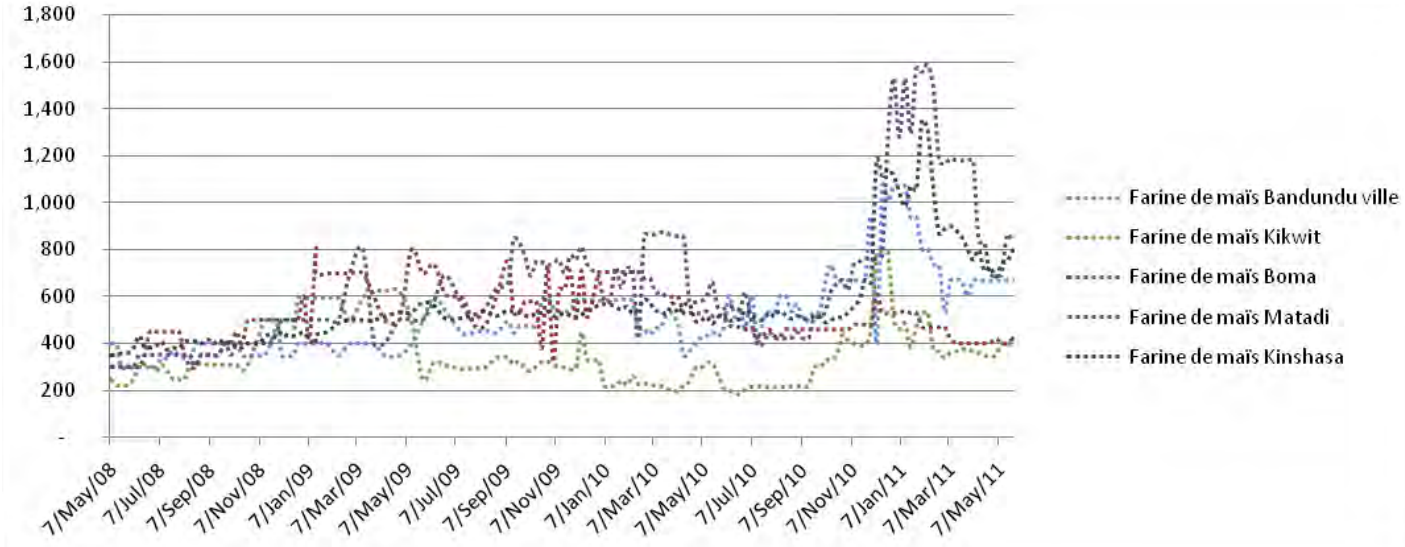
Unfortunately, we do not have prices paid to maize producers (smallholder farmers), nor those in wholesale or semi-wholesale markets in the various cities.

FIGURE 5: MAIZE PRICES (GRAINS) (FC/KG) IN SEVERAL CITIES IN BAS-CONGO, KINSHASA AND BANDUNDU, MAY 2008-MAY 2011



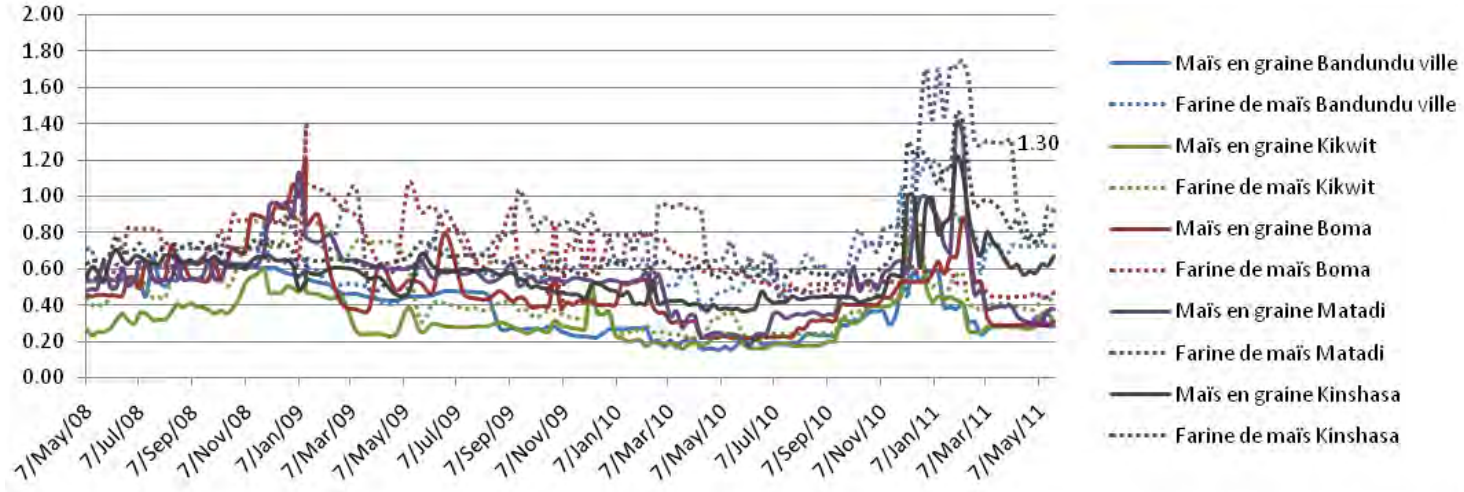
Source of data: FAO Urgences, Kinshasa

FIGURE 6: MAIZE FLOUR PRICES (FC/KG) IN SEVERAL CITIES IN BAS-CONGO, KINSHASA AND BANDUNDU, MAY 2008-MAY 2011



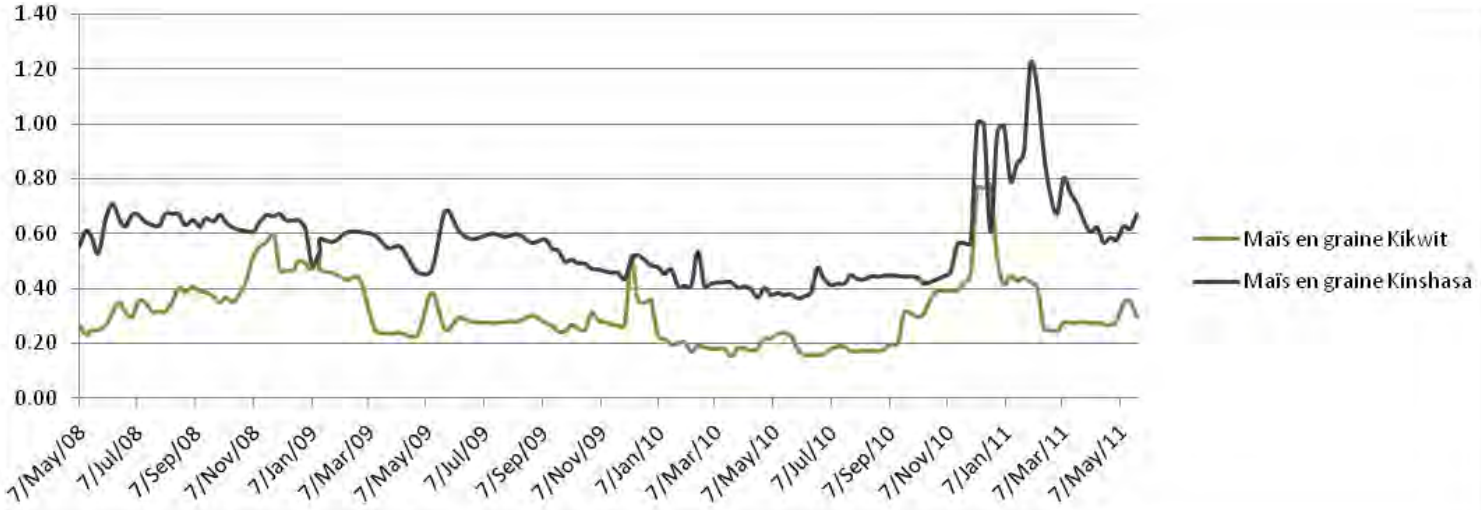
Source of data: FAO Urgences, Kinshasa

FIGURE 7: MAIZE GRAINS AND MAIZE FLOUR PRICES (US$/KG) IN SEVERAL CITIES IN BAS-CONGO, KINSHASA AND BANDUNDU, MAY 2008 TO MAY 2011



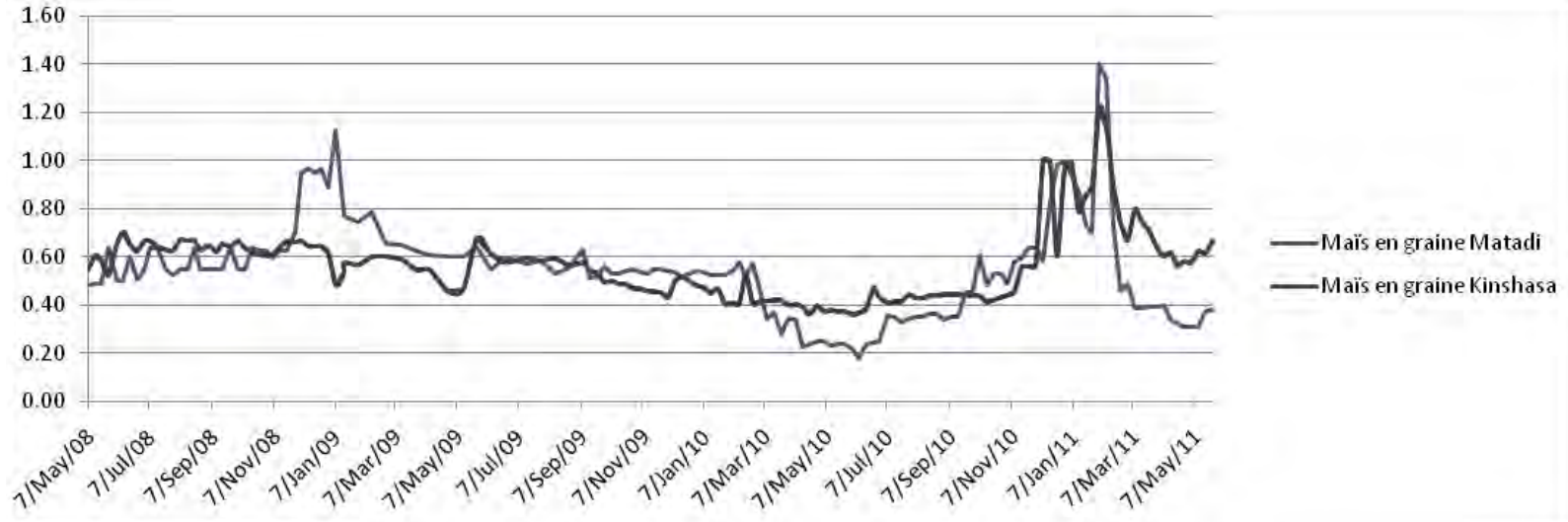
Source of data: FAO urgences, Kinshasa

FIGURE 8: MAIZE GRAINS PRICES (US$/KG) IN RETAIL MARKETS IN KIKWIT AND KINSHASA, MAY 2008 TO MAY 2011



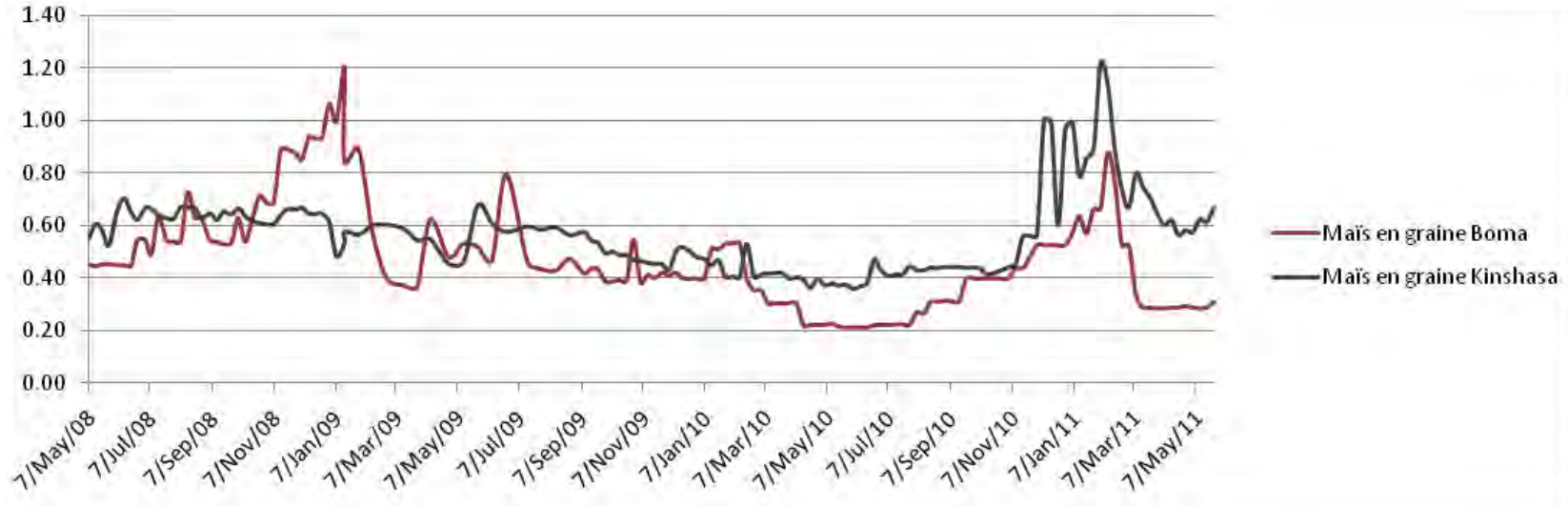
Source of data: FAO Urgences, Kinshasa

FIGURE 9: MAIZE GRAINS PRICES (US$/KG) IN RETAIL MARKETS IN MATADI AND KINSHASA, MAY 2008 TO MAY 2011



Source of data: FAO Urgences, Kinshasa

FIGURE 10: MAIZE GRAINS PRICES (US$/KG) IN BOMA AND KINSHASA, MAY 2008 TO MAY 2011



Source of data: FAO Urgences, Kinshasa

3. IMPORTS OF MAIZE IN THE DRC

Imports of maize in the DRC have been increasing. There are massive imports of maize as flour from Zambia, Malawi and particularly South Africa into Katanga province, from 30-40 t trucks that have delivered copper and other minerals to Durban and Port Elizabeth ports. Official DRC statistics do not show these imports, but they are reported to be over 100,000 t. Official maize imports via Matadi port for Kinshasa are as follows:

TABLE 6: OFFICIAL IMPORTS* OF MAIZE GRAIN AND FLOUR INTO THE DRC (IN T)

	2006	2007	2008	2009[5]
maize (grain)	164	160	443	6,348
maize flour	1,304	10,166	3,667	23,206

Source: SNSA, Ministry of Agriculture, Kinshasa, 2011.
*10% import duty plus 13% ICA (turnover tax) (on 110) = 24,30% total taxes on CIF value of imports

A lot of these imports are either for MIDEMA or for the WFP as food aid for corn-soy mixes as nutritional supplements in nutrition centers.

The WFP in 2009 (ref. annual report) distributed 90,790 t maize or maize flour; in 2010, they did 52,047 t. Most of this maize is now bought locally, particularly in eastern Congo where most of the food distribution takes place (PRRO program) (Protected Relief and Recovery Operations). It is estimated that in 2011, 78,923 t of maize will be needed; the largest part for school meals and early recovery and 69,969 t in 2012. Together (2011 and 2012) 148,273 t at a cost of 57.6 million US$ (see doc. WFP/EB.2/2010/9-C/7 of 20 October 2010).

None of the breweries in Kinshasa use maize for brewing, only malt, wheat bran and (imported) rice. The reason why are not clear, but the high price of maize in world markets and the absence of capacity to produce maize grits in Kinshasa (maize without fat, i.e. without the maize germ) are certainly the major factors.

MIDEMA, the major and only wheat flour mill situated in Matadi, imports about 10,000 to 11,000 t of maize from the European Union or Argentina, and maize flour from South Africa. They report that imported maize is always cheaper than locally produced maize, and of far better quality (color and smell). Local purchases are at around 500 $/t. In principle, imports pay a total of 24,30% taxes, but MIDEMA enjoys a special particular convention which exonerates them. Their imports are probably not included in official OFIDA import statistics.

[5] 31,840 t in total according to the 2009 SNSA food balance sheet.

4. THE PRODUCTION AND MARKETING SYSTEM OF MAIZE

In Bas-Congo and Bandundu, maize is produced by smallholder farmers, one ha or usually less per household, with no external inputs used. In Kinshasa province, there are some large (100-1,000 ha) commercial tractor mechanized farms on the Bateke plateau, which usually use some chemical fertilizers (urea, N-P-K). In smallholder agriculture, yields are very low, usually below 1,000 kg/ha (± 800 kg/ha). Sometimes maize and cassava are grown in intercropping, although the tendency is for monocropping. In smallholder agriculture, all labour is manual, including harvesting and the shelling of the maize cobs. The marketing is usually via the par-colis system, the same as for cassava and grain legumes. There are no large scale or even medium scale maize traders in the project area.

In MIDEMA Kingabwa, traders first bring a sample, which is analyzed in the lab for humidity, color, smell, purity and weevil infestation after which a price is quoted for buying. Usually, a small % (2-3%) of weight is subtracted to compensate for excess humidity and foreign matter. Payment is then cash on delivery. The trade is totally unorganized, speculative and opportunistic. Par colis traders arriving from Bandundu by boat (Ilebo) or truck usually sell sack by sack on semi-wholesale markets, usually to women retailers or women commissionaires (see Annex 4).

The maize trade is thus totally dominated by small-scale traders, called par colis, who buy either at the local weekly village market or go from village to village, aided by what is called “éclaireurs” or “pisteurs” who indicate where there is maize for sale. Many of the par-colis traders themselves produce some maize. They then collect their “colis”, say 10-15 sacks and bring it by bicycle or two-wheel push cart to a collection centre where they will be able to rent a space on a truck for the sacks and themselves, as they will travel together to Kinshasa. They may also rent a space on a boat or baleinière if their collection centre is near a river port or loading point (embarcadère). In the dry season, the rivers are low on water which makes boat traffic difficult or impossible. The opposite is the case in the wet season when truck traffic on local feeder roads is difficult. This explains why more maize arrives by boat in Kinshasa during the wet season, or when feeder roads are in a bad condition.

The par-colis traders usually operate on a 50-50% agreement from Bandundu, whereby 50% or half of their consignment is for the transporter. For Bas-Congo, the proportion is 30 to 40% for the transporter. On top of that, they need to pay a caution when they board the truck, the caution being paid back when they arrive in Kinshasa in the market. For boat transport, the ratio is usually 20-30%. It is to be noted that the share usually remains the same regardless of the distance, i.e. the same for all origins in Bandundu: Idiofa, Gungu, Kikwit, Kenge, etc. On the road to Kinshasa markets, many taxes - legal and illegal - have to be paid; a list of these is available (Mr. Dimandja). On arrival in Kinshasa, usually after 3-4 days minimum, trucks from Bandundu normally go to the MLDK market (Mzée Laurent Désiré Kabila) or Marché de la Liberté. Vehicles from Bas-Congo go to other markets, e.g. Ngaba. On average, about 12 trucks per day arrive at MLDK - about double that on mondays. Women retailers normally buy 1-2 sacks of produce, after a lot of haggling. And when the produce is bought, often the sack is changed, i.e. a buyer brings his own sacks. During transfer from one sack to the other, the quality is checked. These retailers - women - then sell in retail at the market in volume measures (never by weight) - usually three types: a glass, a plastic cup (gobelet = sakombi) or plastic container (= ekolo =3 gobelets). Cash payment is

always required. Excess maize which cannot be sold at retailers usually ends up as alcohol (lotuku) or as animal feed.

To our knowledge, there are only two industrial maize mills in Kinshasa: MIDEMA at Kingabwa for maize flour production and for the feed mill, and CDI Bwamanda (route des poids lourds), which also has both, although because of cash flow problems, CDI only processes maize from its own boats and hinterland (Equateur = 3,000 t and Bandundu = 1,000-1,500 t). The capacity of CDI is 20 t/day but they operate at less than ¼ of their capacity. There is also Maman Yedu Development (MYD) which operates a small Chinese made maize mill at the MLDK and sells maize (and cassava) flour and maize semoule, not only at MLDK but also in 3 other markets. In total, they sell about 5-6 t of maize flour per month. In addition, they have their own maize and cassava production farm at the plateau des Bateke.

In terms of animal feed production - essentially for pigs and poultry - not yet for aquaculture, MIDEMA enjoys a virtual monopoly, as CDI has frequent stoppages. They sell 25,000-30,000 t per year, essentially maize and soya and other mill by-products, but no cassava. All buyers complain about the high feed prices - 600 to 700 US$/ton - making local animal protein production not competitive compared to imports. Nowadays, about 16 million eggs per month are imported, essentially from Europe and India. MIDEMA plans to produce themselves in a new poultry farm in Maluku (about 200,000 layer hens) in a joint venture with en Kenyan partner. There is also a very large poultry farm in Kimwenza from Sokin (Achour) and they make their own feed. We visited a 140,000 bird poultry farm at Mount Ngafula (Belliard: see Annex 4).

What is important for large poultry farms that make their own animal feed is that they usually buy through commissionaires (see Annex 4). These commissionaires are always women that find out where there are maize stocks, buy them by paying cash, find a transporter and then offer this maize for sale to the poultry farmers. Thus, they basically fulfill all the marketing functions, including getting market information, financing of the purchase, transport, etc. They are vital intermediaries in that maize marketing chain.

5. MAJOR CONSTRAINTS ON MAIZE PRODUCTION IN THE PROJECT AREA

5.1 AVAILABILITY OF SEED FROM IMPROVED VARIETIES

The two major varieties grown in the project area are Kasai 1 and Samaru. Kasai 1 which is a white maize was developed by the USAID financed P.N.M. (National Maize Program) program at INERA Gandajika station in the 1980s. It is the result of breeding local maize varieties such as GPS 5 (Gandajika Progeny Selection 5) with maize germplasm coming from CIMMYT Mexico (tuxpeno) and IITA Ibadan. It is a composite variety, well adapted to local conditions, relatively short and fertilizer responsive. Samaru was brought to the DRC by IITA from its Nigeria program at Samaru research station in northern Nigeria, and is a dark yellow variety, also a composite and drought resistant. Some other varieties are grown such as Kaela around Kikwit, which is a soft dent white maize, but which grows 4 m high. Maize varieties being grown according to the SENASEM catalogue are Kasai 1, Samaru, Salongo, MUS, Kahila, Rouge and ZM532 (from CIMMYT Zimbabwe). MUS which is yellow, short, was bred at Gandajika and is not yet on the list of approved varieties. Kasai 1 and Samaru have probably degenerated, having crossed over time with traditional local varieties such as Plata jaune, grown during colonial times. Pure foundation seed of Kasai 1 and Samaru is not available. INERA carries out most of its maize research in Gandajika station in eastern Kasaï but did not do multilocational maize trials over the last 20 years. The major maize breeder at INERA Gandajika left to work in breeding for a private large farm company in Katanga. The major INERA maize breeding work is now on-going at the Bas-Congo M'vuazi station (M. Sc. Kabongo; supported by CTB), including Quality Protein Maize (QPM - high lysine maize). IITA over the last ten years did some minimum maize work in the DRC, financed only from their core funding. But cassava was always the dominant and largely donor financed IITA activity, including from USAID.

Because Belgium finances via CTB a 5 million Euro seed project in four provinces in the DRC (ASS: Appui au Secteur Semancier) and the lack of proper foundation seed, CTB now finances maize field trials at the M'vuaza (Bas-Congo), Kiyaka (Bandundu) and Ngandajika INERA stations. The aim is to identify the best composite varieties and produce foundation seed. This is because the seed produced in the ASS project, certified by SENASEM, has sometimes performed poorly and does not always meet quality standards. This is not surprising given the general neglect of maize research in the DRC over the last 20 years.

It must be noted here that the P.N.M. project, financed by USAID now 20-30 years ago, has been tremendously successful in the sense that the two major varieties now found in farmer's fields, and which stand up relatively well, were produced by that project. Without it, there would undoubtedly have been a major maize crisis, just like now there is still a major cassava crisis.

It must also be pointed out that the ASS project had a very difficult start, with an impossibly broad mandate. Capacity building at SENASEM is a huge challenge. And the best maize specialists in the DRC

work for private maize farms in Katanga, linked to multinational mining companies[6]. Thus, quality maize seed production for the project area could and should benefit greatly from specialized seed expertise provided through the FPPM project. This could even be envisioned as a public private partnership with a large commercial maize farm on the Bateke plateau or in Katanga, resulting hopefully in a viable private seed enterprise in the DRC. The project could maybe also benefit from expertise from private seed companies in eastern and southern Africa (e.g. Pannar seeds in South Africa, Seedco in Kenya, etc.).

It is to be noted that quality seed production from improved maize varieties will require a minimum applied research program, involving INERA and IITA, and given the importance of Bas-Congo and Bandundu, based at M'vuazi and Kiyaka research stations. An American university active in maize breeding and selection could usefully help in that activity. The main challenge would be to find valuable next-generation open pollinated composite varieties which can replace Kasai 1 and Samaru.

5.2 POOR SOIL FERTILITY

Maize always tends to be grown on the better soils in the valley bottoms (Karroo valleys) while cassava is mostly grown on the poorer, acid, sandy soils. Also, if a crop rotation is followed, maize always precedes cassava, and cassava always comes last in the rotation. Nowadays in Kwilu region, a lot of cassava after cassava is grown. Maize cassava intercropping also used to be common but not anymore because of marketing pressure to grow either maize or cassava, depending on the soil type and soil conditions.

Because no chemical fertilizers are used on maize or cassava, except on large commercial farms on the Bateke plateau near Kinshasa, and organic fertilizers such as manure or compost are usually in very short supply, soil fertility is not restored after harvest, and fallows tend to disappear completely because of population and marketing pressure. As a result, yields tend to decrease and poor soil fertility is a major if not the major production constraint.

INERA nor IITA have done multilocational fertilizer trials in farmers' fields over the last 20 years. Thus, the response curve to fertilizer use is not known, although anecdotal evidence shows that maize responds very well to fertilizer use, particularly urea, and cassava much less.

Major fertilizer trials were done in the DRC on cassava and maize and other crops from 1973 to 1990 under the FAO fertilizer program, financed by Belgium. These trials went on for 18 years. A synthesis of there trials was made by Dr. Marc Janssens and is available by the author, including a special report on Bas-Congo and Bandundu provinces. They need to be reviewed carefully before any action is planned. But of course 20-25 years later, soils have changed and the fertilizer response rates may have changed. Nevertheless, they will give a good indication.

The quickest way to boost maize yields in the project is to restore soil fertility, ideally by a combination of organic and inorganic fertilizers, and integrated soil fertility management, using legume crops such as Mucuna, Pueraria, Stylosanthes[7], or fertilizer trees such as Gliricidia, Tephrosia, Sesbania or Tithonia. As said, organic fertilizers are in very short supply, although bat manure could be collected in many villages

[6] A major seed producer in Katanga is the Gegco company owned by Walter Couttenier, which benefitted greatly from USAID support under the PNM and North Shaba and Central Shaba projects.

[7] IITA research has shown that burned or mulched makes, surprisingly, no difference.

and in the caves around Mbanza Ngungu. Crop rotations with cowpeas, soya or groundnuts are also very good for integrated soil fertility management (ISFM).

A program of adaptative multilocational fertilizer trials, particularly on maize, but also cassava and grain legumes, should be initiated. INERA and SENAFIC should be partners in this, and also IFDC, IITA and CIAT-TSBF. The objective would be to find for each major soil type the most economical "best bet" fertilizer doses in terms of N-P-K and possibly micro-nutrients. As far as could be ascertained, only urea (46% N) and 17-17-17 fertilizers are readily available in Kinshasa, but expensive (90 $/bag of urea). For maize, urea will always be needed, and probably also some P fertilizer. This activity could be linked up with the catalyst project of IFDC, which is active in the Great Lakes area.

To stimulate fertilizer use, a subsidy scheme will probably be needed, to be phased out gradually over time. The imports of fertilizers are still subject to a 5% import duty augmented by a 13% ICA tax on (100 + 5). As a first priority, the duty on imports of fertilizers should be completely abolished[8].

Trials could be at M'vuazi, Dumi farm on the Bateke plateau, Kiyaka and with farmers (on-farm trials). Trials should also include short fallow management with legume crops and fertilizer trees. Commercial farmers on the Bateke plateau sometimes already use some chemical fertilizers, because the sandy Kalahari soils are extremely poor. Without some organic matter in the soil and some added nutrients, these soils are almost worthless, although cassava can still yield a meager harvest.

5.3 MAIZE DISEASES AND PESTS, INCLUDING POST-HARVEST

The major problem during maize growing are cob borers (not stem borers) (Busceala fusca, Eldana, Chilo, Sesamia…), especially in season B. Up to 2/3 of the crop can be affected, reducing yields by about 30%. The best strategy to overcome these is early planting, removal of host plants (grasses, particularly Hyparrhenia) and timely harvesting. Farmers tend to harvest late, letting mature cobs in the fields, which encourage insect damage. Foliar diseases are not a problem, although occasionally blast ("charbon") which results in cobs to be transformed in black dust (spores) is a problem. Seed treatment with a fungicide keeps blast under control.

In post-harvest maize storage, weevils are a major problem, and sometimes fungus infections on wet maize resulting in mycotoxins (including aflatoxine). Maize should not be stored on the open ground floor. If maize is to be stored, it should above all be properly dried. MIDEMA and the breweries complain about local maize which is too wet, resulting in molds, bad smell and poor storage. On the poor soils of the Bateke plateau, the parasitic plants Striga and Alectra can become a problem and Mimosa, a thorny weed, can become a huge problem to control it. IITA now conducts in collaboration with INERA PANA-ASA maize trials, i.e. the Pan African Response to Climate Change. 25 maize varieties will be tested in several stations.

It is to be noted that a lot of millet is being grown in Bandundu, Bambara groundnuts and squash for seed ("pistache"). Although season A & B are always mentioned, they flow into each other and the distinction is blurred (see Kiyaka 10 year rainfall data). Season B is best used for fallow with legume crops, e.g. multipurpose cowpea (from IITA) or Mucuna.

[8] Recently, the import duty on cement was abolished in order to reduce the shortage of cement in the market and to make it more affordable. That could thus also happen for chemical fertilizers!

IITA maize trials in the DRC are now co-financed from the CTB ASS seed project and support to key INERA stations. IITA will make a synthesis report on its maize research[9] by the end of 2011. The FPPM project should insist on this promise.

5.4 MECHANIZATION

The GOC pursues a mechanization strategy to modernize agriculture. Already in 2009, 700 John Deere tractors (from India) were imported, financed by EC ag. sector support through the Food Facility project (10 million Euro). In 2011, another 1,500 John Deere tractors (from Mexico and India) are being imported. FAO carried out a "National Strategy for the Development of Agricultural Mechanization" in 2011 by Mr. Kalonji Nsenda Tshipepela, including 14 projects, budget of 222 million US$. Mechanization in the DRC is often equated with tractor mechanization, although animal traction mechanization on savannah sandy soils (as in parts of Kwilu and Kwango) and particularly small scale post-harvest mechanization (maize and cassava mills, water pumps, cassava graters and dryers, etc.) are eminently more economical and practical. All experiences with tractor mechanization in the DRC have basically failed, but these useful lessons are not learned. Examples of government introduced tractor mechanization are:

- 1972: under Minister of Agriculture Litho: FIAT 50C tractors (500) on chains
- 1991: Brazilian tractors; gift of Japan
- 2006: Mahindra tractors; offered by India
- 2008: 700 John Deere tractors; EC Food Facility
- 2011: 1,500 John Deere tractors; budget of the Presidency; this includes one year of functioning of these tractors.

The shelling of maize is usually done by hand, but hand operated small mechanical shellers, as available at IITA, should be manufactured locally and promoted. Drying using plastic sheet frames acting as a greenhouse dryer are also quite indicated. Small scale maize mills, either a hammer mill or screw mill for grinding maize into maize flour, operated by an electric motor (if electricity is available) or a diesel engine, can be commonly found in urban centers where they operate on a custom-operator basis (50 FC/kg). In the rural villages, they could considerably reduce the burden of women and should be promoted in the FPPM project. The ISCO project (see Annex 3) already distributed a lot of these Chinese made maize hammer mills in Bandundu. Animal traction should also be promoted, especially on sandy soils, e.g. in Kwango.

Hand tools for manually operated agriculture, such as hoe, axe, machete, etc. are readily available in the project area, and there are many importers (from China) in Kinshasa, particularly Beltexco, part of the Raw bank group. Locally manufactured hand tools from Chanimetal tend to be too expensive. Many village blacksmiths manufacture hand tools from scrap metal.

[9] As stated by Dr. Stephan Houser on July 6, 2011.

6. THE MARCHÉ DE LA LIBERTÉ (MLDK)[10]

In this market, we met APM (Association des Parkings des Marchés de Kinshasa) representatives. They have as members:

- UACTB: Union des Associations de Commerçants et Transporteurs de Bandundu
- FABC: Fédération des Commerçants du Bas-Congo
- UPA: Union des Parkings d'Arrivée
- BUCOPAC: Bureau de Coordination des Parkings et Agences du Congo
- APM: Association pour le Développement du Bandundu
- AFEVEMAL: Association des Femmes Vendeuses de Mais, Manioc et Arachides

They are not recognized by the State but ensure cleaning of the market ("salubrité") and intervene in dispute settlement. They exist since 2 years and collect 100 FC per sack as "taxe de salubrité", of which half (50 FC) is for APM and half (50 FC) for the administration of the market. Not all transporters are members, and particularly the EC-ISCO group financed from the European Union, run by Marc Rodriguez (French, ex-GRET, ex-IRM), is not a member.

ISCO operates 25 big trucks (MAN, IVECO) of which 3-4 are always at MLDK market. They reportedly pay the same prices to farmers as anybody else, sell at the same prices in Kinshasa, do not use weights, buy everywhere in Kwilu and Kwango where they have set up 3,500 village associations (CVD). They also operate 10 boats from Kwilu. According to Marc Rodriguez, in 2010 they transported 1,800 t of agricultural products by road, equivalent to 6 days of traffic Bandundu-Kinshasa on the RN 1. This is a little less than 3% of all traffic. They do more than half of the transport from Popo and Kasongo-Lunda. Presently, together with Minagri, they conduct a survey in Bandundu to determine their real impact ("Changer l'agriculture congolaise en faveur des familles paysannes", Frans Van Hoof, Alliance AgriCongo, 2011, p. 77). See Annex 3 for more information. The building out of which APM operates was built by ISCO. APM promotes the formation of associations in villages. A series of taxes and guarantees ("caution") need to be paid to truck operators by traders before they depart for Bandundu, to be reimbursed on their return in the market MLDK. Also, on arrival, 100 US$ needs to be paid to the truck driver and assistants ("equipage"). Of all the goods coming from Bandundu, about 2/3 are cassava cossettes and 1/3 maize, groundnuts and palm oil.

APM reports that their greatest difficulty at the market is the lack of a concrete floor in many parkings, making trading in the mud when it rains onerous. They also complain about the shortage of trucks and the lack of commercial credit. Also, not all transport owners are member of APM.

[10] Opened in January 2003, 21 ha, 7,300 tables of 2 m each constructed by M. Forrest company as counterpart for a mining concession in Katanga.

It is to be noted also that no formal weights or scales are used - only volume measures and different types of sacks which all have their name. The quality of the produce is often disputed and the selling process takes a lot of time haggling over the price. A real wholesale function does not exist as trading is sack per sack, called demi- or semi-wholesale and semi-wholesale and retail are not clearly separated. The trading system is thus still quite primitive, lacking specialization and innovation. No bulk transport is made, no quality grading, no objective quantity assessment, resulting basically in high risk of cheating and high transaction costs.

The challenge is to find ways and means to reduce overall marketing costs, reducing risk, fostering economies of scale, specialization and reduced transaction costs. The system has basically emerged “sui generis”, without any government intervention or regulation (except the perception of taxes), without marketing innovations or interventions that foster competition, efficiency and progressiveness in the marketing system.

The challenge of the project will be, in collaboration with the market operators and their associations such as APM, to introduce innovations, including institutional innovations that foster efficiency, progressiveness and equity in the basic food staples marketing system. In this respect, the ISCO approach is a dead end street, creating division and marginalization of part of the traders, by setting up their own, subsidized, separate association, without any institutional or marketing innovations, thus probably introducing unfair competition instead of a level playing field.

At the MLDK market, there is also OTRAPAID (Association des Transporteurs pour la Paix et le Développement), an NGO that fights against corruption and operates a farm at Mongata on the Bateke plateau. They received a tractor from the government. They are a partner of APM, have a storage house, operate a minibus and have various other activities. They are since 2007 at the market and obviously have difficulties just surviving. They provide information to transporters and sensitize them on tracasseries. They also have corresponding agents in the interior of Bandundu. They are also in contact with the Association des Chauffeurs du Congo. There is also a Fédération des Armateurs de Bateau (not met).

7. FARMERS ORGANIZATIONS

Several different approaches now exist in Bandundu to organize and work with farmer (see Frans Van Hoof, "Changer l'agriculture congolaise en faveur des familles paysannes", Alliance AGRICONGO, 2011, pp. 75-78). They are as follows:

- the ISCO project financed by the EC for the Projet de développement Agricole du Bandundu (PAB) relies on Comités Villageois de Développement (CVD) which have to coordinate all the actions in the villages;
- the PARSAR (Projet d'Appui à la Relance du Secteur Agricole et Rural) project relies on Organisations Semencières Villageoises (OSV), which also receive support from SENASEM which has identified farmer leaders multipliers of seed which take part in COPROSEM ("Conseil Provincial Semencier");
- CTB for its feeder roads maintenance has put in place CLER ("Comité Local d'Entretien des Routes") which are paid for maintenance of these roads by manual work (and local groups which did some of this work voluntarily have been discouraged).

The ISCO project works with Minagri and supports the CARG. But to receive extension advice, farmers still have to pay ("côtiser").

In 2009, the farmer organizations (O.P. or "organisations paysannes") of Kwilu have formed the "Fédération des Organisations de Producteurs Agricoles du Kwilu" based on the FOPAC model of North Kivu province. FOPAC is the model farm organization for the whole country. In Bulungu, since 1998 there is UNOPAB ("Union des Organisations de Producteurs Agricoles de Bulungu").

At the national level, several farm organizations based in Kinshasa claim to represent farmers. The most important are (p. 15, Frans Van Hoof):

- COPACO: Confédération des Paysans du Congo
- FENAGRI: Fédération Nationale des Agriculteurs du Congo
- UNAGRICO: Union Nationale des Agriculteurs du Congo
- FOPAC: Fédération des Organisations de Producteurs Agricoles du Congo
- CNAPAC: Cadre de Concertation Nationale des Paysans Producteurs Agricoles du Congo

It will take time before they come to one unified national organization and become strong enough to have a real voice in policy making and in truly representing the interests of the millions of Congolese farmers. For the moment, the CARGs (Conseil Agricole Rural de Gestion) play that role as they represent all of agricultural civil society. There is one CARG per province and most territories have a CARG; that of Kwilu met in May 2011. It remains however to be seen whether they will be durable and whether the GOC will continue to recognize them as valuable partners. Some GARGs manage tractors that were distributed in the provinces by the government. But this could easily give rise to conflicts as the demand for the use of these tractors is huge.

To be noted also that IRM financed by USAID, created in the past CLATs (Comité de Lutte Anti Tracasseries), and many of them still exist but are not anymore active.

Alain Huart notes that some CARGs have already been successful in reducing “tracasseries”. APROFEL and LOPEFACO are women's organizations active in rural areas defending the rights of women, organizing trainings, etc. LOPEFACO is particularly active in Nord Kivu province (Butembo).

Development NGOs are organized into two apex organizations:

- CNONGD: Conseil National des ONG de Développement
- CRONGD: Conseil Régional des ONG de Développement of which 11 exist.

ANNEX 1 : L'ÉTUDE DU SECTEUR AGRICOLE - PHASE II ; PLAN DIRECTEUR DE DÉVELOPPEMENT AGRICOLE ET RURAL, PROVINCE DE BANDUNDU - RAPPORT FINAL, AVRIL 2011, TECSULT INTERNATIONAL EN COLLABORATION AVEC GECT SPRL.

This 73 p. report proposes in the end a priority project costing 3,782,400 US$ “Cité de la transformation agroalimentaire” in Kikwit. Why Kikwit should become a major hub for food processing is not at all clear, as the major food staples: cassava, maize, grain legumes are all principally destined for the Kinshasa market and will be processed there. Other major investments envisaged are:

- agroforestry sites: 28.063 mio US$
- poultry centres: 3.998 mio US$
- mechanization centres: 4.900 mio US$
- promotion and diffusion of seeds and planting material:5.879 mio US$
- beef ranches: 13.579 mio US$
- support for the development of fisheries: 4.134 mio US$

Total: 64,337,300 US$

This document in our assessment does not represent the priority investments for the development of smallholder agriculture in Bandundu where cassava, maize and grain legumes are the major food staples. This BAD commissioned study is likely to be implemented partly by the BAD, which already finances the PARSAR project in Bas-Congo and Bandundu.

ANNEX 2: REPORT OF A VISIT TO SENASEM (ASS) AND APV PROJECT (SUPPORT TO INERA)

2.1 ASS PROJECT AND SENASEM

PERSONS MET

Clément Kandu Kasongo: coordonnateur National

Wilfried Godderis: CTP projet d'appui au secteur semencier (ASS)
email: wilfriedgodderis@hotmail.com

Greg Mamba: head of the Kinshasa SENASEM office
SENASEM is in a new building constructed by CTB, including offices and seed labs. Belgium provides assistance to SENASEM since 2007, for 5 years, 5 million EURO, including one technical assistance senior expert (Wilfried GODDERIS). This support project must be seen together with the APV (Assistance à la Production Végétale) project which provides support to 5 INERA stations (M'vuazi, Kiyaka, Gandajika, Kipopo and Yangambi). The APV project is in its second 5 year phase and the T.A. expert is Stéphane Dubois.

SENASEM does not produce its own seeds, has no seed farms, but supports agro-multiplicateurs. Their main mission is to control in the field the growing of crops for seed through field inspectors, and the certification of the seeds after seed tests in the lab. SENASEM now does not sell seed itself, but gets paid from the agro-multiplicateurs for its control and certification work. When a seed lot is rejected, the farmer usually refuses to pay the inspection and control charges. Most of the clients for certified seeds are FAO, development projects, NGOs, etc., not private smallholder farmers. One major constraint is that the seed law which is before the parliament has not yet been approved. SENASEM has offices in Mbanza Ngungu, Kikwit, Mbuji Mayi, Lusanga, Kenge, Lodja and Kabinda. An office will soon be opened in Boma. The foundation seed always has to come from INERA, and this is often problematic, as often the foundation seed is of poor quality. Nowadays, CTB supports through the APV project the production of quality foundation seed. The best achievements are in Katanga province where the commercial demand for quality seed, especially maize, is growing.

Imports of seeds are basically controlled by O.C.C. In each province where SENASEM operates - not yet in Equateur, Orientale and Kivus - there is a Conseil Provincial Semencier (COPROSEM) and in Kinshasa there is a Conseil National Semencier (CONASEM) where 60% of the members are from the private sector. This is to help structuring the seed sector as foreseen in the seed law.

A major effort in SENASEM has been to train the staff and acquire the appropriate equipment for seed control and for the logistics. The agro-multiplicateurs themselves have now their association. Seeds sales go best in Katanga followed by the two Kasai provinces. Bandundu and Bas-Congo are the most difficult.

SENASEM published in 2008 a variety catalogue and they only control and verify varieties that are in the catalogue. For maize, there are 7 open pollinating (composite) varieties and 6 inbred or hybrids. All the inbreds or hybrids listed come from Zambia and are all from the CRM maize station (Centre de Recherche sur le Maîs) in Lubumbashi and are only used in Katanga. Two decades ago, the CRM station was created after a visit of President Mobutu to Yugoslavia and Yugoslavia helped to set up that station. The 7 composite varieties listed almost all stem from the previously USAID financed PNM project. They are: Kasai 1, Samara, Babungo, Bambou, Musangana 1, Salongo 2, Tambo. Only Tambo (1999) and Musangana 1 (2003) were introduced after 1998. Recently added to the list are DMR-ESR-W-QPM variety from IITA (downy mildew resistant, early, streak disease resistant, white, quality protein maize), ECAQVE4, and Longe 5. MUS, which is a selection from Kasai 1, grown in Bandundu, is not yet on the list.

DOCUMENTS PURCHASED

- Règlement Technique de la Production, du Contrôle et de la Certification des Semences des Principales Cultures Vivrières et Maraîchères, SENASEM et CTB, Kinshasa, 2008.
- Le Nouveau Système de Codification des Lots de Semences, SENASEM et ASS, février 2011.
- Tracabilité, Contrôle et Certification des Semences des Cultures Vivrières par le SENASEM, SENASEM et CTB, Kinshasa, 2008.
- Catalogue Variétal des Cultures Vivrières (mais, riz, haricot, arachide, soja, niébé, manioc, patate douce, pomme de terre, bananier), SENASEM et CTB, Kinshasa, 2008.

2.2 APV (APPUI À LA PRODUCTION VÉGÉTALE) PROJECT II

PERSON MET

Stéphane Dubois, CTB
tel.: 099-590.41.52
email: dubois_st@hotmail.com

CTB supports INERA since 2007 and the project is in its second phase. Major activities were and are:

- rehabilitation of key infrastructure at INERA stations in M'vuazi (completed), Kiyaka, Gandajika, Kipopo (completed) and Yangambi;
- production of foundation seed for the major food staples (“semences de base”);
- now in phase II also support for cocoa and palm oil elite planting material.

The project supports several INERA staff and produces foundation seed and cuttings for SENASEM agro-multiplicateurs and others, as demanded. As they do not have cold storage facilities at the stations, they store very little foundation seed (no stocks) and basically produce what is demanded (up to one year in advance). The major problem in their foundation seed production is the lack of standard (UPOV) variety descriptions which allows checking for purity. Foundation seed is produced in the INERA stations using tractor mechanization. Foundation seed is always sold, not given freely.

ANNEX 3: VISIT TO ISCO (MARC RODRIGUEZ)

The EC makes a call every two years in the DRC for food security projects, to be financed from their food security thematic budget line - 10 mio Euro €. On the last call - 3 years ago - ISCO (Italian NGO based in Venice) obtained 3 contracts for Bandundu and they work in 13 out of the 18 territories. They cover all of Kwango and parts of Kwilu and Mai Ndombe. Their model is to set up CVD - Comités Villageois de Développement – already 3,500 in Bandundu - which they provide trainings and logistics support. The CVD's are grouped into what they call "faitières" at the level of the secteurs and territories and the faitières are regrouped into an interfaitière. The commercial arm which buys agricultural products, brings them to Kinshasa, and returns with manufactured products is ADEC, an agency created in June 2011. ADEC = Association pour le Développement Coopératif. At the end of ISCO's project with the EC in March 2012, ADEC will inherit 25 trucks, 10 baleinières and 38 storage magasins, including several buildings at the MLDK market, and the operating funds. ISCO will remain a member of the General Assembly of ADEC and of the 13 operational faitières. ISCO has distributed improved cassava cuttings in its project area (35% already covered with improved varieties). ISCO also promoted the elaboration of development plans for the 13 territoires in collaboration with the CARGs. Cassava and maize hammer mills were distributed and animal traction promoted.

The ISCO activities are part of the PAB (Programme Agricole Bandundu) supported by the EC in which other NGOs such as TRIAS, CDI Bwamanda a.o. participate. TRIAS works only in Mai Ndombe while CDI Bwamanda is active in Mateso (Kwilu).

The faitières manage the magasins which ISCO helped to build, 65 in total in Bandundu, where CVD members can also buy manufactured products from Kinshasa. This structure resembles the colonial situation where Greek and Portuguese traders fulfilled the same role and some cooperatives which operated after independence. When par colis traders get on an ISCO truck or baleinière to Kinshasa, they also pay 50%, just like with private truckers. Marc Rodriguez states that they barely make a profit at ISCO as costs are very high. A detailed report on their marketing activities exists and I was promised a copy.

Marc Rodriguez sees ADEC as the marketing tool of the farmers' organizations (O.P.) at the local level (CVD). He does not believe these O.P. will work at the district or provincial level because of opposing interests. He believes they can only work at the homogeneous local level. The territoire level is the highest level that can still work. District and provincial levels become too political. He also mentioned that micro-finance institutions in Bandundu charge 5% interest/month for the money they lend. Operating funds are the biggest constraint on agricultural marketing. And the local collection of products is the most costly part of agricultural marketing, including the payment of pisteurs-éclaireurs.

ISCO has promoted the planting of oilpalm, the establishment of community fields, the support to agri-multiplicateurs for seed and cuttings using the "métayage" system whereby part of the harvest is distributed to neighbours, thus propagating the distribution of improved varieties. They do not work with SENASEM.

ANNEX 4: VISIT TO THE FARM OF MR. BELLIARD AT MONT NGAFULA

The farm is situated in a 40 ha park - ex-concession BIA. Mr. Belliard is there since 33 years. He has 140,000 laying hens with a laying % of 85%. He sells the eggs at US$ 5/plateau (= 30 eggs). Eggs are sold in retail markets in Kinshasa at 300 FC/egg. He makes all his poultry feed himself. MIDEMA sells poultry feed at 640 US$/t.

He buys all of his maize locally and imports all of his soybean meal from an animal feed manufacturer in Belgium. He also imports the feed supplements from Belgium. Locally, he also buys wheat bran (from MinoCongo), palm oil, and lime. He buys 3,000 t of maize per year, i.e. 8 t/day, now at 500 US$/t. He has about maize stocks for 3 months.

He buys all his maize through commissionaires (5-6) - women also called Maman Benz. They buy in Bas Congo (April-June), Bandundu and in Kinshasa ports from Equateur. They take a % of the sales value. They find out where there are maize stocks, buy it by paying cash, find a transporter to the Belliard farm and Belliard pays 50% at delivery, and the rest after weighing and inspection. Thus, the commissionaires have to pre-finance everything. They are often accompanied by men who have lent the money. There is no organized maize market in Kinshasa. The commissionaires are from different origins, and are permanently in contact with people in the field that find out where the maize stocks are and at what price. There is no association of commissionnaires in Kinshasa.

It would be interesting to meet with some of these women concessionaires to find out:

- what sort of market information they collect
- how they finance their maize purchases
- the degree of competition in the maize trade
- the importance of maize quality

This will be done during the next mission.

ANNEX 5: SCOPE OF WORK

NAME: ERIC TOLLENS
POSITION: COMMODITY ASSESSMENT TEAM LEADER – MAIZE
PERIOD OF PERFORMANCE: JULY 3–16, 2011

I. PROGRAM SUMMARY

The Democratic Republic of Congo Food Production Processing and Marketing (FPPM) Project, a USAID-funded five year initiative, will tackle the market-side and supply side of food production in the provinces surrounding Kinshasa, the DRC's capital city and largest urban market. FPPM will be a catalyst for improving marketplace activities and transactions along established routes that channel food from their areas of production to end-markets. FPPM will help to transform these market channels into nascent value chains that not only supply urban markets with much needed food but also generate market-based efficiencies that translate into higher returns for value chain participants. Through this process, FPPM will marry the project's goals of improved food security and reduced rural poverty with broad-based agricultural growth, particularly among smallholder farmers working plots of 1-2 hectares. The objective of FPPM, is to double incomes of about 100,000 smallholders and double the volume of food they sell in the principle urban markets such as Kinshasa, Matadi, Boma, Kikwit, and Bandundu City, thereby improving both rural and urban nutrition.

II. SCOPE OF WORK

The proposed Commodity Assessment Team Leader for Maize will carry out the following activities that will contribute to the smooth start-up of FPPM:

Initial Rapid Assessments. The rapid appraisals will validate and detail the FPPM approach to handling maize commodities during program implementation. The Commodity Assessment Team Leader will work with the resident team and national specialists to assess input supply, smallholder production volumes, processing operations, commodity flows, market channel structures, and value chain formation, organization, and operations to confirm market opportunities and assess constraints, building from the findings of provincial action plans discussed during the Round Tables in 2009, an initial list of constraints and likely responses for Congolese commodity chains, and DAI's prior work that has identified problems, solutions, and likely impacts from adoption of technology solutions for maize.

Commodity Producer and Value Chain Workshops. Upon completion of the assessment, the Team Leader will facilitate one or more workshops for small groups of government officials, smallholder farmer representatives, association leaders, and businesspersons most familiar with the dynamics of commodity markets in Kinshasa's market shed. The workshop (s) will review findings and hypotheses for the main FPPM interventions. Kept small, the workshop (s) will offer a deliberative environment, conducive to the open exchange of ideas and opinions. The workshop(s) will lay the foundation for production, marketing, and infrastructure working groups to support setting of common goals and action driven solutions.

III. TASKS

The Commodity Assessment Team Leader for Maize will:

1. Lead the Maize Commodity Assessment with project staff and value chain participants;

2. Develop and facilitate a stakeholders' workshop in Kinshasa or other venue selected by FPPM;

3. Provide input to the finalization of the FPPM workplan related to maize;

4. Provide input to the finalization of the PMP related to maize.

IV. DELIVERABLES

1. FPPM Maize Commodity Assessment Report in Draft and Final;

2. Maize Commodity Assessment Workshop Materials.

V. SUPERVISION

The Director of Operations and Administration will work under the direction of the COP.

INPUT TO THE FINALIZATION OF THE FPPM WORKPLAN RELATED TO MAIZE

Hereafter follow activities which follow logically from de Maize Commodity Assessment. It will take time before these activities bear fruit. There are no shortcuts jumping stages in technology development and bringing institutional innovations which get quick impacts. Maize research & extension has been grossly neglected by GOZ and donors since 1991 – 20 years ago! That cannot be overcome in a few years. Even borrowing technology from abroad will need some time for local testing and adaptation. Most of these proposed activities still need to be more detailed after discussion with partners in the project, and coordination with the workplan for cassava and grain legumes.

1. An adaptive research program on maize with multilocational variety testing, including in farmers' fields and at M'vuazi, Dumi farm and Kiyaka, agronomy and ISFM in collaboration with INERA, SENASEM, IITA, possibly IFDC (Catalyst) and possibly an American university specialized in maize breeding and seed production. The ISFM would include multilocational fertilizer trials, green manure fallow crops such as Mucuna, Pueraria, Stylosanthes (in season B), some fertilizer trees (Gliricidia, Flemingia, Tithonia, etc.) and crop rotations with legume crops such as soybeans, beans, groundnuts, multipurpose cowpea, etc.

2. A pilot fertilizer distribution scheme, subsidized, with the subsidy phased out at the end of the project, and focusing on small scale farmers in Kwilu (not on the plateau des Bateke). This should also involve SENAFIC and possibly IFDC (Catalyst). This may also be linked up with a Micro-Finance institution (Pro Credit bank, Finca, …), or bank (BIAC,…) to be identified in Kwilu.

3. A maize seed production and distribution scheme, in collaboration with SENASEM and the CTB ASS project and possibly an American university specialized in maize seed production and distribution.

4. An extension program with NGOs, farmer organizations and partners on maize agronomy, seeds, fertilizers, ISFM, and post-harvest. The project would provide trainings and demonstrations.

5. A program on maize marketing following the value chain approach, from producers to semi-wholesalers, retailers and consumers in Kinshasa. The aim is to reduce marketing costs, adding value to the chain, stimulating technical and institutional innovations, fostering greater specialization and economies of scale, and enhancing competition. It may comprise the following:

    - reducing transport costs on the roads and rivers;
    - introducing weights and measures as an objective basis for transactions (introducing scales);
    - promoting grading and quality classification, e.g. quality 1 & 2; also properly dried, reducing post-harvest losses;

- A Marketing Information System (MIS), together with the other food staples, for which a separate feasibility study needs to be done first.

6. A maize mechanization activity, comprising small scale maize mills, hand operated maize shellers and maize dryers (plastic frames) in order to reduce post-harvest losses and reduce the burden on women (gender factor), preferably through group action in the villages.

7. A post-harvest loss reduction activity through the proper drying of maize (see 6.) storage, and avoidance of weevil infestation via the use of natural insecticides (bio-pesticides) (to be determined what works best) and/or actellic.

8. An assessment on the basis of criteria of farm organizations (O.P.), farm groups, NGOs and village associations (CVD, CLER, etc.) in order to be able to choose the privileged partners of the project.

9. Promotion of environmental protection by agroforestry and tree domestication - planting of fruit trees, medicinal trees, fertilizer trees, honey production, timber trees, etc. using a mixture of species (not only Acacia auriculiformis). This involves the establishment of nurseries with propagators for rapid vegetative multiplication of key species of local interest (via cuttings, marcots and grafting) in key villages with village associations. These nurseries should become self-supporting in 2-3 years time. Partner: ICRAF.