
Chapter 14

An analysis of Maize value chain and competitiveness in BurkinaFaso: Implications for smallholder-inclusive policies and initiatives*

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1. Introduction

Maize is among the key commodities for food security in West and Central Africa. Maize value chain is also expanding due to demand pull from the poultry sector, brewery and other agro-industrial products. However, like cereal supply chains in general, maize value chain development is hindered by several constraints affecting productivity and competitiveness. This chapter examines the constraints and the opportunities facing maize value chain in Burkina and propose actions needed to enhance maize competitiveness in Burkina Faso.

Many studies have shown that dry cereals (maize, sorghum, millet) have a greater potential to serve urban markets than they do currently and can substitute for imports contributing to greater food security. Moreover, cereal value chains serve several market segments such as the growing animal feed market and agroprocessing (including beverages)

The maize value chain would benefit from better regional trade integration throughout West Africa. Increased intra-regional trade in maize would have several multiplier effects on maize value chain. Beside more remunerative prices for producers and improved standards, greater intra regional maize trade would stimulate public and private investments in research, marketing, agricultural services and infrastructures. Therefore, addressing the existing barriers to intraregional trade is a priority concern for maize value chain development.

A host of policy disincentives and institutional impediments ensures that investments in maize value chain are way below the potential for such strategic food security crop.

This chapter is divided into three main sections. Section 2 examines the demand factors affecting cereal and maize consumption patterns in Burkina Faso. Section three provides an in-depth analysis of the entire maize value chain starting from input markets, production, processing and marketing. This section offers an extensive review of the factors affecting the competitiveness of the maize value chain. Section 4 addresses the critical role of policy, regional trade and the important role of maize producer organizations as a central market agency required to ensure a more inclusive maize value chain development. Section 5 concludes.

2. Demand drivers for maize

2.1 Population, urbanization and economic growth

The main drivers of food demand, and especially maize in Burkina Faso, are the high rates of population and demographic growth and the sustained pace of GDP growth. Burkina Faso exhibits above-average demographic growth when compared with other sub-Saharan countries.

Burkina Faso has experienced a 5 percent annual average growth in GDP over the last two decades, with an average of 2 percent in per capita terms. Similarly, available data show an overall reduction in income poverty, with strong variations between countries. Poverty is relatively higher in Sahelian countries such as Burkina Faso.

Although average food availability per person has been increasing during this period, the access and quality dimensions of food security remain important challenges. Burkina Faso has managed to

reduce the share of undernourished people below 5 percent, but food malnutrition is still persistent (as measured by anthropometric studies in the young population).

Aside from the demographic and income effects, previous analyses of changing consumption patterns throughout the world have underscored the importance of a wide variety of ill-defined structural drivers that shape preferences and consumer purchasing behaviour. Exposure to new products through media, marketing (e.g. supermarkets) and trade affects culture, tastes and lifestyle – particularly for young populations –, and subsequently modifies their consumption preferences. Lifestyle changes have already affected the increased demand for food and meals outside of the home; this promotes increasing individualized consumption which has stimulated a growing informal restaurant sector serving more diverse and processed foods. New tastes for fermented products in large cities are one key aspect of those dimensions.

According to projected demographic trends, the domestic food market will continue to grow, mainly in urban areas. In addition, there will be growth in the demand for semi-industrial and industrial processed food and non-food products, which can stimulate the local agricultural sector if value-chain development takes place.

The simultaneous growth in the urban poor and middle classes provides many new challenges to domestic and regional food systems. One of the biggest challenges and opportunities in the region concerns the growing consumer preference for imported staples (e.g. rice and wheat) and diverse high-quality and safe food products (e.g. meat, dairy, oil, sugar, fruits and vegetables) that are not currently produced in sufficient quantities in the region.

2.2 Consumer preferences and maize consumption

The majority of farmers in Burkina Faso grow maize both for self-consumption as well as cash crop. According to agricultural surveys in Burkina Faso, maize represents about 3 percent of the total working time of the national labour force, contributes about 3 percent of gross domestic product (GDP), and represents around 10 percent of total consumption expenditures (in value terms). These maize shares are also rising.

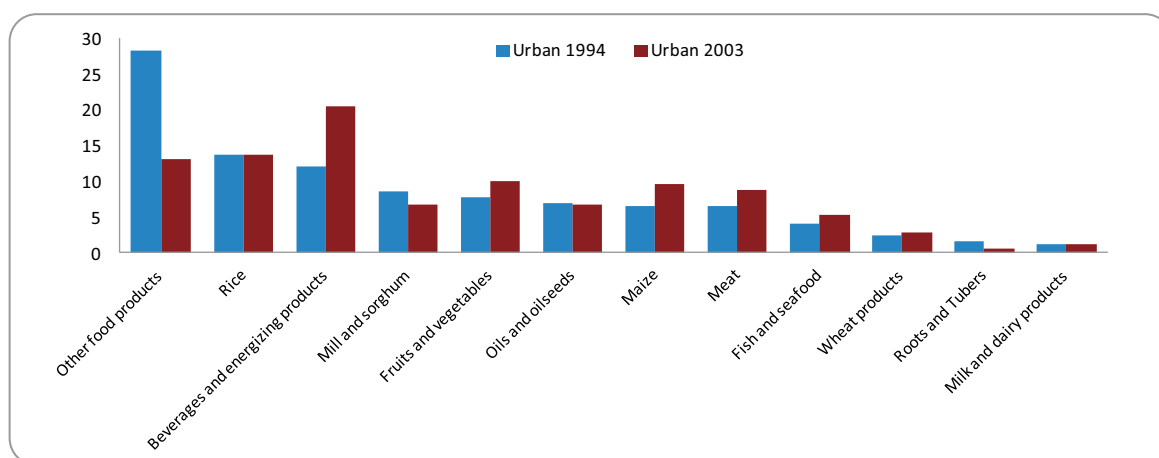
Maize consumption has increased for both rural and urban consumers, but the demand is shifting to higher quality products and processed products in urban regions. This has occurred along with the emergence of an urban middle-class in Ouagadougou, Bobo-Dioulasso, Sikasso and Bamako, for which local supply has not yet responded. Following the increased diffusion of mills and milling, using maize flour as a first source of starchy food has been time-saving for most urban households.

Food demand in urban markets favours imported staples, and this has been mainly driven by the rapid rate of urbanization, which has fostered import-dependency. Dry cereals, such as maize, sorghum and millet have a number of advantages (e.g. low perishability, storage) over other cereals and offer many diverse traditional consumable products and by-products, notably in rural areas. However, they need to be more adapted to the new consumption modes in urban centres and the evolving preferences of urban consumers. Traditional meals can be adapted to the urban environment if constraints to processing and marketing are overcome.

The most current form of maize is cooked paste. The cereal (hulled or not) is milled, and then the flour is cooked and consumed as a paste with sauce. Maize flour (whole flour) can be fermented and consumed as a paste or boiled. Tô, a paste of hulled cereals is the traditional meal in Sahelian countries such as Burkina Faso and Mali. Other meals (e.g. grits) are based on steam cooking hulled cereals and then consuming them as couscous or a mush. Flour can be rolled, cooked and consumed as a couscous (semolina). Maize can be germinated and floured into alcoholic and non-alcoholic beverages (lactic or alcoholic fermentations).

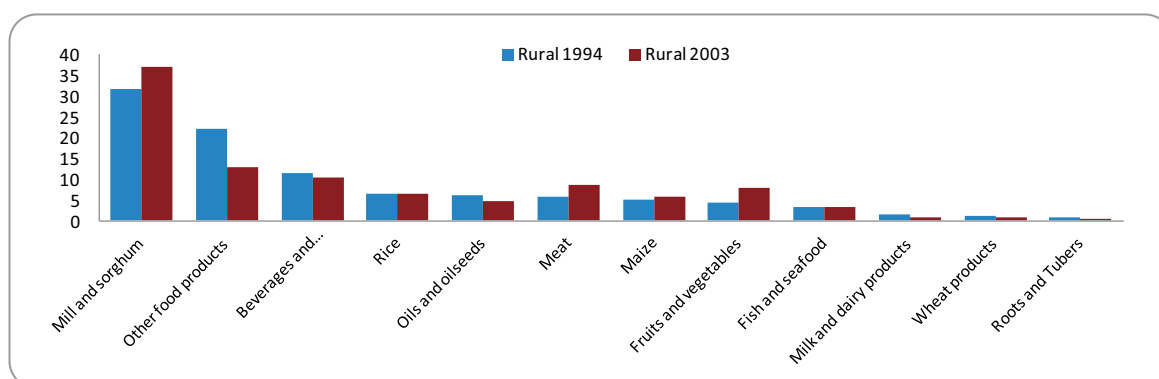
Food consumption in rural and urban populations of Burkina Faso showed contrasting patterns between 1994 and 2003 according to household surveys by The National Institute for Statistics and Demographics (INSD). Urban population showed a marked increase in consumption of meat, fruits and vegetables, maize and drinks; but reduced consumption for traditional staples such as sorghum and millet while rice consumption remained unchanged in percentage terms. For rural households similar patterns were observed for some food items (meat, fruits and vegetables, maize) but were reversed for others. Consumption of sorghum and millet actually increased in percentage terms while consumption of drinks declined. Consumption of rice remained unchanged while the proportion of households consuming vegetables oils slightly declined (Figure 1).

Figure 1. Expenditures shares in Burkinabe's households' food consumption



Source: National Institute for Statistics and Demographics (2003)

Figure 2. Expenditure shares in rural Burkinabe's households' food consumption



Source: National Institute for Statistics and Demographics (2003)

Today, the three main cereals (maize, sorghum and millet) account for 70 percent of consumers' cereal needs (including the needs for food and storage from institutions and poultry feed sector). Burkina Faso is largely food secure in terms of aggregate "dry" cereals needs, except for rice (which heavily rely on imports). The maize sector offers the greatest potential for food value-chain development and production increases because of its multiple food derivatives, especially feed use for poultry.

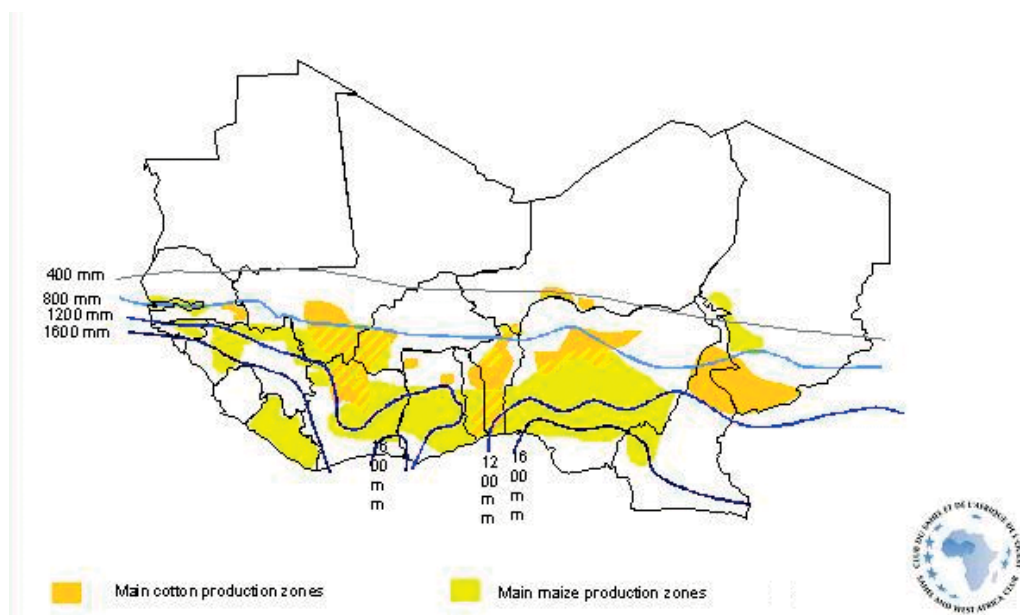
3. Maize value chain: status, constraints, and opportunities

3.1 Production

Maize is produced in much of West and Central Africa covering areas ranging from semi-arid Sahelo-Sudanian agroecological zones to sub-humid tropical areas. In Burkina Faso, maize is located in the cotton-cereal production basin of Burkina Faso. Maize is typically tied to cotton through rotations. In addition, maize also shares inputs (notably fertilizer) that provided on credit for cotton use. Besides maize, cotton is also grown in rotations with sorghum, niébe, sesame and peanuts. But maize remain the preferred staple food crop of choice in cotton growing areas whenever the agronomic conditions are favorables.

As long as cotton is profitable in the market, the cotton-maize rotation bring several agronomic benefits and market complementarities. For one thing, cotton-maize rotation improves soil fertility. The use of animal traction in cotton systems ensure a supply of manure which improves soil fertility. Also rotation allow a better labor allocation between crops. Cotton needs early soil preparation and input applications while cereals require most of the labour force later in the humid season. The same applies to the labour management during harvest (i.e. cotton has an earlier harvest than cereals and other field crops).

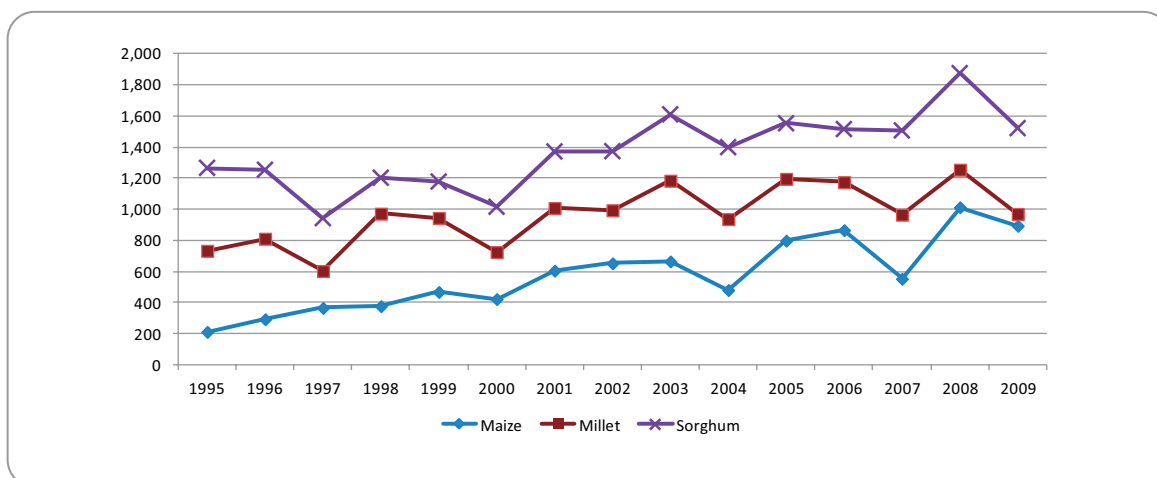
Figure 3. Juxtaposition of cotton and maize production areas in West and Central Africa



Source: Sahel and West African Club (2004), Atlas de l'Afrique (2000) and FAO (2004)

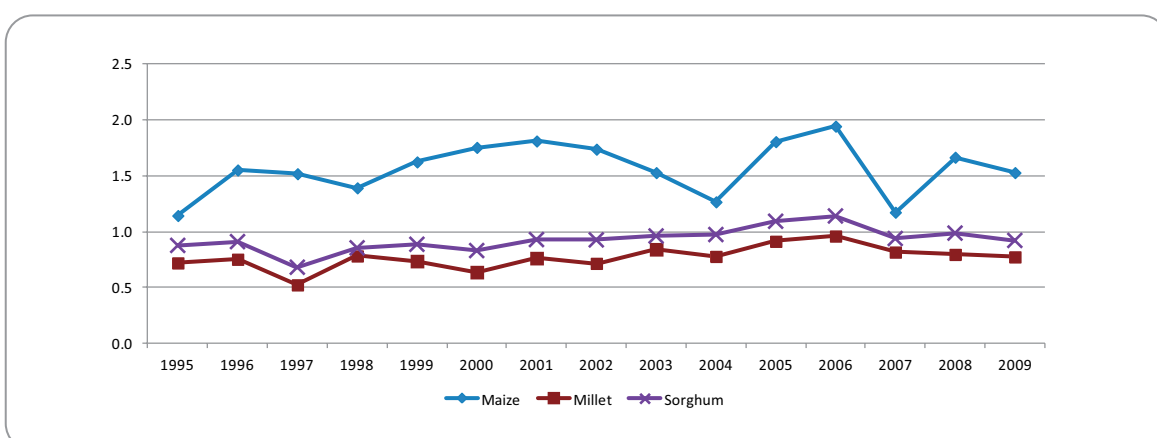
While sorghum remains the number one crop in Burkina Faso, maize has grown the most with a four-fold increase in the past 15 years (see figure 4).

Figure 4. Cereal production patterns in x1000 tons in Burkina Faso



Source: FAOSTAT 2012

Figure 5. Cereal yields patterns (tons/ha) in Burkina Faso



Source: FAOSTAT 2012

Cereal yields have shown no noticeable upward trend hovering around 1.5 tons per ha. As a result production increases has occurred mostly through acreage expansion which continue indefinitely.

3.2 Input markets

Modern inputs are not extensively employed directly in maize production because of a lack of access to inputs and because there are almost no viable contract farming schemes.

Resolving the perennial credit constraint

Badly-functioning input and credit markets result from high transaction costs, repayment and enforcement problems because of asymmetric information and low technical support; Lack of collateral from smallholders, high monitoring costs and informational problems make individual credit contracts unaffordable. This open the door for alternative second-best type agreements such as those

based on a contract between an exclusive buyer of output production who lends “in-kind” inputs in advance to a group of farmers who are jointly liable (individual liability agreements exist too) for their credit repayment. The joint liability provides a form of social collateral to the lender who also holds a guarantee on future production purchases.

Apparently, there are no effective legal ways to enforce contracts which are informal most of the time and which lack a credible legal framework. This specifically applies to the case of cereals in which trade is competitive and output value is low; therefore, there are high default incentives and the cost of monitoring and credit defaulting is too high for agribusinesses. Under weak institutions, contracts can only rely on informal agreements such as peer-monitoring, trust and reciprocity. They may refrain from financing cereal production, which maintains low productivity levels. Therefore, it is desirable to look for alternatives for input access, including via the warrantage system, or through microfinance lenders.

In Burkina Faso, as in the rest of West Africa, there has been dramatic growth in the number of new microfinance institutions in recent years, although their diffusion in the rural sector is still limited and many experiences have proven to be unsustainable and not very viable. The tight relationship between farmers' organizations and newly established rural microfinance institutions in the region provide some interesting examples (e.g. the mutual groups of *Caisses d'Épargne Villageoises*) which have helped farmers get a bank account (the “bancarisation”), secure their savings and access credit. Cereal banks (defined in box 2) have allowed better access to input credit, more remunerative output prices (with economies of scale and better bargaining ability than traders or millers), stabilization of local prices through inventory credit, more mutual learning, collective processing and sometimes self-marketing of miscellaneous products from the farms.

Box 1. Cereal banks and inventory credit in West Africa

Cereal banks are village organizations tied to local communities that buy, store and sell basic food grains to address food security and market access issues with village-level emergency food stocks and better marketing services for farmers and consumers. Inventory credit helps farmers benefit from temporal arbitrage and food price inter-annual variability to enhance food security and income/profits through good market prices in the lean season.

Cereal banks are created with a committee which supervises the construction of a warehouse or its rehabilitation for storage purposes. The non-governmental organization (NGO) generally helps finance this construction and provides training to the managers for grain storage and marketing techniques. A start-up fund helps the bank buy its first stock and treat it against pests.

During the lean season, grains stocks are sold within the community at a discount rate and in other villages at current prices. Grain credit can be provided to the neediest households and the revenues from grain sales are used as a revolving fund for subsequent operations. Inventory credit is often set up by an NGO which arranges a commercial credit facility between a newly formed cooperative and a lender. After harvest, the borrower deposits its grain under predetermined quality standards in a community storage facility. A quality control committee then supervises storage treatment and the issued certificate is presented to the lender. Then the loan is granted to the cooperative, pegged at 75 percent of the prevailing harvest time market price. Managers monitor market prices, quality of stored products and market supply to determine the best time to release the stocks on the market. Sales are used to pay back the loan with interest of 30 percent and to pay storage costs, and the net proceeds are given to the farmer.

Several experiences, notably in Burkina Faso and in Ghana, demonstrate the difficulties in making these schemes sustainable and work without the assistance of outside NGOs. The major bottlenecks involve: lack of management abilities for risky grain speculation and for spatial arbitrage; repayment strategies; governance issues (e.g. theft of cash or grains from warehouses, cash escape by managers). Nevertheless, inventory credit experiences suggest more promising results; members find marketing margins valuable for making profit and acquiring production tools and capacities to market their own production instead of relying on other traders or wholesalers.

Expanding adoption of improved varieties

Up until market liberalisation, maize had received significant attention in breeding and varietal creation because of growing urban demand and higher yielding potential. Throughout Africa, maize showed high yield response to breeding research.

The public sector's involvement in maize research, together with programmes conducted by international research centres,², in collaboration with national ones (including INERA) has allowed rapid expansion of investment. Almost 300 improved varieties and hybrids have been released from 1966 to 1996, which has enabled sufficient diversity in spite of having fewer maize breeders per cultivated area. Open-pollinated varieties (OPVs) are more developed for smallholders, while hybrids are used mostly by large commercial farmers as well as smallholders in some countries. Hybrids require that seeds be purchased every year, while OPVs allow farmers to save seeds for further use without large yield losses. Improved OPVs (e.g. germplasms from the *Wheat and Maize Improvement International Center* (CIMMYT) and the International Institute of Tropical Agriculture (IITA)) have been successful and widely adopted. The yield gains ranged from 30 to 40 percent from the dry areas to those more favourable for hybrids and from 14 to 25 percent for OPVs over local materials. However, breeding research has been severely curtailed after liberalisation leading to a stagnant productivity gains. Only in recent years, following the food crisis of 2007-08 have we observed increased maize yields which resulted largely from increased subsidized input use.

As shown in the literature, farms' adoption of technology is a result of households' internal trade-offs influenced by risk perceptions, expectations of benefits and costs, neighbouring and social effects and the institutional environment.

According to the Boserupian theory (Boserup, 1965), farmers will tend to increase their cultivated area when land is not a scarce resource before intensifying their production systems. Hence, profitability of technological change will be positively correlated with demographic pressure. The intensification process occurs when traditional inputs (e.g. labour, manure, crop residues and local varieties) exhibit an exhausted capacity for production. Following Abdoulaye and Lowenberg-DeBoer (2000), adopting improved technological processes is a gradual process; the first step is using improved varieties and chemical inputs towards new varieties (e.g. use of super-phosphate), and the second step is adopting a total package including urea and insecticides. Implications can be drawn to relax farmers' constraints so as to foster technological adoption. The transitional technical solution is the most likely to emerge, given the conditions of the maize smallholders' environment.

Ahmed *et al.* (2001) show that low rates of adoption for early cultivars in the Sahel built from lack of yield response for new cultivars if the harmony doesn't improve after the release of new cultivars. The adoption then relies on risk-avoidance strategies rather than true profitability reasons; also adoption is higher the lower seed markets' and private marketing institutions' performance. This could be because of inconsistent policies that aim to promote newly-created seeds but that somehow hinders the emergence of decentralized institutions.

New marketing strategies aim to increase technology adoption (by improving profitability); however, they become feasible only under sufficient market demand and according to both demand patterns and market conditions. For instance, technology introduction can be demand-driven for maize. But it can also be too risky if farmers are subject to fluctuations in the prices of imported food. Hence, the issue of market integration is important since it can help secure production and ensure technology adoption by enhancing price stability.

² Many programmes were held by CIMMYT and the IITA.

Public provision of agricultural services has not been fully filled by traders and agribusinesses after structural adjustment plans (Stringfellow *et al.*, 1996 and 1997). Local groups appear to bring the most useful scale economies for marketing, transport and processing, while being the most connected to traders and other wholesalers. It is, however, crucial that group mechanisms be successful for rural cooperation since groups are not always formed on a viable basis. So far, successful matching and farmers' cooperation seems to be influenced by management skills, governance, access to financial resources and markets and activity profiles. However, it is conditioned on the public sector's ability to support agricultural services with other activities to promote market integration and to pilot new institutional arrangements when agribusinesses seem reluctant at first glance. For instance, new credit schemes could be piloted by public agencies – under the assistance of local NGOs for training and improving business skills – when private firms fear that farmers' groups will have poor credit discipline. Public extension systems might also be involved to complement the poor private ones and to adapt project planning to the nature of farmers' cooperation. Agricultural services in Burkina Faso exhibit weak performance due to limited funding and lack of regional cooperation for both extension and research services.

Access to land and land rights

Access to land and land tenure rights and norms are a key driver of productivity, since they may affect incentives to invest in soil fertility and adopt new technologies or farming systems. In Burkina Faso, there is no market for land; it is viewed more as a social obligation than as a material good. However, accessing land has become problematic in the cotton-cereal farming systems alongside demographic pressure, especially for land tenants who do not have secured access to land, while property rights are neither well defined nor privatized.

Empirical evidence reveals that land rights—as interpreted and perceived by the local population—do not matter much in the allocation of factors and land investment among households (Sawadogo and Stamm, 2000) because local peasants, including women (except widows and female-headed households), do not feel insecure about their usage rights. With its population growth and migrants, southwest Burkina Faso has been subject to high demographic pressure on land. Gray and Kevane (2001) have shown that land scarcity results in more land rights uncertainties and lower soil quality. Farmers have intensified their farming systems and adopted more conservation techniques as a strategy to secure their land rights and improve soil quality, independent of their land status. However, this is not independent of ethnic origin, and all other things being equal, farmers from migrant ethnic groups are willing to invest more in soil quality. This process has significant social costs since villagers who cannot access inputs (e.g. fertilizers or manure) are gradually driven out of the process of land allocation. Claims over land from non-resident ethnic group members have led to less fertile soils, and new migrants are sometimes denied access to land.

3.3 Maize processing

The maize market is segmented in terms of end-products (e.g. floured, hulled, boiled, pasted, granulated, cornmeal) but also geographically centered around two major consumption areas: Ouagadougou or Bobo-Dioulasso.

In terms of end-products, the maize market is separated into 3 segments: (1) processed products for the food market; (2) packed and cleaned maize; and (3) poultry feeding and cattle (for milk production).

- Processed food for human consumption: This segment comprises mills which hull maize and make flour to serve most of the urban demand from household consumption, women's groups (i.e. for

prepared meals) and agro-industries (e.g. for biscuits and cakes). Hulled products are priced 30-50 percent higher than raw cereals. This segment is in gradual expansion and processed products are sold in every urban grocery and supermarket.

- Cleaned and repacked products: These cereals are not hulled; however, they are cleaned and repacked by downstream operators in the largest urban centres. Prices are higher to account for packing costs and weight reduction from processing.
- Animal feeding for poultry and cattle: Processing is carried out by poultry growers who directly buy maize from wholesalers in the production areas. The main problems relate to the quality requirements of this segment and arise from the heterogeneity of production conditions. More standardized processing and differentiated production for this market segment would help (e.g. through better horizontal coordination from contracting, such as producer-processor contracts). In response to growing demand and modernization of poultry production in the near future, such demand could increase by 20 to 30 times, and may become a major marketing outlet that could trigger an upstream modernization of the cereal farming systems.

Status of maize processing in Burkina Faso

Milling; The main maize mills are hammer mills, which operate almost everywhere throughout West Africa in villages, cities, markets and districts. Processing of food products, poultry feed and brewery inputs is done on scales ranging from artisanal to industrial. Most food consumers buy maize from a local retailer and send it to a hammer mill. Processing techniques are often manual in the production areas, and women spend a lot of labour and time to produce flour and prepare traditional meals (including *tô*, *couscous*, *bouillie* and *galettes*). This processing technology is a strong impediment to the development and promotion of the value chain. Most processing takes place in more urbanized areas (also including villages) with semi-artisanal district mills. There is a slow but significant shift from manual to semi-artisanal techniques. Industrial processing is also expanding, and is the area to focus on in order to scale up and add value throughout the entire value chain.

Brewing, animal feeding and processed food are developing industries, but are constrained by restricted access to capital markets. One major determinant of maize demand is the demand from the agro-industrial sector. Requirements are also different for the brewing sector, which uses maize and other cereals. Maize is mostly used by traditional brewers, but it is also used by the industrial sector which has focused on conventional sodas and beers. Other marketing outlets at the semi-industrial level are possible, but they will require different cereal varieties and cultivation techniques to gain value for their by-products. Here again, there is significant potential to increase value addition in maize value chain.

The poultry sector is one major outlet for maize flour and maize for the feeding sector. However, the quality requirements for maize in the feeding sector are different than those in the food sector. In most maize-processing industries for the poultry sector in West Africa, maize comprises about two-thirds of the animal feed. One limitation of the feeding marketing outlet for maize is the competition in the poultry sector from frozen imported chicken and fresh chickens from the informal sector (which are not fed with processed feed from maize).

In Burkina Faso, most semi-industrial poultry production is located close to Ouagadougou and Bobo-Dioulasso urban centres. This is an emerging dynamic sector which consumes processed food and medicines, but is geared towards egg production. According to the review of the Burkinabe sector (FAO, 2007), the sector is not well organized yet and little coordination/cooperation takes place (i.e. most production is still in the informal sector). Two industrial units in Bobo-Dioulasso deliver feed, but

most growers produce and use their own feed inputs and sell the other part. There are standardization issues for feed quality which have not been solved. Aside from maize, cotton cakes are used to feed chicks and hens. There is no fully integrated industrial poultry sector for broilers (most broilers are produced through traditional production systems) in Burkina Faso, contrary to Sénégal or Côte d'Ivoire. However, as income increases in urban dwellings, demand could emerge for more biosafety in broiler production, as in Dakar or Abidjan, and be conducive to an industrialization of that sector, which would increase demand for processed grains. This potential is rather significant, with more than 37 million poultry heads produced in Burkina Faso in 2008.

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Quality issues and standards

Processors have different requirements for maize depending on the end-product. For brewery, processors are interested in high-quality maize with high protein content (12 to 15 percent) and low fat matter (lower than 5 percent). White maize is favored for human food outlets and the dairy sector, while yellow maize is favored for animal feeding and for processing semolina. There are significant price gaps between white and yellow maize. Other processing criteria comprise: high degree of friability (i.e. flour production potential after removal of the panicle in both humid and dry processes); which increases the industrial yields of flour-making; uniformity; humidity degree (10 to 14 percent); and low composition of external matter (<7 percent).

There are three main problems with the quality of the raw material originating from maize production: (1) low degree of cleanliness; (2) heterogeneity in grains; and (3) unstable/insufficient quality. For traditional processors, problems of grain quality are even more important than grain heterogeneity. A high percentage of impurities (i.e. non-cleanliness) can be attributed to a lack of appropriate post-harvest handling techniques in storage and conservation and also to a lack of quality certification systems in domestic markets.

Ensuring consistency of product quality is fundamental to developing consumer and customer loyalty. One of the main difficulties for the processing business is to reproduce similar quality over time, since quality is affected by a lack of established standards, non-standardized processing techniques (e.g. a lack of control on ingredients' choices or the heterogeneity in raw materials) and a lack of measuring instruments (e.g. pH-meters, scales).

Fermentation is a major driver of the diversification in consumers' tastes in major cities in West Africa. In Ouagadougou, but even more in Cotonou or Abidjan, 30 to 45 percent of cereal products are fermented, and 85 percent of those are produced by artisanal processors. Chosen cereals are, however, often deprived of essential amino-acids such as lysine. Although fermentation is the most cost-saving technique to increase cereal value, nutritional value, taste and other functional qualities of cereal products, natural fermentations (uncontrolled) result in high variability of final quality. But natural fermentation is widely used in the observed marketed products (e.g. tchoukoutou, kenkey, dolo). Establishing controlled fermentation processes is thus a key challenge for agribusiness small and medium enterprises.

Diverse tastes, smells and colors is key in promoting local products' consumption. This can be achieved by designing new products in order to promote new consumption habits. Marketing specialists and sociologists can collaborate to study new products that will better respond to consumers' preferences for convenience, conservation and safety, while still being competitive.

National and regional norms and standards should be promoted and enforced. These should also be gradually aligned with international norms of production and sales. Numerous constraints continue to impede implementation of norms, including lack of information, as well as inadequate training and communication. The need to comply with quality standards requires not only time, but also human resources and capital, physical investments and the involvement of direct and indirect stakeholders. Capacity-building is essential in the areas of standardization, quality control and promotion of agricultural and agri-food products.

Table 1. Maize products characteristics depending on final uses

Criteria	Miller-processors				
	Breweries	Food processors	Animal feeding		
			Poultry	Dairy	Cattle
Humidity	10 - 14%	12% - 14%	10 -14%	10 -14%	10-14%
Friability-Grinding yields	48-75%	48 -75%	-	-	-
Protein content	12 -15%	12 -15%	12 -15%	12 -15%	12 -15%
Fat matter	≤ 5 %	≤ 5 %	-	-	-
Impurities	≤ 5 %	≤7%	-	-	-
Grain uniformity	Homogenous	Homogenous	-	-	-
Grains' colour	Yellow	50:50	Yellow	White	Yellow
Invasion de charançon	0	0	-	-	-
Mushrooms	0	0	-	-	-
White maize- favoured variety		SR 21 Massongo Obatanpa		Dembanyuman and SR 22	
Yellow maize- favoured variety	FB66 Espoir Sotubaka	FB66 Espoir Sotubaka	Sotubaka FB66 Espoir		Sotubaka FB66 Espoir

NB: "Espoir" et "Obatanpa" varieties own a high percentage of protein content/Variétés QPM

Source: ATP Surveys, Boone et Al., 2008.

Storage

In a post-liberalized market conditions, storage and drying facilities have shifted from open to closed stores that require the use of pesticides to protect against diseases and insects. This is particularly the case for hybrid maize, which is used both for trade and commercial milling. The fact that intra-annual price variations are still significant in both producer and consumer markets means that storage is not being effectively performed. Several incentives can function, however, such as the above-mentioned warrantage programs (i.e. inventory credit).

Following hulling and treatment against insects, it is better to bag the grain and store it in cribs or other improved storage facilities to protect against ground and rain water, pests, animals and heat. Storage's greatest benefits can be attained by a trade-off between storage costs and price differentials, but extension agents must ensure farmers that better prices will be possible as a result of reliable sale arrangements with traders, wholesalers or commercial mills.

Analysis of the maize agro-processing constraints

Maize processing faces many constraints. First, processing yields from mechanical hulling are rather weak (15 to 25 percent for several units), and low-quality processing of mechanic hulling has had bad effects on the overall quality of end products (e.g. taste, nutritional content and conservation attributes). Flour quality is sometimes inadequate as a result of grain size, metallic contamination and other impurities. Handling of the processing machinery may also be inadequate (e.g. choice of the machinery or lack of training of processors). Most manual techniques of second-stage processing are painful and lengthy; packaging is sometimes difficult; and the outputs may be highly perishable.

Processing options that would increase demand for maize include:

- substitution of wheat flour to sorghum and maize flour in several industrial and consumption goods;
- new types of broken grains/fragments, development of new tastes, blown products, crispy products and snacks, cakes and biscuits and instant-made flours; and
- other valuation and by-products with food and non-food uses (e.g. fodder, energy).

3.4 Maize marketing

Farm-gate sales

Most maize producers are small scale farmers typically cash-constrained which often force sales immediately after harvest, when prices are at their lowest level. Limited on farm storage capacity is a major constraint and prevent effective marketing options for farmers. Also from harvest to marketing time, around one-third of maize production is lost at the village level. Generally, farmers sell their production in local markets or directly to small-scale traders. At times, they sell to secondary markets through local traders.

Farmers who live close to a city or who have small quantities of production can sell directly to retail markets, but this is time-consuming and carries risks (e.g. theft or degradation if there is inappropriate storage). Alternatively, farmers can sell to retailers in the market for wholesale at lower prices, but with lower costs. They can sell to traders in town who own their stores close to larger markets, often at fixed prices, or sell to visiting traders in the village. While this last option is the easiest for producers, it nevertheless carries many difficulties such as: (1) prices could be much lower (but maybe not enough to compensate for transport costs); (2) traders may not have sufficient cash; and (3) farmers may wait for a long time to get paid.

Farmers could sell to a hammer mill or to a large-scale mill. Some consumers prefer to buy maize and take it to the nearest hammer mill for milling rather than buying already-processed grain.³ From hammer mills, little production is marketed, but this could change since the increase in the number of mills is associated with a decrease in profit for the owners of hammer mills. Commercial mills are another outlet for farmers provided

³ This has some cost advantages over large-scale mills and consumers often pay a fixed fee per bag.

larger quantities can be delivered and transport can be organized. This last option also requires meeting quality standards, which is another source of risk.

Local traders

Most trade is on an informal basis (i.e. no written contracts, lack of access to information services and poor infrastructures). Most traders collect staples at the village gate and sell to wholesalers who operate in main and secondary markets. Working in primary markets, traders are paid commissions by wholesalers and borrow trucks from them. They operate with cash and bags and receive instructions for pricing, quantities, quality, coordination of purchases and transportation.

Wholesalers

Wholesalers store staples for five to six months before selling them at much higher prices to retailers. Large-scale trade also takes place at the regional level, and at the national level with some transborder trade. Large-scale traders own or rent trucks and organize trade from surplus areas to deficit ones. They own the necessary capital to finance large trade operations, and they possess terminals and warehouses in key terminal and retail markets.

In Burkina Faso, large-scale traders have set up storage facilities that can handle from 500 to 25 000 tons, and they are able to negotiate and process provision contracts with millers and key institutional buyers such as the World Food Programme (WFP), the Army and schools. They also sell large quantities to wholesalers, retailers and small-scale traders. They can contract with producers' organizations (POs) and secure their maize purchases by financing PO members' inputs (outgrower schemes) with large-scale farmers and semi-wholesalers. Large-scale traders and wholesalers can invest in trade through large loans (50 to 100 million Frank CFA or 110,000 to 220,000 US\$) at 5 percent interest rates, which are much lower than typical banks interest rates for agriculture in general (currently averaging around 18 percent).

Retailers

In Burkina Faso, retailers only sell a few tons a month and have small liquid funds for purchases. Their marketing outlets mostly concern terminal and urban consumers, and they sell maize as well as some rice and sesame. Most retailers are supplied by wholesalers despite the fact that they can purchase at the farm gate. A few farmers also work as occasional retailers, according to their family and kinship ties, as do small-scale rural traders.

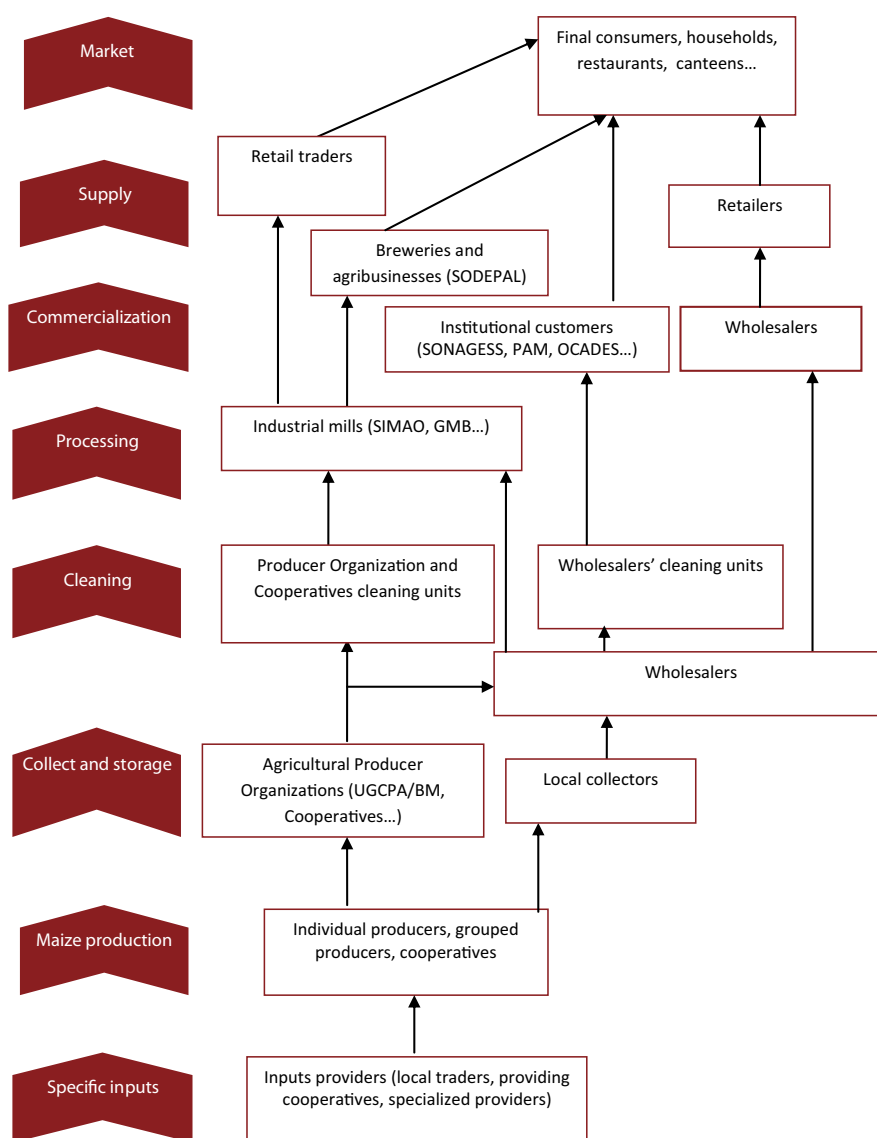
Value-chain relationships

Various nodes of a given marketing channel are composed of marketing networks led generally by the wholesalers and semi-wholesalers operating in wholesale markets. These networks have ramifications through collecting markets (grouping) and rural producers' markets, as well as through export regional markets. They are in general composed by stakeholders whose business relationships are based on trust, kinship or parental relationships. In Burkina Faso, maize production is becoming more of a commercial activity, and more contracting arises exclusively among the stakeholders of the marketing channels.

Wholesalers are the main funders of dry cereal marketing systems. They determine the nature and quantity of production to purchase and provide indications about prices, given their expectations for marketing prospects. But prices can be raised occasionally whenever wholesalers have additional contracts to implement. Wholesalers fund collectors who initiate orders on their behalf after having jointly agreed on price offers to make, based on export prices and prices observed on behalf of urban wholesalers and institutional customers. Thus collectors pay for cereals in producers' markets to supply them to wholesalers and groupers, which in turn supply and market the production to the other stakeholders of the marketing system.

Once purchased, cereals reach network heads (e.g. wholesalers or semi-wholesalers, retailers or exporters in wholesale markets) that take care of final marketing and sales. Then they reinvest money within their networks. In order to minimize risks, network funding is cyclical at all levels and reaches groupers as long as deliveries proceed at their level of the chain. Amounts invested increase if formal contracts are implemented. Otherwise, this is done according to demand conditions. For each delivery, several checks are performed to ensure that quality criteria (e.g. color, cleanliness, and impurities) are satisfied.

Figure 6. Maize supply chain



Source: Compiled by authors from different sources

Analyzing marketing constraints for maize

Transport unit costs - Cereals have a low value/weight ratio, often resulting in high transport costs. They exhibit large price variability at the producers' gate because of induced low market integration between surplus and deficit periods. This is also the result of well-known short-run low supply and demand elasticity. Hence, the transport cost component of cereal marketing is often substantial, which limits further market integration and increases transaction costs.

This problem is further accentuated since local grain production faces higher logistical disadvantages compared with imports: transactions costs, inland freight costs (which are two to three times the costs of ocean freight) and low quality infrastructures.

Infrastructures - Infrastructural constraints (particularly transport and communications) are a major cause of the low long-run supply response of farmers to price incentives. Cost-effective ways to provide infrastructure may involve user communities in maintaining existing infrastructures with their own-managed funds. Productivity benefits could be achieved by improving off-road transport and intermediate means of transport with capital-savings techniques for road construction, using labor-based techniques to overcome usual problems related to equipment use and availability in the region.

Market imperfections and market incompleteness - Deficiencies in extension services also explain the lack of viable input credit schemes and the possibility to scale them up with more thoroughly managed arrangements. Access to credit is also problematic when considering the few risk-mitigation strategies of rural entrepreneurs.

Finally, formal rural risk markets do not exist. And yet, since cereal market liberalization, farmers and other stakeholders have faced increased market and production risks. First, farmers have to choose their marketing channel, then they must decide when and how much to sell and when and how to store. The absence of insurance markets is often explained by high transaction costs, geographical remoteness and risk covariance at the local level. However, improving information about weather conditions will help set weather-indexed insurance schemes (which have been tried in southern Africa) and provide farmers with new producers' incentives. Although the development of such markets requires a strong financial framework, enhancing access to information through new technologies and communication could help spread these schemes.

4. Policies and initiatives for competitive and inclusive maize value chain

4.1 Cereal market liberalization and renewed policy support

In the early 1990s, the cereal sectors were liberalized in Burkina Faso, with the dismantlement of former parastatal marketing boards and cereal *caisses de stabilisation*. Before liberalisation, maize producers were able to access subsidized inputs and credit and to benefit from guaranteed prices and market outlets. Despite productivity improvements for maize through the late 1980s from research and extension programs, the pre-liberalisation marketing system offered low price incentives for farmers.

While cereal market liberalization improved to some extent the price incentiveness, this came at the cost of higher price variability and less access to inputs and technical assistance. Consequently the net impact of liberalization on producers was minimal.

While Burkina Faso fully liberalized its cereal markets, the accompanying measures did not provide sufficient incentives for investments in storage-related capacities. As a result, even if domestic markets became more integrated, they have also become less competitive due to increased concentration of traders, and rise in collusive behaviour through personal networks and reduced price information (see Toyi, 2002).

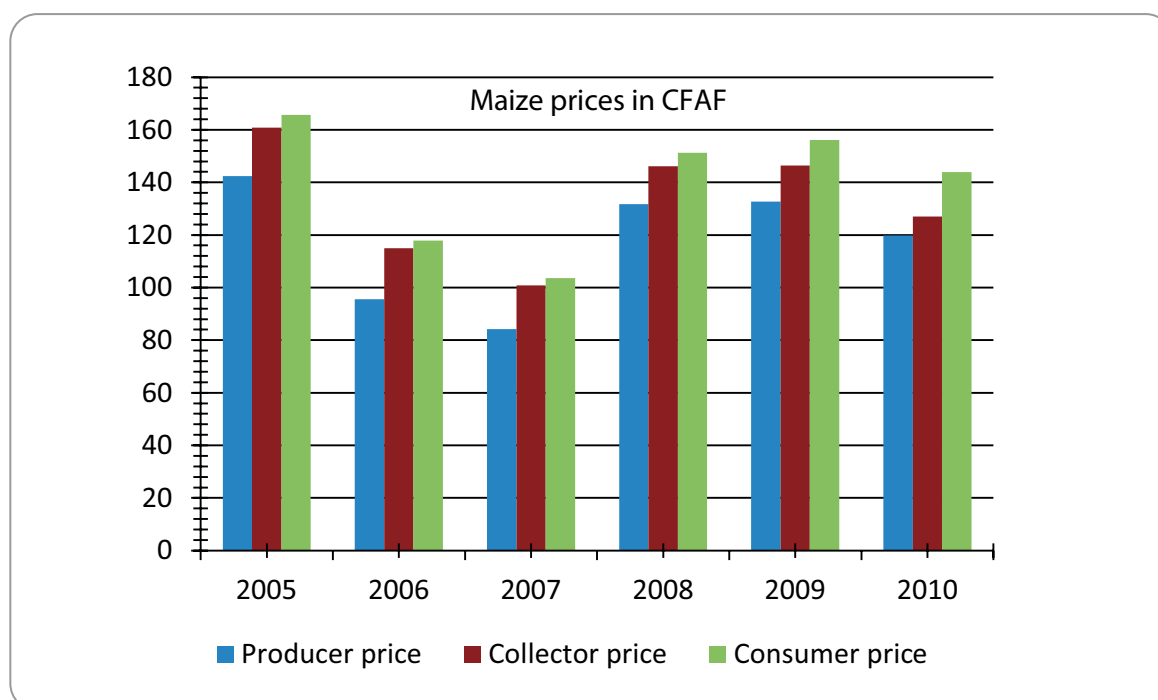
Currently, the role of the public sector is confined to regulation, implementation and control functions through ministries, market information services and systems and regulatory bodies. Research institutions, such as the Institut National de l'Environnement et de Recherches Agricoles (INERA), design and implement research projects for breeding and selecting cultivars, testing and processing techniques. Other external stakeholders (e.g. banks, donors, international research networks and other institutions that provide extensions, such as SOFITEX and development offices) provide supplementary support by funding research, providing needed expertise and technical knowledge. At regional level, national policies have been aligned with the Comprehensive African Agricultural Development Policy (CAADP) framework, which promotes harmonization at the regional level within the New Economic Partnership for African Development (NEPAD) framework. This notably involves common trade policies with the ease of circulation for commodity products and inputs.

Price dynamics

Cereal prices decreased in Burkina Faso from the late 1980s up to the late 1990s, following liberalization. Since then, prices in the maize production and consumption markets have been fluctuating (Diakit , 2006). Producers' and consumers' prices follow similar patterns across years (also within years, as discussed in next sections), but marketing margins are lower when producers' prices are low and margins increase together with maize prices. The relationship is therefore not exactly linear between both (producers and consumers) price series, but rather concave. Gross margins fluctuate from year to year, according to product types and geographic areas. In general, margins are low in larger production areas, and much higher in landlocked ones with low production, which thus reflects more competition and scale economies in the largest production areas. Since the 1994 CFA Franc devaluation, the overall competitiveness of "dry cereals" (i.e. maize, sorghum and millet) has improved in both local and regional markets⁴ in Burkina Faso. Demand from neighboring countries has scaled up, as have processing units (Diakit , 2006).

⁴ Diakit , L. 2006, page 136 : « after the devaluation, it is found that stallholders still receive positive margins in spite of a very sensitive increase in transport cost. This has been made possible thanks to the increase in competitiveness of national cereals-based products ». See also K b  *et al.* 2005.

Fig.7 Maize prices in Burkina Faso

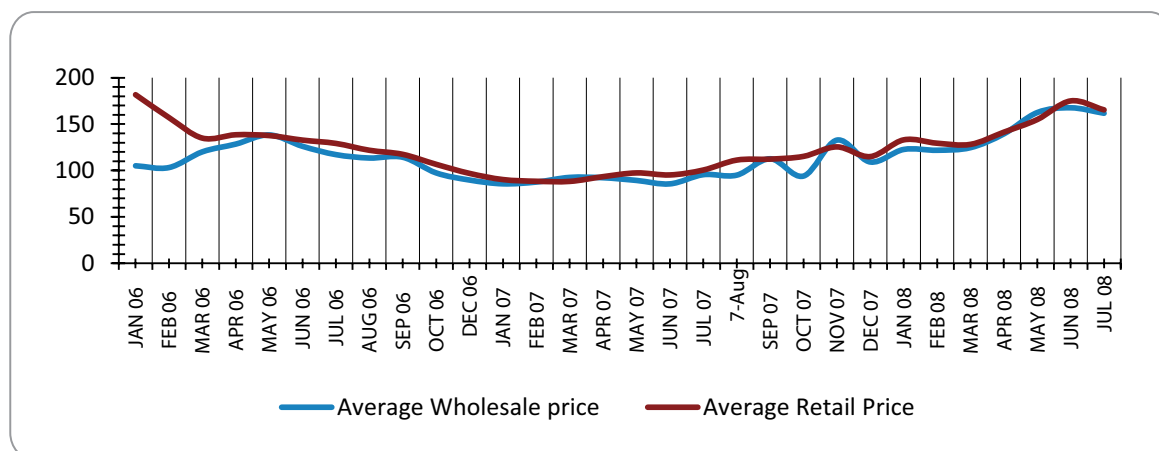


Source: Diakit , 2006.

Fully liberalized maize markets imply seasonal price variability, which is supposed to provide incentives for farmers to store crops; however, the carrying costs are often not recovered because of the variability in spot wholesale markets and bad infrastructures for storage. Many factors cause this failure of storage capacities: uncertainties about speculative storage profitability; the disposal of remaining public stocks and food aid; future policies and related expectations; weak systems of crop forecasting; no information on private stockholding (information problem); weak financial frameworks and banking sectors; infant warehouse receipt systems; shortage of creditworthy customers (e.g. no collateral, information problems, credibility problems); and farmers' cash constraints or risk-aversion towards storage losses because of insects, rodents or molds⁵.

Cereal prices follow a similar intra-annual pattern every season, beginning with low levels at harvest, increasing and reaching maximum values during the lean period and then collapsing during harvests. This behavior is attributable to production and supply conditions. The first has to do with climatic factors, while the second has to do with low levels of storage among producers. Storage by traders and wholesalers increases marketing costs, and, together with a decrease in supply, is responsible for the increasing pattern of prices over the season.

⁵ Mali offers one interesting counter-example, where there has been good recorded storage of millet and sorghum for several years.

Figure 8. Intra-annual price fluctuations in Burkina Faso (2006-2008)

Source: TradeNet, RESIMAO

Hence, cereal prices can multiply four-fold over the agricultural season. Parameters other than supply and demand influence the observed market prices. First, there is an effect from neighboring countries which have experienced under-production shocks, even if national production is in large surplus. Cereal markets are quite sensitive to world market shocks. However, the effect on the price of imported food is much larger than the effect on domestic markets for locally-produced cereals. This has to do with the substantial transaction costs of marketing and trade for local cereal production, which entails a competitive disadvantage (imperfect transmission effects). Agrofood processing can handle production surpluses and lengthen/improve conservation while adding value, and thus attenuate seasonal price variation on local markets by appropriately serving increasing demand in such processed products. To date, most of these domestic markets are still dominated by importers, which mean that there is a strong potential for value-chain development of local cereals, given their competitive advantages. Better market regulation, investment in processing facilities and reduction of marketing costs through appropriate investments in infrastructures would facilitate such promotion of local value chains through processing.

Table 2 presents the evolution of maize market prices on rural producers' markets and in Banfora markets (which are close to northern Côte d'Ivoire and thus potentially affected by maize imports from abroad).

Table 2. Monthly producers and wholesale prices

Periods	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Producers' prices	98	104	103	120	126	126	129	136	131	125	105	91
Banfora prices	125	135	130	124	132	139	153	142	132	104	97	114
% gap between production and wholesale prices	28%	30%	26%	3%	5%	10%	19%	4%	1%	-17%	-8%	25%

Source: Direction Générale des Prévisions et Statistiques Agricoles.

Marketing margins from local markets are achieved right after harvest in November, and while rural market prices increase gradually during the rest of the agricultural season, urban markets in Banfora exhibit a much slower increase because of cheaper imports from northern Côte d'Ivoire. This explains the reduction in the gap between the two markets. The period during which consumers' prices are lower than producers' prices corresponds to the harvest period when produced quantities are not

marketed. The Sourou maize study (2010) by AECOM and Desjardins (2011) shows that the Banfora markets, which are better linked to Ivorian wholesale markets, have a competitive advantage over the Bobo-Dioulasso markets where consumers' prices are much higher and follow the pattern of producers' prices more closely. Cereal banks also have directly affected local markets, and they represent additional competition for providers in local consumers' markets. It has been shown that heterogeneity in cereal banks' functioning is correlated with heterogeneity in local producers' markets (i.e. driving up prices before harvest and driving them down before, with an overall smoothing effect), independently from second and central markets such as Banfora.

4.2 Trans-border trade and necessity to remove trade barriers

In West Africa, maize is available during the post-harvest season, from November onwards. However, Sahelian countries such as Burkina Faso have a competitive disadvantage from July until November when prices are increasing at a time that coastal countries (e.g. Ghana), which have more precipitation, have a second harvest. However, the competitiveness of Burkinabe maize in regional and domestic markets (as compared with maize from Ghana or Nigeria) could be increased by scaling up storage and productivity increases (i.e. more capacities to invest in high-yielding seeds together with necessary insurance mechanisms).

Burkina Faso is one of the few maize-surplus producers in West Africa, and one of the main providers of maize exports to neighboring import-dependent countries. Target regional markets include Niamey and Tamale (Ghana). High regional demand also affects Côte d'Ivoire, Nigeria and Senegal. Burkina Faso also can increase its national demand if adequate marketing and processing options are further developed and promoted (see previous section).

Two main barriers to intraregional trade have been identified in the literature about market integration (and the lack thereof) in West Africa. The first barrier relates to costly transportation and high transaction costs, and the second arises from inconsistencies in trade policies (e.g. export bans for food security purposes that do not allow performing producers to benefit from remunerative prices) and non-tariff trade barriers.

Among the trade cost factors, the transport component is particularly important. Indeed, transport remains a key constraint for the expansion of intraregional and intra-continental trade in sub-Saharan Africa. Yet the continent has the potential to get the lowest transport prices in the world because of its low wage levels and because trucking is essentially a labor-intensive activity.

Costs to operate a vehicle and other indirect costs (e.g. license, insurance and tolls) are not seemingly high when compared with other regions. And yet, prices are quite high and service quality is often poor; this results from high profit markups and institutional failures. The regulation of the trucking industry includes market entry barriers (e.g. access restrictions, regulations, customs and cartels), and corruption in freight-sharing schemes favors the use large fleets and old trucks in poor condition. Old fleets persist because of the regulation of truckers' income (i.e. a revenue cap), which deters or postpones investment in new trucks. Truck overloading is the result of excess capacity and contributes to road degradation. Indeed, road conditions are the main cause of high variable operating costs, increasing fuel consumption and maintenance costs and reduced lifetimes of vehicles (Teravaninthorn and Raballand 2008).

However, in West Africa, wherever international corridor routes are paved in reasonable condition, transport costs cannot be reduced because there is little traffic. The main avenue for improving conditions is therefore paving additional corridors and maintaining good road conditions. Reduction of informal payments and fuel prices can help decrease transport costs, but overall, the main priority for

the region is institutional and policy content. Reforms in the regulations to reform cartels and break interest group coalitions must lead to a more efficient trucking industry (Teravaninthorn and Raballand 2008). Indeed, cartels are a preeminent factor in transport prices (notably in Burkina Faso).

Some key characteristics of transport systems in West Africa are non-tariff barriers which include cumbersome, slow trade procedures and informal taxation at the borders. Administration procedures also can be very costly (World Bank, 2009), and import/export procedures are more time-consuming and costly (i.e. with more documents) than in any other region in the world. There are many causes of this, including electronic breakdowns, poor coordination in inspection, delays in duty refunds and insufficient opening times. Another concern is the efficiency of the customs environment (e.g. governance, corruption) which is responsible for additional costs from border controls (irrespective of the distance covered). The predictability of trade and business administration is important and depends on the policy and regulatory environments. Modernization of customs is a clear avenue for enhancing intraregional trade (e.g. successful reduction of clearing time in Ghana airports).

Table 3. Transport costs in the main West-African corridors

S/N	City/country of origin	Market	Distance (km)	Quantity (t)	Mean transport cost (FCFA)
1	Bobo-Dioulasso Burkina Faso	Niamey-Niger	870	40	750.000
2	Bobo-Dioulasso Burkina Faso	Tamale-Ghana		40	550.000
3	Sikasso-Mali	Dakar-Sénégal		40	1.000.000
4	Sikasso-Mali	Niamey-Niger		70	1.500.000

Source: Boone and Al., 2008.

There has been a low political concern or willingness to rely on cross-border trade to smooth prices swings because of grain markets' characteristics, the fear of food deficit or political blaming, which has often resulted in trade restrictions (e.g. an export ban). In this configuration, a viable strategy of reducing transport costs and accessing urban markets with better logistical means (i.e. less costly) would help consumers to not suffer from import or domestic prices that are too high, and would offer an alternative to import-substitute food. Moreover, cross-border trade is mostly informal (i.e. parallel market) as a result of discouraging trade policies (e.g. highly distortionary taxes or bans, red tape in borders and weakness of custom offices), which inhibit long-term production planning and more formal marketing programs.

Box 2. Enhancing regional trade in cereals in West Africa: USAID/ATP experience

The USAID/ATP is a pilot project for information gathering and sharing. It is based in Accra and covers many producing countries in West Africa, including Mali and Burkina Faso. The project owns an Internet platform through which market information is gathered and disseminated about maize, shallots and cattle/meat. This project posts its own market agents who collect information about prices, marketing agents' characteristics, contracts and offers. This information is then released through mobile phones (SMS). Thanks to this platform, some market stakeholders cut commercial deals. Additional tests need to be performed to make these information systems useful for POs.

Most West African countries, including Burkina Faso, have long relied on regional trade to ensure the availability of staples. As shown by other evaluations conducted within the region, the main identified problems in the maize value chain concern the many trade barriers such as fictive/shadow costs and the harassment of procedures. Maize exporters interviewed by the ATP team in Burkina Faso have witnessed transborder-induced delays and additional (fictive) costs, which represent a significant bottleneck for regional maize trade. Stakeholders often report additional costs which amount up to 200 000 CFAF (USD 396.958) per loaded truck in bribes and other unofficial payments. Harassments and other expenditures are a significant constraint to regional trade since they increase the marketing costs of regional maize exports by 5 to 10 percent.

In 2008, three countries (Burkina Faso, Mali and Niger) decided on export bans of many cereals, including maize (and sorghum-millet). The political objective was to slow down price increases and to ensure adequate supply in domestic markets. According to producers and stakeholders interviewed by the ATP team, however, export bans may have negative long-term impacts on future investments in maize production-related, trade-related and storage-related capacities, because producers and traders would be induced to shift their future resources to unbanned crops or to move into informal sector when unable to shift to these unbanned crops. As a result, export bans may likely produce counterproductive incentives by reducing mid-term supply levels, instead of increasing them.

In addition, the Burkinabe government introduced price regulations by controlling/leveling cereal prices which entail price reductions around 5 percent in 15 provinces (out of 46). No one knows whether those price interventions have significantly affected local market prices as expected. Notwithstanding, this policy stance indicates that maize and other staples' prices are subject to increased interventionist measures – not only at the borders but also in domestic markets. Those measures are not facilitating value-chain development; they better serve politicians' self-serving motives behind food security.

4.3 Critical role of producer organizations as a market agency

Enhancing the value-chain process strongly relies on better horizontal and vertical coordination. The role of professional organizations (POs) is critical as they help reach the needed economies of scale to render new marketing relationships profitable.

POs act in the role of former public services, helping farmers coordinate their marketing strategies and driving farmers' participation in the market and inclusiveness within the value chains. According to Mercoiret (2006), the progressive transformation of village groups into more professional federations

has allowed farmers to participate in the public and policy debates about agriculture, but POs still fail to strongly defend their members or consistently represent their interests. Most of them lack sufficient bargaining power, expertise and access to information to be credible actors in the negotiation process. But a minority of them has gained crucial importance in the policy debate and emerged as an independent force in policy-making (e.g. (Réseau des Organisations Paysannes et de Producteurs d'Afrique de l'Ouest) (ROPPA) for West Africa, Union Nationale des Producteurs de Coton du Burkina Faso (UNPCB) for cotton in Burkina Faso or Association des Producteurs de Coton Africain (APROCA) for international cotton negotiations). POs are the preferred organization form through which the implementation of external projects is channeled.

Box 3. Examples of professional organizations active in maize in Burkina Faso

In Burkina Faso, many organizations exist and some of them are involved directly in maize and cereal commodities. Among these:

- **FEPPASI** (Fédération des Professionnels Agricoles de la Sissili) is a PO of the Sissili province which aims to support farmers through training, marketing and agricultural credit. Priorities for maize production apply to grouped marketing, maize storage and agricultural credit. FEPPASI receive funding and support from donors such as the Swiss Cooperation and they also have developed partnership with the USAID project ATP to develop fertilizers' funding opportunities, improved cultivars and storage capacities.
- **UPPAH** (Union Provinciale des Professionnels Agricoles du Houet), established in 1998, has 2 500 members in the outskirts of Bobo-Dioulasso. It supports maize producers through training, grouped marketing and agricultural credit. Some strategies with ATP are envisioned, and the organization functions much as does FEPPASI.
- **Professional associations of marketing, trade and processing stakeholders**, including UGCPA (Union pour la Commercialisation des Produits Agricoles)(grouped marketing and relationships between POs and traders);

In Burkina Faso, an interprofessional body was set up in the dry cereal value chains – the Comité Interprofessionnel des Céréales du Burkina Faso (CICB). The CICB was established to help public policies better reach smallholders and enhance coordination between smallholders and other stakeholders. The CICB is the main recipient of the PAFASP, Programme d'Appui aux filière Agro-Sylvo-Pastorales (program in support of agricultural and forest-derived value chains), a government-led project to support all stakeholders of the maize value chain in both production and marketing facilities.

Intra-level relationships are almost non-existent, although most stakeholders belong to the same association (e.g. CICB), and there are low levels of cooperation, which does not facilitate more vertical integration. It is possible to find several POs in the same localities, but without any significant relationship among them. Professional bodies of traders and retailers exist in several regions to ensure price collusion or information-sharing about availability of cereals, quality and prices. For maize, they even have their formal professional association, the UGCPA, within the CICB. No spontaneous formalization of relationships with producers arises, even in the maize sector, since the marketing stakeholders have difficulties enforcing provision contracts when prices are not favorable to producers.

Inter-professional associations are an interesting tool for the relationships between “insiders” stakeholders and other participants of the commodity chains, including labor unions, insurers, microfinance institutions, chambers of commerce, government agencies and donors. While outside

agencies can facilitate the establishment of associations when there is a critical bottleneck in communication among stakeholders, it is also more difficult to ensure a sustainable organizational structure with the acceptance of full cost participation. It is clearer, however that such associations should be “associations of associations” as it would be very difficult to ensure the participation of farmers, input suppliers or other agro-processors on their own (Shepherd, 2008).

The UNPCB, the cotton union, has recently attempted to expand its cotton model to maize and set up its own maize marketing program. It aims to propose new marketing schemes to its members by: fixing prices and providing more agricultural inputs to producers; establishing its own network of collectors and vertically related customers; targeting institutional customers and processors for value addition; saving on collecting costs so as to propose more remunerative prices to producers and harness possible economies of scale; developing business relationships with the main wholesalers; and maintaining business partnerships with other producers’ associations. UNPCB tries to reach economies of scale by grouping production surpluses and managing timing of marketing operations to benefit from the pattern of market prices and intra-annual fluctuations.

4.4 Toward a strategy for competitive and inclusive maize value chain

FAO studies show that maize production in Burkina Faso is competitive, meaning that it is more profitable to produce dry cereals locally than to import them, at reference prices, and from a social welfare standpoint. However, self-sufficiency in maize does not necessarily imply that quantities are available throughout the year and throughout the country. Further, trade restrictions for food security and underlying political purposes do not help in adding value and making farmers and traders benefit from higher prices. Better management of storage and safety nets policies also can be helpful in implementing more efficient food-security policies while facilitating trade and private development of the value chains.

Existing results show that local resources are efficiently used and allocated (20 percent of efficiency for maize). Value chains generate more than 150 CFAF billion (around 320 million US\$ equivalent) of added value before accounting for public investment and subsidies. However, without public transfers, the added value would be much less, meaning that social transfers to maize value-chain improve efficiency. Farmers and traders receive lower profits than their contribution to added value while processors receive more. It means that social transfers are first channeled through processors. Without such transfers, there would be less private investment in processing, and this would in turn reduce the profit prospects of farmers and traders. Hence, returns to social transfers are largely positive.

However, competitiveness can be scaled up significantly. Two nodes of the chain could benefit from scaled-up modernization techniques, a better market and business environment and better investment incentives. Two factors are key to enhanced competitiveness. First is farmers’ productivity. It has been shown that farm modernization through farmers’ adoption of more technologically advanced packages (e.g. early cultivars, fertilizers, manure, animal traction) together with appropriate extension services can lead farmers to increase their productivity significantly, and notably for maize which is the crop that reacts the most to these packages in terms of yields.

The second point is about agro-industrialization and processing, which can drive a two-fold increase in value addition. Institutional arrangements and policies could facilitate and enable more processing to take place within value chains, notably through regional strategies and complementarities (e.g. industrial poultry production in Côte d’Ivoire and Ghana and grain production surpluses in Burkina Faso).

5. Conclusion

In West Africa, maize is hugely important for agricultural transformation, intraregional trade integration and food security. Maize can serve multiple market outlets (food, feed and industrial applications) with significant opportunities for expansion and agroprocessing development. In the case of Burkina Faso, the authors examine the key obstacles facing maize value chain development and review the incentives required to transform maize from a predominantly self-consumed crop into a cash commodity serving the needs of several growing market outlets (processed food, animal feed, breweries). Driven by strong and multiple demand sources, incentives do exist for greater uptake of productivity techniques (fertilizers, seeds) and improved maize supply quality (including post-harvest).

The maize sector continues to be hampered by multiple market and institutional failures. On the marketing side, maize value chain actors confront large seasonal price variability and variation in supply and quality. Institutional obstacles include the lack of an effective legal system and weak commercial and market transactions, all of which limit the growth potential for the agroprocessing sector. Institutional-type reforms include support to credit schemes and incentives such as subsidizing collective storage for use in inventory credit (warrantage). As was pointed out for other commodities, successful institutional reforms hinge on the emergence of credible and business-oriented producer organizations able to mediate between producers and credit institutions to facilitate adoption of new technologies and to perform collective purchases and sales. Maize trade within West Africa is much lower than its potential. However, improving maize intraregional trade requires a better understanding of the economic and business costs of current barriers to trade, as well as better communication with policy-makers about the magnitude of the resulting costs to national food security.

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