WEST AFRICAN FUTURES

SETTLEMENT, MARKET AND FOOD SECURITY

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REGIONAL TRADE AND FOOD SECURITY

Regional food markets and trade are crucial to West African food security. With changes in settlement patterns, particularly the ratio between urban and rural populations (WAF no. 3), and the growing proportion of non-producers in agriculture (WAF no. 4), markets have come to play an essential role in supplying food to West African households. Given the scale of cross-border trade flows, these markets must be viewed from a regional perspective. The informal nature of much of this trade, particularly trade in agricultural products, must also be taken into account. Since they are difficult to quantify, informal trade flows are not included in food balance sheets, raising questions about the reliability of the food security indicators derived from these data. This paper aims to highlight these statistical inconsistencies and how they can impact perceptions of food issues. It illustrates the need to consider the regional and informal dimensions of trade when designing food security strategies.

(ORIGINAL VERSION : FRENCH)

1 REGIONAL MARKETS AND TRADE

Markets have become the primary source of food supply for West African households. While self-produced food still accounts for much consumption, food needs are increasingly being met through the market (figure 1). A study of five countries by the Strengthening Regional Agricultural Integration in West Africa programme (SRAI) estimated that in the 2000s, markets provided averages of 62 % (Burkina Faso) to 87 % (Senegal) of household food supply. Côte d'Ivoire in particular saw a sharp rise in the proportion of food bought from markets, which coincided with an increased urbanisation pace (the urban/rural ratio (U/R) rose from 0.62 in 1993 to 0.89 in 2008) following the renewal of economic growth beginning in 1993. Urbanisation is a determinant factor in changing how households acquire food. In urban areas almost all food is market-bought,

with an average 93 % of household consumption being supplied through various market distribution channels. The change in the ratio between non-primary and primary populations (NPP/PP) that follows urbanisation can be a good way to measure the growth of food markets. Given the need to standardise agricultural population data at the regional level (WAF no. 4), this note only looks at the relative change in NPP for Côte d'Ivoire. The data indicate a close correlation between the proportion of non-agricultural producers in the total population and the proportion of market supply in total food expenditure.

Markets are vital channels for ensuring household food security. Analysing how it operates is therefore essential

for assessing the two primary dimensions of food security: supply of and access to "sufficient, safe and nutritious foods" (FAO, 1996). To evaluate markets' ability to meet demand,

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particularly in terms of food diversity and a seasonal sourcing strategy, the issue must be examined at the regional level.

Trade flows zigzag across West Africa, with agronomic and soil conditions being major determinant factors in agricultural production. The diversity of regional ecosystems helps reduce the hazards of climate and creates greater possibilities for trade. This trade narrows the distance between production areas and market sheds, particularly the high-demand coastal urban areas (agglomerations in the Gulf of Guinea and western Senegal). Map 1 illustrates the diversity and geographic distribution of the main grain production areas in West Africa. Millet and sorghum production are

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figure 1 – **Market supply as a proportion of household food expenditure and share of non-primary and urban populations in total population**

Legend:
- Share of market purchases in household food expenditures
- Share of non-primary population in total population
- Share of urban population in total population
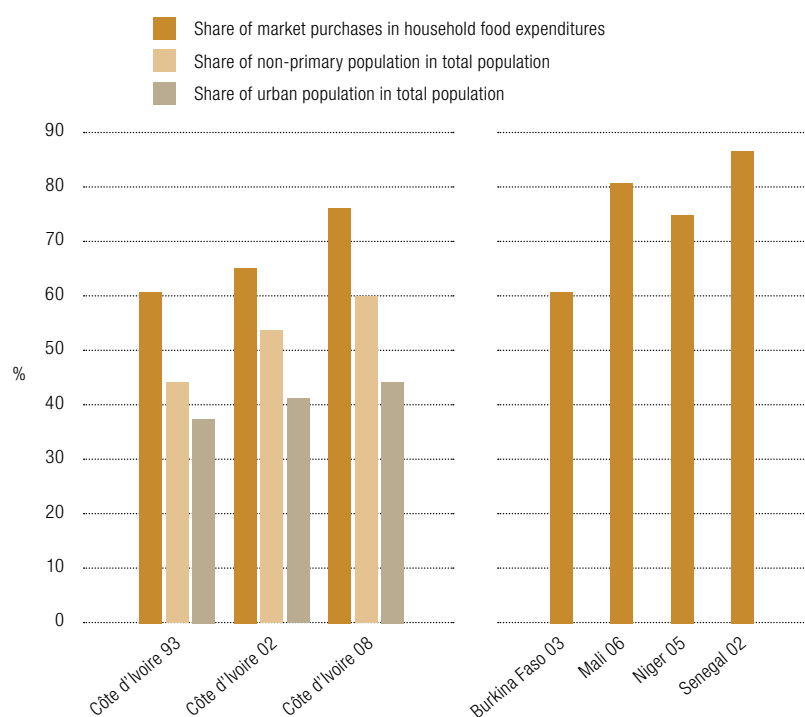
Sources: MSU, SRAI programme (2011); FAO, PopSTAT; Africapolis (2009) and authors' calculation

primarily concentrated in the southern Sahel, with Burkina Faso, Mali and the Niger-Nigeria border appearing as the primary producers. However, maize and rice production is more significant in Guinea and the coastal area in general. Thus for grains alone, crops grown in different areas complement each other in a way that is favourable to trade.

The existence and importance of cross-border trade has often been demonstrated. CILSS estimates the total volume of grain (sorghum, millet, maize and rice) traded between Burkina Faso and its neighbours in the last quarter of 2009 at 34 000 tons[1]. These flows are mostly informal, often evading any form of regulation or reporting. Table 1 shows the percentage of unreported trade within the West African Economic and Monetary Union (UEMOA). Informal sector transactions are believed to have amounted to 11.3 % of official exports in 1996–2000. Also, trade can consist of large numbers of transactions involving small quantities, making

it even more difficult to account for them. Changes to monetary policies and arbitrage trading, a major source of profit, can help explain the direction of trade flows and the high volume of trade between different monetary zones. The volume of informal cross-border trade also "seems to be inversely proportional to the level of harmonisation of economic and tax policies between neighbouring countries".[2] Borders between UEMOA and economically dynamic non-UEMOA countries are subject to larger volumes of informal cross-border trade. In general, a large share of regional trade does not appear in national accounts.

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2   Soulé, B.G. (2010), "Le commerce informel transfrontalier en Afrique de l'Ouest : potentiel, obstacles et lignes d'évolution", in "Le futur du commerce intra-régional en Afrique de l'Ouest ", Enda tiers-monde, p. 52.

1   Cross-border trade flow monitoring test results (September–December 2009).

table 1 – **Percentage of trade within UEMOA not reported in official export statistics**

	Average 1996 – 2000	Border with
Benin	92.1%	Nigeria
Burkina Faso	25.6%	Ghana
Côte d'Ivoire	6.8%	Ghana
Mali	1.7%	–
Niger	48.4%	Nigeria
Senegal	2.6%	–
Togo	76.5%	Ghana
UEMOA average	11.3%	–

Source: Adjovi et al. (2008), cited in Soulé (2010), "Le commerce informel transfrontalier en Afrique de l'Ouest : potentiel, obstacles et lignes d'évolution".

map 1 – **Primary grain production areas**
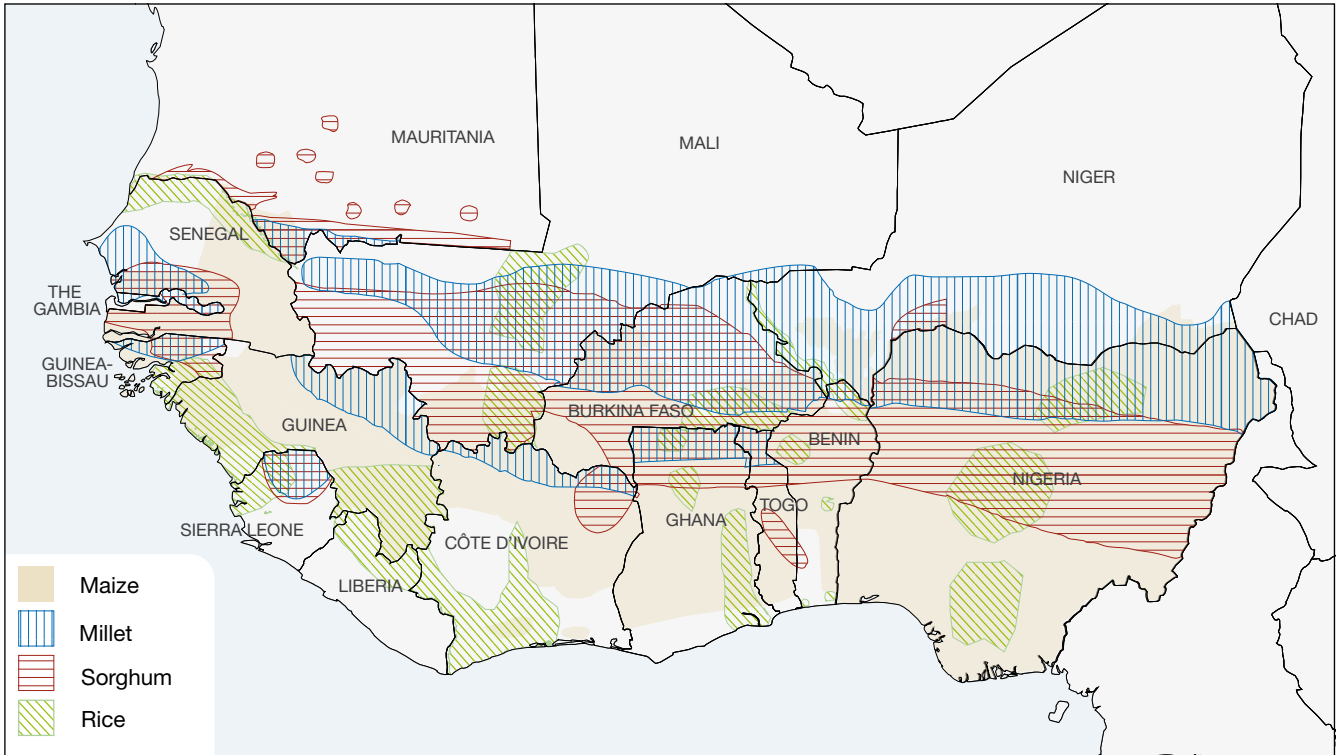
Source: USAID, Trade Hub (2011); CILSS/CIRAD/FAO/FEWSNET/WFP, "Rice crisis, market trends and food security in West Africa" (2011)

2 FOOD SUPPLY AND CONSUMPTION

Each year, the FAO produces a food balance sheet for every country, charting the quantity of food available for human consumption (box 1). This information has become an essential tool for designing food security policies. Food balance sheets are used to calculate dietary energy supply (DES), a key indicator for nutritional policy. In the absence of food consumption survey data, this availability is often considered as a proxy for energy intake. Even though the FAO itself warns that its food balance sheets indicate human consumption "from a supply perspective", they are commonly used for country profiles and consumption trends.

Table 2 shows per capita food supply in Burkina Faso according to the FAO 2003 Food Balance Sheet. For the same period, the Burkina Faso National Institute of Statistics and Demography (INSD) conducted a survey of household living conditions using the QUIBB methodology[1]. The survey monitored the food expenditure of 8 500 Burkinabé households in 425 enumeration areas. In addition, the Burkina Faso National Society for Food Security Stock Management (SONAGESS) collects monthly market price data through the Market Information System (SIM). For four basic cereals (sorghum, millet, maize and rice), the average daily per capita consumption can be precisely calculated after adjusting

1 QUIBB: Standardized Questionnaire on the Basic Indicators of Wellbeing.

for the regional price levels observed over the period. This indicates, first of all, that the quantities actually consumed differed significantly from the quantities available for human consumption as estimated by the FAO. Except for millet, the differences vary depending on whether one looks at the macroeconomic (FAO) or microeconomic data (INSD). The FAO Food Balance Sheet greatly overestimates sorghum and maize consumption by 15 to 19 %. However, it estimates rice consumption at 26 % lower than that observed in the survey. Burkina Faso is known as a major producer of sorghum, millet and maize but is a net importer of rice, particularly Asian rice, which arrives through coastal countries (Côte d'Ivoire, Ghana and Togo). This information suggests that the Food Balance Sheet's poor accounting of intraregional food flows is generating a false calculation of the residual available for food consumption.

Food supply is calculated as the difference between, on the one hand, production, the trade balance (imports – exports) and any change in stocks, and on the other hand, all utilisations other than human consumption (seed, livestock feed, etc.). Food available for human consumption is therefore indicated by the remainder (box 1). The exports and imports reported by the FAO come from official data and do not take into account unreported trade flows. It

can therefore be assumed that the failure to account for informal regional trade – the existence of which has been confirmed by several studies – is leading to biased assessments of

Failure to account for informal regional trade leads to biased assessments of food supply.

food supply . In the case of Burkina Faso, the FAO seems to have underestimated rice imports, leading it to give a lower figure than the INSD study for the amount of rice in the average Burkinabe shopping basket. However, as a major sorghum producer, Burkina Faso most likely exports more sorghum than the FAO estimates. The same can be argued for maize. This results in a very different picture of food intake and a generally lower energy intake (in terms of these four foods alone).

table 2 – **Food supply and consumption in Burkina Faso (2003)**

in kg/person/year	Food Balance Sheet (FAO 2003)	QUIBB (INSD 2003)	Difference
Sorghum	89.6	75.23	+19%
Millet	72.6	72.78	0%
Maize	48.1	41.87	+15%
Rice	16.6	22.29	-26%

Source: FAO, Food Balance Sheet ; INSD, household living conditions survey; authors' calculations.

box 1

FOOD BALANCE SHEETS

Food balance sheets show "for each food item – i.e. each primary commodity and a number of processed commodities potentially available for human consumption – the sources of supply and its utilization. The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilization side a distinction is made between the quantities exported, fed to livestock, used for seed, processed for food use and non-food uses, lost during storage and transportation, and food supplies available for human consumption […]. The per caput supply of each such food item available for human consumption is then obtained by dividing the respective quantity by the related data on the population actually partaking of it. […]

Once estimates of the other components of the domestic supply have been made, the estimate of food available for human consumption is usually derived as a residual. Since the estimate of food available for human consumption is derived as a residual, its reliability would depend on the availability and accuracy of the other components on which it is based. In the case where the majority of the basic data are available and reliable, and the adjustments are based on sound judgment, the estimate of the food available for human consumption is likely to be reliable."

(FAO, Food Balance Sheets - A Handbook, 2003, pp. 2–7)

World cereal market at a glance [1]

	2009/10	2010/11 estim.	2011/12 f'cast	Change 2011/12 over 2010/11
	million tonnes			%
WORLD BALANCE				
Production	**2 262.7**	**2 237.6**	**2 314.9**	**3.5**
Trade [2]	**276.1**	**274.8**	**276.0**	**0.4**
Total utilization	**2 234.4**	**2 279.1**	**2 311.3**	**1.4**
Food	1 037.3	1 054.2	1 069.2	1.4
Feed	767.2	774.3	785.8	1.5
Other uses	430.0	450.7	456.3	1.2
Ending stocks	**533.6**	**490.0**	**493.9**	**0.8**
SUPPLY AND DEMAND INDICATORS				
Per caput food consumption:				
World (kg/year)	151.9	152.5	152.9	0.3
LIFDC (Kg/year) [3]	156.9	158.0	158.9	0.6
World stock-to-use ratio (%)	**23.4**	**21.2**	**21.0**	
Major exporters' stock-to-disappearance ratio (%)	**18.6**	**15.3**	**15.4**	

FAO cereal price index (2002-2004=100)	2009	2010	2011 Jan-May	Change: Jan-May 2011 over Jan-May 2010 %
	174	183	256	59.8

[1] Rice in milled equivalent
[2] Trade data refer to <u>exports</u> based on a July/June marketing season for wheat and coarse grains and on a January/December marketing season for rice
[3] Low-Income Food-Deficit Countries

Source: FAO, Food Outlook – Global Market Analysis, June 2011

3 MAIZE PRODUCTION IN BENIN

To design adequate food security policies it is essential to account for regional food flows when compiling food balance sheets: an example from Benin where maize is the predominant grain crop.

Regional trade and food balance sheets

In a recent study,[1] the Laboratory for Regional Analysis and Social Expertise (LARES) reported that in the early 1990s, informal exports of maize from Benin to its neighbours reached an estimated 30 000 tons, "of which 15 000 went to Niger, 5 000 to 6 000 to Togo and the rest to Nigeria". For the same period, the FAO food balance sheets reported outgoing maize flows at zero (table 3). Without reliable statistics, the authors of this paper can go no further in building a picture of the Benin maize trade or estimate its scale.

The World Bank's World Development Report 2001 on poverty, states that the informal sector represented 92.8 % of non-agricultural employment in Benin in 1990, the highest rate in Sub-Saharan Africa.[2] In terms of national income, Benin's informal economy was estimated at 71.6 % of its GDP in the late 1990s.[3] As regards trade, based on statistics from the Central Bank of West African States (BCEAO), Adjovi et al. (2008) estimate unreported trade at 92 % of Benin's total exports.

Table 3 shows the maize data from Benin's food balance sheets in 1990 and from 2000 to 2003. Variations in production have an almost proportional effect on available food supply. While maize production grew by 26.7 % in 2003, domestic food supply rose 24.6 % and per capita supply by 20.5 %. However, given the inertia of food habits, it is highly unlikely that per capita maize consumption could jump so quickly. Such abundant availability should also have caused maize prices to fall; SIMA-Bénin[4] reports that maize prices did fall significantly, but given the range of the price elasticity of demand for maize in Benin (-0.41 according to the USDA), the decline in prices could not have had such a large effect on the quantity of maize consumed. Reported exports also increased more than fivefold in 2003. It therefore seems much more likely that the rise in production, if not absorbed by a change in stock levels, fuelled informal cross-border trade. Intra-regional trade is a key adjustment variable; failure to take it into account explains the high variability of the remainder available for human consumption.

Figure 2 shows the changes in food output, domestic supply and per capita supply from 1961 to 2007. It shows that variations in production
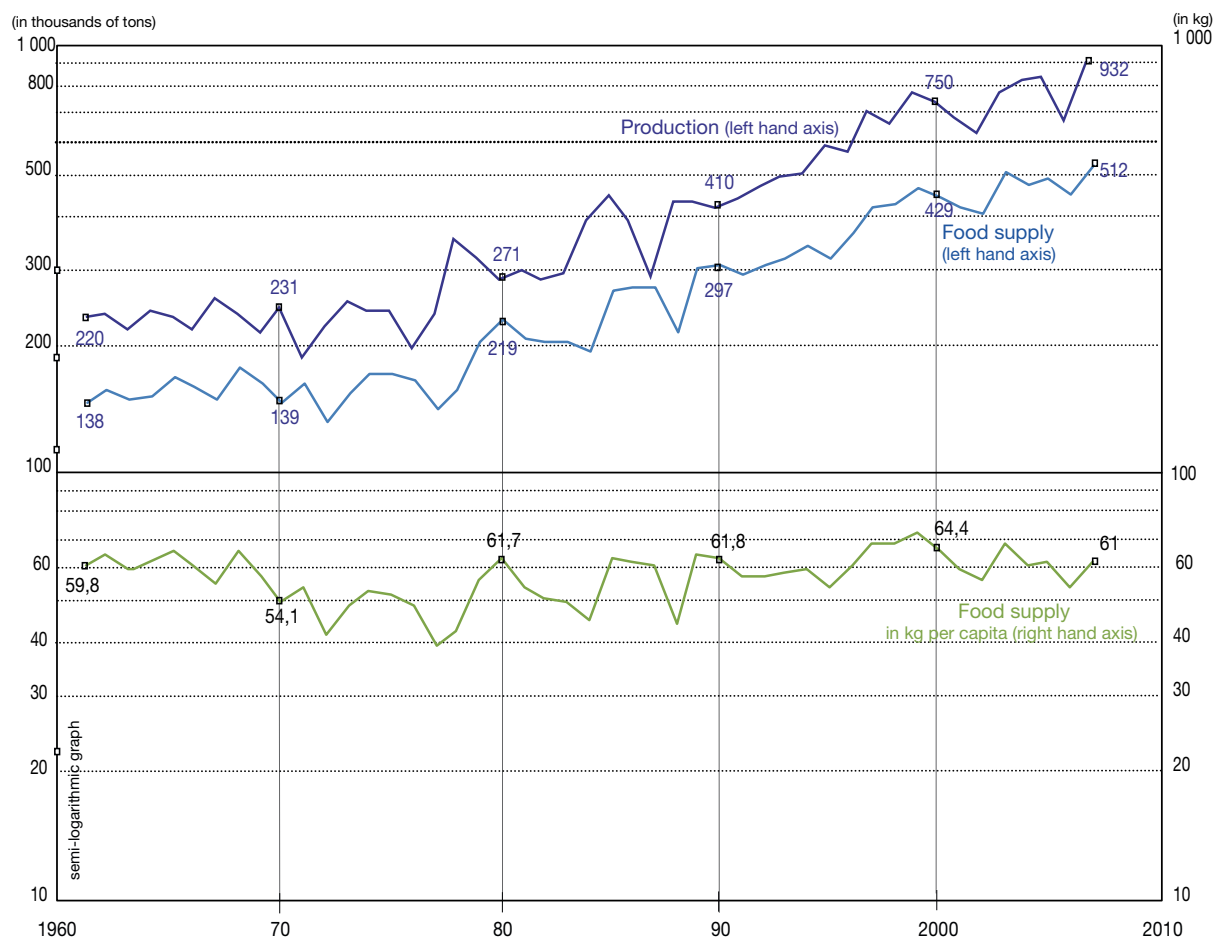
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1 Igue, J. (2008), "Le secteur informel au Bénin : État des lieux pour sa structuration", LARES, p. 21.

2 Charmes, J. (1998), Informal Sector, Poverty and Gender, A Review of Empirical Evidence, Background paper for the World Development Report 2001, World Bank.
3 Charmes, J. (2000),Measurement of the Contribution of the Informal Economy and Informal Employment to GDP in Developing Countries: Some Conceptual and Methodological Issues, cited in the 2007-2008 West Africa Report, OECD.

4 SIMA-Bénin: Benin Agricultural Marketing Information System.

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table 3 – **Food balance sheets for Benin (1990 and 2000–2003)**

	1990	2000	2001	2002	2003
Production (tons)	409 994	750 442	685 902	622 136	788 320
Annual growth	–	–	*(-8.6 %)*	*(-9.3 %)*	*(26.7 %)*
+ Imports (tons)	10 027	100	1 795	2 439	446
– Exports (tons)	0	55	31	8	47
Annual growth	–	–	*(-43.6 %)*	*(-74.2 %)*	*(487.5 %)*
+ Change in stocks (tons)	11 000	6 000	-35 000	0	0
= Domestic food supply (tons)	431 021	756 497	652 667	624 567	788 719
– Livestock feed (tons)	13 500	117 000	52 000	52 000	75 000
– Seeds (tons)	9 288	12 468	14 093	13 251	14 283
– Loss (tons)	111 690	197 897	180 218	164 208	207 158
= Food supply (tons)	296 543	429 132	406 335	395 108	492 278
Annual growth	–	–	*(-5.3 %)*	*(-2.8 %)*	*(24.6 %)*
Per capita food supply (kg)	**61.8**	**64.4**	**59.1**	**55.5**	**66.9**
Annual growth	**–**	**–**	**(-8.2 %)**	**(-6.1 %)**	**(20.5 %)**

Sources: FAO, Food Balance Sheets and authors' calculations.

figure 2 – **Changes in maize production and supply in Benin (1961–2007)**

(in thousands of tons)
(in kg)

Production (left hand axis)

Food supply
(left hand axis)

Food supply
in kg per capita (right hand axis)

semi-logarithmic graph

932
750
512
429
410
297
271
231
220
219
138
139
64,4
61,7
61,8
61
59,8
54,1

Source: FAO, Food Balance Sheet and authors' calculations.

symmetrically affect domestic food supply. Since population growth is more stable, per capita food supply variations are less pronounced but still significant.[5] While consumption depends on supply, particularly in developing countries, there are mechanisms that can limit excessive or sudden variations in the quantities consumed. Stocks are one example. Stock variations in food balance sheets are subject to a wide margin of error, even according to the FAO.[6] Regional trade flows are another example for smoothing consumption levels. Demand is a major determinant of changes in agriculture, and variations

in demand can change the direction of trade flows. It is therefore important to understand the dynamics of regional market sheds when designing food security policies.

Market sheds and cross-border trade flows

LARES[7] reports that maize has been traded in the region since the early 20th century. The Dahomey authorities took advantage of the arrival of a German maize-trading company "to systematically promote maize production in the South of the country […]. It was at this time that maize first spread to both southern Benin and Nigeria. The experiment led to the birth of major trading markets such as Pobé, Dogbo and Ouègbo […]." When the German

traders left after World War I, surplus maize was redirected to Nigeria and Ghana, encouraging new cross-border trade flows (particularly to supply breweries). Until the mid-1990s, benefitting from the development of cotton[8], maize production spread throughout the country, "making Benin a surplus maize producer […]. This surplus was sold to Nigeria, Niger and Togo" (p. 21).

Map 2 illustrates the cross-border trade in maize between Benin and its neighbours. The main maize farming areas are located around Parakou, particularly between Parakou and Gogounou, where agronomic and soil conditions are particularly favourable. Two major areas of demand seem

5   Increases in per capita food supply are inevitably limited by population growth, resulting in a fairly stable per capita quantity over the period.
6   Jacobs and Summer (2002), The Food Balance Sheets of the Food and Agriculture Organization: A Review of Potential Ways to Broaden the Appropriate Uses of the Data, FAO.

7   Igue, J. (2008), "Le secteur informel au Bénin : État des lieux pour sa structuration", LARES, p. 58

8   Fertilizer use in maize production is directly linked to that of cotton.

map 2 – **Cross-border maize flows from Benin**
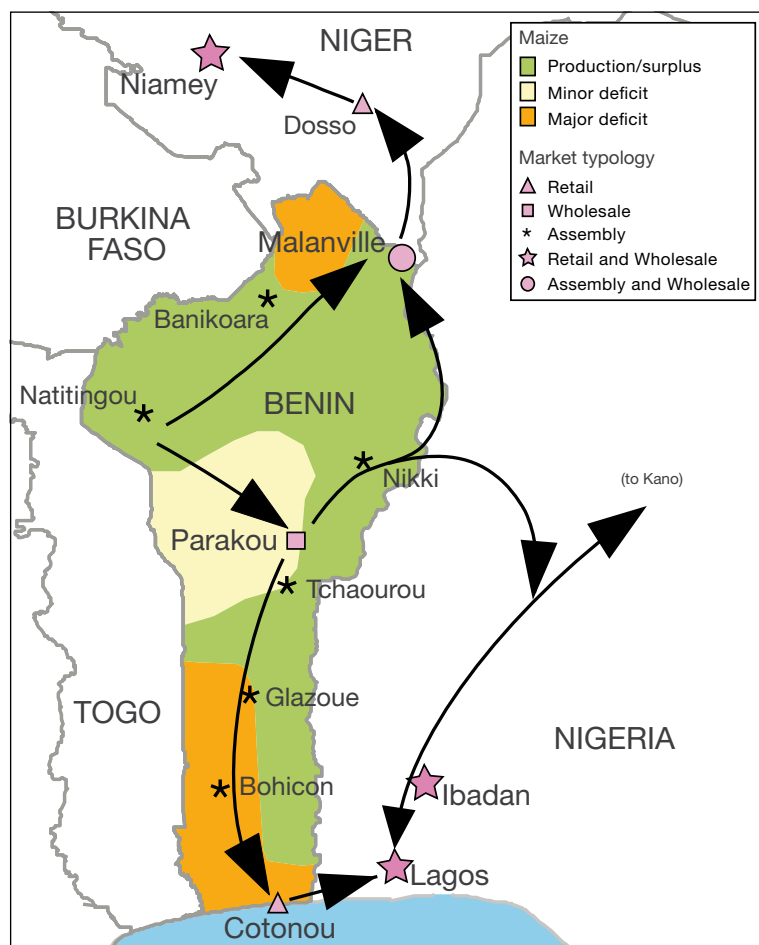
Source: USAID, FEWSNET

to attract maize from Benin: in the South, the Gulf of Guinea agglomerations from Cotonou to Lagos and in the North, Niamey (Niger) and Kano (Nigeria). As part of the SRAI project, Soulé and Gansari (2010) review the dynamics of regional grain trade in West Africa. In Benin, they highlight the importance of Malanville as a very active marketplace, "dealing in […] maize from central and northern Benin and destined for the markets of Dosso and Niamey" (p. 64). Nigeria's Southwestern cities (Abéokuta, Oyo, Ibadan) "purchase maize produced in Benin's southern production region (Kétou and Pobè)" (p. 65). However, trade can also flow in the opposite direction; Cotonou has on occasion had to source maize from Nigeria to manage lean pre-harvest periods. A joint mission of CILSS experts to several border areas in 2008 also gives a partial indication of the volume and direction of grain transactions, which mostly go from Nigeria and Benin to Niger. They estimate that Niger imported 1 315 tons of maize from Benin for the months of January and February 2008. The K²M (Katsina-Kano-Maradi [9]) study in 2006 already reported large flows of grain to Niger. It estimated that "some hundred thousand tons of cereals" cross the border between Niger and Nigeria each year, "the majority of which – but not exclusively – goes from Nigeria to Niger" (p. 15).

It is important to understand the dynamics of regional market sheds when designing food security policies.

9   CILSS/SWAC/FEWSNET/OCHA/WFP/WAMIS-NET/ UNICEF (2006), Food security and cross-border trade in the Kano-Katsina-Maradi (K²M) corridor.

box 2

WEST AFRICAN REGIONAL TRUCKING

"Most West African cereals and livestock traders are (…) informal-sector operators and are comfortable dealing with informal-sector truckers. Big cereals traders do exist and generally have their own haulage fleets, but field work for this study revealed that many of these are run on an informal-sector basis. And they tend to use informal-sector truckers to meet any shortfall in their own trucking capacity.

Formal-sector trucking companies seek long-term contracts in order to keep their trucking capital predictably profitable. The cereals and livestock sectors hold little attraction for them because both small cereals traders without trucks and larger cereals traders with a core fleet have largely unpredictable needs for

trucking services which rarely coincide with excess supply on the part of the formal-sector truckers.

Truckers often set port-to-Sahel rates on the assumption of no backhaul load, so if drivers can find backhaul freight, they do not charge nearly as much as for the outbound trip from the port. Since long-distance commercial livestock flows generally move from the Sahel to the coast, livestock particularly suits truckers (or their drivers) who deliver freight from the ports to landlocked countries and then find themselves without a backhaul load (…). Whereas most formal-sector trucking firms with port-to-Sahel haulage contracts instruct their drivers to return quickly without cargo in

order to deal with the next contracted northbound load, many entrepreneurial informal-sector drivers look for livestock to generate backhaul revenue. The optimum packing of livestock in a truck does not add up to a heavy load (…) and so livestock has the additional advantage of imposing low wear and tear on the vehicle. Moreover, livestock traders want to minimize mortality and shrinkage of their animals, so are keen to pay bribes along the way in order to get their animals to market as soon as possible, thus making for a fast journey back to the coast."

USAID, Trade Hub, Regional Agricultural Transport and Trade Policy Study, 2011, p.64.
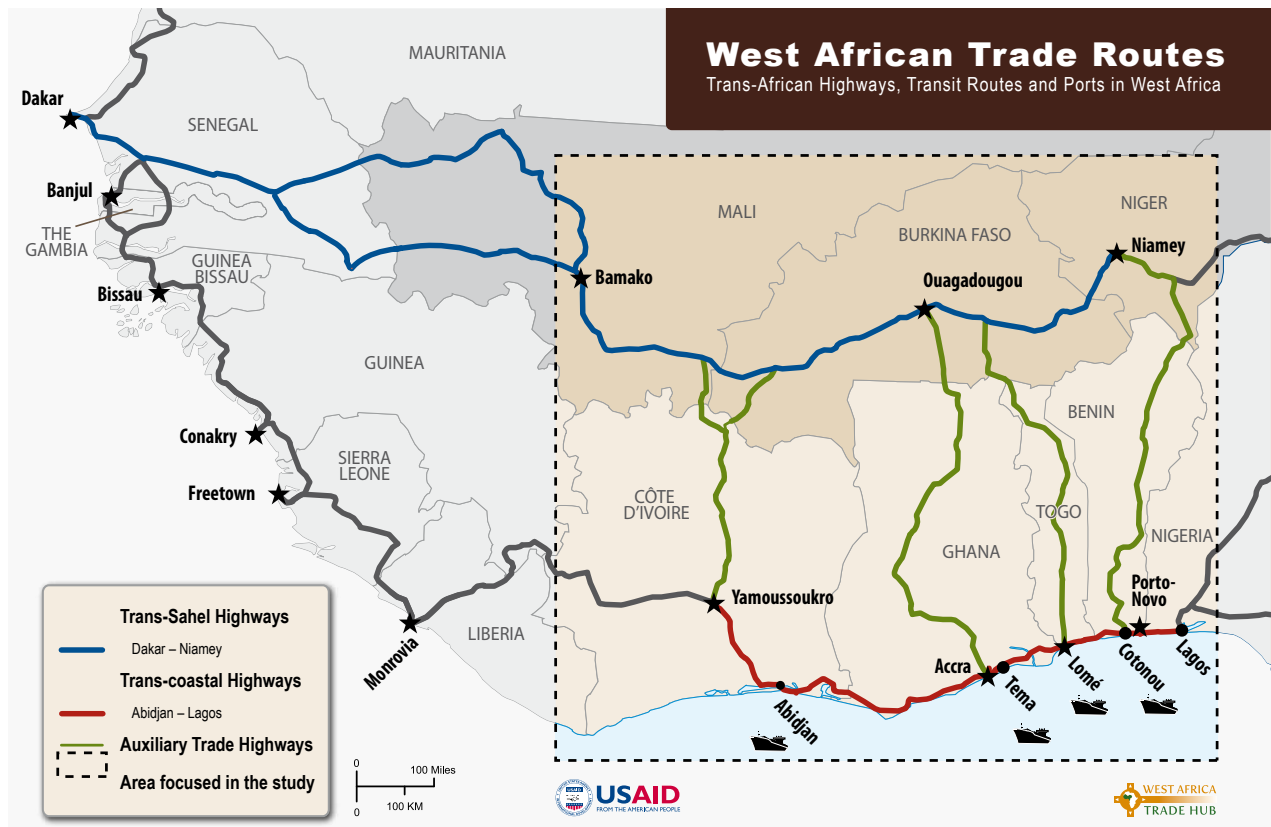
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4 THE INFORMAL SECTOR AND REGIONAL INTEGRATION

The informal sector is often considered a major obstacle to regional integration. However, informal trade seems to be most intense between different monetary zones. This is the case of Togo and Burkina Faso in relation to Ghana, and of Benin and Niger in relation to Nigeria (table 1). Informal networks can also give populations access to markets that would otherwise be impossible. For example, the formal transport sector is not always an option given the structural unpredictability of agricultural output and the sometimes small volumes traded (box 2). The informal sector handles therefore a large proportion of food trade that is essential to food security. Informal practices are not a long-term solution to reducing poverty, but they are a step – and not an obstacle – on the road to development.

> ▶ *An upcoming WAF note will focus on the informal sector.*

Glossary

→ **Food balance sheet**
A food balance sheet provides a macroeconomic picture of the quantities of food available for human consumption in a country for a given period.

→ **Food supply**
Food supply is calculated as the difference between (a) production, the trade balance (imports – exports) and any change in stocks, and (b) all utilizations other than human consumption (seed, livestock feed and losses).

→ **Non-primary/primary ratio (NPP/PP)**
Ratio between the non-agricultural and agricultural (which may not be exclusively rural) populations; provides a basic indication of the development of food markets.

→ **Pace of urbanisation**
Rate of growth of the ratio between the urban and rural populations (which is equal to the difference between urban and rural population growth rates).

→ **Urban/rural ratio (U/R)**
The ratio between urban population and rural population, an unconstrained indicator (unlike the urbanisation rate, which cannot exceed 1, i.e. 100 %). It can be used as a rough guide to the rural world's ability to feed the urban population.

→ **Urbanisation**
Process by which the percentage of urban population within total population increases.