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MILLET PRICES, PUBLIC POLICY AND CHILD MALNUTRITION: THE CASE OF NIGER IN 2005

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Millet Prices, Public Policy and Child Malnutrition: The Case of Niger in 2005

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Summary: Severe food crises were common until the middle 1980s. Since then, they became less frequent and until the sharp rise of food prices in 2007-8 the dominant perception was that, except in areas suffering from political instability, famines were slowly becoming a problem of the past. Niger's 2005 events suggest it is too soon to claim victory. Indeed, between March and August 2005 the country was hit by a doubling of millet prices, and a sharp rise in the number of severely malnourished children admitted to feeding centres. The extent and causes of such crisis remain controversial. Some argue that these extreme events are part of a normal seasonal cycle while others suggest that in 2005 Niger's chronic food insecurity turned into a nutritional crisis that in some areas reached near-famine conditions. This paper reviews the evidence in this regard in the light of the main famine theories and against the background of the chronic food insecurity and high child malnutrition characterizing Niger. The study concludes that the decline in food production invoked by many to explain the crisis does not help comprehending a complex crisis that can only be understood by examining the entitlement failures of several socio-economic groups, the malfunctioning of domestic and regional food markets, and policy mistakes in the fields of food security, health financing, and international aid.

Keywords: child malnutrition, food prices, famines, food security, public policies

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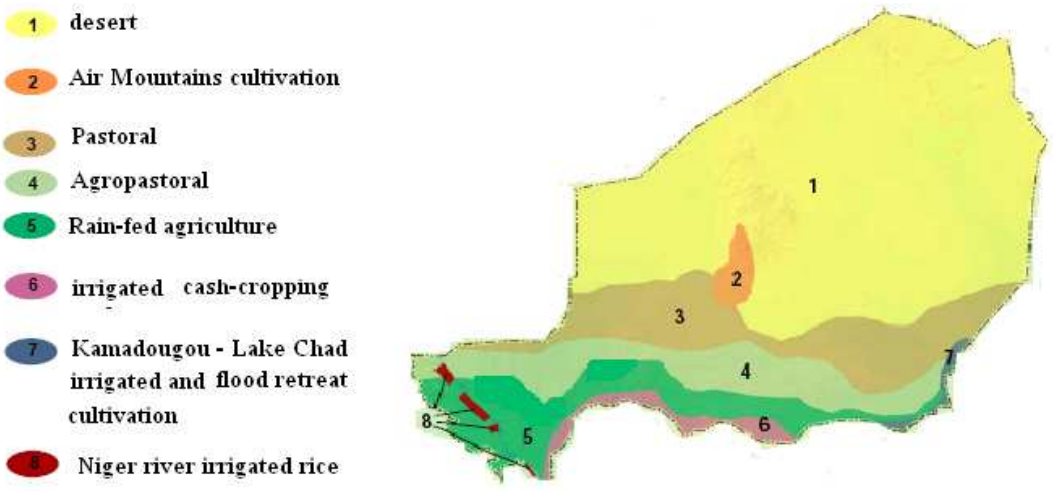
Contents

1. INTRODUCTION AND NIGER'S MAIN FEATURES

Between March and August 2005 Niger was hit by a severe food crisis characterized by a doubling of millet prices, a widespread adoption of unsustainable survival strategies, and a sharp increase in the number of severely malnourished children admitted to feeding centres. The extent and causes of such crisis remain controversial. Some argue that these extreme events are part of a cruel but normal seasonal cycle while for others Niger's chronic food insecurity turned in 2005 into a severe nutritional crisis that was exacerbated by its poor handling by the national and international authorities. This paper reviews the available evidence in this regard in the light of the main famine theories and against the background of the chronic food insecurity and high child malnutrition affecting Niger.

Niger is a vast Sahelian country of 1.267.000 square kilometres with a population of 12.5 million in 2005. 65 per cent of the country is occupied by the Sahara Desert (area 1 in Figure 1). At 3.3 per cent, population growth is the highest in the world and the total fertility rate reaches 7.0 in the country as a whole and 8.0 (DHS 2006) in the comparatively fertile Southern regions inhabited by the polygamous, sedentary and numerically dominant Hausa (areas 5 and 6 in Figure 1). Rapid population growth increases the demand for land which is satisfied by growing migration towards the marginal lands of the Central region (area 4 in Figure 1). Beside by the lack of good land, economic growth is hampered by the shortage of human capital. At 28.7, 50 and 10 per cent, adult literacy and primary and secondary school gross enrolment rates are among the lowest in the world (World Bank 2008).

Figure 1: Agricultural Zones in Niger



Source: FEWS-NET, January 2005.

The country is landlocked and the closest port, Cotonou, is over 1000 km away, a fact that makes transport and communications difficult and expensive. The country counts on important uranium deposits. Following the discovery of the Arlit and Akouta mines in the mid 1970s, uranium came to represent 80 per cent of exports, 27 per cent of gross capital formation, and 46 per cent of government revenue. This however made the country dependent on a commodity subject to strong price and demand fluctuations (Chambas 1988).

Finally, as a member of the West African Economic and Monetary Union, Niger cannot conduct an independent monetary and exchange rate policy.

The years after independence (occurred in 1956) recorded a steady growth that continued till the early 1980s. However, a fall in uranium demand and prices and the agricultural crisis of 1984 caused a major recession. Since then, the country underwent a series of adjustment programs and a 50 per cent devaluation of the CFA franc without recording however till 2005 any visible macroeconomic improvement and diversification of its economic structure (Tinguiri 1992). 40 per cent of GDP and 85 per cent of employment are still accounted for by subsistence agriculture and cattle rearing while manufacturing (a meagre 14% of GDP) and services are dominated by the informal sector. At around PPP US$900, Niger's GDP per capita is the second lowest in West Africa and among the ten lowest in the world. After a series of coups, in 1999 the country held fair and free elections (Baudais and Sborgi 2006) and has enjoyed since then a stable presidential democracy and a relatively free press.

2. NIGER'S FOOD AVAILABILITY AND FOOD ENTITLEMENTS OVER THE LONG

2.1 Long term trends in food supply and availability

Food availability per capita (FAV/P) depends on the net food production (NFP i.e. food production minus post harvest and storage losses and seeds set aside for sowing), food imports (FI), food exports (FE), food aid (FA), changes in the food stocks of private traders (ΔFSPr) and public authorities (ΔFSPu), and population size (P). An analysis of the trend in food availability thus requires assessing the changes over time in the variables included in relation (1) below.

$$FAV/P = (NFP + FI - FE + FA \pm \Delta FSPr \pm \Delta FSPu)/P \quad (1)$$

i) Food production. Niger can be divided in four main agro-climatic zones. Below the desert lies the Sahel (area 3 in Figure 1). With an average rainfall of 100-300 mm per year and sub-desert climate, this land can be used only for transhumant cattle herding. However, growing population pressure has led to an encroachment of agriculture along its southern part, and 70-80,000 new hectares of land subject to wind and water erosion are being cultivated every year. Second, the agro-pastoral zone (area 4 in Figure 1) receives 300-600 mm of rain per year and is thus suitable for the extensive farming of millet. Yet, due to low yields, most households are unable to produce enough millet to feed them throughout the year, and thus have to engage in cattle and goat rearing, casual labour, wood selling, small trade and seasonal migration. Third, the rain-fed area (the Maradi and Zinder regions and parts of the Western Plateaux, area 5 in Figure 1) is characterized by semi-intensive agricultural practices, intercropping of cereals with cow peas and groundnuts, and livestock rearing. Finally, irrigated cash crops are grown in small oasis around the country, as for onions in Agadez and Dosso and vegetables in the South (areas 2, 6 and 8, Figure 1).

Food production is dominated by subsistence farming of millet and sorghum which account for 78 and 19 per cent of cereal output, with rice and other cereals making up for the rest (Beekhuis 2005). Despite attempts at confronting the deep seated weakness of Niger's agriculture made on occasion of the structural adjustment programs of the 1980s and 1990s,

its dependence on climatic factors, backward farming techniques, limited input use and extreme price fluctuations have not decreased, while the liberalisation of agricultural trade and prices did not succeed in stimulating production. Table 1 illustrates the long term trends in farmed land, food production and land yields.

Table 1: Population, production of millet and sorghum, and total farm land per inhabitant, 1980-2004

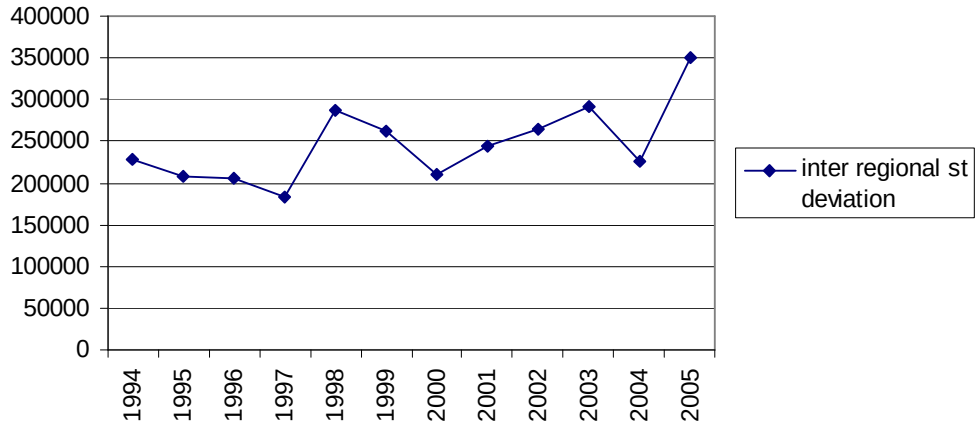
Year	Pop (1000)	Cultivated area (1000 Square Km)	Output (1000 tonnes)	Farm land per capita	Output per capita (Kg)	Net Domest, availa-bility Per/c	Land yields (Kg/Ha)	Output change on previous year (or previous 4 years)	Change in output per capita on previous year (or 4 years)	5 year variance of land/C	5 year variance of Output/C	5 year variance of output/ Ha
1980	5578	3840	1731	0.7	310	....	451					
1981	5763	4071	1635	0.7	284	....	402					
1982	5954	4218	1651	0.7	277	....	391					
1983	6151	4242	1653	0.7	269	....	390					
1984*****	6355	4128	1007	0.6	159	....	244	-39	-41 (-44)			
(Average '80-84)		**4099**	**1535**	**0.7**	**260**		**375**			0.0025	3411.7	6036.7
1985	6565	4310	1774	0.7	270	238	412					
1986	6783	4348	1743	0.6	257	229	401					
1987*****	7008	4359	1362	0.6	195	174	313	-22	-24			
1988	7240	4995	2326	0.7	321	280	466					
1989	7480	5094	1754	0.7	235	170	344	-24	-26			
(Average '85-89)		**4621**	**1792**	**0.7**	**256**	**218**	**388**			0.005	2176.5	3597.5
1990	7728	6942	2045	0.9	265	154	295					
1991	7967	6456	2314	0.8	291	249	359					
1992	8214	7519	2171	0.9	264	223	289					
1993*	8469	6099	1714	0.7	202	171	281	- 28	-23			
1994	8731	6950	2368	0.8	271	227	341					
(Average '90-94)		**6793**	**2123**	**0.8**	**259**	**205**	**313**			0.0075	1119.5	1206
1995	9002	7164	2034	0.8	226	190	284					
1996	9286	7138	2172	0.8	234	201	305					
1997*****	9574	6386	1641	0.7	171	153	257	-24	-27			
1998	9871	7607	2894	0.8	293	257	381					
1999	10117	7449	2772	0.7	272	240	372					
(Average '90-94)		**7149**	**2303**	**0.7**	**239**	**208**	**322**			0.0075	2205.7	2984.7
2000*	10492	7306	2050	0.7	195	175	281	-24	-28 (-20)			
2001	11060	7835	3022	0.7	273	247	386					
2002	11403	7816	3236	0.7	284	259	414					
2003	11756	8041	3502	0.7	298	257	436					
2004	12121	7823	2637	0.6	218	189	337	-25	-26 (-17)			
(Average '00-04)		**7764**	**2889**	**0.7**	**254**	**225**	**372**			0.0025	1993.5	3890.5

Source: Population: Annuaires Statistiques 1991 et 2003 DSCN, RGP/H 1998 et 2001. Production and surface: Rapport techniques SSA/DCV/MDA. Table from CFSVA (2005b). *Notes*: a * indicates a bad harvest year.

However, the stable trends illustrated in Table 1 conceal more than reveal. Indeed, the rapid growth of the rural population and its migration towards the agro-pastoral and pastoral areas (Rochette 1988) have gradually eroded food security in the following ways:

- increased year-to-year output volatility. The expansion of the agricultural frontier towards lands exposed to a high risk of erosion and the overexploitation of the Southern areas have heightened the vulnerability of Niger's agriculture to climatic shocks, as suggested by the increasing frequency of bad harvests: prior to the 1980s bad harvests happened every ten years, over the last twenty years they took place every five years, while over 1997–8 – 2004–5 they occured every 2-3 years.
- increased inequality in the distribution of land, assets and income. Lack of safety nets and efficient credit markets force the farmers affected by production crises to sell their assets (animals, jewels and household goods), mortgage or sell their land at distress prices, and borrow money at usury interest rates. All this worsens their net asset position, increases their debt servicing obligations, and erodes their ability to survive future crises. The rising land concentration induced by ever more frequent crises has led to the formation of new classes of medium-large farmers who can pay up to 50.000–120.000 FCFA/ha (Abdoulaye and Ibro 2006), and of landless or near-landless labourers whose survival depends on casual employment. While 88 per cent of farmers still own small amounts of land and sharecropping and land tenancy involve only 0.9 and 0.6 per cent of all households, a growing number of them is now involved in casual farm work (CFSVA 2005a).
- increased spatial variation in food availability. In a context of well functioning markets, private trade tends to align the spatial distribution of food consumption to local purchasing power, despite of spatial differences in production. However, in Niger rising intra-regional inequality in food production (Figure 2) was accompanied by growing spatial inequality of food consumption due to growing dependence on purchases in the local markets which are often not reachable by traders because of adverse whether conditions, insecurity, poor roads and weak local demand, and to limited integration between regional markets and local village markets.

Figure 2: Standard deviation* of millet production in the eight regions of Niger



Source: own calculations based on FAOstat. *Note*:* The standard deviation may seem an inaccurate measure of variability due to the non stationarity of regional millet production over time. In this case, the scale- invariant coefficient of variation – which would yield a flatter trend than that described in Figure 2 – would be more appropriate. Yet, in countries such as Niger, where 70-85 per cent of the millet output is used for self-consumption, the year to year variations across regions in marketed millet tend to be much more pronounced than those in total output. Lack of information on millet self-consumption by region does not allow to compute the changes over time in the coefficient of variation. Given all this, the standard deviation of total millet production may provide a more faithful, if still imprecise, proxy of changes over time in regional variability in marketed millet output.

Rising spatial inequality in food production and availability might be due also to the progressive concentration of Niger's population in a few areas. For example, detailed micro-studies suggest that between 1977–1988 and 1988–2001 the Northern departments of the agro-pastoral zone experienced the fastest increase in population growth rates in the country, e.g. from 3.4 percent to 4.1 percent in Dakoro, and from 2.8 to 4.3 in Mayahi (Faculté d'Agronomie de l'Université Abdou Moumouni de Niamey 2006).

ii) A growing dependence on imports. In the 1960s, cereal imports acted as a safety valve during years of bad harvests while they fell to zero in normal years and some exports were realized in good years. However, Niger's cereal trade balance started becoming negative in the 1970s. Food imports have thus become permanent and constitute an increasingly important component of total food supply. Though over 1998–2004 food imports amounted to only five per cent of total food availability, they represented a third of marketed output and over half of the cereal deficit. Import volumes and prices have thus become a key determinant of domestic food prices.

Over 2000–2004, 75–85 per cent of millet and sorghum imports originated from Northern Nigeria. Trade with this country is facilitated by the dominance of Hausas on both sides of a long porous border, a well-established network of Nigerian traders in Niger, and low transport costs. The remaining imports originated from Burkina Faso and Mali.

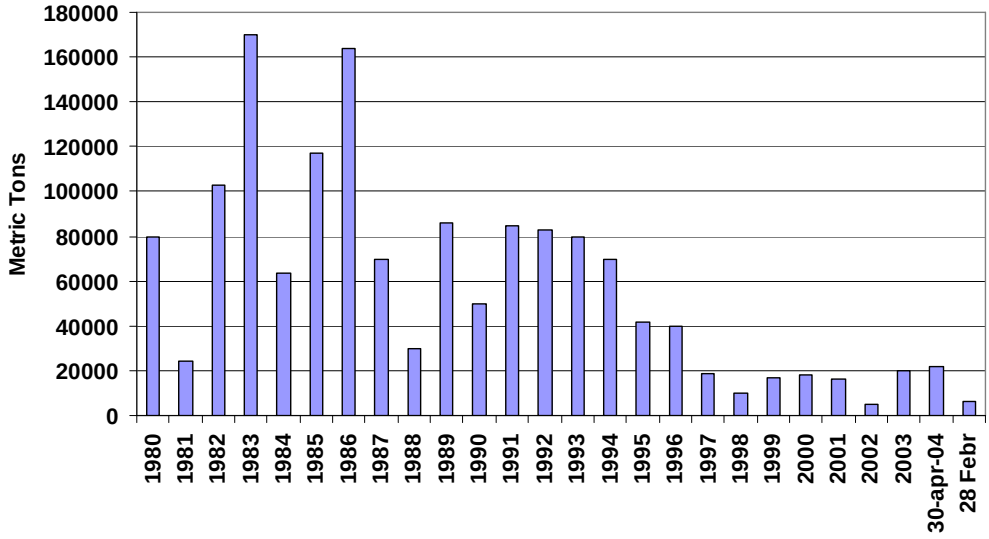
Increased dependence on food imports exposes Niger to a number of risks. The first problem is represented by the lack of good roads and the ensuing high haulage costs. Transporting a 100 kg sack of millet costs 1500–1750 FCFA from Northern Nigeria, 3250–3500 from Mali, 5500–9600 from Cotonou and 7400–11200 from Lomé, depending on the final destination in Niger (Beekhuis 2005). Secondly, the Sahelian countries are often hit by co-variant whether shocks, a fact which reduces the extent to which regional trade can cover food shortfalls and cap food prices in the region, while food imports from outside the region entail high transport costs and long delays. Thirdly, Niger is the one of the smallest, poorest and most remote country in the Sahel. Under these circumstances, supply and demand shocks experienced in larger nations are amplified in Niger. This asymmetric integration is particularly marked in relation to Nigeria, a country with more than twice Niger's income per head and ten times its population.

Official cereal exports have became less frequent, except for some circular trade in the Southern region, though their assessment is hampered by lack of reliable data. In fact, given the strong integration with Northern Nigeria, higher prices in that market may provoke a rise in food exports even in years of scarcity, as observed after the 2001 and 2004 harvest.

(iii) Changes in the stocks of private traders and the national food security reserve. Not much information is available on private stocks. Wholesalers stock up during the last three months of the year and sell from March-April when demand by food-deficit farmers starts rising. As for the long term, it seems unlikely that private wholesalers changed their behaviour, at least in normal years, during which they try to turn around their stocks quickly to minimize financial charges. Food security has been also traditionally ensured by the state cereal marketing and food security board (OPVN) which in the past managed most food

trade, stabilized food prices and maintained a food security reserve. With the signature of the 1983 IMF Standby agreement, the role of OPVN was drastically reduced. The number of its marketing outlets was cut and its price stabilisation role abolished. The only task left was to manage a food security reserve of up to 80,000 tons. Later on, the emphasis shifted from holding a food security stock (or its financial equivalent) to relying on imports which were given the task of stabilizing domestic food prices and covering shortfalls. As a result, the government's food security reserve dwindled from 150,000 tons in 1983 (Gromotka and Bendow 1992) to 80,000 in 1991, and 40,000 in 1996, and 12,000–20,000 between 1996 and 2004 (Figure 3). In 2001 the government planned to set aside a cash reserve equivalent to 20,000 tons of millet but this plan was never implemented. The government's food relief capacity was thus severely eroded.

Figure 3: Level of the National Food Security Reserve (tons), 1980–2005



Source: for 1980-90: our elaboration of OPVN data reported in 'GFA – Niger: role, volume et gestion du stock de sécurité alimentaire', for 1991–2005 are from CCA-SAP quoted in FEWS NET monthly report of 29 September 2005.

iv) Food aid. In normal years, almost 30,000 tons of food aid are distributed on average in Niger through the Dispositif National de Prévention et de Gestion des Crises Alimentaires (DNPGCA) or NGOs that finance cereal banks, food-for-work and food-for-training schemes, school meals, targeted food distribution via nutritional centres, and subsidized sales.

2.2 Food demand and food entitlements of main household groups

Following Sen (1981), the entitlements bundle of group h (h=1,..k) can be written as follows:

$$Qf_h = Qf\text{-}sc_h + Qj\ Pj_h/Pf + Qw_h\ Pw/Pf + T_h/Pf + |-\Delta A|_h/Pf \qquad (2)$$

where Qf_h, $Qf\text{-}sc_h$, Qj_h and Qw_h indicate respectively the total amount of food available, the amount of food produced for self-consumption, the amount of goods (such as goats, cash crops, firewood, etc.) sold and the amount of wage work performed by household group h. In turn, Pf, Pj and Pw are the prices of food and goods sold on the market and the wage rate, T_h

the nominal value of transfers received, and $|-\Delta A|_h$ the income obtained from the sale of household assets (jewels, land and so for). Pj/Pf and Pw/Pf are the 'terms of trade' between the prices of goods exchanged to buy food and the price of food, and between the wage rate and the price of food. The volume of market demand for food of household h is Qf_h - $Qf\text{-}sc_h$, while total food demand is equal to Σ_h (Qf_h - $Qf\text{-}sc_h$)

(i) Food-deficient small agro-pastoralist farmers. This group is found mainly in areas 3 and 4 of Figure 1. It comprises families of 6-9 members cultivating food crops on plots of low-quality land. Even if the food they produce does not cover their yearly consumption, these households are forced to sell part of it after the harvest (when food prices are at their lowest) to cover expenses for taxes and religious ceremonies and to repay debts contracted during the lean season. In turn, they buy food after they have exhausted their stocks at the beginning of the lean season (when prices are at their highest) with cash obtained by selling small animals, working as wage labourers, migrating abroad, doing some small trade, going into debt, or getting enrolled in food aid programs. In normal years, farmers rely on the food they produce ($Qf\text{-}sc_h$) between October and March in surplus areas, and only between October and January in deficit areas.

(ii) Cash crop farmers producing groundnuts, sugar cane, vegetable and onions. They are found mainly in area 6, and the flooding zones along the Niger and Komadougou rivers and Lake Chad. Some cash crops farmers also cultivate cereals on small plots, or seek casual work across the border. Overall, their control over cereals depends on the demand and prices of the vegetables they produce, and the terms of trade between vegetables and millet ((Pj_h/Pf).

(iii) Landless or near-landless farm labourers. Though land distribution in Niger has traditionally been fairly egalitarian, the process of rural differentiation described in section 2.1 has slowly lead to the formation of a rural proletariat that buys food on the market with the cash earned through casual rural work at wages of 750–1000 FCFA per day in the villages and 1250–1500 in the suburbs of big cities (Abdoulaye and Ibro 2006). Recent studies show that in the department of Aguié more than half of the land is concentrated in the hands of less vulnerable farmers, while nearly 10 per cent of local agricultural households does not own land and another 10 per cent has only 0.7 ha per household (Abdou and Adamou, 2003–2004). Control over food of this group depends mainly on the level of labour demand (Qw_h) and the terms of trade 'daily wage/millet price' (Pw/Pf).

(iv) Pastoralists. They raise animals which they sell to buy millet. Their food entitlements depend also on the price of fodder and availability of pastures, which determine the quality of the herds and their market value, as well as the price of animals and millet. Fodder production fluctuates widely from year to year, while the amount of pastures has declined considerably in response to the increasing demand of farmland and the 50 Km shift of the agricultural frontier to the north since the 1970s (Hammel 2001). The pastoralists' food entitlements depend on the terms of trade 'animals price/millet price' (Pj_h/Pf) and 'animals/fodder'.

(v) Problem families. They include incomplete, women-headed, migrant, handicapped, and beggar households who do not produce enough food for self-consumption and depend for their survival on small trade, remittances and transfers relative to the price of food (Th/Pf). Nearly 11 per cent of Niger's population migrated at least once in their life (CRESA 2006) but such number is an underestimate as it does not include the migrants absent from the

country at the moment of the census. Most internal migrants head to Niamey. Traditionally, people used to migrate to Nigeria and coastal West Africa during the dry season (November to February), but have recently extended their stay or migrated permanently, including to faraway places such as Libya, Algeria, Cameroon and Europe (Koné and Tourè 2006).

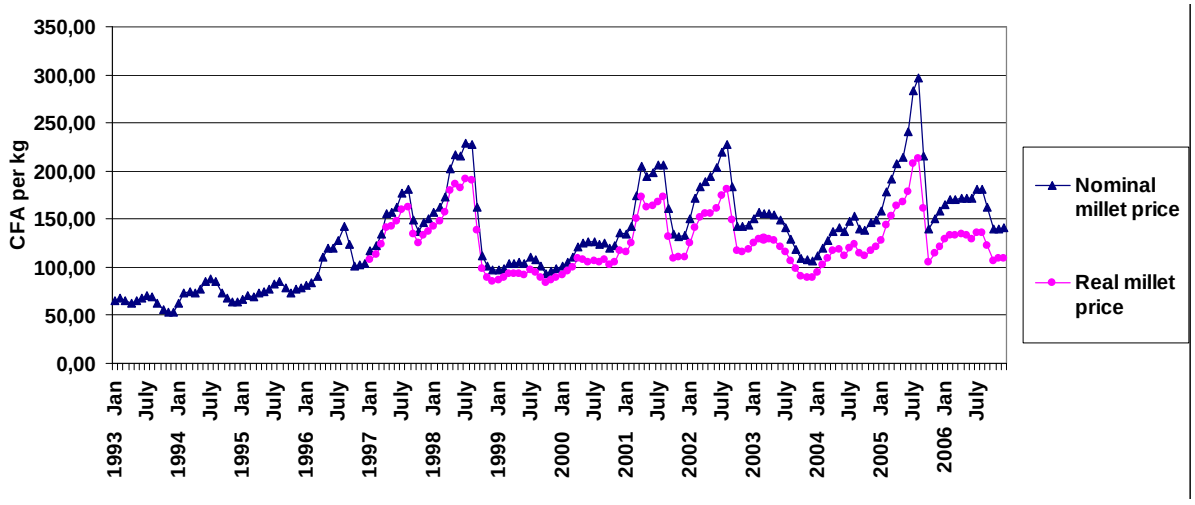
(vi) Urban households. With few exceptions, their command over food depends on their level of employment and their wage. The employees of the public sector and large industries can count on a monthly wage of at least 20000 CFA francs and the guarantee of stable employment, while those in the informal sector generally earn less.

2.3 Price dynamics, market integration and food security

Cereal and cattle prices exhibit large seasonal fluctuations that affect the nutritional status of many Nigerians. In a normal year, millet prices fall immediately after the harvest (September) and reach the lowest level in November when all harvest is in and demand from food-deficient farmers is at its lowest. Starting from December, prices pick up as availability on collection markets decreases while demand starts rising. Prices peak in August when, in normal years, they reach a level 30-40 per cent higher than in November. The intensity of these seasonal fluctuations varies across regions and is more marked in village markets where food producing households cannot arbitrage between low and high prices due to lack of finance, storage facilities, and cereal banks.

Nominal millet consumer prices have risen since 1990 (Figure 4), mainly as a result of the CFA franc devaluation of early 1994[1] and of the bad harvests of 1996-1998 and 2001-2002 and 2004-2005. As for the real price, the trend does not signal any clear long term increase though it confirms that crises, that benefited surplus producers and large traders, became more frequent.

Figure 4: Evolution of the nominal and real consumer price of millet, 1993-2006



Source: SIMA (National Dataset). Note: the real price is expressed in 1995 prices (annual average) by deflating nominal prices with the CPI.

[1] The parity was changed from 50 CFA to 100 CFA francs per one French franc.

Consumer prices vary moderately across the main regional markets in Niger. This strong market integration is confirmed by the high co-variation of millet prices in these markets (Table 2). Food insecurity does not seem to depend, therefore, on the divergence of millet prices across the main markets. Less is known about the extent of market integration and price co-variation between the main regional markets and the towns and villages markets (that are not monitored by SIMA) where most of the rural population buys its food during the lean season. While private trade is well developed, the poor state of roads, security problems and fragmented nature of local demand raise marketing costs and food prices, make supply erratic, and reduce market-based food security.

Table 2: Correlation coefficients of millet consumer prices in national and cross border markets, average October 2000–September 2005[2]

	Jibia	**Malanville**	**Mopti**	**Dori**	**N'Dja mena**	Maradi	Dan Issa	Dosso	Tahoua	Birni n Konni	Zinder	Gaya	Tillaberi	Niamey K.
Jibia (Nigeria)	**1.00**													
Malanville (Benin)	**0.96**	**1.00**												
Mopti (Mali)	**0.53**	**0.50**	**1.00**											
Dori (BurkinaFaso)	**0.81**	**0.74**	**0.97**	**1.00**										
N Djamena (Chad)	**0.73**	**0.63**	**0.56**	**0.77**	**1.00**									
Maradi	**0.94**	**0.94**	**0.46**	**0.81**	**0.74**	1.00								
Dan Issa	**0.95**	**0.97**	**0.51**	**0.77**	**0.68**	0.97	1.00							
Dosso	**0.91**	**0.89**	**0.62**	**0.83**	**0.80**	0.92	0.92	1.00						
Tahoua	**0.92**	**0.92**	**0.54**	**0.77**	**0.74**	0.96	0.96	0.92	1.00					
Birni N'Konni	**0.95**	**0.94**	**0.49**	**0.79**	**0.73**	0.95	0.97	0.93	0.95	1.00				
Zinder	**0.94**	**0.92**	**0.48**	**0.82**	**0.74**	0.96	0.95	0.93	0.95	0.96	1.00			
Gaya	**0.87**	**0.92**	**0.46**	**0.67**	**0.58**	0.87	0.90	0.85	0.88	0.88	0.87	1.00		
Tillaberi	**0.89**	**0.86**	**0.61**	**0.86**	**0.83**	0.93	0.91	0.94	0.92	0.91	0.93	0.85	1.00	
Niamey Katako	**0.89**	**0.86**	**0.73**	**0.88**	**0.81**	0.91	0.90	0.95	0.92	0.90	0.91	0.82	0.96	1.00

Source: own calculation on the basis of data from SIMA (Niger, Nigeria), OMA/PROMISAM (Mali), AFRIQUE VERTE (Mali, Burkina Faso) and FEWS NET (Chad).

Market integration with the neighbouring countries is also considerable, especially with Nigeria, Benin and Burkina Faso (Table 2). Indeed, millet and sorghum price differentials in the cross-border markets are moderate and prices generally fluctuate together. This means that demand, supply and price shocks in nearby countries are quickly transmitted to Niger (Beekhuis 2005) whose food security is affected by demand, supply, pricing, tax and trade shocks in neighbouring countries, as well as by fluctuations in the Naira/CFAF exchange rate. With regard to price shocks, Debrun et al. (2002) estimated that a surge in domestic inflation in Nigeria causes a 3.7 per cent rise in inflation in Niger, while the effects of inflation surges in Niger on Nigeria were nil. Thirdly, a study of exchange rate fluctuations on Jibia's parallel exchange rate market used by Nigerian traders to convert their FCFA into Nairas showed that while the nominal FCFA/Naira rate rose by 39 per cent between 2000 and June 2005, the much higher cumulative inflation recorded in Nigeria during the same period

[2] Additional data on the relation between millet prices on national vs. cross-border markets is available from the authors.

caused a depreciation of 24 per cent in the CFA franc, thus making it less attractive for Nigerian exporters to sell millet in Niger (Beekhuis 2005).

2.4 Long term trend in access to health care

Child malnutrition and mortality crucially depend on access to health care. Health services in Niger are organized according to a three-tier system comprising national hospitals and disease control centres in Niamey and the main cities, district hospitals at the departmental level, and Integrated Health Centres (CSI) and Health Homes at the village level. Though they should constitute the first health contact in rural areas, CSI are few and far between and only 27 per cent of the rural population lives at less than 5 km from a CSI (DHS 1998). Only the Niamey's population is adequately covered and large areas of the country do not have access to CSI (World Bank 2004). In addition, the quality of care they provide is low as they suffer from a chronic shortage of health personnel and drugs.

The high cost of health care is another factor excluding the poor from health services. Until the mid 1980s, health services where financed by the state budget. Yet, in response to the fiscal crisis of 1983–1984 and as a condition to obtain a USAID health care grant of US$15 million, in 1986 the government introduced user fees for hospital care. The resulting revenue was to be allocated to CSI in neglected areas, while partial or total exemptions were foreseen for children and indigents. Cost recovery for outpatient consultations increased from 7 per cent in 1986 to 40 per cent of total CSI resources in 1988, but fees were not applied uniformly, exemptions often benefited the rich, and poor patients were the least likely to be referred to a hospital because of their limited resources (Wong 1988).

In 1993 the Government carried out a three-district pilot study on the impact of cost recovery in primary health care. The study showed that the number of people seeking treatment declined in areas where a pure fee method was adopted but rose where an indirect form of payment had been introduced[3] (Diop et al. 1995, Chawla and Ellis 2000). On the basis of these results, in 1995 the Government introduced a nationwide cost recovery system leaving to the communities of each health district the right to choose the level and type of fees. However, a 1998 survey conducted in 11 health care centres of Tillaberi region showed that attendance to CSIs declined by 40 per cent following the introduction of fees of 750 CFA per consultation or half of it for children, and that the revenue from fee payment was insufficient to cover the cost of drugs and administration (Meuwissen 2002).

2.5 Long term trends in child malnutrition and mortality

Four large health and nutrition surveys were undertaken during the 1990s in Niger, i.e. the Demographic and Health Surveys (DHS) of 1992 and 1998 and the UNICEF-sponsored MICS of 1996 and 2000. If account is taken of the fact that 1998 was a bad year, these surveys point to a stagnation at high levels of severe child malnutrition (around 15%) and

[3] The indirect method of payment implemented in Boboye district provided for an annual tax of 200 CFA per household plus moderate fees per episode of treatment of 50 CFA for adults and 25 CFA for children. By contrast, according to the pure fee for service method introduced in the district of Say, an adult had to pay 200 CFA per episode of treatment, while a child had to pay 100 CFA.

severe-acute child malnutrition (around 3%), i.e. values considered alarming from an international perspective.

Malnutrition rates vary considerably according to the child characteristics. Severe-acute weight-for-height malnutrition is highest (7%) among the 12–23 months old children, and much lower (1–2%) among the 0–6 and 24–30 month old. In contrast, the incidence of growth retardation rises with age. Child malnutrition correlates also closely with the status of women in society. In parts of Niger women are valued as providers of dowry in case of marriage, producers of future manpower and child-minders. Yet, a biased intra-family distribution of land, food, workload and household chores places huge demands on their time and leaves them little time for child feeding. Short-spaced births are also a cause of high child malnutrition due to the recurrent depletion of the mother's body and her inability to cope simultaneously with many small children. As elsewhere, low maternal education is a good predictor of early marriage, high fertility and child malnutrition. Child malnutrition is also 50–80 per cent higher in rural than urban areas. In addition, the regions of Maradi and Zinder show higher rates of child malnutrition than the poorer Agadez and Dosso, a surprising result when considering that the former two regions account for 40 per cent of total millet production. Yet, in these regions land distribution is less egalitarian, female education lower and the incidence of polygamy higher. Finally, acute child malnutrition is highest among the poor (MICS 2000).

As for child mortality, Table 3 points to a long-term stagnation in IMR that compares poorly with the performance of other low income countries such as Bangladesh that reduced mortality by 5–6 points per 1000 a year over the last 15 years. A slightly better performance is evident for the under five mortality rate (U5MR) that declined by some 2 points a year. For both indicators, the initial trend is towards an increase, followed by a decline during the second half of the 1990s. These trends are confirmed by Garenne et al. (2003) who show that U5MR decreased between 1958 to 1972, then stagnated till 1992, to decrease again between 1992–1998.

Table 3: Indirect estimates of mortality trends based on DHS 1992, DHS 1998 and MICS 2000

	IMR (per 1000)			U5MR (per 1000)		
	DHS 92	**DHS 98**	**MICS 2000**	**DHS 92**	**DHS 98**	**MICS 2000**
1978-1982	129	135		308	317	
1983-1987	146	137		334	322	
1988-1992	123	150		318	325	
1991-1995			137			305
1993-1998		123	126		274	280

Source: DHS and MICS surveys.

3. NIGER'S 2005 FOOD CRISIS

Between March and September 2005, 2.5–3 million people (a fourth of the total population) from low and middle income households living in agro-pastoral and some agricultural areas were affected by a severe food crisis. What were the features of such crisis and what explains it? These points are explored hereafter following the same approach used in equations (1) and (2) in section 2.

3.1 Macroeconomic stance

In 2004 GDP fell by 0.6 per cent, mostly because of a 3.9 per cent drop in agricultural output, while inflation surged from 4 per cent at end 2004 to 13.4 per cent in August 2005 mainly as a result of a 28 per cent jump in cereal prices. 2005 recorded also a trade deficit higher than that of the prior eight years which was offset by a doubling of unrequited transfers, rising migrant remittances and cancellation of part of the external debt (IMF 2007). Indeed, over 2004–2005, after reaching the completion point of the HIPC initiative, the country benefited from the cancellation of US$197 million of debt due to the Paris Club and US$86 million due to the IMF. While the state budget exhibited in the past a chronic deficit of 8–10 per cent of GDP (which fell to 3–4 % when foreign grants were accounted for), 2005 recorded the lowest deficit since 2000, despite a fall in tax revenue of 0.7 per cent of GDP. This suggests that the Government attached greater priority to the deficit reduction foreseen by the IMF's Poverty Reduction and Growth Facility programme than to an expansion of public expenditure to respond to the food crisis. Indeed, public expenditure dropped in 2005 in relation to 2004 (Table 4). Its allocation was also questionable. While minimal resources were allocated to the food security reserve and while expenditures on health and agriculture were a puny 6 and 8 per cent of the total, sizeable public funds were used for the Francophone Games which the Niger's authorities were committed to host in December 2005 (IMF 2005). In early 2005 the Government tried to increase tax revenue by introducing a 19 per cent VAT on milk, sugar and wheat and by reducing the tax exemptions on water and electricity. Such measures triggered a mass protest and were withdrawn in April of the same year.

Table 4: Niger's Government revenue, expenditure and deficit in percentage of GDP, 1998–2005

		1998	1999	2000	2001	2002	2003	2004	2005
% of GDP	TOTAL REVENUE	9.1	8.8	8.6	9.3	10.6	10.0	11.2	10.5
	of which tax revenue	7.9	8.1	8.0	8.8	9.6	9.7	10.8	10.1
	TOTAL EXPENDITURE	17.3	18.7	16.7	17.2	18.4	17.5	20.4	18.1
	of which current expenditure	11.6	12.4	11.2	11.0	10.7	10.2	11.1	9.2
	OVERALL DEFICIT	-8.2	-9.9	-8.1	-7.9	-7.8	-7.5	-9.2	-7.6
	OVERALL DEFICIT (cash basis)	-8.5	-6.0	-16.9	-9.1	-10.0	-8.3	-10.5	-8.2

Source: IMF (2007).

3.2 Changes in food production, imports, stocks and availability

(i) An important but not catastrophic decline in food production. The combination of the 2004 drought, locust infestation and early end of the rainy season resulted in a cereal production fall of 9 per cent in relation to the average of the prior year. However, the September 2004 harvest exceeded the prior five-year average by 11 per cent, and was 28 per cent higher than that of 2000 (Tables 1 and 6), when a much greater harvest failure did not lead to a food crisis. Some areas of the country were much more affected by the output decline. In all departments of Agadez and Diffa regions cereal production fell by 90 per cent, and in Matameye and Tanout departments of Zinder region the harvest dropped by 55 and 43 per cent in relation to the prior five-year average. All in all, cereal production fell by more than 25 per cent in 19 departments, a value similar to that recorded during the 2000 crisis (WFP 2005).

(ii) A sharp decline in food import. Unlike on prior occasions, cereal imports failed to offset the 2004 production shortfall. Official imports decreased by 65 per cent in comparison to the average of the last five harvests (CFSVA 2005b) and were only 16 per cent of 2000–2001 imports (Table 5). As only about 20 per cent of the food harvest is marketed (WFP 2005), the fall in imports contributed in a major way to the rise in the price of cereals by reducing sharply the amount of marketed food compared to the prior five years average and to 2000–2001 respectively (Table 5). The main decline was recorded for official imports from Nigeria that dropped from 39,000 tons in the first 5 months of 2004 to 14,000 tons during the same period of 2005. Likewise, cereals imports from Benin, Burkina Faso and Mali were only 37 and 39 per cent of the average of the prior five years. In addition, according to CILSS (2006) significant amounts of grains was exported from Niger to Nigeria and other neighbouring countries.

Table 5: Cereal Imports by marketing year (October–June), estimated food marketed output* and total food marketed, selected periods.

	Average 1999-2000/ 2003-2004	2000-2001	2004-2005	2004-2005 as a share of average over 1999-2000/ 2003-2004 %	2004-2005 as a share of 2000-2001 %	Sources of decline in total food supply btw 2004-2005 and average of prior 5 years (% changes in parenthesis)	Sources of decline in total food supply btw 2004-2005 and 2000-2001 (% changes in parenthesis)
A. Food Imports							
Imports of Millet	27884	79190	12016	43.0	15.1	…….	…….
Imports of Sorghum	5904	16459	695	11.7	4.2	……	……
Imports of Maize	37146	61135	12016	32.3	19.6	…….	……
Total Imports	70934	156784	24728	34.8	16.0	…….	……
B. Sources of decline in total marketed food							
Hypothesis 1. (marketed output = 20% net output)							
Total Imports	70934	156784	24728	…….	……	-46206 (48.7)	-132056(-385.4)
Marketed Net Output	507680	361200	459000	……	….....	-48680 (51.3)	98700 (285.4)
Total Marketed Supply	578614	517984	483728	…….	……	-94886 (100.0)	-34356 (-100.0)
Hypothesis 2. (marketed output =15 % net output)							
Total Imports	70934	156784	24728	…….	……	-46206 (55.6)	-132056 (-190.7)
Marketed Net Production	380760	270900	344250	……	……	-36510 (44.4)	73350 (90.7)
Total Marketed Supply	451694	427684	368978	……	……	-82707 (100.0)	-58706 (-100.0)

Source: Authors' calculations on data from DPP, Ministry of Agriculture (production data) and Beekhuis 2005 (import data). Notes: * the total marketed food supply is the sum of imports and marketed net output. The latter is assumed here to be equal to either 20 or 15 per cent of national net production.

Niger's import collapse was only in part due to a bad harvest in its traditional suppliers. The 2004 agricultural year was average in most CILSS members (CILSS 2005) and Burkina Faso and Mali even had a surplus. Yet, in Nigeria production was lower than the average of the prior five years, while Cameroon and parts of Ghana and Cote d'Ivoire recorded a significant decrease. All this raised the demand for cereal imports and pushed up prices region wide. Though less markedly than in Niger, abnormal price rises were experienced in most of the region, including in countries that had recorded a surplus. However, in the closely integrated Sahelian cereal market, Niger, the smallest and most remote country, was hit most by the price tensions emerging in the region.

A comparison of cross-border markets shows that, contrary to the usual situation, from October 2004 to June 2005, millet prices in Jibia (Nigeria) were higher than in Maradi. This exceptional price rise was in part the result of the promotion of the domestic poultry industry by the Nigerian government and of an expansion of milling capacity which raised the demand for millet, sorghum and maize, all of which can be used to make flour or as chicken feed. In addition, the Government of Nigeria reinforced its border controls to reduce unofficial exports. In turn, Burkina Faso imposed a ban on the exports of cereals. In addition, between January and October 2005 the Nigerian naira appreciated by 5 per cent on the official market and 7.5 per cent on the parallel market, reducing in this way the incentives to export cereal to Niger (Terpend et al. 2006).

(iii) Changes in wholesaler's stock. Millet wholesalers in Niger are less than twenty and are thus able to control the marketing process upstream and downstream and to be perfectly informed on price movements at all levels (Beekhuis 2005). One could surmise therefore that during the 2004–2005 season they stocked up more than usual to sell later in the season at higher prices. Yet, data on their stocks, which basically report what they choose to declare, register a significant and progressive reduction in stocks from May onwards (CC/SAP 2005), while a WFP (2005) survey carried out in July 2005 concluded that there was no evidence of millet hoarding by the wholesalers.

(iv) A negligible release of food from the 'food security reserve'. As a result of the food security policy adopted in the mid 1990s (section 2.1.5), in 2005 the DNPGCA had to face up to the crisis with a food security reserve that in March 2005 stood at 5,000 tons, a level that drastically limited its disaster management capacity, and that forced it to purchase food on the world market.

(v) A delayed donors' response. According to UN-OCHA, between October 2004 and December 2005 Niger received US$121 million of humanitarian assistance, of which more than half was food aid. Nevertheless, no food arrived before July 2005, despite a 25 November 2004 joint appeal by Niger's Food Crisis Unit and WFP and the launch in February 2005 of an emergency operation. In May 2005 the UN issued a 'flash emergency appeal' for US$16.1 million, but by end June only 11 per cent of this request had been satisfied. On 19 July 2005, the BBC broadcast the images of children dying at feeding centres, with the effect of stirring up the world public opinion. 'More money was received in the week' following the broadcast of the BBC service 'that it had in the previous six months' (Jan Egeland's declaration to the BBC). Despite this, by end July the UN had received just a

third of the US$30 million it had asked for, and by September 2005 the WFP had received only 34 of the US$57 million requested.

The problems caused by the donors' late response was compounded by the fact that during the first seven months of 2005 WFP was not allowed to carry out any free food distribution, though it was permitted to start food-for-work and food-for-training activities and a few cereal banks. WFP went along the Government's plan to offset the food shortage through five subsidized sales of 12,000 mt. at 100 CFA per kg. Yet, the quantities actually sold were insufficient to meet the needs of the population and failed to stop the increase in food prices (MSF 2005a, WFP 2006). In addition, even the subsidized prices were out of reach for most of the population affected, particularly as they rose in line with the rise in market prices (Rizzo 2005). Finally, in August 2005, when malnutrition rates had almost reached their peak, WFP carried out a general free food distribution, that reached more than 3 million people in the affected areas, and introduced targeted feeding programs for malnourished children and lactating women.

3.3 Changes in food prices during the crisis[4]

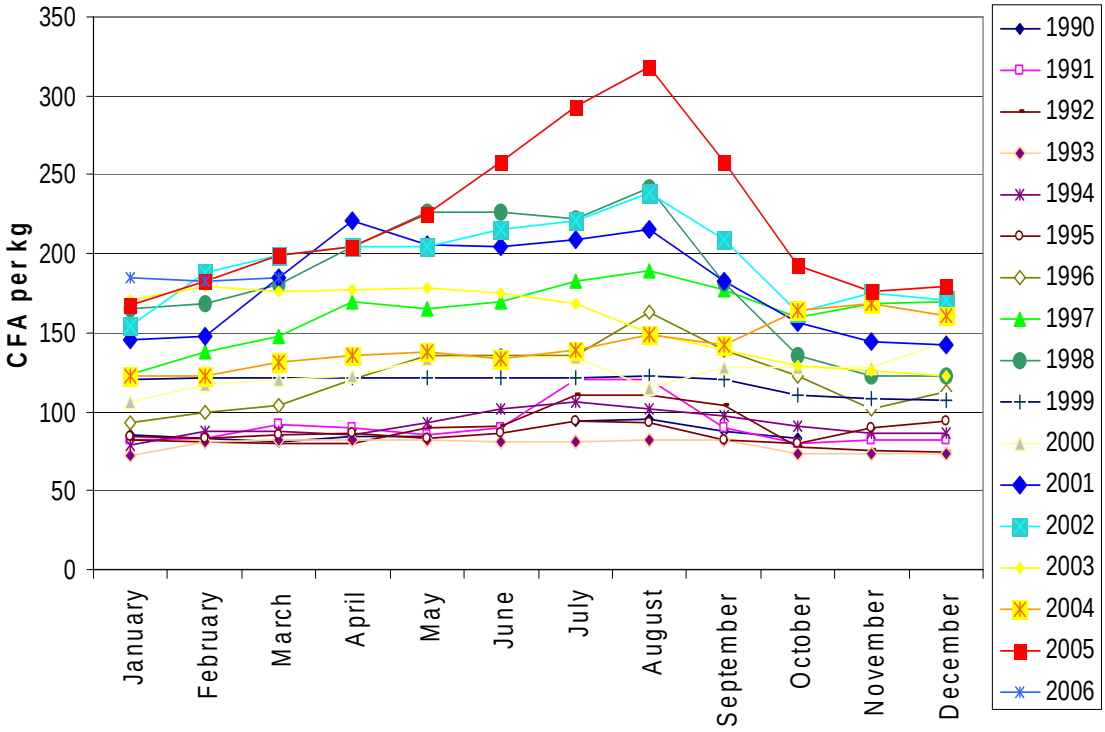
Price tensions started to emerge already in November 2004, and between January and June 2005 millet prices rose by between 5 and 12 per cent a month. In July and August the price of millet reached a level 70–80 per cent higher than the average of the prior five years and twice that of 2004 (Figure 5). After a good harvest, millet prices gradually returned to a normal level at the end of 2005.

To what an extent such unprecedented hike in the consumer price of millet was due — in addition to the supply shocks illustrated above — to the abnormal behaviour of food markets? The first point to be noted here is that the rise in consumer prices was accompanied by a growing divergence between the producer prices paid in small versus large collector markets. In the small markets monitored by SIMA,[5] during the crucial months of October 2004 to January 2005 small producers received on average 82 per cent of the price paid in large collector markets (which cater mainly to intermediaries), as against an average of 91 per cent received during 2000–2004 (Table 6). Though other studies (Beekhuis 2005) suggest there is no evidence that big traders increased their trade margins (that fluctuated as usual between 15–30% of the consumer price), the data in Table 6 suggest either a rise in unit collection costs (as the drought reduced supply) or a surge in wholesalers' profits.

[4] More information about the evolution of millet prices is available from the authors.

[5] For the Maradi region the available data permit to compare the producer prices in rural markets with those of Maradi's wholesale market for all months considered, but the same cannot be done for other regions. For Zinder, the price on two big collector markets was compared with those from Zinder's city market at the beginning and end of the agricultural season. For the Tahoua region, the price on the small Bouza market was compared with that of the large Badaguichiri wholesale market. For Tillabery region the comparison was done using data from Kirtachi and Torodi.

Figure 5: Monthly consumer price of millet, 1990 to 2005 (CFA per Kg)



Source: SIMA, National Dataset. Note: a one-tail t test of the significance of the monthly variations (year on year) confirms at the 10.9 per cent probability level the hypothesis that the 2005 price changes were significantly higher than those recorded over 1994–2004. The probability level rises sharply if the test is restricted to the period May–October.

Table 6: Ratio of producer prices of millet in small markets and main collector markets, 2000–2004 versus 2004–2005

	October		November		December		January		April		July		August		September	
	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005	2000-2004	2004-2005
P Mayahi / P Maradi	0.88	**0.81**	0.86	**0.77**	0.92	**0.9**	0.89	0.88	0.92	**0.87**	1.05	**0.96**	1.02	….	0.99	1.15
P Tessaoua / P Maradi	0.88	**0.83**	0.8	**0.78**	0.89	**0.86**	0.91	0.98	0.94	0.95	1.06	….	0.98	….	0.87	1.18
P Tchadaoua / P Maradi	0.91	**0.82**	0.92	**0.78**	0.94	**0.86**	0.87	0.86	0.76	0.98	1.02	1.02	0.88	….	0.85	1.02
P Bakin Birgi / P Zinder *	0.87	**0.76**	0.94	**0.86**	0.92	**0.91**	0.92	….	….	….	….	0.97	….	1.18	1.06	**0.93**
P Koundoumawa / P Zinder *	0.89	**0.79**	0.96	**0.9**	0.94	0.97	0.92	….	….	….	….	1.1	….	1.12	1.21	1.25
P Bouza / P Badaguichiri	1.07	….	1	1.03	0.96	0.98	1.05	**0.99**	1.03	**0.97**	1.05		1.03	**0.87**	1.1	1.22
P Kirtachi / P Torodi °	0.69	**0.64**	0.81	**0.52**	0.82	**0.5**	0.85	**0.51**	0.86	**0.76**	0.91	0.96	….	….	0.98	**0.91**
Average Ma radi	0.89	**0.82**	0.86	**0.78**	0.92	**0.87**	0.89	0.91	0.87	0.93	1.04	**0.99**	0.96	….	0.9	**1.12**
Average Zinder	0.88	**0.77**	0.95	**0.88**	0.93	0.94	0.92	….	….	….	….	1.03	….	1.15	1.13	**1.09**
Total Average	0.88	**0.78**	0.9	**0.81**	0.91	**0.85**	0.92	**0.84**	0.9	0.91	1.05	**0.92**	0.98	1.06	1.01	1.09

Source: Authors' calculations on data provided by SIMA. Notes: * The 00-04 price ratio for September is the mean of September 2001 and 2003; ** The 2000–2004 price ratio is the average of 2002–2003 and 2003–2004 data for all the months, with the exception of January-March, when are counted also data from 2001–2002 ,and June–July, when available data are only from 2002–2003.

Second, the 2005 rise in consumer prices is also explained in part by growing differences between producer and consumer prices in relation to the 2000–2004 average. In this regard, Table 7 shows that the average nationwide difference (27.4%) recorded during July–September 2005 was considerably higher than that (12.5%) recorded during the same period of 2000–2004, with huge differences observed in Maradi (57.5 versus 20%), Torodi (125 versus 10.3%) and several other places. Such growing price divergence might have been due to a rise in marketing costs or to the realisation of huge profits by wholesalers who sold during the lean season at prices twice as large those paid immediately after the harvest.

Table 7: Differences in consumer and producer prices of millet in selected locations, 2000–2004 and 2004–2005

			OCT		JAN		MAY		JUNE		JULY		AUG		SEPT	
			00-04	05	00-04	05	00-04	05	00-04	05	00-04	05	00-04	05	00-04	05
MARADI	Maradi	CFA francs	8.0	12.0	14.0	17.0	7.0	11.0	11.0	25.0	21.0	18.0	10.0	…	12.0	61.0
		% of prod.price	9.0	9.6	12.7	12.4	5.8	6.1	8.3	12.7	14.0	8.0	7.6	…	20.0	57.5
	Tessaoua	CFA francs	7.0	8.0	7.0	5.0	9.0	18.0	9.0	11.0	10.0	…	11.0	74.0	11.0	14.0
		% of prod. price	8.9	7.7	7.1	3.7	7.0	9.5	7.1	5.0	6.9	…	8.4	41.5	12.1	11.1
	Tchadaoua	CFA francs	9.0	9.0	10.0	11.0	10.0	12.0	8.0	15.0	13.0	13.0	11.0	24.0	9.0	18.0
		% of prod. price	10.9	8.8	10.5	9.3	7.6	7.2	6.5	7.2	9.2	5.6	8.8	9.7	10.0	16.0
ZINDER	Bakin Birgi	CFA francs	5.0	8.0	5.0	8.0	4.0	9.0	5.0	8.0	4.0	9.0	7.0	11.0	7.0	8.0
		% of prod. price	5.7	8.9	4.7	6.6	2.7	5.8	3.8	4.3	2.9	3.9	6.2	3.9	5.8	5.8
	Dungass	CFA francs	7.0	10.0	10.0	10.0	26.0	6.0	22.0	-7.0	20.0	12.0	10.0	74.0	10.0	28.0
		% of prod. price	9.0	9.7	9.6	8.0	16.8	4.6	14.2	-3.2	12.2	4.9	7.3	30.4	11.2	20.0
TIL.	Torodi	CFA francs	19.0	3.0	21	36.0	14.0	47	15.0		30.0	180	28.0	193	11.0	145
		% of prod.price	18.3	2.7	21.1	33.0	11.2	35.6	12.9		22.1	155	20.5	166	10.3	125
TAHOUA	Badagui-chiri	CFA francs	12.0	…	12.0	17.0	11.0	9.0	13.0	15	13.0	…	12.0	0.0	12.0	23.0
		% of prod.price	12.4	…	10.0	12.3	8.0	4.5	8.8	7.7	8.5	…	8.4	0.0	10.5	19.3
	Birni N'Konni	CFA francs	12.0	9.0	11.0	17.0	12.0	22.0	13.0	14.0	12.0	20.0	14.0	16.0	14.0	18.0
		% of prod.price	12.4	8.3	9.3	12.9	7.9	13.2	9.6	7.0	8.4	8.2	9.6	6.0	12.5	13.6
	TOTAL NIGER	CFA francs	10.0	9.0	11.0	13.0	12.0	15.0	11.0	15	14.0	29.0	14.0	39.0	12.0	32.0
		% of prod price	11.0	8.8	10.0	10.4	8.6	9.0	8.4	7.4	10.1	18.3	10.8	23.6	12.5	27.4

Source: Authors' calculations on data provided by SIMA. Notes: * The 2000–2004 price ratio for September is the mean of September 2001 and 2003; ** The 2000–2004 price ratio is the average of 2002–2003 and 2003–2004 data for all months, with the exception of January-March, when are counted also data from 2001–2002, and June–July, when available data are only from 2002–2003.

Third, there is no evidence that the rise in consumer prices was due to a drop in market integration between regions, as the bilateral price co-variation among different regions was more pronounced in 2005 than over 2000–2004 (Table 8). Likewise, there is no evidence that deficit regions were affected more than the surplus ones. Indeed, during the last months of 2004 millet prices in Zinder, a surplus zone, were the third highest in Niger, immediately after the deficit regions of Diffa and Agadez.

Table 8: Correlation coefficients of monthly consumer prices of millet on key markets, 2000–2004 vs. 2004–2005

	Maradi		**Mayahi**		**Zinder**		**Koundomawa**		**Niamey Katako**		**Dosso**		**Tahoua**		**Tillaberi**		**Ouallam**		**I'n Gall**		**Maine Soroa**	
	00 04	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**	**00 04**	**04 05**
Ma radi	1	1																				
Mayahi	0.91	**0.98**	1	1																		
Zinder	0.95	**0.99**	0.92	**0.98**	1	1																
Koundo-mawa	0.94	0.96	0.93	**0.96**	0.97	**0.98**	1	1														
Niamey Katako	0.87	**0.93**	0.82	**0.91**	0.88	**0.92**	0.89	**0.97**	1	1												
Dosso	0.89	**0.95**	0.90	**0.93**	0.91	**0.97**	0.93	**0.98**	0.92	**0.97**	1	1										
Tahoua	0.94	**0.98**	0.91	**0.98**	0.90	**0.98**	0.91	**0.94**	0.84	**0.89**	0.86	**0.92**	1	1								
Tillaberi	0.91	0.**92**	0.88	**0.93**	0.91	**0.93**	0.92	**0.97**	0.96	0.95	0.92	**0.97**	0.87	0.90	1	1						
Ouallam	0.79	**0.92**	0.79	**0.91**	0.85	**0.93**	0.84	**0.97**	0.88	**0.98**	0.84	**0.98**	0.68	**0.89**	0.89	**0.96**	1	1				
I'n Gall	0.84	**0.98**	0.80	**0.86**	0.83	**0.90**	0.86	**0.96**	0.93	**0.97**	0.88	**0.93**	0.75	0.83	0.94	0.94	0.85	**0.98**	1	1		
Maine Soroa	0.85	**0.90**	0.74	**0.89**	0.85	**0.90**	0.87	**0.96**	0.94	**0.98**	0.85	**0.97**	0.89	0.89	0.91	**0.97**	0.71	**0.96**	0.77	**0.96**	1	1
Average	0.90	**0.94**	0.87	**0.93**	0.91	**0.95**	0.91	**0.96**	0.88	**0.93**	0.89	**0.95**	0.87	**0.92**	0.91	**0.94**	0.81	**0.94**	0.82	**0.92**	0.84	**0.92**

Source: Authors' calculations based on data provided by SIMA.

Fourth, there is no evidence that the rise in food prices was related to the introduction on January 2005 of a 19 per cent VAT on selected food items, as millet, maize and sorghum were not covered by such measure, and as such tax was quickly repealed following a series of street demonstrations. Yet, it possible that such street protests and the media campaign promoted by some NGOs and international organisations trying to focus the world's attention on Niger's crisis modified the expectations of large traders who hoarded cereals in anticipation of price rises and growing purchases by aid agencies (WFP 2005). An econometric analysis of weekly millet prices in different markets over 1997–2005 (Michiels et al. 2006) suggests that the 2005 price rise was exacerbated by widespread expectations of price rises, the food procurement policies of aid agencies, and speculation by a few big traders. Some traders interviewed by local newspapers admitted they had bought large quantities of millet when the crisis was announced and stocked it until August, when they resold it for double the purchase price (Le Nouvel Observateur 2005). Speculative hoarding appears to have been greater in small markets, where the collusion among traders is more likely (NEPAD 2004). Yet, most traders denied they hoarded food, while the Government said that the extra profits they realized were due to strong market demand. It is also unclear whether the actual food purchases by the Government and aid agencies contributed to the surge in cereal prices (Koné and Touré 2006). WFP food procurement at the beginning of the 2004–2005 marketing season accounted for a puny 0.2 per cent of domestic output. In contrast, in June 2005, the Government was forced by the events to purchase on the domestic market cereals equal to two per cent of domestic production, possibly helping to putting pressure on prices.

Table 9: Correlation coefficients of monthly millet consumer prices in cross border-markets

	Jibia (Nigeria)		**Illela (Nigeria**		**Malanville (Benin)**		**Dori (B.Faso)**		**Mopti (Mali)**		**Segou (Mali)**	
	00-04	**04-05**	**00-04**	**04-05**	**00-04**	**04-05**	**00-04**	**04-05**	**00-04**	**04-05**	**00-04**	**04-05**
Maradi	0.88	**0.93**	0.87	**0.95**	0.87	**0.97**	0.43	**0.74**	-0.12	**0.76**	-0.18	**0.77**
Dan Issa	0.83	**0.94**	0.92	**0.95**	0.89	**0.97**	0.45	**0.75**	-0.70	**0.76**	-0.15	**0.75**
Zinder	0.85	**0.95**	0.82	**0.96**	0.86	**0.97**	0.47	**0.77**	-0.06	**0.78**	-0.09	**0.76**
Dungass	0.63	**0.79**	0.86	0.81	0.85	0.84	0.27	**0.70**	-0.20	**0.71**	-0.3	**0.72**
Dosso	0.82	**0.89**	0.72	**0.90**	0.77	**0.93**	0.74	**0.85**	0.36	**0.86**	0.30	**0.87**
Doutchi	0.75	**0.90**	0.74	**0.91**	0.83	**0.94**	0.48	**0.83**	0.06	**0.84**	0.03	**0.84**
Tahoua	0.92	0.92	0.83	**0.94**	0.84	**0.96**	0.67	0.66	0.21	**0.67**	0.12	**0.67**
Birni N'Konni	0.91	0.93	0.93	**0.95**	0.90	**0.96**	0.54	**0.70**	0.00	**0.70**	0.00	**0.69**
Tillaberi	0.74	**0.91**	0.62	**0.91**	0.72	**0.92**	0.79	**0.86**	0.37	**0.87**	0.32	**0.84**
Tera	0.72	**0.96**	0.57	**0.96**	0.62	**0.97**	0.86	0.84	0.55	**0.85**	0.52	**0.82**
Niamey Katako	0.58	**0.86**	0.43	**0.86**	0.49	**0.88**	0.97	0.87	0.77	**0.89**	0.73	**0.89**

Source: Authors' calculations on data provided by SIMA, FEWS-NET and AFRIQUE VERTE.

Finally, as already noted, another factor in the price rise recorded in Niger was the 2005 price surge in the Nigerian market. A comparison of consumer millet prices in pairs of cross-border markets shows in fact that, from May to July 2005, millet prices were considerably higher on the Nigerian side (SIMA 2006). This suggests that, at least during this period, the Nigerian traders found more attractive to purchase food in Niger, leading in this way to a much closer price alignment on cross-border markets (Table 9). The same 'pull-effect' on Niger's food

prices cannot be attributed to developments in its other neighbours, as their food prices remained consistently below those observed in Niger (SIMA 2005 and 2006; Fews-Net, Monthly Food Security Update, Niger, September 2004-April 2006; Afrique Verte n° 40-55, 2004-2005), though also in this case prices in cross-border markets moved more closely together.

3.4 Changes in food entitlements

At the aggregate level, Niger's food crisis can be represented by a sharp leftward shift (contraction) in the schedule describing the market supply and by a moderate outward shift (increase) in the schedule depicting the market demand for food. While food demand in urban areas likely remained unchanged, in rural areas it rose owing to a drop in production for self-consumption. Indeed, in Tahoua, Tillaberi and the northern part of Maradi and Zinder regions the months of food consumption covered by subsistence production fell from a normal level of 4–6 to 1.7–3 in 2005 (CFSVA 2005a). As a result, as early as January 2005, a higher than normal number of households started purchasing food by liquidating their assets and undertaking a variety of income-generating activities. The extent to which this rising food demand was actually satisfied was influenced, however, by the rise in food prices and the frequent fall in value of the exchange entitlements of most household groups.

i) Food deficient agro-pastoral farmers. These households suffered not only a decline in food self–provisioning, but also a fall in the price of livestock they exchanged to buy food, due to a fall in meet demand and a decline in the animals quality caused by a fodder deficit equal to 36 per cent of the needs and high fodder prices during the 2004–2005 season.[6] As a result, in Zinder and Maradi regions, sheep, goats and livestock were sold in mid-late 2005 at one third to one quarter of their value (Koné and Touré 2006). As in other Sahelian famines (Sen 1981), such distress sales drove the price of animals further down, forcing the agro pastoralists to sell an even greater share of their herds. As a result, by July 2005, the animals/millet terms of trade declined by 50–58 per cent in relation to the prior year (Table 10).

There are no precise data on the income generated by selling wood, community assistance, and casual work, but it is plausible to assume that also these entitlements were eroded by a large rise in the number of people seeking casual employment and a drop in labour demand and community solidarity. As a result, most households in these regions were forced to pawn their durables, sell their land at distress prices, or borrow money or millet. The EFSA 2005 survey shows that almost 60 per cent of households surveyed got into debt during this period. Such loans proved, however, very onerous due to high interest rate and the sharp price differences between April–August (when the households bought cereals) and September–October (when they sold the new harvest to pay back the loans).

[6] The minimum cost for assuring the daily food ration to a bovine during 2005 was 5000 CFA. Indeed, in certain zones the 50kg sack of bran was sold at 7500 CFA, while the price of a bale of straw reached the unprecedented level of 25–30.000 CFA francs CFA (Egg et al. , 2006).

Table 10: Terms of trade* between millet and different goods and services, 2003–2004, 2004–2005

	Quintals of millet per female sheep			Quintals of millet per female goat			Quintals of millet per cow			Quintals of millet per100 kg of onions			Quintals of millet per 20 days rural wage°		
	03/04	04/05	% change	03/04	04/05	% change	03/04	04/05	% change	03/04	04/05	% change	03/04	04/05	% change
Oct	2.1	1.4	-33.3	1.5	1.0	-33.3	12.6	7.8	-38.1	3.4	2.1	-37.6	2.45	0.97	-60.3
Nov	2.1	1.4	-33.3	1.4	1.0	-28.6	12.1	7.7	-36.4	3.7	2.2	-40.6	2.39	0.92	-61.5
Dec	2.1	1.4	-33.3	1.5	1.1	-26.7	11.9	7.4	-37.8	3.6	1.8	-50.2	2.37	0.91	-61.5
Jan	2.2	1.4	-36.4	1.5	1.0	-33.3	11.0	6.6	-40.0	3.0	1.2	**-59.8**	2.25	0.86	-61.7
Feb	1.8	1.1	-38.9	1.4	0.9	-35.7	10.3	6.2	-39.8	2.2	1.1	**-51.4**	2.05	0.77	-62.4
Mar	1.7	1.0	-41.2	1.2	0.8	-33,3	9.6	5.6	-41.7	1.5	0.9	-43.8	1.88	0.70	-62.4
Apr	1.5	0.9	-40.0	1.2	0.7	-41.7	9.1	5.0	-45.1	1.3	0.9	-31.1	1.81	0.68	-62.7
May	1.4	0.9	-35.7	1.1	0.7	-36.4	8.5	4.5	-47.1	1.2	0.9	-25.2	1.75	0.65	-62.7
Jun	1.5	0.8	-46.7	1.1	0.6	-45.5	8.8	3.7	**-58.0**	1.4	0.9	-31.0	1.78	0.58	-67.6
Jul	1.3	0.6	**-53.8**	1.0	0.5	**-50.0**	8.1	3.5	**-56.8**	1.3	1.0	-22.5	1.68	0.47	**-71.9**
Aug	1.4	0.7	**-50.0**	1.0	0.5	**-50.0**	7.8	3.6	-53.8	1.,3	1.2	-11.1	1.62	0.47	**-71.0**
Sept	1.6	1.0	-37.5	1.2	1.0	-16.7	8.5	5.4	-36.5	1.7	2.0	17.6	1.78	0.68	-61.6

Source: Authors' calculation based on data provided by SIMA, SIMB and EPAD-Niger. Notes: * terms of trade expressed as number of 100 kg sack of millet obtainable by selling one head of livestock, or 100kg of onions, or 20 days of agricultural work. Based on EPAD data. A constant average daily wage of 625 CFA and CFA 1125 was respectively assumed for 2004–2005 and 2003–2004.

(**ii) Cash crops farmers.** In 2004–2005 the price of cash crops decreased during a few months in relation to that of millet. For instance, the nationwide price of onions (a key cash-crop) declined by 60 per cent between March 2004 and March 2005 because of weakening demand in Niger, Ghana and Cote d'Ivoire (FEWS-NET March 2005) but recovered with the April/May 2005 harvest. As a result, the terms of trade millet/onion moved against onion producers from February until August 2005, while by September 2005, they started rising (Table 10).

(iii) Landless or near land less casual labourers. During 2004–2005, the supply of casual labour grew markedly (WFP 2006). By contrast, labour demand fell sharply as part of the crops had been lost due to the drought and locusts invasion. As a result, 9 per cent of households declared to have been affected by higher than normal unemployment (CFSVA 2005a). Moreover, the daily wage of casual labourers fell, and as of June–August 2005 reached 500–750 CFA in the villages (half its normal value), 750–1000 CFA in the suburbs of the big cities (EPAD Niger, 2007), i.e. not enough to satisfy the nutritional needs of a households of 5–6 people as millet prices had meanwhile reached 240–300 CFA francs per kilo (FEWS-NET, June 2005) (Table 10).[7]

[7] According to DHS/MICS III survey, near 14 per cent of the men and 53 per cent of the women surveyed did not work between January 2005 and July 2006. Among the men who worked during that period, 47 per cent were employed in agriculture, 25 per cent in the sales of goods and services and 17 per cent as skilled manual workers. For the women such percentages were 39.5, 38.6 and 17 per cent respectively.

(iv) Pastoralists. The pastoralists — who own on average several heads of livestock, including bovines which are too expensive for poor agro-pastoral farmers — were severely affected by the deterioration in the bovine/millet price ratio, as they rely entirely on market purchases of food (Table 10). Moreover, the big animals were more affected than the small animals by the 2005 fodder deficit. Pastoralists reacted to the lack of pastures by moving their animals earlier than normal towards a few areas of surplus grain and forage. All this, however, depleted pastures and water sources for local herds and created conflicts between agro-pastoralists and pastoralists. As a result, a lot of livestock, in particular large animals, was lost in both agro-pastoral and pastoral areas (FEWS-NET, June 2005). Though the losses were lower than in 1973 and 1984, in the most affected department (Dakoro), some pastoralists lost 60–70 per cent of their herds (Charasse and Gouteyron 2005).

Though the pastoralists lost more animals than the agro pastoralists, they suffered less acute nutritional problems as, on average, they owned larger herds and were in this way able to exchange the surviving animals for food, if at unfavourable conditions. While this was true for large herders, it was not for nomadic pastoralists. According to FEWS-NET (October 2004), most nomadic Bororo households in northern Dakoro and Tanout were forced to sell all their livestock and migrate.

(v) Problem families. During 2004–2005, the number of children and women begging on the streets increased considerably (Konè and Touré 2006). In Niger, local solidarity is very strong, and food gifts and loans are usually considered the third survival strategy after migration and the sale of firewood. But during the 2005 crisis, more and more households increased their demands for food assistance to better off households less affected by the crisis. Some of the latter remained in the villages but avoided to exhibit their resources while others left to enjoy the anonymity of city life (ibid). Intra-household solidarity is also reported to have eroded, with cases of household heads refusing to provide food to the families of their sons and daughters despite their greater food availability (ibid.).

The 2004–2005 season was particularly harsh for households relying on remittances. Though the 2005 migration data are limited, it appears there was a rise in the number of Nigerian who left the country to contribute to the family food-stock and reduce the number of mouths that needed feeding. Many families interviewed confirmed that in 2005 migration was exceptionally high (EFSA 2005). During the free food distributions of August 2005, WFP estimated a deficit of 17 per cent in relation to the registered population (Charasse and Gouteyron 2005). Moreover, 90 per cent of the households interviewed by IRAM declared that one of their members migrated more than once in 2004–2005, and that 80 per cent left before the first weeding (a decision that might have affected yields) while in 50 per cent of the households interviewed the migrants did not return as usual to help with the harvest (Koné and Touré 2006).

Estimates by the World Bank (2006) indicate that in 2005 official remittances to Niger reached about US$60 million (1.8% of GDP), about the same as in 2004, though plausibly less than the real figure, as informal remittances are not fully accounted in official statistics. Yet, in 2005 the volume of remittances might have been affected by growing instability in Nigeria, the reduced chance of finding seasonal jobs and depressed wages. For example, Nigeria, which receives seasonal migrants from Niger, Mali, Burkina Faso and Ghana,

reported a ten-fold increase in the number of people seeking work, with the result that the job done in the past by one person was shared in 2005 among three people, with each of them earning one third of the normal wage (Harragin 2006). Finally, more and more households resorted to the sale of firewood. But, with a higher than normal supply, its price decreased, so that people had to carry five loads of wood to the market to make enough money for a cup of millet (The Guardian 2005).

(vi) Urban families. They were on the whole less affected by the 2005 food crisis. Those with a formal sector job could count on, at least, a minimum wage (20.000 CFA francs per month — US department of State, March 2006). Their command over food was however influenced by the rise in millet prices as, as observed during other famines (Sen 1981), nominal wages do not grow in line with food prices. Informal sector wages (received by maids, textile labourers, bakers and miners) became in some cases too low to guarantee a decent living and fell to almost the same level of fifteen years ago.[8]

Finally, evidence of the sharp entitlements erosion of the most affected households is provided by the dietary changes adopted during the crisis periods. Near half of the 1800 households interviewed by CFSVA declared to have changed their food patterns in order to survive: 17 per cent declared to have reduced the quantity of food eaten, 7 per cent the number of meals per day and another 8 per cent the quality of the food, while the most vulnerable households resorted to the consumption of leaves and several new types of wild foods, in some cases toxic, that had never been eaten before, not even during the great famines of 1974 and 1983 (Koné and Touré 2006).

3.5 Access to basic health services during the crisis

The nutritional and mortality changes recorded in 2005 were affected also by the of adjustments in the policies regulating access to health services and health financing. Despite an appeal to freeze user fees in health by MSF, UNICEF and the World Bank (that offered to finance the related revenue shortfall), patients attending public health facilities continued to be charged 300-600 FCFA per consultation, against a daily wage of 625–1000 FCFA, and to bear the full cost of drugs (MSF 2005b).

Though no study has quantified the effect of such policies on the nutritional and health status of Niger's population during the 2005 crisis, it could be plausibly argued that this decision contributed to the rise in child malnutrition and mortality. Indeed, in Niger, much of child and adult mortality is due to the perverse interaction between infection and malnutrition. When affected by malaria or diarrhoea, children of poor families remained at home or were taken to traditional healers. When weeks later the households decided to bring them to a public health facility, most of them had become too malnourished or ill to be saved (MSF 2005c). A timely recourse to health services would thus have reduced both child malnutrition and mortality. According to DHS/MICS III (2006), 78 per cent of the women interviewed faced in 2005 problems in obtaining the health care they needed, 65 per cent did not have the money to pay for the treatment, and 51 per cent gave up because of the distance of the health centre.

[8] See ILO October Inquiry 1986–1988 , available at www.laborsta.ilo.org

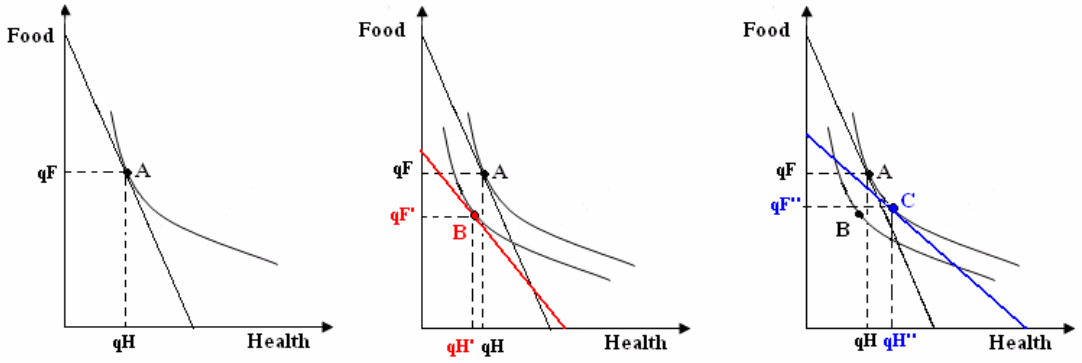
Standard consumer theory helps illustrating the moderating effect that a reduction in fees would have had on the consumption of medicines and food and, through this, on child malnutrition and mortality. In Niger, poor households spend near all their income on food and health, so that the consumption of health services depends on total income, and the prices of food and health services. Given the low income and poor nutritional conditions prevailing in the country, the demand for health is generally more price elastic than that for food. Panel A in Figure 12 illustrates by means of the usual budget constraint line (whose gradient is the ratio of the price of health services to that of food and the intercept total income divided the price of food) and the iso-utility schedule the pre-crisis equilibrium in which the household consumes quantity qH and qF of food and health services corresponding to the maximum utility obtainable in point A. For many people, in particular for most affected groups such as the agro-pastoralists, pastoralists and problem families, the 2005 crisis entailed a decline in nominal household income and rising food prices that led to (Panel B) to an inward shift and rightward rotation of the budget constraint line, causing a decline in both the quantity of food and health services consumed (qH' and qF') and a lower overall utility obtainable in point B. Had user fees in health been abolished, the inward shift of the budget constraint line would have persisted but it would have rotated further towards the right, permitting therefore to consume a greater quantity of both health services and food, as the households would have replaced some less expensive health services for some food, with a net effect of increasing their utility from point B in panel B to point C in Panel C. Thus, the income fall and increase in food prices caused by the crisis would have been in part compensated by the abolition of the fees, with the result that the reduction in the quantity of food would have been smaller and the utilisation of health services higher.

Figure 6: Effects of an income fall and rising food prices on the quantity of food and health consumed (Panel B) in relation to the initial conditions (Panel A) and a situation in which the crisis is counterbalanced by the abolition of user fees (Panel C).

PANEL A: pre-crisis equilibrium

PANEL B: impact of crisis

PANEL C: impact of crisis – assuming the abolition of user fees



Empirical evidence from other countries supports this conclusion. Case studies on Uganda, South Africa, Madagascar and Kenya provide evidence of the positive effect of the abolition of user fees on the utilisation of health services (James C. et al., 2005). The abandonment of cost recovery in health led to an increase in service utilisation by 53 per cent in Uganda, 41

per cent in Kenya, and 16 per cent in Madagascar (Burnham et al. 2004; Deininger, Mpuga 2004; Fafchamps, Minten 2003; Mwabu et al. 1995). A study on South Africa showed that with the introduction of free primary health care the total number of consultations for curative care doubled, while that for preventive services fell due to clinic congestion and reduced consultation times (Wilkinson et. al. 2001).

3.6 Evidence of child nutrition and mortality changes in 2005

Like all other Sahelian countries, Niger lacks an ongoing nutrition monitoring system, and evidence of changes in child malnutrition and mortality during 2005 can be derived only from the following surveys conducted in the midst of the crisis: (i) HKI/WFP (January 2005) covering the rural areas of Maradi and Zinder regions, (ii) MSF-F and Epicentre (April 2005) taken in rural villages of the north Maradi and Tahoua region; (iii) Epicentre (August 2005) covering Keita and the Tahoua region, (iv) Epicentre (August 2005) taken in the rural suburbs of Zinder; (v) Epicentre and MSF (September 2005) conducted in Ouallam and Tillaberi region; (vi) ACH (November 2005) carried out in different agro-geological zones of the Maradi and Tahoua regions; (vii) CDC-UNICEF (October 2005) covering all regions.

These nutritional surveys suffer from comparability problems that limit the inference that can be drawn on their basis (Delpeuch 2005). First of all, they cover specific areas where NGOs and international agencies tentatively identified a worsening of nutritional standards. As such, they suffer from selection bias, and their results cannot be extrapolated to unaffected areas of the same departments, let alone to the whole country. Moreover, while DHS 1998 and MICS 2000 covered both rural and urban population, several 2005 surveys in Table 11 were carried only in rural areas where acute malnutrition is generally higher. Thirdly, some surveys focused on children of 0–59 months old while other surveys concentrated on the more vulnerable age group of 6–29 months old. Fourth, some of the above surveys were conducted between October and January (after the main harvest) when malnutrition is generally low, while others refer the lean season of May-August during which malnutrition rates climb even in normal years. The CDC-UNICEF survey overcomes some of these difficulties, as it was administered in all regions and in rural and urban areas separately. However, while the malnutrition rates it reports are higher than the international emergency threshold used to identify famine conditions, the survey was carried out between mid September and mid October, i.e. immediately after the 2005 bumper harvest. For this reason, the ad hoc surveys included in Table 11 might be more suitable than the CDC-UNICEF one to monitor malnutrition during the peak of the crisis.

Table 11: Rates of malnutrition (weight for height) and mortality from several 2005 surveys, in relation to those of DHS 1998 and MICS 2000

Author		DHS 1998*	MICS 2000 °	KHI -WFP		MSF – EPICENTRE					ACF Spain			CDC UNICEF
Region		Nation.	Nation.	Maradi	Zinder	Maradi Dakoro Mayahi, Tessaoua	Tahoua Keita	Zinder Mirriah	Tahoua Keita	Tillaberi Ouallam	Maradi Tahoua Agricul zone	Maradi Tahoua Agropast zone	Maradi Tahoua Pastoral zone	Nation
Surveying period		March July 1998	Apr – Aug 2000	4-16 Jan 2005	4-16 Jan 2005	28 Apr 3 May 2005	28 Apr 3 May 2005	Aug 2005	24 - 28 Aug 2005	15- 20 Sept 2005	17 Sept - 6 Oct 2005	21 Sept- 15 Oct 2005	14- 25 Oct 2005	17 Sept 14 Oct 2005
Number of children		4403	4948	901	907	951	906	908	941	888	1061	1040	746	5324
Sex ratio m/f				-	-	0.95	1.04	1.10	1.07	0.90	1.10	1.00	1.20	
% of severe acute malnutrition	6 – 59 months		3.2	**2.2**	**2.7**	**2.4**	2.9	**3.0**	1.8	1.8	**4.1**	5.4	2.8	1,8
	6 – 29 months	3.7				4.4	4.1	5.6	3.7	3.7	6.6	8.1	2.2	
	30- 59 months					0.9	1.9	0.8	0.5	0.4	0.2	1.5	0.7	
% of global acute malnutrition	6 – 59 months		14.1	13.4	13.5	19.3	19.5	18.6	15.6	15.3	19.2	24.7	16.4	15,3
	6 – 29 months	20.7				28.5	28.2	32.6	25.3	24.5	32.0	33.9	19.8	
	30- 59 months					12.4	13.0	7.2	9.1	8.6	7.0	15.2	11.7	
Crude mortality rate (deaths/10000/day)						0.8	1.0	1.5	0.3	0.5	0.54	0.45	0.54	0.4
Under five mortality rate (deaths/10000/day)						2.2	2.4	4.1	0.3	1.4	1.97	1.63	1.73	

Source: various nutritional surveys (cited at the end of the paper)

* 1998 was a bad year. The Sept/Oct 1997 harvest was only 76 percent of the previous year and 19 percent below the prior five year average. It likely therefore raised the incidence of malnutrition as the 1998 DHS survey was taken during the more difficult than normal soudure period. Moreover, DHS 1998 takes into account data for children aged 0-36 months.

° MICS 2000 takes into account children aged 0-59 months.

Conscious of these limitations, we proceed to an analysis of the evidence summarized in Table 11. A first thing it can be noted is that in all but one 2005 survey, the 'global-acute' and 'severe-acute' malnutrition rates among the 6–59 months old are above the international thresholds used by the WHO to identify 'emergency situations' (i.e. 15% for the first and 2%

for the second), with peaks of 19.2–24.7 per cent in Maradi and Tahoua for the 'global-acute' and 3 per cent in Zinder, and 4.1 and 5.4 in the agricultural and agro-pastoral zones for the 'severe-acute' malnutrition. Second, malnutrition rates are extremely high for the 6–29 months old, with rates above 30 per cent for 'global-acute' and 4 per cent for 'severe-acute' in almost all surveys, i.e. rates that are indicative of a nutritional crisis. Third, a comparison of the 2005 malnutrition rates for the 6–29 months old with those of the DHS 1998 (a 'bad year' affected by the 27 percent decline in food production) indicates that between May and September 2005 malnutrition rates where 50 to 100 per cent higher than in 1998 (Table15) with the exception of Tillaberi and Ouallam. Finally, a comparison of the evolution over 2005 of rates of acute-severe child malnutrition in Maradi (in red) and Zinder (blue) point to a steady increase in the course of 2005, though lack of seasonal data for prior years does not allow to establish whether the rise in malnutrition was due to seasonal effects, the 2005 crisis or both.

A comparison of mortality rates with those generated by DHS 1998 and MICS 2000 is even more complicated, as these surveys use the Brass method to compute retrospectively the mortality over several years prior to the survey itself. Yet, a conversion of the estimates based on deaths per 1000 live births per year to deaths per 10000 children per day[9] shows that the under five mortality rates (U5MR) derived from the surveys included in Table 3 are consistently higher than those recorded in MICS 2000 for the five year period centred in 1995, with abnormally high values in Zinder and Tahoua regions (Table 12). In addition, in three regions out of eight, U5MR exceeded in 2005 the international emergency threshold of two deaths per 10000 children per day, with a peak of 4.1 deaths/10000/day in the department of Myrriah, Zinder region.

A second source of information about the nutritional status of Niger's children during the 2005 crisis is provided by the data on child admissions to MSF-France feeding centres in the Maradi region. At the end of 2001, well before the outbreak of the 2005 crisis, MSF-France launched a child nutrition program in Niger. In particular, it opened a number of child feeding centres called CRENI or CRENAS in Maradi. The weekly data on child admissions to such centres thus permit to track the evolution of child malnutrition (Fig 7).

[9] The conversion formula used is: $\text{U5MR (per 10000/day)} = \frac{\text{U5MR (per 1000 live births)}}{\text{CF}} \times \frac{10}{365}$

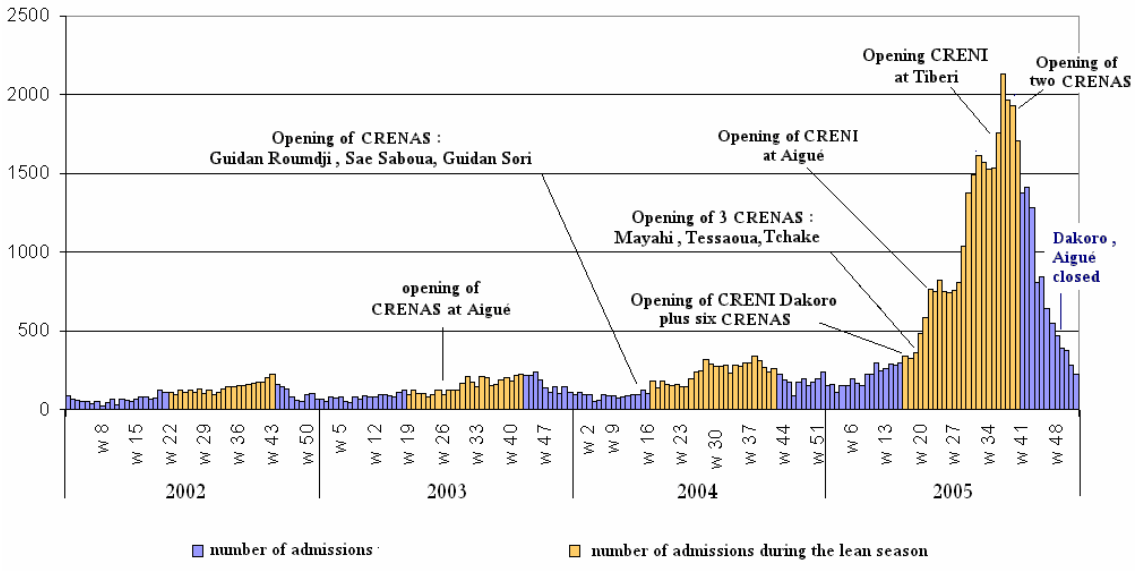
Where the CF is the conversion factor that was calculated as follows: we divided the under–five child population in five one-year cohorts, assuming that none of the children born in the last year are dead (children alive in cohort 0-1=1000), children between 1-2 years of age had been exposed to the risk of dying before 1 year of age (children alive in cohort 1-2 =100-IMR) and that children between 4-5 years of age have been affected by the cumulate mortality risk over five years (children alive in cohort 4-5 =1000-U5MR). The number of children survived for the other two groups of age, 2-3 e 3-4 is obtained by interpolation. The final estimation of child population under 5 years of age is divided per 1000 (the number of child live births each year).

Table 12: Number of children 0–5 years of age dying per day per 10000 of the relevant population

	DHS 1992	MICS 1996	DHS 1998	MICS 2000[a]	Local Surveys 2005	UNICEF-CDC nutrition survey 2005
Period covered	*1982 - 1992*		*1988-1998*	*1995 – 2000*	*2005*	*15 Jan – 15 Sept 2005*
Maradi	2.8	2.9	2.7	2.0	2.2	1.3
Tahoua	2.3	2.4	2.0	1.7	**2.4**	**2.1**
Zinder	2.5	3.3	2.3	2.5	**4.1**	2.2
Tillaberi	1.9	2.4	1.6	1.3	1.4	**1.7**
Agadez	-	0.9	-	1.0		0.3
Diffa	-	1.7	-	2.5		1.4
Dosso	1.9	2.2	1.5	1.9		1.2
Niamey	0.9	0.8	0.8	0.8		**1.1**
National	2.2	2.4	2.0	1.8		1.7

Source: Authors' calculations on DHS and MICS surveys and the 2005 nutritional surveys quoted in bibliography. Note: a Data for the period of time centred on 1993.

Figure 7: Number of weekly admissions of children to feeding centres run by MSF-France in Maradi, 2002–2005



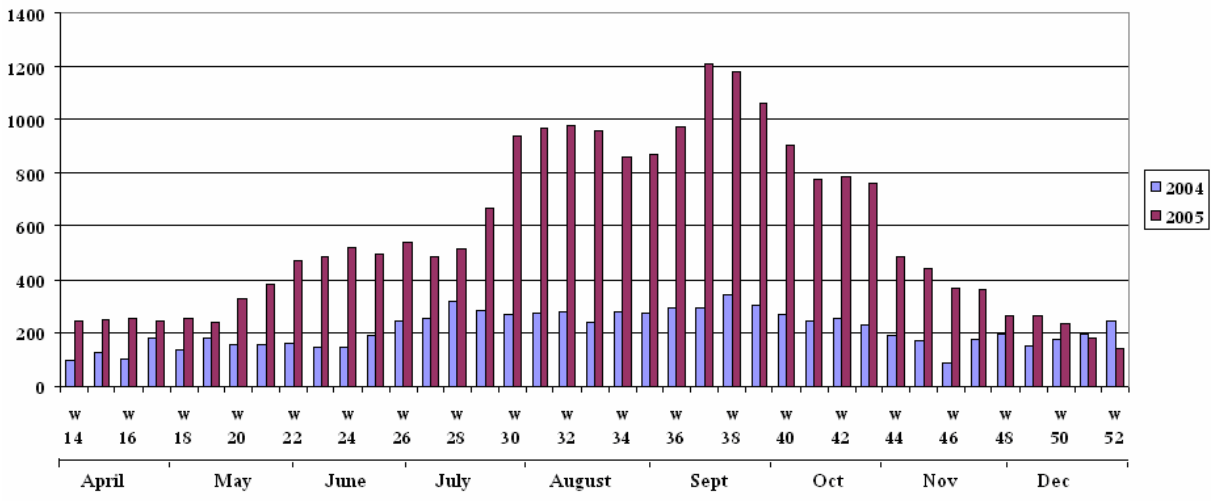
Source: Moonen et al. 2006**.**

Though not population-based, these data show in 2005 a sharp rise in admissions to the MSF-F feeding centres in Maradi. While admission to feeding centres reduces mortality risk, the CRENI/CRENAS-based child mortality rates remained well above the normal level.

It has been argued that the growth in child admissions to MSF-F feeding centres in 2005 was not the result of a nutritional crisis but was due to the rise in the number of such centres that thus enrolled in their nutritional programs chronically malnourished children. Indeed, as

shown by Figure 7, the number of feeding centres rose from four in 2002 to 22 in December 2005. One way to disentangle the effect of rising food prices from that of capacity expansion is to compare child admission data for eight feeding centres that were in operation in Maradi in both 2004 (a normal year) and 2005 (the crisis year). This is done in Figure 8 that shows that in 2005 the admissions to these centres more than doubled in relation to 2004, and that between July and October the rise was more than three times. As the number of feeding centres did not change, the surge in admissions likely reflected a rise in child malnutrition.

Figure 8: Weekly admissions of malnourished children to eight MSF-F feeding centres, 2004 and 2005, Maradi region



Source: Moonen et al. 2006.

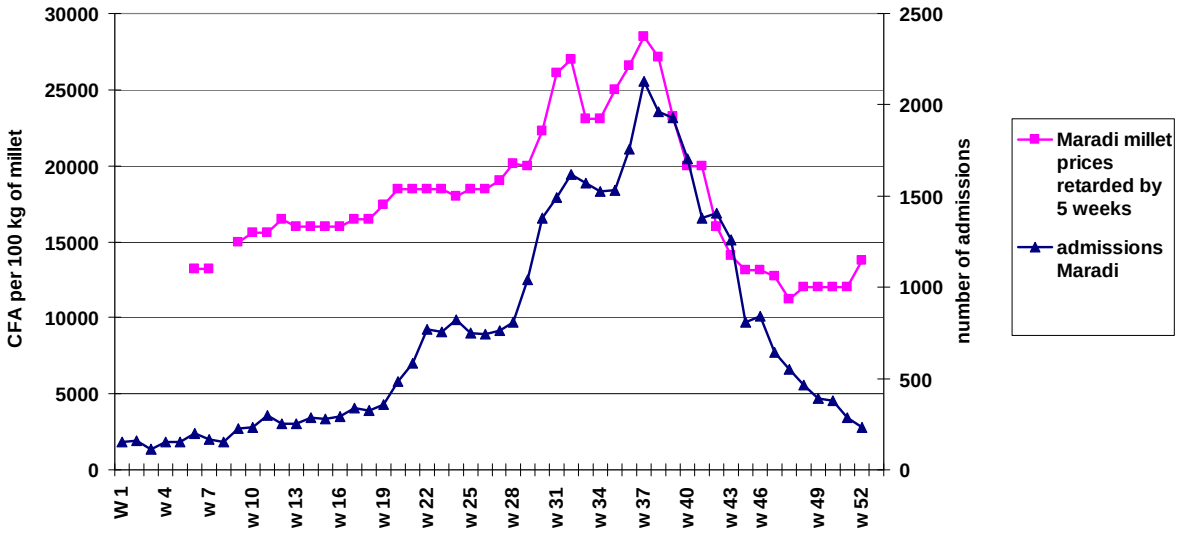
A second objection to the use of child admission data as an indicator of nutritional crisis is that a rise in demand for child admission was due to the desire of obtaining 'food protection rations' distributed by MSF-F to mothers of malnourished children sent home after their conditions had improved. Yet, if this assumption of opportunistic behaviour is correct, one cannot explain the sharp fall in the number of child admissions immediately after the good harvest of September 2005. Why should have mothers forfeited the opportunity of receiving free food rations? The most plausible answer is that most of them brought their children to nutritional centres only when they were short of food. After the bountiful 2005 harvest, children were less malnourished and fewer of them required admission to nutritional centres.

A third symptom of nutritional crisis is provided by the 2005 sharp rise in millet prices (Figure 6). The literature on the relation between food prices and child mortality-child malnutrition suggests that the 100 per cent rise in millet prices recorded in Niger in 2005 impacted child malnutrition. An econometric analysis of the 1974–1975 Bangladesh famine (Mc Cord et al. 1980) shows that the price hikes recorded during that period led to a statistically significant increase in death rates with a lag of two months. A strong correlation between food prices and the incidence of underweight children of 6–59 months of age was observed in Bangladesh (Bloem et al.1994), as well as in Ghana, Togo, Botswana and Madagascar (ACC/SCN, 1992). The study on Ghana shows that the price-malnutrition nexus was most evident when price changes were most pronounced, as during the 1983–1984 drought, when a sharp rise in food prices was followed with a lag of three months by a surge

in the rate of underweight children. A similar lag was found between millet prices and anthropometric indexes in Niamey for the period 1981–1986 (Khan et al. 1992).

Such analyses show also that the price elasticity of food demand is highest among the poor, and that the decline in food consumption due to a price hike or income decline is far greater among this group. Pinstrup-Andersen (1986) showed that in Egypt a 10 per cent income decline caused a 5.6 per cent fall in food demand for the poor and of 1 per cent for the rich. Similar results were arrived at by Alderman (1986) who reviewed fifteen studies conducted during the 1970s in 11 countries. In all studies, the impact of price hikes was most marked among the ultra-poor, who already spent 80 per cent of their income on food, and thus had little room for sacrificing the consumption of other items to sustain food intake. In India, between 1952 and 1971, a one per cent rise in food prices cut food consumption by 0.7–0.8 per cent among the bottom class and of 0.1–0.2 per cent for the top group (Radhakrishna 1983). This is likely what happened in Niger in 2005. With a diet comprising nearly exclusively millet, the income fall and price rise of 2005 caused a larger decline in food intake and growing dietary deficiencies among the poor than the better off. Inspired by this literature, the paper analyzes now the relation between weekly millet prices and child admissions to MSF-F feeding centres in Maradi lagged five weeks. Figure 9 shows that these two variables are strongly correlated.

Figure 9: Weekly millet price (lagged five weeks) and admissions to MSF feeding centres in Maradi, 2005



Source: weekly admissions to nutritional centres-MSF France 2005, millet prices- SIMA and MSF-France.

Five increasingly more comprehensive econometric models were used to test the relation between changes in millet prices and child malnutrition. Model 1 explores the bivariate relation between the log of admissions of malnourished children to feeding centres and the log of millet prices (lagged five weeks) on the basis of 208 weekly observations covering the period 2002–2005. The results of such model (Table 13, column 1) show that the elasticity of child admissions in relation to a one per cent change in millet prices is high and highly significant, though the R2 is low, suggesting the omission of other explanatory variables.

Table 13: Regression analysis of admissions of children to MSF-F feeding centres, Maradi 2002–2005

	Model 1 (Log-log)	**Model 2** (Log-log with time dummies for number of centres)	**Model 3**[a] (Log-log with time dummies for number of centres and interaction with log price)	**Model 4** (Log-log spline)	**Model 5** (Log-log spline with time dummies for number of centres)
	Dependent variable: Log child admissions to feeding centres (lagged 5 weeks)				
Constant	-9.95 ***	-5.93 ***	- 3.31*	4.72	6.22
LogPrice	1.60 ***	1.09 ***	0.83***	.....	.....
Dummy 1	.....	0.86 ***	10.09**	.....	0.52 ***
Dummy 2	.....	0.93 ***	- 2.16	.....	0.93 ***
Dummy 3	.....	1.91 ***	- 19.41***	.....	1.66 ***
Dummy 4	.....	1.97 ***	-14.17***	…..	1.99 ***
LogPrice*Dummy1	…...	…..	-1.02**	…..	…..
LogPrice*Dummy2	…...	…..	0.32	…..	…..
LogPrice*Dummy3	…...	…..	2.15***	…..	…..
LogPrice*Dummy4	…...	…..	1.69***	…..	…..
LogPrice (price range 1) [b]	…..	…..	…..	0.18	-0.20
LogPrice (price range 2) [b]	…..	…..	…..	1.38***	1.17 ***
LogPrice (price range 3) [b]	…..	…..	…..	5.45***	2.83 ***
R2	0.266	0.811	0.842	0.399	0.831
F statistics	76.18***	178.37***	117.28***	45.25***	147.12 ***
Numb. of obs	208	208	208	208	208

Source: authors' calculations. Notes: *, **, *** indicate that the estimated parameters are significantly different from zero at less than 0.1, 0.05 and 0.01 probability level. [a]The results of Model 3 can be simplified by summing up the parameter of LogPrice with that of the interaction of LogPrice for the relevant time dummy, and repeating the same operation for the constant. Such procedures yields the following results: for July 2003–March 2004 Model 3 takes the following form: logAdmis Lagged = 6.78 - 0.21 logPrice; for April 2004–April 2005: logAdmis Lagged= -5.47+1.15 logPrice; for May 2005–September 2005: logAdmis Lagged = -22.72 + 2.97 logPrice; for October 2005 – December 2005: logAdmis Lagged = - 17.48 + 2.52 log Price. [b]The three periods (corresponding to different price intervals) were chosen on the basis of a Chow test which suggests that the slope of the relation between millet prices and lagged child admissions to feeding centres changed significantly (p-value =a 0.0006) on two occasions, thus suggesting two structural breaks in the relation. Thus the time series can be broken down into three price ranges, the first during which logPrice was <9.4 (i.e. 120 CFA Francs a Kilo), the second when it was between 9.4 and 9.8 (i.e. 120 - 180 CFA francs a Kilo), and the third when it was bigger than 9. 8 (i.e 180 CFA Francs a Kilo).

To correct such omissions, Model 2 takes into account the impact of the opening up of new child feeding centres in Maradi (in addition to the four that were already in operation in early 2002). Four time dummy variables were introduced to test this hypothesis: Dummy1 (equal to 1 from July 2003 to March 2004 – when 5 centres were in operation – and 0 otherwise), Dummy 2 (equal to 1 from April 2004 to April 2005 – when 8 centres were in operation and prices had started rising – and 0 otherwise), Dummy 3 (equal to 1 from May 2005 to September 2005 - when 18 centres were in operation and millet prices had started rising sharply – and 0 otherwise), and Dummy 4 (equal to 1 if 22 centres were in operation – i.e. from October 2005 to December 2005 – and 0 otherwise). The results of Model 2 reject the

hypothesis that the increase in child admissions was driven only by the opening of new centres, as the elasticity of LogPrice remains highly significant (though with a lower value than in Model 1), while the statistical fit of the relation (R^2=0.818) improves markedly. In turn, the positive, growing, and statistically significant parameters of the four dummy variables of Model 2 suggest that the opening of new feeding centres contributed in a increasingly more significant way to the surge of child admissions to feeding centres. However, these dummies explain a much smaller share of the rise in the number of child admissions than LogPrice. Indeed, while a one per cent variation in the price of millet produced after 5 weeks an increase of 1.09 per cent of the number of admissions to the MSF-F feeding centres in Maradi, the presence of 5 operating centres raised the number of admissions by only 1.3 per cent,[10] that of 8 operating centres by 1.5 per cent, that of 18 operating centres by 5.7 per cent and that of 22 centres by 6.1 per cent.

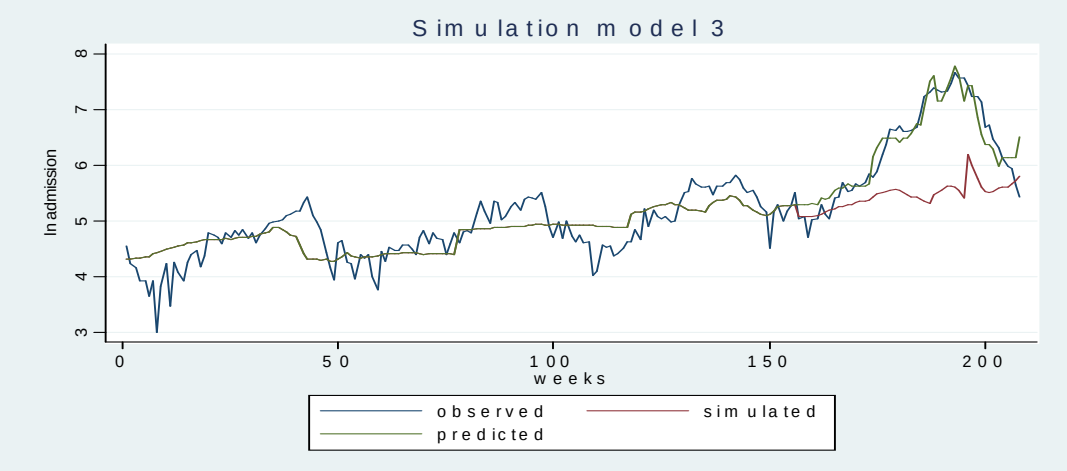
In turn, Model 3 includes in the regression analysis the interaction between the four time dummies described above and LogPrice with the purpose of testing whether the 'millet price-child admissions' elasticity changed during the four periods considered in line with the rise in the number of feeding centres noting, however, that millet prices rose significantly only in periods 3 and 4. The regression results (Table 13, column 3) indicate that the 'millet price-child admissions' elasticity was indeed much greater from May 2005 onwards, and especially during August and September 2005, than during the two previous period (see footnote a, Table 13). The fit of the regression also improved markedly (from an R of 0.811 to one of 0.843). In other words, the rise in admissions depended on the fact that the increase in millet prices was accompanied by the opening of new feeding centres. Yet, the increase in the number of feeding centres per se does not increase significantly or may even reduce the number of admissions in periods of price stability, as suggested by the parameters of the first two interactions terms, and by the fact that the elasticity of price changes on the nutritional status of children is greater when the millet price exceed a critical level, as observed during the crisis of May–September 2005.

Model 4 tests in a different way the non-linearity of the relation 'millet price-child admissions' by means of a spline regression in which the elasticity of this relation is allowed to vary over time. In fact, there is no good theoretical reason to believe that such elasticity should remain constant at vastly different price levels, as implicitly assumed in Model 1. Unsurprisingly, the results show that the price elasticity of admissions in price range 1 is not significantly different from zero, which means that below 120 CFA Francs per kilo, admissions to feeding centres are not influenced by millet prices (child malnutrition is thus purely a structural problem), while the price elasticity is significantly different than zero in the price range 2 and – especially – price range 3, which means that when millet prices rise above such threshold the number of child admissions rises significantly. However, the fit of such model is not satisfactory. Finally, Model 5 extends Model 4 by including the four time dummies described above. Also in this case, the dummies are highly significant (and with

[10] A good estimate of the percentage impact of each dummy variable on the number of admissions is given by g = 100(exp (b - V(b)/2) - 1) where b is the estimated coefficient on a dummy variable and V(b) is the estimated variance of b (Halvorsen, Palmquist, The Interpretation of Dummy Variables in Semilogarithmic Equations, American Economic Review, Vol. 70, 1980, pp. 474-475; Kennedy, Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations, American Economic Review, Vol. 71, 1981, p. 801).

values close to those of Model 2). And also in this case, as in Model 4, in the first price range (i.e. when millet prices are below 120 CFA F per Kilo) the elasticity of the relation 'millet price-child admissions' is not significantly different from zero. The fit of the regression improves markedly in relation to Model 4. All in all, Model 3 exhibits the best fit and allows to predict most accurately the changes in child admissions to feeding centres in 2005 (Figure 10).

Figure 10: Log of observed child admissions (blue line), predicted admissions on basis of model 3 (green line) and simulated child admissions in 2005 (red line) assuming millet prices behaved week by week as the average of 2002–2004 prices



In conclusion, the regression analysis discussed above and the data in Figure 8 confirm beyond any reasonable doubt that the rise in the number of child admissions to MSF-F feeding centres in Maradi during 2005 was explained to a considerable extent by an abnormal rise of millet price. While the time dummies (alone or interacted with LogPrice) are generally significantly different from zero, thus indicating that the opening of new centres contributed to the rise in the number of admissions, their relative impact was comparatively modest. On the other side, LogPrice was found to be strongly significant in all specifications except when prices were below 120 CFA F per Kilo or for the years prior to 2005. The slow rise in child admissions to feeding centres prior to 2005 was therefore due to structural factors and an expansion of the capacity of feeding centres, but not to rising prices. The opposite was true in 2005, especially after March.

One way to asses quantitatively the impact of price changes versus other factors (the opening of new feeding centres and other variables not explicitly included in the regression analysis described above) is to simulate the hypothetical number of child admissions to MSF-F feeding centres in Maradi in 2005 assuming that weekly millet prices behaved in 2005 as the average of 2002–2004. This simulation is done by means of Model 3 which, as noted, generated the best statistical results. As shown in Table 14, if millet prices in 2005 behaved in line with their average for 2002–2004, the rise number of admissions of children to MSF-F feeding centres in Maradi region would have been much less pronounced, though it would not have been eliminated entirely. In fact, Table 14 shows that for the whole of 2005 the surge in millet prices was responsible for 68 per cent of the child admissions to feeding

centres. If the period is restricted to the crises months of July–November 2005, such percentage rises to 78 per cent, and if only the most acute crisis period (August–September) is considered 85 per cent of the admissions were due to the rise in prices.

Table 14: Effective and simulated number of children admitted to MSF-France feeding centres in Maradi, 2005.

Month of 2005	Effective number of child admissions to feeding centres	Child admissions to feeding centres simulated on the basis of model 3 assuming 2002-4 price behaviour	Absolute difference (i.e. number of child admissions due to price rises in 2005)	% difference (i.e. % of child admissions due to price rises in 2005)
January –March	2505	2288	217	9%
April-May	2957	1804	1153	39%
June-July	**7814**	**2142**	**5672**	**73%**
August-September	**15517**	**2255**	**13262**	**85%**
October-November	**9061**	**2765**	**6296**	**69%**
December	1285	1196	89	7%
Total 2005	**39139**	**12451**	**26688**	**68%**
July-November 2005	**32392**	**7162**	**25230**	**78%**

Source: Authors' calculations.

Notes: the number of admissions during week 30-39 reflects the rise in prices occurred between week 25-34. The simulation was carried out on the basis of Model 3, Table 13, assuming that in 2005 millet prices behaved as the average of 2002–2004 prices.

In conclusion, the 2005 trend in millet prices, the fragmentary but telling evidence provided by the nutritional surveys, the results of the regressions analysis discussed above suggest that the rates of child malnutrition and – to a lesser extent – child mortality rose between April and November 2005. Most of such rise was driven by a substantial rise in millet prices (caused by a moderate fall in output, a sharp decline in net imports and the inability of the government to distribute provide emergency relief) and the incomes fall due to a decline in self-provisioning and the decline in the prices of livestock, cash crops, wages of casual labourers and remittances that affected several social groups, in particular the agro-pastoralists.

4. SEVEN INTERPRETATIONS OF THE 2005 FOOD CRISIS

As noted in the introduction, there is no agreement on the extent and causes of Niger's 2005 food crisis. The main viewpoints are discussed hereafter in the light of the main famine theories.

(i) There was no crisis. This position – dominant in government circles – argues that in 2005 there was no food crisis. While some departments were affected by food shortages caused by poor rains and locust invasions, these events were not unusual and the nutritional problems observed between March and November 2005 were no more pronounced than normal, and

anyway not sufficient to talk of a food crisis. According to President Tanja, had there been a crisis, a large number of people would have fled to neighbouring countries and begged in the street. Yet, such interpretation is not consistent with the 2005 trends of food prices (Figure 8), erosion of food entitlements of most social groups (Table 10), rise in child admissions to feeding centres (Figures 7 and 8), peaks in survey-based incidence of severe malnutrition among children of 6–29 months of age in several departments (Table 11), and scattered but telling evidence that more Nigerians than usual were forced to migrate, seek casual work, beg in the street, and rely on the consumption of wild and even toxic foods never eaten before.

(ii) A Malthusian crisis. A second viewpoint recognizes that in 2005 there was a food crisis, but argues that this was the result of a long term growth of population faster than the growth of land and food resources leading to over-grazing, soil erosion and deforestation in the agro pastoral belt (area 4 in Figure1) and soil overexploitation in the relatively fertile Southern belt (Malthus 1798). Yet, while there is evidence that high and rising population pressure has increased the instability of long term agricultural growth and vulnerability to crises, there is no strong evidence (Table 1) of a significant decline in aggregate food production per capita and land yields over the last 20 years. Therefore, the 2005 crisis cannot simply be seen as the culmination of a cumulative process of declining food production per capita that reached in 2005 crisis proportions. High population growth and the consequent desertification and concentration of farmland aggravated the impact of the crisis but were not its primary cause.

(iii) A Food Availability Decline (FAD) crisis. The FAD approach argues that as a result of the drought and locust infestation, the September 2004 harvest registered a decline of 223,000 tons of cereals which triggered a steep rise in food prices and an increase in child malnutrition. Yet, though sizeable, the production decline recorded in 2004 was smaller than that observed in 2000-2001 when no increase in mortality and malnutrition, recourse to extreme survival strategies, and other famine symptoms were reported. Thus, the 2005 crisis cannot be explained by a fall in domestic production. The decline in food availability was more pronounced if the fall in food imports (Table 5) is taken into accounts. But, even in this case, the FAD approach does not capture aspects of the 2005 crisis, such as a large increase in trade margins (Tables 7-9), possible food hoarding by traders and the erosion of food entitlements of the pastoralists, agro-pastoralists and families dependent on casual work (Table 10).

(iv) An Entitlement Failure (EF) crisis. As emphasized by many studies, a rise in malnutrition is often not caused by sheer lack of food, but from the erosion of the food entitlements of some social groups. In Niger while the food demand of small farmers and herders rose, their purchasing power decreased considerably due to the failure in the four entitlements to food theorized by Sen (1981), i.e. a failure of production-based entitlement caused by the drought; trade-based entitlement resulting from the erosion of the terms of trade between cereals and the good produced and sold, such as small animals, cattle, cash crops and firewood; labour-based entitlement, due to limited employment opportunities and declining wage of casual labourers; and, transfer-based entitlements due to the erosion of community solidarity and a possible reduction in the value of remittances. Despite its richness, even the EF approach misses some important aspects of the 2005 crisis discussed hereafter.

(v) A Food Intervention Decline (FID) crisis. The decline in market availability of food was not offset or moderated by the narrow scope and poor timing of the relief measures introduced by the Government and the donors. A first factor in the FID analysis concerns the food security approach followed in Niger before and during the crisis. Indeed, the decision of sharply reducing and monetizing the National Food Security Reserve (Figure 4) and relying on market imports to stabilize food prices and cover production shortfalls generated large adverse effects as food imports declined due to the narrowness of the Sahelian millet market, high covariance of whether shocks among the countries of the region, and the considerable time and transport costs required to mobilize commercial imports and food aid from outside West Africa. Because of structural handicaps of the Sahelian market, regional imports are often unable to stabilize food prices and food shortfalls, particularly in the most remote countries of the region. Under such circumstances, public policy should have opted for holding an adequate national food security reserve in kind as – given the chronic budget deficit of Niger – there is a high-risk that cash reserves be allocated for purposes other than the purchase of food (NEPAD 2004).[11]

Secondly, the deficiencies of the present approach to food security depend also on the narrow scope of the Early Warning System (EWS) used to detect food crises. Indeed, EWS equates food insecurity with insufficient cereal production, and implicitly assumes that an adequate food output is a necessary and sufficient condition for ensuring adequate levels of nutrition. Strange as it may seem, in 2005 the EWS did not monitor vital information such as changes in net imports, food aid, food stocks, food entitlements of main social groups, and changes in nutritional indicators.

Thirdly, once the crisis erupted, there was no attempt at moderating the rise in food prices by means of the free distribution of cereals, and the launch of food- and cash-for-work programs that have been shown to be very effective in emergency situations (Drèze and Sen 1989), the timely delivery of international food aid and the freeze of user-fees in health. The government's decision to only subsidize food sales was possibly inspired by the desire of sticking to the free-market ideology adopted in 1984, or of protecting the interests of millet wholesalers who strongly supported the National Movement for the Development of Society of President Tanja, and who sat in large numbers in Parliament.[12] The Government's reluctance to intervene may also have been due to the cost of a broader relief operation. Such program would have required an increase in spending and budget deficit, or the reallocation of funds from other expenditure chapters, or an increase in tax revenue. In contrast, in 2005 the budget deficit declined (Table 4), and expenditures for the Francophone Games and other less urgent programs were not reallocated to food relief.

[11] The impact of a biased approach to food security in small, landlocked and very poor countries has been well analyzed also on occasion of the Malawi famine of 2002 (Devereux 2002). On the advice of the IMF, during 2001 the Malawi Strategic Grain Reserve was reduced from 180,000 tons, judged 'unnecessarily high and unsustainably expensive', to 60,000 tons. Therefore, to cover the 2002 deficit of 220,000 tons of maize, the Government planned to buy locally 70,000 tons and import the remaining 150,000. But several difficulties arose in finding domestic sellers even when the Government purchase price was raised. On the other hand, imports were considerably delayed, due to transport problems as well as price rises caused by an increase in food demand in its richer and larger neighbouring countries, i.e. Zambia and Zimbabwe (Stevens et al. 2002) that were also affected by co-variant whether shocks.

[12] According to Devereux (2002), in Malawi the decision not to carry on free food distribution in 2001 reflected the collusion of the Government with wealthy groups, able to exercise strong political pressure.

Finally, the FID approach stresses the delayed response of the international community which ignored the emergency appeal of WFP during the initial crucial months of 2005. Such neglect might have been due to disagreements about the nature of the crisis between the international organizations, NGOs and Government of Niger, each of which provided contradictory information and analyses to the donors. It might have been due also to the parallel efforts at mobilising aid for the Tsunami and Dartford victims, which may have 'crowded out' aid to Niger.

(vi) A Market Failure (MF) crisis. The crisis is also due to the failure of the Sahelian and North Nigerian millet market. Such market is narrow, affected by a high co-variance of climatic shocks and production risks among Sahelian countries, and handicapped by lack of transport infrastructure, i.e. all factors that reduce the insurance role that regional food trade could play. Unilateral trade restrictions by countries of the region, overregulation and over taxation of marketing and transport represent an additional constraint to intra-West African trade (Badiane, in Lavergne 1997). Finally, the economic integration within the countries of the region is highly asymmetric, and policy or random shocks in larger countries (e.g. Nigeria) influence markedly the performance of smaller neighbours, while the opposite is not true. Close economic integration may be desirable among countries of broadly similar weight, subject to different shocks and production risks, constituting a sufficiently large economic union, and linked by good transport infrastructure. Yet, this is hardly the case of Niger and the Sahel. All this as well as the absence of regional stabilizers and safety nets to offset cross-country contagion suggests the adoption of prudent and independent insurance policies, especially in the field of food security. Market failures are evident also at the domestic level, most obviously in the case of the agricultural credit market, oligopolistic food market, and lack of infrastructure.

(vii) A composite 'EF-FID-MF crisis': each of the last three explanations catches some aspects of the 2005 crisis, but not all of them. The crisis can therefore be defined as a composite crisis explained by three different theoretical approaches. As suggested by the EF hypothesis, the entitlements erosion suffered by the agro-pastoral, pastoral and problem families was possibly the most important contributor to the rise in malnutrition. But, as suggested by the FID model, the impact of the crisis would have been less severe had different food security policies, a more comprehensive approach to the detection of food crisis, and adequate international aid relief been adopted. Finally, as argued by the MF approach, the crisis was also caused by the poor functioning of the Sahelian millet market that, because of the reasons illustrated above, was unable to spontaneously cover Niger's millet shortfall, while domestic market failures exacerbated the divergence in regional and sub regional prices and allowed a large increase in wholesalers' profits.

5. CONCLUSION

Outright famines and severe food crises were common in the post-World War II period, at least until the mid- to late 1980s. Since then, famines became less frequent because of improvements in food production, early warning systems and food aid. The common perception is now that, except in conflict areas or countries with authoritarian regimes, famines and severe food crisis are slowly becoming a problem of the past. The events of

Niger, a fairly democratic country unaffected by conflicts or major tensions, suggest it is too soon to claim victory.

This study provides evidence on changes in output, imports, prices, survival strategies, admission to feeding centres and child malnutrition and mortality suggesting that 2005 was not 'a cruel but normal year', but a year that witnessed a severe crisis that in some districts bordered famine conditions. The study has also argued that the FAD approach invoked by many is too narrow and does not help comprehending a complex crisis that can only be understood by examining the entitlement failures of several socio-economic groups, the failures of domestic and regional market, and policy failures in the field of food security, health financing, and international aid. Insufficient data does not permit to come to firm conclusions on aspects of the crisis that have attracted considerable controversy, such as food hoarding by wholesalers, or the impact of the crisis on child and overall mortality trends. Additional work in this area is warranted.

Though not meant to provide prescriptions, three policy implications may be seen to emerge from this analysis. First, barring major and unlikely changes such as large exogenous improvements in agriculture or mass migrations, Niger's present high rate of population growth is unsustainable in a food security perspective. Attention to population policy is essential for a medium- to long-term food security strategy. Second, the food security policy in operation in 2005 was inconsistent with the structural characteristics of Niger. There is therefore a need to re-emphasize the creation of a sizeable food security reserve and developing much more comprehensive early warning systems. Even if costly, such reserve would allow swift intervention on occasion of recurrent food crises. Finally, the cost of the strongly asymmetric integration with Nigeria needs to be emphasized. Although such a relation is also beneficial to Niger, the introduction of measures sheltering temporarily Niger's economy will help to avoid the country being affected as 'an innocent bystander' by multiple shocks emanating from the large, dynamic and unstable Nigerian economy.

Indications are given for further analysis of a number of issues raised in this paper.

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