Market Assessment

NYALA
South Darfur

March 2013
Data collected in
November - December 2012

WFP
World Food Programme
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Nyala Market Assessment

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World Food Programme - Analysis and Nutrition Service

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Picture on front page: © Diego Fernandez Gabaldon, Market in South Darfur

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ACRONYMS

CMA	Centred Moving Average
CO	WFP Country Office
C&V	Cash and Voucher
FOB	Free On Board
GDP	Gross Domestic Product
GSI	Grand Seasonal Index
HAC	Humanitarian Aid Commission
IDP	Internally Displaced People
IDR	Import Dependency Ratio
LTSH	Landside Transport, Storage and Handling
NVS	Nutrient Value Score
ODOC	Other Direct Operational Costs
SDG	Sudanese Pound
SMoAF	State Ministry of Agriculture and Forestry
SMoF	State Ministry of Finance
SSR	Self-Sufficiency Ratio
USD	United States Dollar
WFP	United Nations World Food Programme

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All the errors and omissions remain with the author.

EXECUTIVE SUMMARY

i. Since the onset of Darfur crisis, World Food Programme has been playing a strategic role in Sudan delivering in-kind food aid to vulnerable people. In line with the strategic shift towards food assistance, WFP Country Office is also providing market-based transfers in North and West Darfur. This assessment was required to analyse market functioning and ascertain the feasibility of expanding cash and voucher transfer modalities in South Darfur, and specifically in the IDP camps close to Nyala.

ii. Nyala presents most of the features typical of spatial re-ordering driven by rapid urbanization, conflict, population movement and aid infrastructures growth. The result is a massive gentrification process ensuing seizure on land and pressure over available resources, which eventually turned a small rural market into one of the major cities in Sudan.

iii. A number of urban and peri-urban IDP camps were established in the proximity of the city, with increasing population, close to 240 thousands at the time of the assessment. Beyond distinctive rural-urban migration drivers, such a momentous urbanization was mostly fuelled by changes in security in the countryside.

iv. The economy in Nyala evolved over time following its expansion, with enhanced supply of labour and slight diversified working opportunities, including small-scale trading. Albeit, newcomers either moved from agriculture into unemployment, or are involved in residual activities compared to the existing work-force in town. As a matter of fact, few IDP households are engaged in the agricultural sector, while crop production is crucial for residents.

v. Livelihoods in Darfur have been dismantled by systematic asset-stripping, production and market failures, poor access to natural resources and constraints on the remittances flow. The crops locally produced are sorghum, millet and, as a cash crop, groundnuts. Since agriculture is the most important livelihood and source of food, poor precipitations and not sustainable land use practices adversely affected local population. Food aid plays a strategic role in South Darfur but it is rather a supplement to existing livelihoods than the major source.

vi. **Predictors of food insecurity were both covariate shocks, including conflict and natural hazards such as droughts, and idiosyncratic factors linked to households' wealth, their resident/IDP status and resilience capacity**. Within the IDP camps monitored in South Darfur, some 10 percent of households are considered food insecure according to the composite food security indicator, with poor and borderline food consumption scores (4 and 13 percent, respectively). At the state level, vulnerability driven by price volatility is relevant as 53 percent of the residents in the camps may have purchasing power issues as their expenses devoted to purchasing food are high. Specifically, in Otash camp close to Nyala, they account some 60/70 percent of total expenditures.

vii. Despite being the first millet producer and one of the most prominent States in Sudan for sorghum production, **South Darfur is generally cereal-deficient**, unless exceptional harvests occurred. In the past years, production has been quite erratic in the whole country, with declining stock-to-use ratio leading to a drawback of sorghum and wheat strategic reserves.

Such food shortage turned into reduced utilization of food for other means beyond human consumption. Sorghum consumption has changed by only 3 percent in the past eight years, while wheat increased by fifty-nine percent in the same period, becoming steadily more popular.

viii. **Domestic production failures and increasing demand for wheat amplified the exposure of Sudan to international food price volatility, despite its feature of a small open-economy**. Countrywide, sorghum trade is larger in terms of volumes than millet, which is conversely comparable to wheat volumes.

ix. Locally produced sorghum and millet are cultivated exploiting rain-fed irrigation in South Darfur, where small size farms usually implement low-input based traditional systems. The area harvested is usually lower from the one actually planted, returning significant losses and unpredictable yields, in turn affecting local produce and market functioning.

x. As a result, **cereal prices are highly sensitive to produce shortfalls**. Poor performance recorded in 2011/12 fuelled prices in Nyala up to the peak in mid-2012. Since then, granted to positive harvest expectations, prices have reversed their trends, still remaining above previous year levels. Local cereal prices are extremely correlated, being substitute foods, while wheat is also subject to external factors beyond local production outcomes, and therefore present weaker correlation.

xi. Worth mentioning, millet prices diverged from sorghum in 2011, becoming more expensive. As South Darfur is the major producer of millet within Sudan but sorghum presents wider trade flows countrywide, the more the price difference between the two amplifies, the more likely trade is compensating local production failures channelling sorghum towards South Darfur.

xii. Considering the consumption patterns and granted the predominant role of sorghum, it is likely that **wheat price variations hinder households' purchasing power more than variations of millet do**. In the frame of market-based interventions, **it is therefore recommended to monitor wheat price changes** as beneficiaries may see the value of their vouchers reduced by higher prices of this commodity.

xiii. Price volatility is another source of risk for households' purchasing power. In particular, **intra-annual volatility when not adequately taken into account in the design phase may reduce not only the value of vouchers but also trigger dissatisfaction among beneficiaries on the validity of the programme itself**. While higher sorghum prices are expected to fall in the period between March and August, with peaks usually occurring in summertime, the high-price period for millet is one/two months earlier. The prices of both commodities start declining when projections on the goodness of the forthcoming harvest are disclosed to achieve their lower levels between November and December, making that period of the year most profitable to eventually expand the caseload of beneficiaries. However, wheat prices at that time may be above their average, thus partially offsetting the value of the vouchers if beneficiaries are willing to retain the same level of purchases of that commodity, as the increasing consumption of wheat in the past years suggests.

xiv. A fine-tuning exercise of the value of the vouchers according to actual prices is crucial during the implementation phase beyond the forecasted figures presented in this report. **Highlighted months indicate the most probable times when revision should be considered**.

xv. When large scale market-based interventions are implemented, it is crucial to assess if increased liquidity channelled in the market would not trigger additional inflation. Thence, integration of Nyala sorghum market with other markets in Sudan was analysed.

xvi. Sorghum in Nyala has been steadily more expensive than in the rest of the country, as transaction costs and overheads are more biting for traders, whilst causality of sorghum prices highlights that changes in other markets strongly affect local prices. Still, in view of the positive production prospects, **Nyala prices converged to the level of many other markets by the end of 2012, indicating a certain degree of integration and a market functioning thereof in line with the rest of the country**; integration is however highly dependent on the goodness of the harvest, as trade from other Sudanese states may not be fully effective to absorb local supply unbalances.

xvii. **Nyala and the other major markets in Darfur present a lesser degree of integration when local produce is poor**, as the trading routes involved are largely affected by exogenous factors not controlled by traders. Being cyclically above or below, sorghum price patterns in El Geneina (West Darfur) and Eddein (East Darfur) differ substantially from Nyala, therefore advising that **successful market-based programmes in different locations in Darfur might be grounded on quite different drivers**.

xviii. To have an in depth understanding of the structure and conduct of the market in Nyala, a trader survey was conducted by late October 2012. Traders interviewed were 143, divided in four categories according to their type, being either wholesalers or retailers (or a mix of the two), and specialization in one or many commodities. Results are representative only for big-size wholesalers as almost all players in that category were interviewed, while for the other groups a purposive sampling approach was used and results may only provide a global picture of the market.

xix. Most of the interviewed traders have been running their activities since five years or more, and pursue quite a strict commodity specialization as their most important source of business hardly changes.

xx. The size of traders operating in the IDP camps is negligible as compared to those operating in town, and their delivery capacity may be an issue if they were to increase their volumes. **Considering the involvement of traders more grounded in town and with tighter connection up along the supply chain is therefore a recommended option**.

xxi. **Seasonality affects volumes** by and large, in particular for millet. Sorghum volumes are less season-dependent, as traders are less constrained by local harvest outcomes and rely on other supply areas as well. Limited variability of sorghum volumes as compared to millet supports the finding of market integration when supply in Sudan is adequate.

xxii. As the change of volumes from the last year returns mixed-evidence, no major covariate shock has affected traders' activities, which were otherwise influenced by idiosyncratic factors. Most

of the traders involved in retailing activities claimed to have decreased their sales, reasoning with a reduced demand. The increased number of occasional competitors powered by improved availability may be an explanation for that. In opposition, a quarter of big-size wholesalers acknowledged improved local availability as the reason for a better performance.

xxiii. The number of inhabitants in the IDP camps likely represents a significant share in Nyala market global activities. Otash, the camp where the CO is planning to first introduce vouchers, is estimated to weight between 2.5 and 6 percent. Therefore, the increased demand driven by vouchers introduced in this camp may be considered limited if compared to the size of the market town, and with limited effects when supply is adequate. Differently, scaling-up should be considered only after having evaluated the implications from the piloting phase.

xxiv. Traders' capacity to respond is limited by the market environment, including insecurity issues, transport costs, and overall high food prices. Limited resource availability ties with such external factors, and incrementally affects all the categories from wholesalers to retailers. Traders may therefore be affected by failures in stocks provision up along the supply chain when produce is poor.

xxv. Hence, **an increased demand by a quarter would likely push sorghum prices up** for 61 percent of the respondents, even though traders are largely confident they would be able to deliver in a decent time (one week for half of them). Partially resumed credit arrangements between traders have been increasing especially for those commodities whose prices are more incline to inflation.

xxvi. **Stocks are only available to meet one week of demand** for more than 60 percent of the interviewed traders, even though the stock level is recognized as an issue for less than a third of them, and in particular for retailers. The confidence of traders to be able to meet increased demand does not ground on solid rationales if the stocks strategy is considered.

xxvii. Alleged price margins are in the order of 5-10 percent, while by commodity sorghum present the highest variability.

xxviii. The last part of the assessment compares two different food baskets. In particular, costs and benefits were tackled not only in monetary terms (efficiency), but also taking into account nutritional benefits (effectiveness). The two food baskets under different transfer modalities include sorghum, pulses, vegetable oil, sugar and salt for in-kind; while only sorghum and pulses for vouchers. Planned rations per person for the second food basket were improved by the CO to provide comparable caloric intake between the two.

xxix. Cost efficiency comparison, built on price forecasts for year 2013, was determined on the full costs likely to be undertaken with the two different food assistance scenarios. To the extent of this exercise, only sorghum and pulses were considered to allow consistency in the exercise.

xxx. Overall, **vouchers transfer modality is by 9 percent more cost-efficient, with the only exception in July. Full scaling-up of the programme is recommended in November and December**, when gains would be in the order of 11 and 17 percent, while partial scaling-up is recommendable only after summer. Differently, if prices switched to the upper band of forecasts, then vouchers would be more cost efficient only in October, November and

December 2013. In this scenario, seasonality matters, and overall there would be a 2 percent gain with in-kind. Alpha value analysis confirms these results.

xxxi. As prices are strictly correlated with the outcomes of the upcoming harvest season, **contingency planning is needed to tackle the worst case scenario should prices follow the forecasted upper band**.

xxxii. To assess the effectiveness of the different modalities, the choice of the food baskets is critical. Measures of the nutritional values compared in-kind vs. vouchers not only in terms of caloric contribution, but also as considered micro- and macro-nutrient contents.

xxxiii. While the calorie intake provided by the two food baskets is similar, roughly meeting half of the requirements, calcium slightly improves with vouchers but it is still a quarter of the daily needs, while fat declines significantly. Vitamin C is poor with both baskets, while iodine and vitamin A are missing with vouchers. Nonetheless, the beneficiaries may find alternative sources in the market, in particular from groundnut oil consumption. Eventually, **mixed transfer modalities may be an option in case the choice of beneficiaries would be at detriment of important nutrients intake**.

xxxiv. An omega value index was finally computed to take into account not only full costs, but also the outcomes of the nutrients score. **If beneficiaries would bind their choice only to sorghum and pulses, then the in-kind modality would be more cost-effective**.

xxxv. **Rigorously monitoring actual purchasing patterns is therefore crucial** during the implementation phase, to confirm the validity of the analysis, or alternatively to perform it with actual purchasing patterns.

xxxvi. In conclusion, **moving towards vouchers may be a viable option in 2013, if incoming harvest prospects are good. A close monitoring of both actual prices and consumption patterns is pivotal to draw lessons from the pilot phase. Eventually, to provide stability to the programme, limited inefficiencies may be tolerated, but timely contingency plans should be endorsed.**

OBJECTIVES

In accordance with WFP's strategic shift from food aid to food assistance, WFP in Sudan has been providing food assistance to thousands of vulnerable people in North and West Darfur using cash and voucher transfers in place of in-kind food aid. The CO is now exploring the possibility of expanding the use of cash and/or voucher transfers to South Darfur, and specifically in IDP camps close to Nyala.

There is a growing recognition that market-based approaches can be effective and appropriate tools to provide food assistance to beneficiaries when markets are properly functioning and food is available. Besides offering greater flexibility for beneficiaries to meet their needs, non-food transfer modalities may also stimulate and support the local economy.

This report is aimed at assessing the market functioning and provide baseline information of market dynamics in Nyala, to help ascertain which transfer modality, or mix of modalities, is the most appropriate for WFP's interventions to deliver food assistance to vulnerable people in South Darfur.

More specifically, the assessment focuses on the following issues:

a. availability of food on local markets and recent changes, the overall environment in which food commodity trade takes place and the level of competition between traders;
b. historical market conditions (competition, price setting behaviours, staple food availability, price trends for selected commodities including seasonality, volatility, and market integration);
c. market-perspective recommendations on possible areas and times of the year conceivable to support C&V interventions and to what extent;
d. major bottlenecks in the market functioning by highlighting the expected threats arising from an exogenous manipulation of households' food demand (by means of market-based interventions), including traders' potential to timely expand food supply (storage facilities, duration of stocks and their replenishment lead-time) to absorb injections of C&V;
e. cost comparison between different transfer modalities.

METHODOLOGY

The first part of the analysis relies on secondary data, including WFP reports and relevant background literature, cereal balance sheets, production data and price time-series. Additionally, primary data collection was undertaken, following a field visit in October 2012, to develop questionnaires to analyse different markets in town, and assess traders in the specific, so to provide an overview of Nyala trading environment. The final section tackles cost comparison between food baskets delivered by means of different transfer modalities in terms of efficiency and effectiveness.

Market assessment findings and recommendations will be followed-up by a Technical Committee that includes WFP, State Ministry of Agriculture and Forestry (SMoAF), State Ministry of Finance (SMoF), and Humanitarian Aid Commission (HAC) to evaluate and eventually address reasons of concern related to possible drawbacks of market-based interventions in vulnerable IDPs camps close

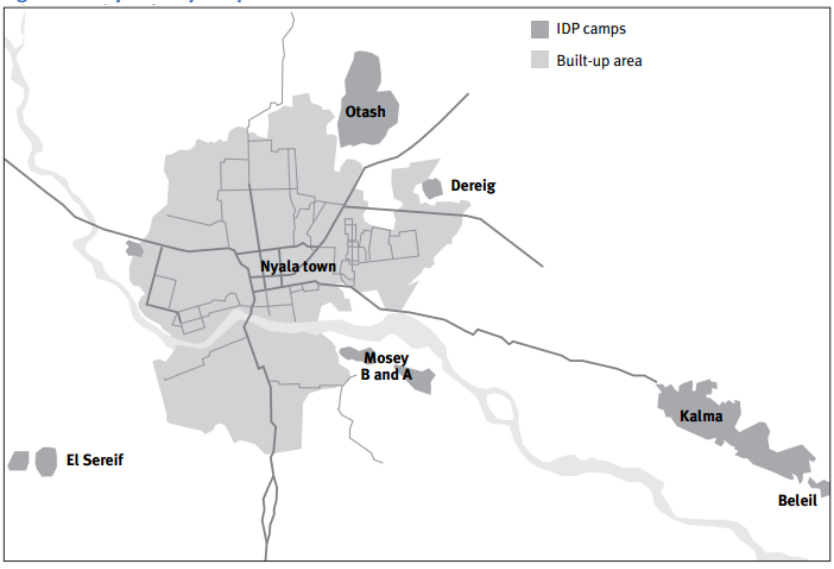
to Nyala, and avoid negative trickle down effects in the town markets. Awareness meetings with IDPs chiefs and population will set the stage to potential market-based interventions.

1. BACKGROUND

Since the onset of Darfur crisis, the gentrification of Nyala determined a tremendous expansion of the edge of town, turning a small rural market into a large city, with consequent seizure on land and pressure over available resources (Bartlett *et al.*, 2012). The population rose from 315,486 in 2000, to 565,734 in 2007 without IDP camps (Alix-Garcia *et al.*, 2012a), to amply exceed the million threshold nowadays. More recent estimates widens largely. According to Buchanan-Smith and McElhinney (2011), in 2009 the figures spanned from an overall population of 1.6 million (including 300,000 in IDP camps) to only 700,000 (with 100,000 in IDP camps). More recent estimates from the Nations Online Project 2011 claim that Nyala is now the second largest city in Sudan, with a population of 2,960,000 people (Bartlett *et al.*, 2012).

A number of urban/peri-urban IDP camps were established in the proximity of the city centre (Figure 1), *e.g.* Kalma, Otash and Derieg, with estimated populations[1] of 78, 14 and 13 thousand people (Nugent and Zambakides, 2009). Reportedly, those figures have increased thereinafter, with some 91,800 inhabitants in Kalma, 57,000 in Otash, 23,000 in Derieg, 17,000 in Mosey and El-Sereif camps, and approximately 20,000 inside Nyala itself (Bartlett *et al.*, 2012). Most of the people living in those camps rely heavily on food aid. However, the most accurate and updated figures resulting from a verification exercise conducted by WFP among its beneficiaries during the last quarter of 2012, set the populations in Kalma, Otash and Derieg camps, respectively at 83,800, 55,200 and 20,700 people, and the overall internally displaced population close to 240 million.

Figure 1 - Nyala City Map



SOURCE: Buchanan-Smith *et al.* (2011).

This massive arrival in comparison to historical inhabitants has altered substantially the economic environment of Nyala, creating an urban space where old and new residents struggle to balance

[1] Those figures are out of date, being increased in the meantime.

between their commonalities and differences, even though "*townspeople claim that the aid the IDPs receive is damaging their business*" (Nugent and Zambakides, 2009).

Significant urbanization was mostly fuelled by changes in security in the countryside, thus being an additional – and possibly determinant element for rural-urban migration (Alix-Garcia *et al.*, 2012b). As a matter of fact, Bartlett *et al.* (2012) provide an interesting representation of the gentrification process that has been operating in Nyala in the past few years, putting the phenomenon in the broader category of spatial re-ordering in African cities, mostly driven by rapid urbanization, conflict, population movement and aid infrastructures growth. Urbanization "*occurs as a result of a number of complex and intersecting dynamics which include, but are not limited to: economic restructuring, environmental degradation, political policies, religious or ethnic conflict, poverty, and food scarcity*" (*ibidem*). According to these authors and the sprouting literature on conflict urbanization, cities are perceived as more secure as compared to rural settings, being also a key source of information other that transport and logistical hub points for aid deliveries. An additional factor coming along is the concentration of newcomers in the very proximity of pre-existent city agglomeration, thus creating a wider urban area where the engagement between different groups becomes more stringent. In conjunction with new trade opportunities, as food, housing and entertainment demand adapt to the increased population[2], also the "*dangers associated with conflict have a habit of insinuating themselves into city life in ways that can often distribute populations in unintended ways"* (*ibidem*). Thence, along with new-comers pressure, the city adapted its shape as also local residents had to cope with additional insecurity and skyrocketing housing costs, thus creating a category of internal displacement within the city itself.

The labour market also evolved according to new unskilled workers inflow ideally in competition with local ones on the demand side, and an increase in potential employers on the supply side. As Alix-Garcia and Bartlett (2012) indicate, insecurity and high transaction costs should have potentially channelled Nyala market as if it was a closed economy, with prices and wages locally determined, being the latter likely shrinking as a result of enhanced competition among lower skilled labourers. Empirical findings from these authors tend to confirm that within IDPs arrived in Nyala after 2003 some 55 percent moved from agriculture into unemployment. The remaining ones apparently are found not to compete with existing workers, being either employed as nanny or house servants, or in casual labours, with very few working in other sectors, including farmers, traders, and drivers (*ibidem*). Of course, as the flow of new inhabitants persists, late arrivals are more likely to remain unsatisfied with their employment hunt.

However, this massive flee of people modified substantially the economy, and according to demand changes, it has increased *inter alia* the number of small-scale traders, as they move in town and engage with the new environmental setting (Buchanan-Smith and Fadul, 2008). Eventually, few IDPs will return to their rural homes, but rather they will likely to stay in town, fostering their urbanised lifestyle and source of livelihoods (Buchanan-Smith and McElhinney, 2011).

[2] The increasing number of aid community workers plays a significant role in most of the abnormal changes in different markets, in particular as referred to the housing one.

2. DRIVERS OF FOOD INSECURITY

Food insecurity in Darfur is the result of a manifold set of causes, where national- and international-level processes critical in the evolution of the conflict intertwined with recurrent droughts and an overall and wide-spread insecurity[3]. Chronicle of the roots of the conflict in Darfur goes beyond the scope of this report, still it has to be noted how systematic asset-stripping, production and market failures, poor access to natural resources and constraints on the remittances of migrant workers all played a significant role in the failure of livelihoods strategies in Darfur, including not sustainable land use practises (Young *et al.*, 2005). In addition, decreasing land resources since the '70s associated with a substantial decline in precipitations, adversely affected trade between farmers and herders, potentially leading to a collapse of the market economy (Olsson, 2010).

As a matter of fact, according to a comprehensive food security and vulnerability assessment undertaken by WFP in 2006 - *here reported to provide baseline figures to compare against more recent evidence* - the share of food insecure households in South Darfur was 13 percent (427,796 people), while in the Greater Darfur this phenomenon was even more widespread (26 percent). Households used to rely heavily on agriculture as their most important livelihood and source of food, even though an emerging reliance on daily labour and petty trade activities revealed as a consequence of traditional livelihoods destruction. Yet, baseline findings reported that food aid, despite being as significant as in the rest of Darfur, was rather a supplement to existing livelihoods than the prominent source (WFP, 2007). The crops mostly produced were sorghum, millet and groundnuts, with the latter primarily used as a cash crop.

The snapshot of food consumption patterns reported that some 80 percent of households relied on markets to access food, with cereals and tubers consumed on average 6 times per week, pulses 5 times, vegetables, fruit and milk 4 times, and meat 3 times (*ibidem*).

Predictors of food insecurity were not only associated with the effects of the conflict but also with covariate shocks affecting agricultural production outcomes, *e.g.* drought and floods[4], while at the idiosyncratic level, female headed households, IDP households, and those repeatedly affected by shocks were most likely to be food insecure. Interestingly, wealth status remained the strongest predictor of food security (*ibidem*).

Since 2009, WFP has been implementing a food security monitoring system in Darfur[5], to track changes in community groups (IDPs, resident or mixed) deemed to be vulnerable to food insecurity. Among the 1805 households monitored in the latest round, 499 were in South Darfur. Figure 2 confirms the substantial reliance of IDPs on waged labour and to a limited extent on small scale business, without being engaged in agriculture. Differently, crop production remains crucial for resident. Significantly, almost a quarter of IDP households secure their livelihoods with *other*

[3] Young *et al.* (2005) noted how the "*limited mobility resulting from insecurity has seriously limited: • the cultivation of fields; • seasonal livestock migration, which threatens to cause environmental degradation through; • over-grazing of dry-season pastures; • trade and access to markets, for both buyers and sellers; • labour migration and the return of remittances; • travel to rural areas for the collection of firewood, fodder and wild foods.*" As it will be noted afterwards, some of these constraints still bite after few years.

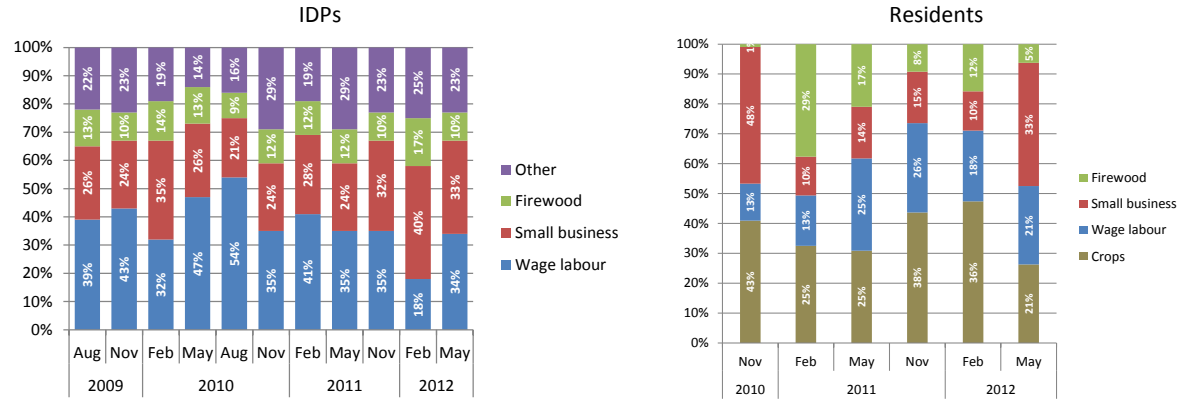
[4] "*Households throughout Darfur were vulnerable to conflict and flooding, though in both cases households in the areas north and west of Nyala were are particular risk*" (WFP, 2007).

[5] http://www.wfp.org/content/sudan-food-security-monitoring-system-2012.

activities, which is a residual category not even mentioned for residents. Even though not statistically representative at a broader state level, those findings largely are in line with the insights reported in the previous section on the labour market.

Despite an overall improvement, as the number of food secure households within the IDP focus groups has increased from 22 to 53 percent in the period (May 2010 - May 2012), yet a substantial number of households are still considered food insecure (10 percent)[6], having poor (4 percent) or borderline (13 percent) food consumption. Even though in the same time span the percentage of those IDPs claiming to have not faced food shortages jumped from 36 percent to 58 percent, regrettably there is still room for malnourishment among their children, with 12 percent of them having less than 125 mm of mid-upper arm circumference. As most of the expenditures are bounded to food, 53 percent of the residents in the camps may have access issues as their purchasing power is not enough to afford the minimum healthy food basket.

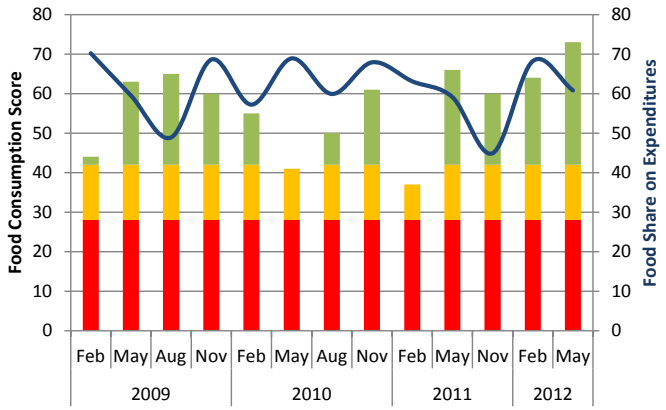
Figure 2 - Main Income Sources for IDPs



SOURCE: WFP, FSMS.

To narrow the focus closer to Nyala, households in Otash camp spend on average some 60/70 percent of their total expenditures on food (Figure 3), thus being highly vulnerable to prices changes, as overall inflation erodes their purchasing power[7].

Figure 3 - Food Consumption Score and Food Expenditures Share in Otash Camp



SOURCE: WFP, FSMS. Stacks reflect the Food Consumption Score, while the continuous line shows food share expenditures.

[6] Based on the Food Security Indicator that combines values for food consumption, relative expenditure on food and absolute expenditure compared to the cost of the Minimum Healthy Food Basket

[7] See also Figure 11 showing increasing price trends for different commodities in Nyala town.

Since the beginning of the food security monitoring in Otash, the aggregate Food Consumption Score - based on a seven-day recall period on the variety and frequency of foods consumed - has been steadily over the 42 score defined as the threshold between borderline and acceptable consumption, with the only exceptions recorded in May 2010 and May 2011.

3. FOOD AVAILABILITY

Agriculture plays a significant role in the economy of Sudan, contributing for almost a quarter in the Gross Domestic Product (GDP). Following the secession of South Sudan and the oil-sharing arrangement which determined a down-size of the oil industry, its role is expected to be even higher; besides, in rural areas agriculture provides employment for about 70-80 percent of the labour force (Omer, 2011; Robinson, 2012). Principal cash crops are cotton, sesame and groundnuts, while the most important food crops are, *inter alia*, sorghum, millet, wheat, and beans.

As domestic production fails to meet the demand, Sudan cereal deficit has to be compensated with imports. Figure 4 shows that opening stocks and production used to meet domestic needs from 2005/06 to 2010/11, with the significant exception of 2009/10, while in the last two years in the graph, imports were pivotal to compensate production shortfalls. In particular, 2011/12 was remarkably a poor year for cereal production. Noteworthy, in the past four years, production has been quite erratic, with bad harvests being compensated by relatively better off ones every other year. As a consequence, the stock-to-use ratio[8] has been declining hitherto, with yearly cutbacks by 45 percent and 23 percent in 2011/12 and 2012/13, respectively (Figure 5). Available figures for the marketing year 2011/12 estimated a cereal deficit of 2.86 million tonnes, of which 960 thousand tonnes were for sorghum and 250 thousand tonnes for millet, which turned into a drawdown of the Strategic Reserve for sorghum and wheat (Robinson, 2012).

Figure 4 - Cereal Supply and Domestic Utilization

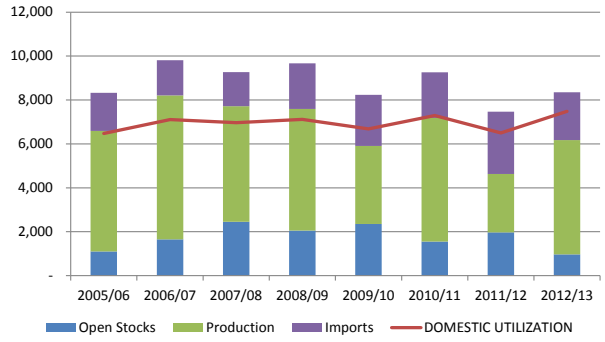
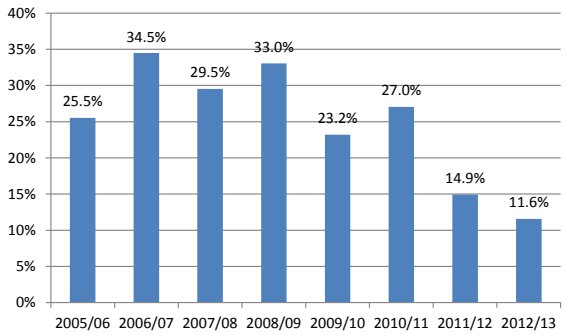


Figure 5 - Cereals stock-to-use ratio

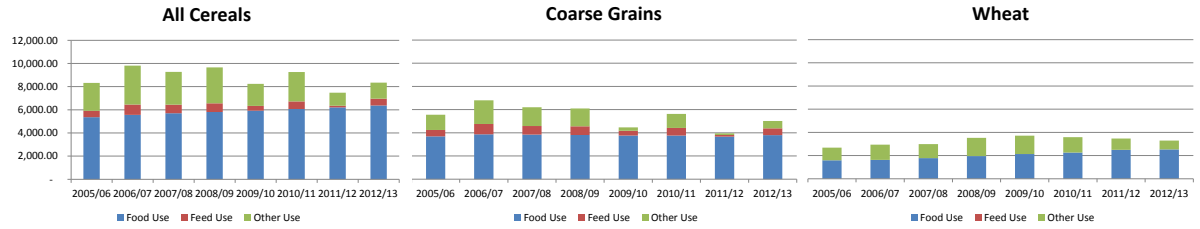


SOURCE: FAO, Cereal Balance Sheet.

How does food availability, and its shortfalls, translate into food use? By and large, food shortages are majorly absorbed by a reduction either in feed use or other uses, while food tends to be relatively buffered against those changes, showing an average 2.5 percent yearly increase. This has been mostly true in particular for grain sorghum, of which food consumption changed by only 3 percent in 2012/13 as compared to eight years before. Differently, wheat for human feeding is steadily becoming more popular, with a 59 percent increase in the same period (Figure 6).

[8] The stock-to-use is the ratio between closing stocks and domestic use.

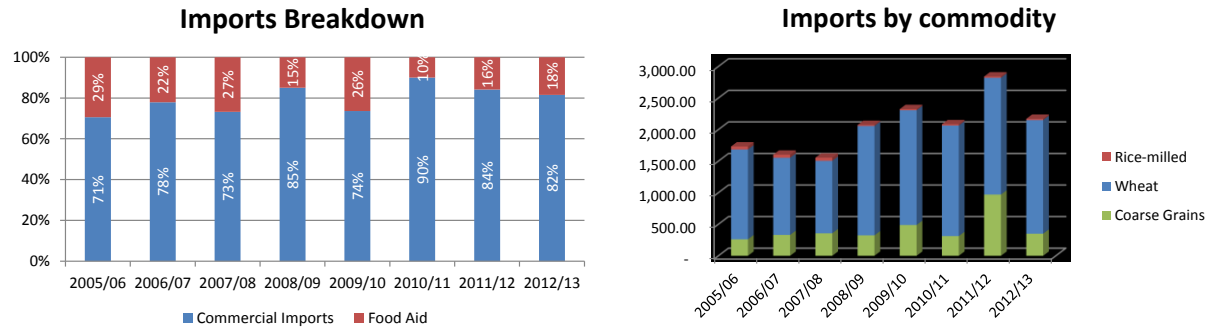
Figure 6 - Food Use by Commodity



SOURCE: FAO, Cereal Balance Sheet.

A significant share of domestic demand is fulfilled by food aid, which accounts on average for 20 percent of total imports (Figure 7), and is generally channelled through sorghum deliveries, while wheat is the commodity majorly imported, with fairly stable quantities in the past five years. As the reserve available deteriorated in 2011/12, sorghum commercial imports more than tripled in that year (while food aid roughly doubled), thus introducing - as well with rain vagaries and unpredictable production outcomes - "*another important explanatory variable […] represented by the international market price, despite the Sudanese feature of small open-economy*" (Sassi, 2012).

Figure 7 - Cereal Imports

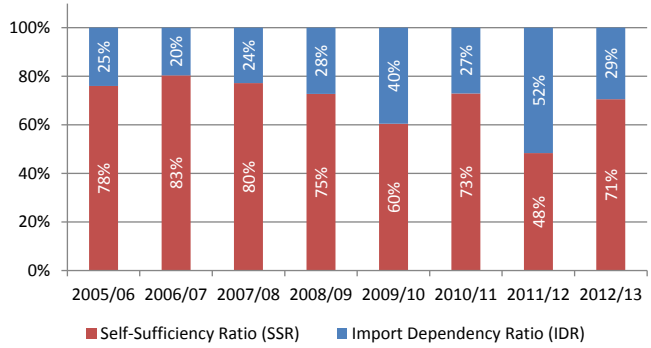


SOURCE: FAO, Cereal Balance Sheet.

As Figure 8 shows, the Self-Sufficiency Ratio (SSR) and Import Dependency Ratio (IDR)[9] ideally span between the range of 70/80 percent for the former and 20/30 percent for the latter, while proportions beyond those figures indicate abnormal years, *i.e.* 2009/10 and 2011/12, as compared to the baseline. It is not clear whether those years need to be considered either as outliers to the general rule or, more probably, as resulting "*aspects of 'hit-and-run' agricultural development, reinforcing widespread deforestation, soil-mining and environmental degradation*" (Robinson, 2012).

[9] Self-Sufficiency Ratio and Import Dependency Ratio are computed according to the following formulas: *SSR = Production / (Production + Imports – Exports)*, and *IDR = Imports / (Production + Imports – Exports)*. They provide information on how much of the available domestic food supply has been imported and how much comes from the country's own production. However, there is a caveat to be kept in mind: these ratios hold only if imports are mainly used for domestic utilization and are not re-exported (FAO, 2001).

Figure 8 - Self-Sufficiency and Import-Dependency Ratios



SOURCE: FAO, Cereal Balance Sheet. Author's elaboration.

In detail, the agriculture sector is divided into *irrigated* and rainfed, which can further be categorized into rainfed *semi-mechanized* and *traditional* systems. As "*the irrigated sector is made up of small to medium-scale mechanized, commercial farms on gravity-fed schemes*" or "pri*vately-owned pump-schemes"* growing different crops, it is far more intensive than the other, even though it usually fails to achieve the planned figures "*as a result of water shortages/delivery problems and managerial shortcomings*" (Robinson, 2012). While in the rainfed sector farm size spans significantly from very few hectares up to 50 ha, in general it is low-input based, with traditional farmers more incline to pay attention to good farming practices than those engaged in the semi-mechanized system, which in fact has been recording falling production of sorghum due to poor yields and limited crop rotation[10], as compared to traditional farms which is relatively improving its records (Omer, 2011).

Sorghum and millet are the most important crops locally produced (Table 1), with the latter mostly growing on traditional-based schemes in Darfur and having limited interventions from the authorities; on the other hand, sorghum is more country-spread and traded in bigger volumes, playing also a key role in the strategic reserve policy, either by free or subsidized distributions in case of production shortfalls. In terms of volumes traded, millet and wheat are comparable, albeit the latter is mostly imported. Figure 9 provides detailed insights on the production of sorghum and millet by Sudan state, showing how El Gezira irrigation system, located between the White and Blue Nile rivers, is the most relevant project for sorghum production and one of the largest artificially irrigated region in the world (*ibidem*).

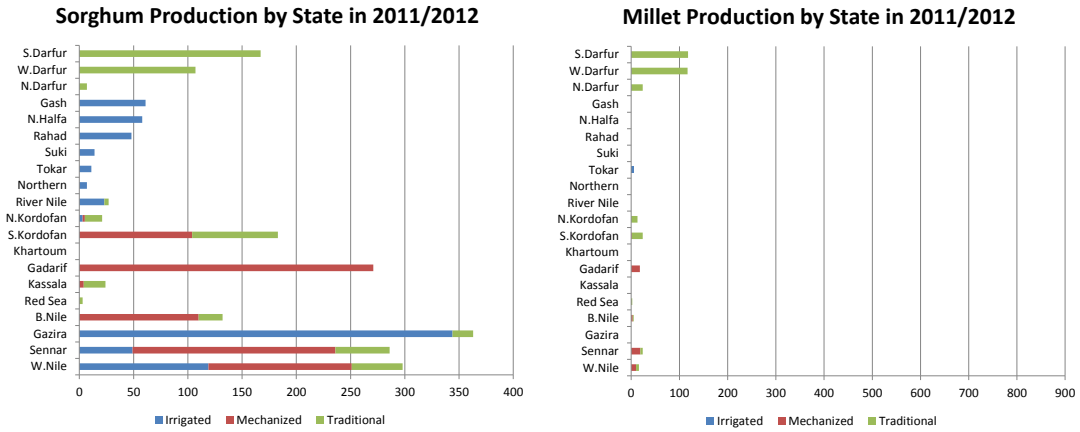
Table 1 - Commodities in Sudan

Commodity	Location	System	Public Intervention	Trade
Sorghum	Country-wide	Mixed	Strategic reserve; free or subsidized distributions	National trade or imported in case of production shortfalls
Millet	Mostly in Darfur	Mostly Traditional	Strategic reserve	Local
Wheat	Northern state, White Nile, Gezira, New Halfa	Irrigated, with the exception of Jebel Marra area in Darfur	Stategic reserve; subsidies and price setting	Mostly imported
Rice	Northern state, White Nile, Gezira	Irrigated		Mostly imported

SOURCE: Robinson, 2011; Robinson, 2012.

[10] As noted by Omer (2011), "*only a few crops had been found suitable for cultivation in the cracking clay area*" besides sorghum, *i.e.* sesame and cotton.

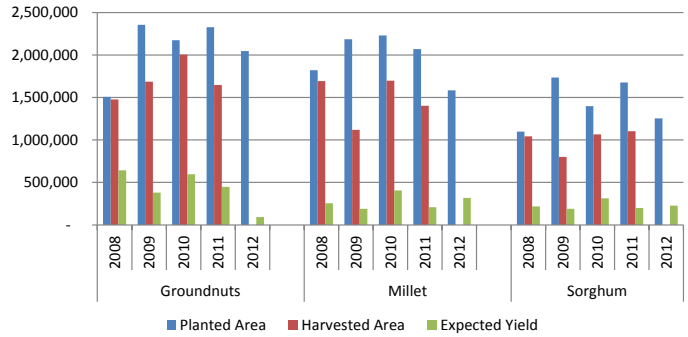
Figure 9 - Sorghum and Millet Production by Sudan state



SOURCE: Robinson, 2012.

South Darfur is the fourth largest producer of sorghum and the first of millet in the whole Sudan. An additional source of income for farmer is provided by groundnuts production. Typically, production comes from small-size farms (2 ha) and, as irrigation depends on rainfalls, it follows a strict traditional system with labour being the most exploited input. Significant losses from planted to harvested areas return unpredictable yields (Figure 10), in turn affecting local produce and market functioning.

Figure 10 - South Darfur crops overview



SOURCE: SMoAF, 2012

4. MARKET PERFORMANCE

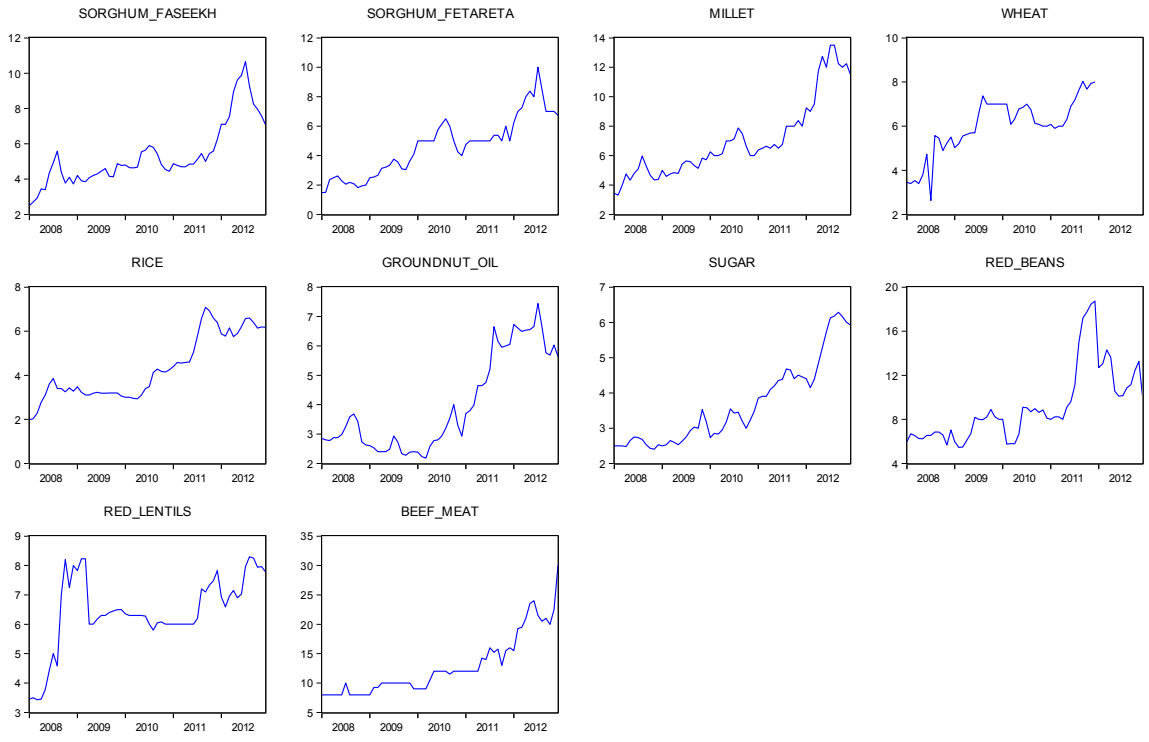
The succeeding price analysis was carried out with the objective of understanding Nyala market functioning. Specifically, it aims at investigating price patterns for sorghum and millet, which are two staple commodities playing a key role in households' food security. Hence, the analysis mostly focuses on price changes over time, assessing the issue of price volatility which is likely to transmit uncertainty when price fluctuations are not predictable. Furthermore, it also explores whether price shocks are transmitted across markets, which can be a proxy in the definition of market integration. The latter infers at the interaction between markets, thus providing hints on proper market functioning and commodity flow within different areas. Finally, an example of transaction costs is provided.

4.1 Price Trends

Despite the good harvest recorded in 2012/13, local cereal prices in Nyala remained high by the end of 2012 when compared with the same time of the previous year. However, most of the locally produced commodities presented a declining pace since the onset of the harvest season (e.g. sorghum *faseekh* and *fetareta*, millet and groundnut oil), partially compensating the price shock occurred with the spikes in early-mid year; since then, almost all prices returned on their previous – *increasing* – trends (Figure 11). The underlying inflation rates are to be ascribed also to high production costs (fuel, labour and seeds), delays in harvest due to labour shortages, and insecurity problems in two surplus regions (Blue Nile and South Kordofan).

As the stock-to-use ratio has been quite pauperized for two consecutive years in a row (Figure 5), the current harvest relented the pressure on cereal stocks and it is likely to relax prices in the next months, unless prospects of another production failure in the forthcoming season (2013/14) will disclose. At the time of writing, the agricultural year 2011/12 might be considered an outlier in the price generation process, and therefore an inaccurate predictor of future prices if considered alone. Still, it is worth incorporating the information accrued during that irregular year in the extrapolations of prices, but still relying on longer time-series to be able to take into account more general trend perspectives.

Figure 11- Food Basket Prices in Nyala 2008-2012



SOURCE: South Darfur SMoF.

Further insights on price trends can be derived from the analysis of price correlations for the period 2008-2012 (Table 2). With no surprise, sorghum (both *fetareta* and *faseekh* qualities) and millet prices are extremely correlated (above 0.9), as they are locally produced and bounded to similar shortfall risks and overall production issues, including insecurity. Beyond price levels (as millet is by

far more expensive), they can be considered substitutes in households' preferences, and shocks are likely to be transmitted from one price to the others.

Differently, wheat is slightly less correlated with locally produced cereals, showing an average 0.75 correlation with them. Even though updated figures on wheat were not available, it is very likely that prices follow similar trends as compared to sorghum and millet, noting that internal demand has been steadily increasing in the past few years. As wheat is mostly imported, international price volatility plays a substantial role in departing wheat from other commodity trends.

Considering the remaining commodities, groundnut prices are highly correlated with cereals (on average 0.8) as the production drivers are similar; the same applies to sugar and meat (both on average 0.88). Pulses show lower extents of correlations and are even not well correlated among themselves (0.41 between lentils and beans).

Table 2 - Price Correlations in Nyala (2008-2012)

	SORGHUM_Fetareta	SORGHUM_Faseekh	MILLET	WHEAT	RICE	SUGAR	RED_LENTILS	RED_BEANS	GROUNDNUT_OIL	BEEF_MEAT	GOAT_SHEEP_MEAT
SORGHUM_Fetareta	1										
SORGHUM_Faseekh	0.90	1									
MILLET	0.92	0.96	1								
WHEAT	0.74	0.73	0.78	1							
RICE	0.76	0.76	0.83	0.59	1						
SUGAR	0.85	0.86	0.94	0.67	0.89	1					
RED_LENTILS	0.45	0.51	0.54	0.58	0.55	0.51	1				
RED_BEANS	0.58	0.52	0.60	0.64	0.85	0.67	0.41	1			
GROUNDNUT_OIL	0.76	0.80	0.84	0.43	0.94	0.87	0.43	0.79	1		
BEEF_MEAT	0.85	0.87	0.93	0.68	0.84	0.93	0.49	0.61	0.84	1	
GOAT_SHEEP_MEAT	0.86	0.84	0.92	0.72	0.89	0.96	0.52	0.71	0.87	0.97	1

SOURCE: South Darfur SMoF. Author's elaborations.

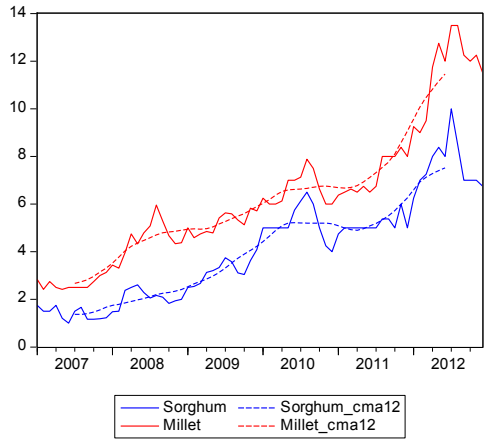
As sorghum and millet are key local commodities[11], the remainder of this section is focused on these two staple foods, with some reference to wheat where possible. Figure 12 reports price trends in Nyala for sorghum (*fetareta*) and millet from January 2007 to December 2012. Both commodities present similar patterns, being sorghum a cheaper substitute in households' diet and consumption preferences. The dash lines represent 12-month centred moving averages to highlight the underlying trends once price fluctuations are smoothed out.

As already noted, the prices of these staple foods in Nyala have been steadily increasing since 2007, showing a slight ease in their growth as a consequence of good produce outcomes in 2010-2011 harvesting season (Figure 12 but also Figure 11, and Figure 4).

In the two-year period between 2011 and 2012, the price pace was steep, particularly as considered millet, thus widening the gap with sorghum prices and forcing households' preferences. Even after a good harvest outlook at the end of 2012, the price dip for millet was less significant as compared to sorghum. Noteworthy, millet prices diverged from sorghum since 2011, becoming more expensive. Considering the relevance of South Darfur as a millet producer, the more price difference against sorghum amplifies, the more likely trade is compensating local production failures channelling sorghum towards South Darfur.

[11] Besides, data limitation prevents to undertake the rest of the analysis to the other commodities.

Figure 12 - Sorghum and Millet Prices in Nyala 2007-2012



SOURCE: WFP, VAM Food and Commodity Prices Data Store.

Under a non-food transfer perspective, the increasing difference between millet and sorghum prices needs to be taken into account in terms of trade-off between cost-related constraints on one side, and food preferences and nutritional outcomes on the other, being millet nutritional facts slightly better, even though the energy contribution is comparable between the two (Table 3)[12].

Table 3 - Nutritional Facts

Food	Energy	Fat	Iodine	Iron	Niacine	Protein	Riboflavine	Thiamine	Vitamin A	Vitamin B12	Vitamin B6	Vitamin B9	Vitamin C	Zinc
MILLET	378	4.22		3.01	4.72	11.02	0.21	0.42	-	-	0.38	-	-	1.68
SORGHUM	339	3.30		4.40	2.93	11.30	0.14	0.24	-	-			-	
WHEAT FLOUR	321	1.90		3.00	5.00	11.90	0.16	0.40	-		0.50	57.00	-	2.90

Source: USDA, available at http://www.wfp.org/fais/nutritional-reporting/food-composition-table

Evidence from consumption patterns over the past years shows that beneficiaries prefer to withdraw some of their millet consumption in favour of wheat, despite its price. Therefore, the highlighted substitution effect applies not only from millet to sorghum but also, to an unknown extent, to wheat[13]. Reportedly, demand patterns between sorghum and wheat are comparable with far less consumption of millet, thus indicating that huge price variations of wheat may dramatically hinder households' purchasing power more than millet does. It is therefore recommended to start collecting again wheat prices on the market once C&V programmes will be introduced.

4.2 Price Volatility

Price volatility is a major source of risk for poor and vulnerable households' purchasing power. The coefficient of variation, computed as the ratio of the standard deviation to the mean, is a useful tool to compare the degree of variation of different price data-series. Being an indicator of price

[12] Data in Table 3 are merely indicative, as the macro and micronutrients contents differ according to the specific variety, origin and utilization of consumed millet and sorghum.

[13] Wheat prices were available only up to 2011, showing a very similar price level as compared to millet; noteworthy, during 2011 wheat was slightly cheaper.

dispersion from their average, it provides useful hints to assess how prices for different commodities change in the market according to time[14] (WFP, 2011).

The coefficient of variation of sorghum prices in Nyala was slightly higher than millet (respectively, 53.7 and 46.4 percent), soundly reflecting the above described trends in terms of overall and steady growth, as well as with the reduced tendency of millet to absorb-back price hikes. Noteworthy, both commodities present high overall price volatility[15].

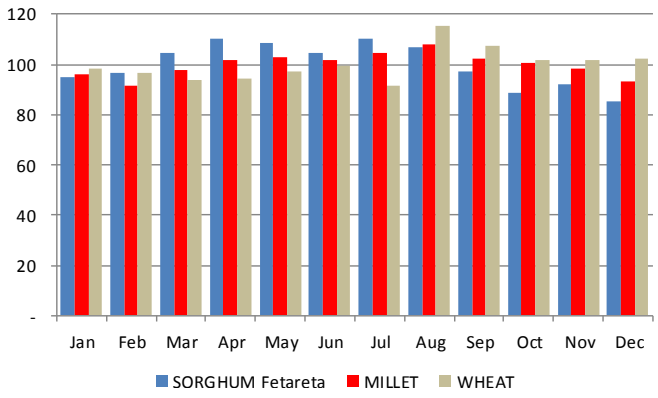
In order to correctly design voucher transfers and avoid misinterpretation of price increases during the implementation phase, another relevant component is the intra-annual volatility, thus incorporating seasonality in the analysis.

The full cycles of seasonal patterns for sorghum and millet in Nyala are reported in Table 4, by means of the Grand Seasonal Index (GSI), *i.e.* the ratio between a price at a given time and its Centred Moving Average (CMA), averaged by each month. This procedure, should remove all random movements of the time-series, thus showing the real seasonal fluctuations of prices (Aminu, 2010).

Sorghum GSI is above the index average value of 100 between March and August[16], while for millet the above average period is slightly shifted ahead, falling between April and October; thus suggesting that price increases are expected to occur starting from the second quarter of every year, when the harvest season is yet to come[17].

Table 4 - Nyala Sorghum and Millet Grand Seasonal Indexes

Month	SORGHUM Fetareta	MILLET	WHEAT
Jan	94.95	96.14	98.22
Feb	96.86	91.82	96.81
Mar	104.38	97.92	93.80
Apr	110.49	101.52	94.28
May	108.41	102.68	97.32
Jun	104.69	101.95	99.61
Jul	110.30	104.72	91.47
Aug	106.70	108.14	115.10
Sep	96.99	102.60	107.28
Oct	88.93	100.78	101.58
Nov	92.15	98.51	101.97
Dec	85.15	93.22	102.56



On the other hand, wheat GSI spikes in August and remains above the average for the rest of the year. This countertendency pattern may have implications in the frame of C&V, if the value of the

[14] And space, see paragraph 4.3 Market Integration.

[15] To provide a reference for understanding volatility width, the coefficients of variation of internationally traded commodities in the same time period (2007-2012), *e.g.* wheat, maize, rice and crude oil, were 23.8%, 27.8%, 25.3% and 26.8%, respectively. Naturally, their volatility is prone to completely different drivers as compared to locally traded sorghum and millet.

[16] This is a key information for cost comparison, as it will be clearer in section 6.

[17] In this poor and dense Savannah agro-ecological zone, the sowing/planting period for sorghum occurs between July and September, while the harvesting period between October and December (FAO, Crop Calendar website).

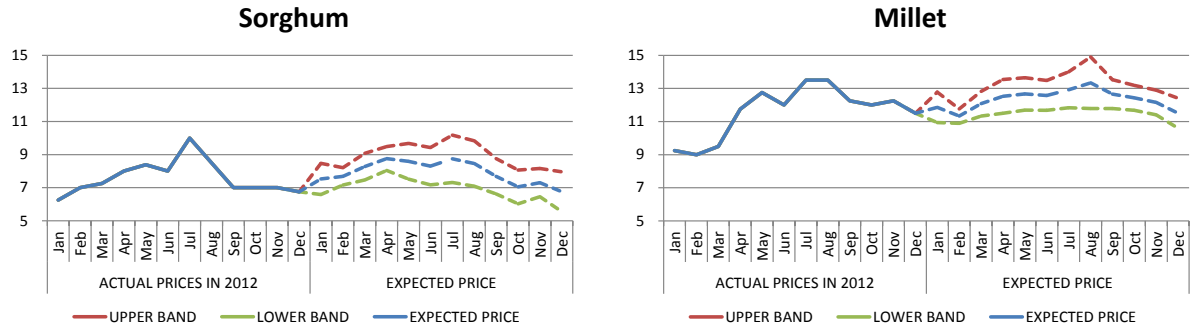
voucher is reduced to follow the seasonal slowdown of sorghum prices, and beneficiaries are willing to retain the same level of wheat purchases.

In fact, sorghum prices relaxes by the end of the planting season, when projections on the goodness of the forthcoming harvest can be made, and remain below average up to February, when stocks are likely to be reduced. Similarly for millet, even though substantial price decreases are to be expected only in December, January and February. Yet again, sorghum prices are more prone to intra-annual variability both in terms of hikes and dips.

The above information is critical in price forecasting, and thereafter for cash and voucher transfer value setting and determination of forward contract prices of local purchases. In fact, the evidence so far described, based on GSI analysis, can be exploited to define upper and lower bands within which prices are supposed to fluctuate. The forecasting exercise in Figure 13 is therefore built on historical prices between 2007 and 2012, taking into account monthly price changes that can be inferred by sorghum and millet time-series. Built on a known price history, by no means can these projections take into account abnormal and/or forthcoming shocks.

These forecasted prices can eventually help in the definition of the transfer value for vouchers, by setting it using the upper bound as a contingency of price hikes on both the budget and the transfer value to beneficiaries.

Figure 13 - Price Forecasts



SOURCE: WFP, VAM Food and Commodity Prices Data Store. Author's elaboration.

In 2013, fine-tuning the value of one malwa[18] of sorghum between 9 and 10 Sudanese Pound (SDG) according to the month, and monitoring the evolution of prices during the implementation phase, is likely to prevent households to have the value of their vouchers spoiled by seasonal price vagaries. Actually, the expected highest price may occur in July (10.18 SDG), thus the voucher value may be set accordingly. In the remainder of the lean season, an average voucher of 9.50 SDG is likely to buffer its nominal value against price volatility. Similarly, during the harvest season, the value can be reduced to 8.20 SDG (or 7.20 SDG, if produce expectations are satisfactory). Considering the high vulnerability to food insecurity of potential beneficiaries, risk aversion should refrain from setting the value of vouchers to the lower band forecasts.

Similarly for millet, the buffer value for one malwa may span between 13 and 15 SDG according to the month. The highest value of a voucher may be at 14.90 SDG in August, fixed as a precautionary

[18] One malwa is equivalent to 3 Kg.

ceiling, while for the remainder of the lean season[19] it may be on average at 13.56 SDG per malwa. In November and December, the nominal voucher may be reduced to 12.65 SDG (or 11.83 SDG if the season is favourable). As millet is less important in food consumption strategies, millet price forecasts may be less informative in a programme design perspective, unless sorghum trade to Nyala collapses and millet becomes the only available cereal, rising therefore broader concerns over food availability. However, considering harvest prospects in 2012/13, this is a reasonably unlikely circumstance.

Worth mentioning, the value of the vouchers should be fine-tuned according to actual prices during the implementation phase with the evidence derived from market monitoring; still the proposed price forecasts indicate most probable times when revision needs to be considered[20].

4.3 Market Integration

Nyala is the major city in Darfur, therefore being a strategic market for traders operating in Sudan. Similar prices between Nyala and other foremost markets provide hints of existing trade flows, which is a condition for market integration, other than price correlation.

The extent and timeliness to which price signals are transmitted between markets depends on the degree of market integration, which incurs when price differences between two markets is less compared to the transaction costs sustained by traders to actually move commodities. Indeed, as traders pursue price differences among space and across time to make profits by moving goods taking advantage of price margins, those price unbalances are in theory bound to dwindle in the long run. With less stringent assumption than price convergence, when markets are integrated arbitrage is less likely and price differences are expected to minimize because adjustments would take place promptly across markets.

In terms of large-scale interventions based on non-food transfers, one of the concerns to be thoroughly assessed beforehand, is the assumption of appropriate spatial integration between markets to avoid that increased liquidity available may end up triggering inflation. Basically, market integration turns into the *conditio sine qua non* to appraise the feasibility of interventions as such.

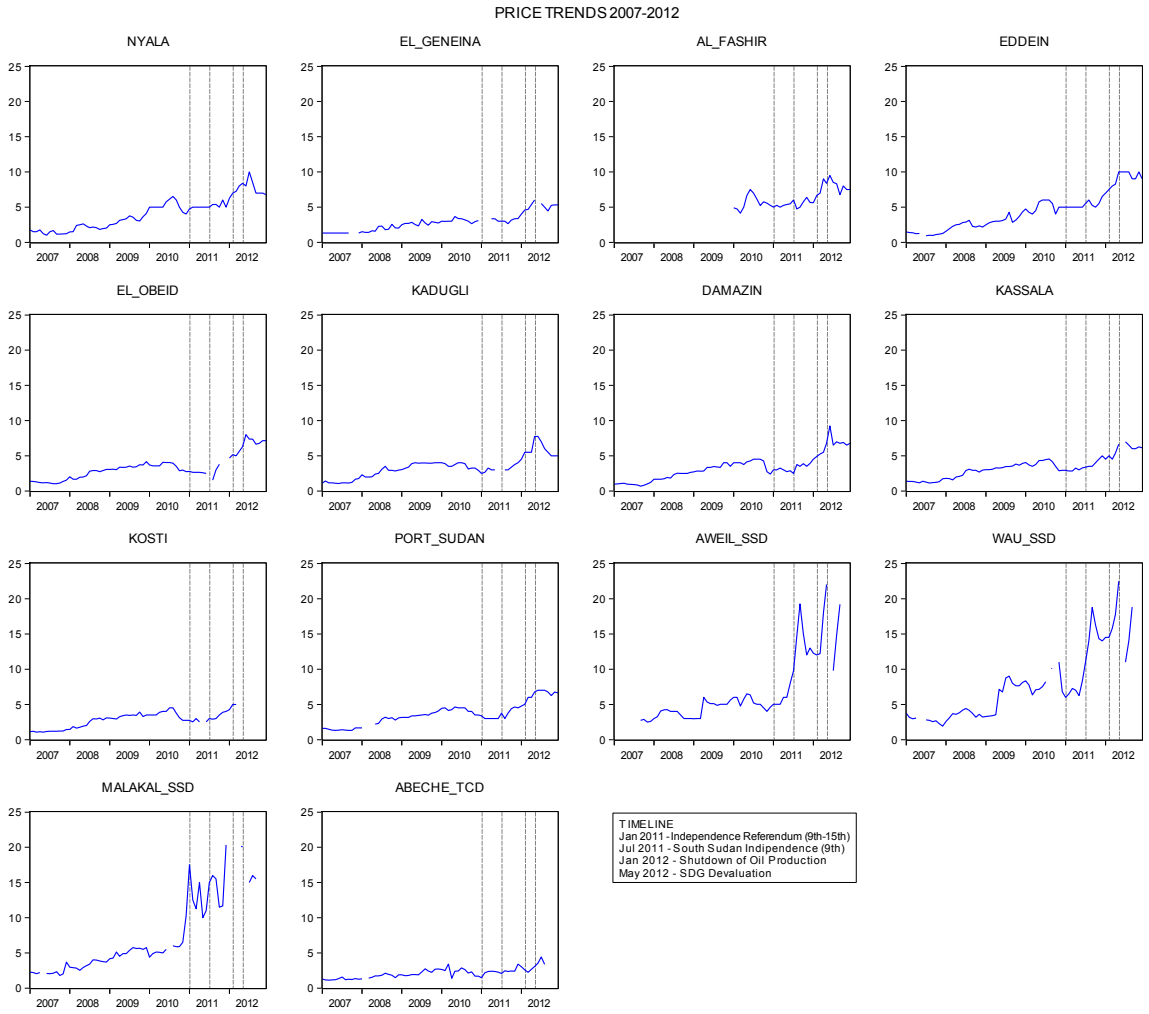
Yet, no information on commodity flows was disclosed in the assessment due to security reasons, therefore in the remaining of this section, price correlations will be used as a proxy of market integration. Besides, also price causality tests will provide further hints on market integration.

Figure 14 reports sorghum price patterns for a number of markets in Darfur and the rest of Sudan, as well with other markets close to the border in South Darfur and Chad, which are likely to be in the catchment area of Nyala market[21]. Similarly, Figure 16 depicts millet price patterns but limiting to Sudanese markets.

[19] From March to October, excluding August.
[20] For broader information on the value of vouchers, please refer to section 6.
[21] A total of 13 markets excluding Nyala where analysed: El Geneina, Al Fashir, and Eddein in the Greater Darfur; El Obeid, Kadugli, Damazin, Kassala, Kosti and Port Sudan, in the rest of the country; Aweil, Wau, and Malakal in South Sudan; Abeche in Chad.

Sorghum prices in Nyala can be described as a random walk with a drift. Most of the other markets present similar trends, showing a bimodal pattern with a hike in 2010 and a peak by mid-2012. During the last quarter of 2012, prices slightly declined almost everywhere. Figure 14 provides also a timeline of four major events that likely influenced sorghum price changes, namely the Independence Referendum held in mid-January 2011, South Sudan secession as of 9th of July 2011, the shutdown of oil production in South Sudan in late January 2012, and the announcement of currency devaluation in May 2012. The former three had effects in particular in South Sudan markets, whereas it is quite clear that the country schism provided quite a momentum to price instability especially in Nyala, other than in greater Darfur and other bordering markets. Reportedly, informal trade of sorghum to South Sudan through East Darfur has been on the rise since 2011, albeit no ascertained evidence and studies assessing its magnitude are available so far.

Figure 14 - Sorghum Prices in Sudan and Close to the Border Markets in South Sudan and Chad

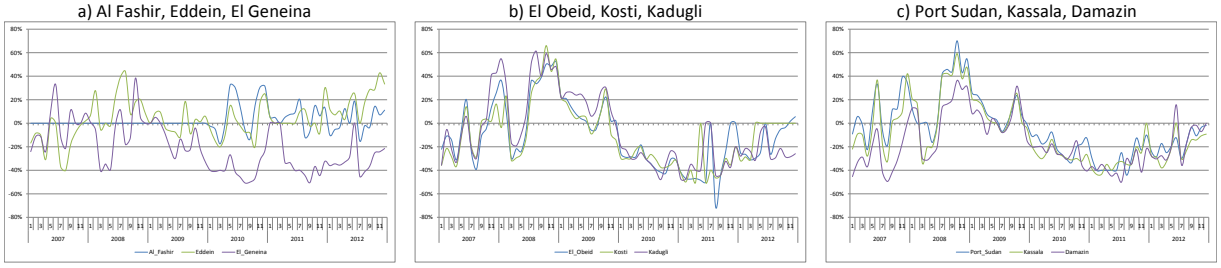


SOURCE: WFP, VAM Food and Commodity Prices Data Store.

Yet, sorghum prices in Nyala appear steadily above most markets in Sudan, with the exception of El Geneina (West Darfur) and Eddein (East Darfur), that used to be an important source of supply for Nyala market (Buchanan-Smith and Fadul, 2008). Figure 15 reports price differences, setting Nyala as the baseline, and grouping markets by remoteness from South Darfur main town.

Since 2010, sorghum has been constantly more expensive in Nyala than in El Obeid, Kosti, Kadugli, Damazin, Kassala and Port Sudan, with very few short-lived exceptions, thus making sorghum trade to central Sudan not much profitable[22]. Noteworthy, patterns described in panes *b)* and *c)* show quite similar trends between panes and within markets. When the pattern alters the underlying trade flows between that specific market and Nyala may have been affected. Furthermore, recurrent hikes and dips may also suggest a certain extent of integration with Nyala and between the other markets. Significantly, prices in late 2012 seem to converge in Nyala, El Obeyd, Damazin, Kassala and Port Sudan. In opposition, pane *a)* returns a different picture if other sorghum markets in Darfur are compared to Nyala. There is no price convergence, and the patterns differ erratically, advising that the trading routes are somehow bound to exogenous and diversified factors. Anyway, since July 2007, those external factors appear to be persistent but constant, hereby affecting Nyala and the remaining Darfur markets price differentials in a stable but significant fashion. As El Geneina has stronger trans-border connections with neighbouring Chad, sorghum is by far cheaper than in Nyala. The opposite applies to Al Fashir and Eddein, where prices in the last quarter of 2012 have been respectively 11 and 35 percent above Nyala. On a longer-term perspective, sorghum prices in those two Darfurian cities have been cyclically above and below Nyala, even though it has to be noted that when prices get more expensive in Nyala, these differences are less pronounced than the other way round, thereof suggesting that market-based programmes implemented elsewhere in Darfur might be not fully comparable with Nyala.

Figure 15 - Sorghum Price Differences compared to Nyala (in %)



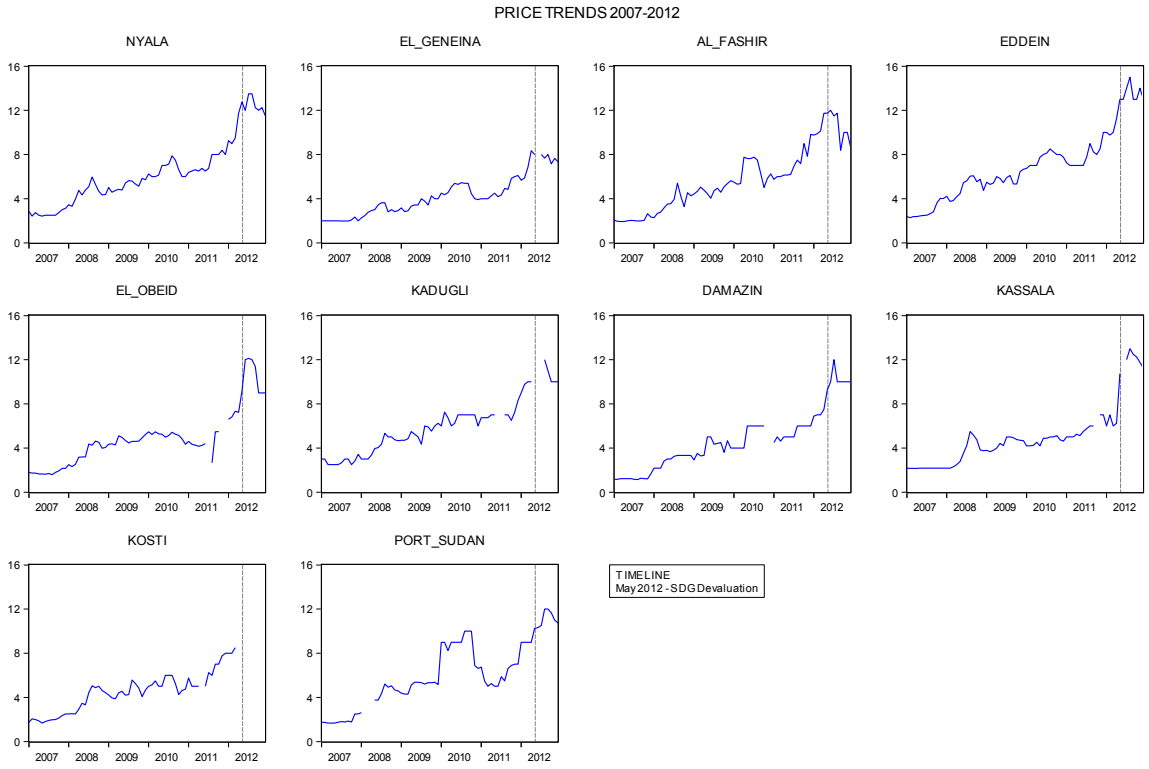
SOURCE: WFP, VAM Food and Commodity Prices Data Store. Author's elaboration.

In case of a good harvest season (*e.g.* 2012), sorghum prices in Nyala tend to converge to other relevant markets outside Darfur, suggesting good market integration when supply is fair. Still, historical data show that Nyala is persistently more expensive compared to the others, implicitly referring to transaction costs and overheads to be tackled by traders. Expressly, either during the lean season or when supply is not adequate, these factors may hinder market functioning in town. Differently, Nyala and the remaining markets in Darfur show a lesser degree of integration, even if such level tends to improve with adequate produce.

With regards to millet, on average Nyala prices are again more expensive but in Eddein and Kadugli (Figure 16). Trends have a propensity to diverge, in particular in El Geneina and Port Sudan. Still, in most markets the steady increasing pace is clear, with a peak in mid-2012 up to the currency devaluation and the following positive harvest outlooks.

[22] See also Dorosh and Subran (2009), on the profitability of commercial sorghum imports and exports between 2000-2007.

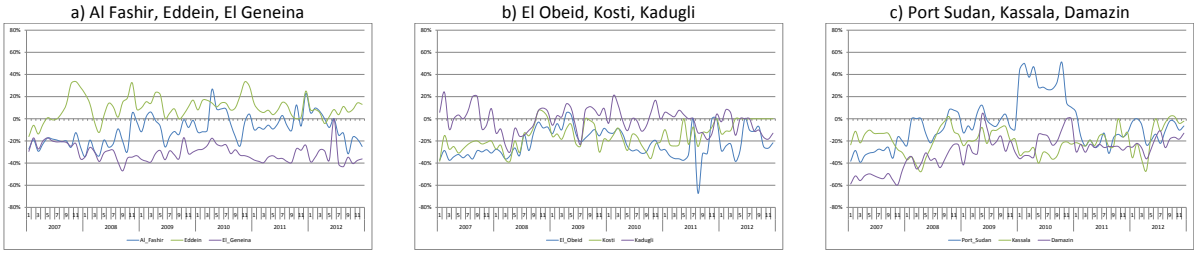
Figure 16 - Millet Prices in Sudan



SOURCE: WFP, VAM Food and Commodity Prices Data Store.

Reading each pane in Figure 17 at year 2007, it is worth noting how millet price differentials from Nyala where smaller in Darfur markets rather than in the rest of the country. Progressively, this picture turned into its opposite in 2012, when a kind of price convergence with farthermost markets can be envisaged, whilst markets in Darfur appear to have lost degrees of integration.

Figure 17 - Millet Price Differences compared to Nyala (in %)



SOURCE: WFP, VAM Food and Commodity Prices Data Store. Author's elaboration.

Since South Darfur is the major millet producer in Sudan (Figure 9), the price analysis suggests that the millet market is integrated to a lesser extent than for sorghum.

Yet, the operational capacity of both commodity markets in Nyala is somehow biased by contingency factors, including transaction costs; in addition, overall supply appears to be over-linked to actual local production. Put it in another way, market functioning in Nyala is not fully effective to absorb local supply unbalances, thence traders may not be able to fully compensate produce shortfall with production coming from other Sudanese states.

Still, price correlations between Nyala and the other markets are high enough, thus suggesting that price signals are fairly transmitted across the country. This result does not necessarily conflict with the above findings, in view of the attitude of most markets to lean towards the same price, when supply is fairly enough to boost trade, by reducing the commodity price to balance some additional costs faced by traders to operate in Nyala.

Table 5 - Sorghum and Millet Price Correlations

SORGHUM	Nyala	El_Geneina	Al_Fashir	Eddein	El_Obeid	Kadugli	Damazin	Kassala	Kosti	Port_Sudan	Aweil_SSD	Malakal_SSD	Wau_SSD	Abeche_TCD
Nyala	1													
El_Geneina	0.93	1												
Al_Fashir	0.85	0.87	1											
Eddein	0.96	0.96	0.87	1										
El_Obeid	0.86	0.93	0.86	0.91	1									
Kadugli	0.86	0.92	0.85	0.88	0.94	1								
Damazin	0.90	0.94	0.82	0.93	0.96	0.94	1							
Kassala	0.91	0.95	0.84	0.94	0.97	0.95	0.98	1						
Kosti	0.82	0.90	0.62	0.82	0.97	0.96	0.96	0.97	1					
Port_Sudan	0.91	0.95	0.84	0.94	0.97	0.94	0.97	0.98	0.97	1				
Aweil_SSD	0.73	0.74	0.49	0.79	0.65	0.67	0.70	0.72	0.46	0.71	1			
Malakal_SSD	0.77	0.77	0.33	0.82	0.59	0.61	0.65	0.68	0.42	0.64	0.79	1		
Wau_SSD	0.84	0.81	0.50	0.86	0.73	0.75	0.80	0.80	0.68	0.80	0.94	0.80	1	
Abeche_TCD	0.83	0.80	0.52	0.82	0.85	0.83	0.85	0.88	0.79	0.85	0.55	0.61	0.66	1

MILLET	Nyala	El_Geneina	Al_Fashir	Eddein	El_Obeid	Kadugli	Damazin	Kassala	Kosti	Port_Sudan
Nyala	1									
El_Geneina	0.98	1								
Al_Fashir	0.95	0.96	1							
Eddein	0.99	0.96	0.95	1						
El_Obeid	0.94	0.92	0.89	0.94	1					
Kadugli	0.96	0.95	0.94	0.97	0.93	1				
Damazin	0.98	0.95	0.92	0.98	0.94	0.95	1			
Kassala	0.94	0.89	0.85	0.94	0.94	0.89	0.94	1		
Kosti	0.95	0.92	0.94	0.94	0.91	0.94	0.92	0.94	1	
Port_Sudan	0.89	0.91	0.87	0.91	0.88	0.91	0.90	0.81	0.80	1

SOURCE: WFP, VAM Food and Commodity Prices Data Store. Author's elaboration.

Finally, in order to better understand whether the information included in the observed prices in one location contributes to the prediction of future prices in another market, Granger causality tests (Granger, 1969) were applied for sorghum, when price data were not collinear. Thus, Table 6 unveils additional evidence on sorghum market functioning, specifically focusing on the detection of key markets where price changes may affect prices in Nyala. Results are presented with a 10 percent (or less) significance level, where the null hypothesis refers to prices in the location *i* that does not Granger-cause prices in Nyala and vice versa. The rationale behind it is detecting key markets for Nyala, including the direction of the causality.

Table 6 - Sorghum Granger Causality

Market A does not G-cause	Market B	Chi-sq	Prob	
Abeche (Chad)	Nyala	6.641901	0.2487	
Al Fashir	Nyala	29.275644	0.0000	***
Aweil (S.Sudan)	Nyala	3.501347	0.4777	
Damazine	Nyala	32.383969	0.0000	***
Eddein	Nyala	23.117125	0.0003	***
El Obeid	Nyala	41.723763	0.0000	***
Elgenina	Nyala	20.853143	0.0001	***
Kadugli	Nyala	34.662256	0.0000	***
Kajok (S.Sudan)	Nyala			
Kassal	Nyala	11.834542	0.0371	**
Kosti	Nyala	8.879358	0.0118	**
Malakal (S. Sudan)	Nyala	2.769079	0.7355	
Port Sudan	Nyala	23.720723	0.0002	***
Wau (S.Sudan)	Nyala	12.572306	0.0136	**

Market B does not G-cause	Market A	Chi-sq	Prob	
Nyala	Abeche (Chad)	7.483793	0.1871	
Nyala	Al Fashir	19.060341	0.0019	***
Nyala	Aweil (S.Sudan)	6.605901	0.1582	
Nyala	Damazine	18.969262	0.0019	***
Nyala	Eddein	7.001667	0.2205	
Nyala	El Obeid	2.971826	0.7043	
Nyala	Elgenina	1.692926	0.6385	
Nyala	Kadugli	3.728165	0.4440	
Nyala	Kajok (S.Sudan)			
Nyala	Kassal	18.842556	0.0021	***
Nyala	Kosti	0.886328	0.6420	
Nyala	Malakal (S. Sudan)	5.112905	0.4023	
Nyala	Port Sudan	6.500882	0.2605	
Nyala	Wau (S.Sudan)	4.568164	0.3345	

SOURCE: WFP, VAM Food and Commodity Prices Data Store. Author's elaboration.
Column Prob reports level of significance at 10% (*), 5% (**), and 1% (***).

As noted, Nyala has a growing population. Moreover, all sorghum production in South Darfur is traditional and therefore extremely variable; with neither irrigation nor mechanized agriculture systems available.

No surprises therefore if most of the causalities go in direction to Nyala rather than the opposite way round, denoting that changes in other markets strongly affect sorghum price in Nyala. This may be explained by higher produce availability granted by more modern system of production, in particular in Kosti (in White Nile state, close to Sennar).

Apparently, a two-way causality is established only between Nyala-Al Fashir, mostly explained by the closeness of the two cities, Nyala-Damazin and Nyala-Kassala, probably as a result of higher demand on one side, and more stable production granted by mechanized systems on the other.

Yet, a comprehensive supply-chain mapping of sorghum would further disclose actual trade flows and confirm/reject the above findings.

4.4 Transport Costs

From the previous paragraph, it is clear that commodities in Nyala tend to be relative more expensive than in other markets. Besides the undue dependency on local production, which is a spy-light that markets may not operate properly under tighter local supply conditions, transaction costs and overheads were blamed to be hindering market operational capacity in town, and to a bigger extent in Darfur.

Table 7 tackles transportation costs from Nyala in three directions, *i.e.* El Geneina (306 Km north-west), Rahad Albirdi (137 Km south-west), and Eddein (150 Km south-east), with a breakdown for trucks renting, taxation and fees, and all the remaining costs related to insecurity issues.

Table 7 - Transportation costs from Nyala breakdown in October 2012

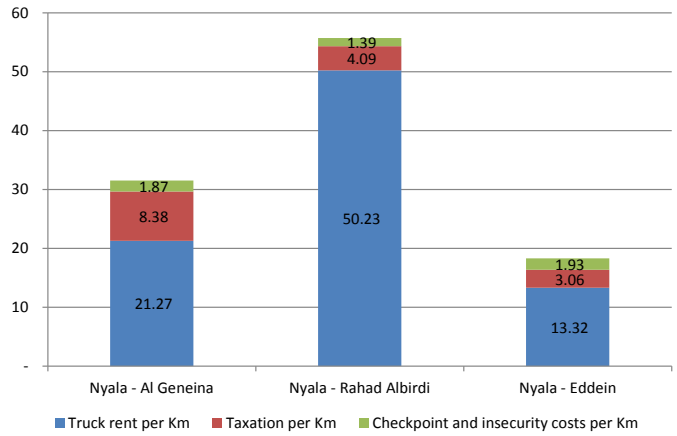
Nyala - Bolbul - Kass - Nama - Tour - Nertity - Zalinge - Khor Ramla - Morny - Al Geneina			Nyala - Bulbul - Umzeifa - Umjanah - Eddalfursan - Rahad Albirdi			Nyala - Beleil - Tor Taan - Shorum - Malia - Silia - Kassib - Umwaragat - Eddein		
Average rent of truck (25 mt)	6500	SDG	Average rent of truck (25 mt)	6875	SDG	Average rent of truck (25 mt)	2000	SDG
Government levies and taxations	2500	SDG	Government levies and taxations	500	SDG	Government levies and taxations	400	SDG
Traffic police fees - Nyala	60	SDG	Traffic police fees - Nyala	60	SDG	Traffic police fees - Nyala	60	SDG
Government escort fees	200	SDG	Escort fees	0	SDG	Escort fees (military & police)	150	SDG
Nyala town checkpoint	100	SDG	Nyala town checkpoint	50	SDG	Nyala town ckeckpoint	50	SDG
Bolbul checkpoint (Military)	20	SDG				Beleil ckeckpoint (military)	20	SDG
Two small checkpoints (Military)	20	SDG				Tor Taan ckeckpoint	20	SDG
Kass checkpoint (Military)	30	SDG				Shorum ckeckpoint	10	SDG
Khor Ramla check point	20	SDG	Bulbul checkpoint	20	SDG	Malia ckeckpoint	10	SDG
Small ckeck points (Janjaweed)	50	SDG	Umzeifa checkpoint	20	SDG	Silia ckeckpoint	10	SDG
Morny check point	50	SDG	Umjanah checkpoint	25	SDG	Kassib ckeckpoint	10	SDG
Small check point (Janjaweed)	30	SDG	Eddalfursan checkpoint	40	SDG	Umwaragat ckeckpoint	10	SDG
Al Geneina checkpoint (Military)	50	SDG	Rahad Albirdi checkpoint	35	SDG	Ed Deain checkpoint	0	SDG
TOTAL	9630	SDG	TOTAL	7625	SDG	TOTAL	2750	SDG
Truck rent	6500	*67%*	Truck rent	6875	*90%*	Truck rent	2000	*73%*
Taxation	2560	*27%*	Taxation	560	*7%*	Taxation	460	*17%*
Checkpoint and insecurity costs	570	*6%*	Checkpoint and insecurity costs	190	*2%*	Checkpoint and insecurity costs	290	*11%*
Distance	305.58	Km	Distance	136.86	Km	Distance	150.20	Km
Total Cost *per Km*	31.51	SDG	Total Cost *per Km*	55.71	SDG	Total Cost *per Km*	18.31	SDG
Truck rent *per Km*	21.27	SDG	Truck rent *per Km*	50.23	SDG	Truck rent *per Km*	13.32	SDG
Taxation *per Km*	8.38	SDG	Taxation *per Km*	4.09	SDG	Taxation *per Km*	3.06	SDG
Checkpoint and insecurity costs *per Km*	1.87	SDG	Checkpoint and insecurity costs *per Km*	1.39	SDG	Checkpoint and insecurity costs *per Km*	1.93	SDG

SOURCE: WFP.

According to the specific market destination, trade is majorly affected by distance or insecurity, without a clear rule of thumb. Cost per kilometre (Figure 18) in fact differs a lot, being cheaper on the way to Eddein, which is the most likely trading route; while being more expensive to Rahad

Albirdi, mostly fuelled by renting costs, notwithstanding the proximity to Nyala as compared to the other towns. Insecurity weights 11 percent on total costs to Eddein, while it is only 2 percent to Rahad Albirdi and 6 percent to El Geneina.

Figure 18 - Transportation costs from Nyala per Km



SOURCE: WFP.

Trading from and to Nyala is likely susceptible to heterogeneous and exogenous factors, *per se* not controlled by traders. The operational capacity of Nyala market may therefore be adversely affected any time one of the above operational constraints bites differently.

5. MARKET STRUCTURE AND CONDUCT

5.1 Traders Survey Design

Nyala market has become among the most important in Sudan, having 7 major markets in town (Table 8). Residual petty-trade activity takes place in the IDP camps nearby the city, and in semi-urban markets.

The survey design was planned to cover all the markets in Nyala, including those in some IDP cams nearby.

Table 8 - Nyala relevant markets

NYALA	IDP Camps	Semi-Urban
Central	Derige (small retailers)	Buran
Al Geniena	Kalma (small retailers)	Kass
Al Jabal	Otash (small retailers)	Edd El Fursan
Al Malija		Gereida
Al Moashy		
Al Neil		
Al Shabi		

Markets in Darfur have always been quite specialized with most traders dealing in just one major commodity (Buchanan-Smith and Fadul, 2008). Hence, the trader categorization proposed is based on accrued evidence of markets in Sudan:

- ✓ Big-size wholesalers: *Specialized in one/two commodities; using wholesale units (i.e. sacks and jerry cans); selling the whole unit and not part of it;*
- ✓ Medium-size wholesalers: *Specialized in many commodities; using wholesale units (i.e. sacks and jerry cans); trading the whole unit and not part of it;*
- ✓ Wholesaler-retailers: *Selling both to traders and ultimate customers; specialized in many commodities; using both wholesale and retail units (i.e. malwa); selling in small quantities;*
- ✓ Retailers: *specialized in many commodities; using retail units (i.e. malwa); selling in small quantities.*

Considering that the objective of the market assessment is to evaluate the feasibility of a gradual introduction of market-based interventions in IDP camps, eventually replacing part of the food assistance provided so far, it was agreed to limit the assessment to those actors trading the commodities already in the in-kind food basket delivered by WFP, *i.e.* cereals (sorghum and millet), oil, sugar, pulses (lentils and beans), and salt.

According to the above definitions, a rapid assessment as of October 2012 in Nyala markets returned an estimate of the number of big-size wholesalers operating in town. Reportedly, at least 45 traders falling in that category operate in Nyala (*i.e.*, 10 for cereals, 15 for oil, 10 for sugar, 5 for pulses, and 5 for salt). Provided they likely represent the bulk of trading flows in town, it was decided to interview all of them to have the best picture of market functioning, plus 25 traders falling in the remaining categories. The sample design, including also a general questionnaire per market, was therefore:

TRADERS QUESTIONNAIRES	
Big-size wholesalers	45
Medium-size wholesalers	25
Wholesalers-retailers	25
Retailers	25
TOTAL	120
MARKET QUESTIONNAIRES	7
GRAND TOTAL	127

Additionally, it was proposed to expand the sample to take into account IDP camps, and 2 out of 4 semi-urban markets, according to security constraints and resource availability. As a rule of thumb, 3 small retailers per IDP camp were to be selected, plus 3 retailers and 5 wholesalers in semi-urban markets (only those trading cereals and oil):

TRADER QUESTIONNAIRES		
IDP camp markets	9	
Semi-urban markets	16	
TOTAL	25	
MARKET QUESTIONNAIRES	2	*only in semi-urban markets*
GRAND TOTAL	27	

5.2 General Characteristics of Traders

The actual figures of traders interviewed after the data collection are reported in Table 9. The overall numbers of fulfilled questionnaires is 143, and among those 44 were big-size wholesalers. From hereinafter, given the estimate of big-size wholesalers operating in the market from the rapid assessment findings, it is possible to assume the representativeness of this sub-category population in the sample.

Differently, the purposive approach exploited for the remainder of the categories returns a global picture of actors operating in the market, without being statistically representative of those groups.

Table 9 - Traders by type and market

	Nyala						IDPs Camp		Semi-Urban	
Trader type	Central mkt	Abuoja mkt	Aljabal mkt	Alshabi mkt	Malja mkt	Sakaly mkt	Dereige camp	Otash camp	Geriada mkt	Total
Big wholesaler	43	0	0	1	0	0	0	0	0	***44***
Medium wholesaler	23	0	0	0	0	0	0	0	0	***23***
Wholesaler/Retailer	28	3	0	0	1	0	0	0	5	***37***
Retailer	1	3	8	6	9	3	3	3	3	***39***
Total	**95**	**6**	**8**	**7**	**10**	**3**	**3**	**3**	**8**	**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

The central market of Nyala outweighs the smaller ones, provided that almost all big-size wholesalers set their trading activity over there. Other markets play a role for the retailing sector, providing a widespread network of sale points in town. Among those, a total of six in Dereige and Otash camps were included, other than those in Geriada semi-urban market.

The size of traders operating in the camps appears negligible as compared to the ones operating in town; as they are mostly involved in petty-trading, it may be advisable involving also traders with a higher delivery capacity. Granted not only retailers but also other trader categories may be involved in the programme, the concentration of those actors in Nyala central market may be a minor issue in the implementation phase of a voucher programme, in terms of coverage and closeness to beneficiaries.

The enumerators asked traders to prioritize commodities according to the relative importance in their business. Table 10 provides balanced commodity coverage, with a surplus of sugar retailers. Within cereals, sorghum is significantly more important than millet.

Table 10 - Most important commodity by trader type

Trader type	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Not applicable	No answer	Total
Big wholesaler	8	2	12	13	5	2	1	1			44
Medium wholesaler	0	1	9	4	1	5	1	2			23
Wholesaler/Retailer	9	2	6	13	3	4	0	0			37
Retailer	6	1	26	6	0	0	0	0			39
Total	**23**	**6**	**53**	**36**	**9**	**11**	**2**	**3**			**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

The majority of traders interviewed in the sample were men, and within the 7 percent of females, most of them are involved in retailing. With no surprise, all big-size wholesalers are men. Besides, 83

percent of respondents owned their business activity, with a higher percentage for wholesalers, apparently more inclined to run their business without devolving the presence in the shop to others (Table 11). Almost half of big-size wholesalers and retailers own their premises, while for the remaining trader categories they are more likely to be tenants (Table 12).

Table 11 - Trader type and position in the business activity

Trader type	Owner	Owner's relative	Clerk	Other	No answer
Big wholesaler	41	1	0	2	0
Medium wholesaler	21	2	0	0	0
Wholesaler/Retailer	24	2	1	8	2
Retailer	32	1	2	3	1
Total	**118**	**6**	**3**	**13**	**3**

Table 12 - Trader type and ownership of the business

Trader type	Owned	Rented	Other	No answer
Big wholesaler	22	22	0	0
Medium wholesaler	7	16	0	0
Wholesaler/Retailer	7	28	1	1
Retailer	20	17	1	1
Total	**56**	**83**	**2**	**2**

SOURCE: WFP, Traders survey in Nyala, November 2012.

The survey showed a limited turnover of the most important commodity traded, as only 13 percent percent of respondents declared to have changed it in the last year (Table 13). Commodity specialization remains therefore key for traders, and hardly have they swapped the focus of their business from one commodity to another. Moreover, most of traders have been running in the business for at least 5 years or more.

Table 13 - Change of the most important commodity traded by market

	Yes			No	No answer	Total
Commodity	*Central mkt*	*Alshabi mkt*	*Malja mkt*			
Sorghum	*1*	*1*	*0*	20	1	23
Millet	*1*	*0*	*0*	5	0	6
Sugar	*4*	*2*	*1*	46	0	53
Oil	*4*	*0*	*0*	32	0	36
Salt	*1*	*0*	*0*	8	0	9
Lentils	*3*	*0*	*0*	8	0	11
Beans	*0*	*0*	*0*	2	0	2
Other	*0*	*0*	*0*	3	0	3
		18		**124**	**1**	**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

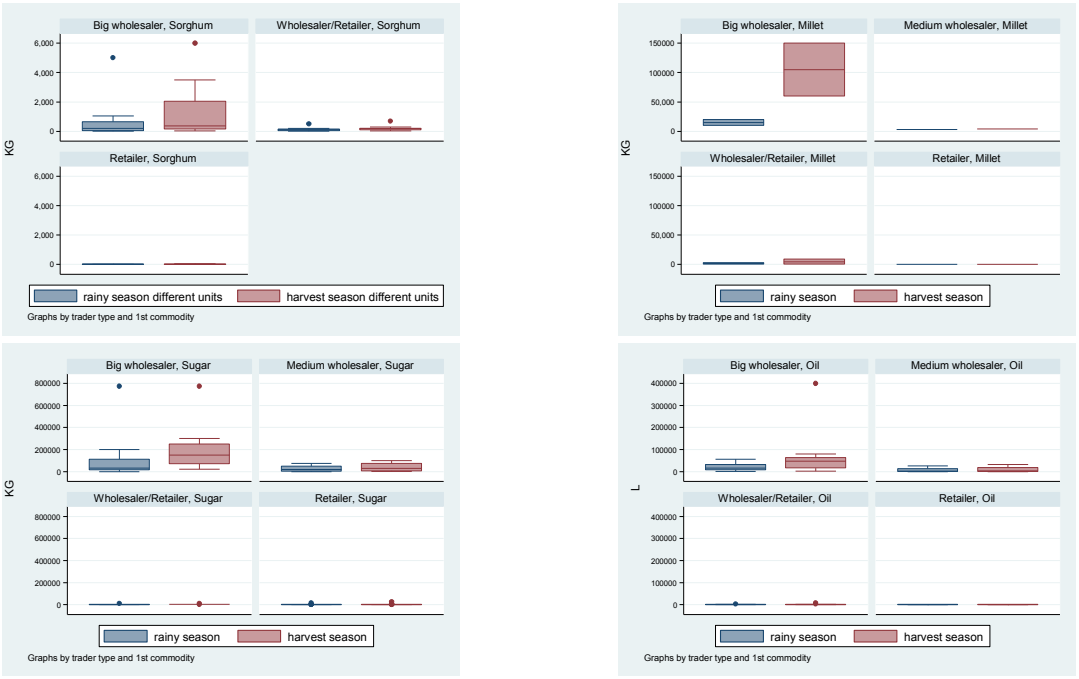
5.3 Volumes and Flows

This section aims at analysing volumes, as regards quantities traded and current performance of the business compared to the previous year, and flows, by assessing if supply sources have recently changed, and how. The rationale behind is to figure out possible pressure on traders, either concerning seasonality issues or hitches in the provisions of goods.

Merchants were asked to appraise the quantities traded by season. Panes in Figure 19 return those estimates by trader category and commodity (*e.g.* sorghum, millet, sugar, and oil). The higher levels of seasonality belong to big-size wholesalers dealing with cereals. The amount of millet traded, and thence its relative importance, is strictly season-dependent, being a further confirmation that maize market is bound to the outcomes of local supply, being South Darfur the top producer for millet in Sudan (Robinson, 2012). Still, traditional agriculture practices stick its functioning to climate whims and yearly cycles, therefore likely affecting traders' business when supply is poor, since the market may not be able to offset local unbalances elsewhere. Similarly, sorghum volumes are quite volatile for big-size wholesalers, even though to a lesser extent compared to millet. Since sorghum is also

imported from other markets in Sudan, the reduced variability may be an indicator of a better functioning market environment. These results confirm the analysis on the price tendency to converge outlined in late 2012, in times of (relatively) good harvests.

Figure 19 - Estimates of quantities traded by season



SOURCE: WFP, Traders survey in Nyala, November 2012.

The reduced perishability of the other two commodities can be envisaged in the minor variability of the volumes between seasons, in particular for oil, being locally produced, whilst sugar is mainly channelled in South Darfur from factories close to Khartoum.

Interestingly enough, major divergences of quantities traded according to the season do not apply for other categories of traders, with very minor exceptions. This result suggests that smaller traders somehow manage to secure their volumes despite the season[23], even though their relevance in the market can be negligible.

The change of sales volume from last year in Table 14 returns mixed evidence both for big-size wholesalers and medium-size wholesalers. Apparently, either increases or decreases with different nuances in the depth of the change occurred compared to last year, regardless to the type of business. Thus, no clear trend can be highlighted, which is a sign that the trading activity was affected by idiosyncratic and not covariate shocks.

Peculiarly, several wholesaler/retailers and most of the retailers interviewed claimed to have slightly decreased the sales level from last year (Figure 20), because of a drop in the number of buyers both in Nyala and in nearby IDP camps. Indirectly, the relative abundance of supply may have either increased the number of petty-traders and thus occasional competition, or pushed those out of the market who can rely on limited own production when produce is fair enough.

[23] Here stock strategy turns to be a relevant driver to control this finding (see paragraph 5.6 Stock Strategy).

Table 14 - Sales change compared with last year by commodity

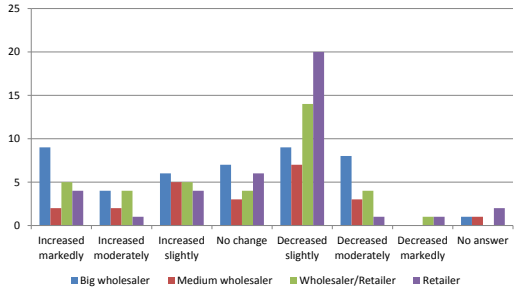
Big wholesaler	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Total
Increased markedly	2	0	1	4	2	0	0	0	9
Increased moderately	2	0	2	0	0	0	0	0	4
Increased slightly	1	0	2	2	0	1	0	0	6
No change	1	0	2	0	3	1	0	0	7
Decreased slightly	2	0	3	3	0	0	1	0	9
Decreased moderately	0	2	2	3	0	0	0	1	8
Not applicable	0	0	0	1	0	0	0	0	1
Total	**8**	**2**	**12**	**13**	**5**	**2**	**1**	**1**	**44**

Medium wholesaler	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Total
Increased markedly		0	2	0	0	0	0	0	2
Increased moderately		0	0	1	0	1	0	0	2
Increased slightly		1	0	1	0	2	0	1	5
No change		0	1	1	1	0	0	0	3
Decreased slightly		0	3	0	0	2	1	1	7
Decreased moderately		0	3	0	0	0	0	0	3
No answer		0	0	1	0	0	0	0	1
Total	**0**	**1**	**9**	**4**	**1**	**5**	**1**	**2**	**23**

Wholesaler/Retailer	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Total
Increased markedly	2	0	0	1	1	1			5
Increased moderately	1	1	1	1	0	0			4
Increased slightly	2	0	1	0	1	1			5
No change	1	0	1	2	0	0			4
Decreased slightly	3	0	3	5	1	2			14
Decreased moderately	0	1	0	3	0	0			4
Decreased markedly	0	0	0	1	0	0			1
Total	**9**	**2**	**6**	**13**	**3**	**4**	**0**	**0**	**37**

Retailer	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Total
Increased markedly	0	0	3	1					4
Increased moderately	0	0	1	0					1
Increased slightly	2	0	2	0					4
No change	1	0	4	1					6
Decreased slightly	2	1	13	4					20
Decreased moderately	0	0	1	0					1
Decreased markedly	0	0	1	0					1
No answer	1	0	1	0					2
Total	**6**	**1**	**26**	**6**	**0**	**0**	**0**	**0**	**39**

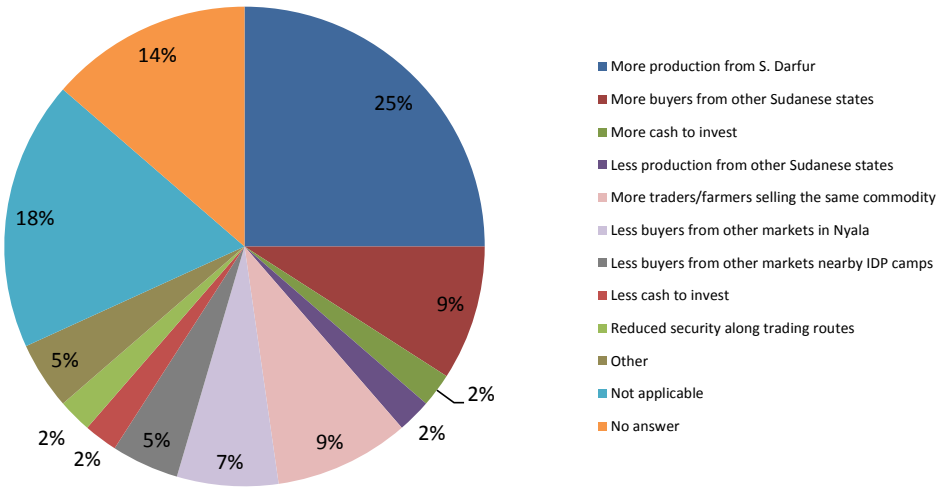
Figure 20 - Sales change by trader group



SOURCE: WFP, Traders survey in Nyala, November 2012.

At the big-size wholesale level, enhanced competition is in fact blamed as a reason for sales reduction by 9 percent of respondents, balanced by additional demand from other Sudanese states for the same number of traders. As a matter of fact, 1 out of 4 traders within this category perceive augmented production in South Darfur as a reason for improved sales performance (Figure 21).

Figure 21 - Big-size wholesalers' sales performance compared to last year



SOURCE: WFP, Traders survey in Nyala, November 2012.

Sugar is generally purchased by big-size wholesalers from factories outside Nyala and then sold to local traders; while oil is mostly sold by local factories that rely on South Darfur groundnuts

production (Table 15 and also Figure 10 for groundnuts production figures). Cereals supply channels are less readable, and sorghum may be purchased indifferently either from factories or traders, both locally or outside Nyala.

Table 15 - Purchasing Sources

Source	Sorghum	Millet	Sugar	Oil	Salt	Lentils	Beans	Other	Total
Local factories	6	0	3	24	0	0	0	0	33
Factories outside Nyala	4	2	11	2	5	0	0	0	24
Farmers	1	0	0	0	0	1	0	0	2
Middlemen	1	0	2	0	0	1	0	0	4
Local traders	4	3	28	6	3	2	0	1	47
Traders outside Nyala	5	0	7	0	1	5	1	2	21
Other	1	1	0	4	0	1	1	0	8
No answer	1	0	2	0	0	1	0	0	4
Total	**23**	**6**	**53**	**36**	**9**	**11**	**2**	**3**	**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

Finally, big-size wholesalers are mostly dealing with local traders, even if some 23 percent are involved in trading outside Nyala. The category of wholesaler/retailer is more oriented towards wholesaling than retailing, therefore being not a perfect substitute for simple retailers in selling food to households (Table 16).

Table 16 - Customers

Trader type	Local traders	Traders outside Nyala	Households	Other	Total
Big wholesaler	34	10	0	0	44
Medium wholesaler	21	2	0	0	23
Wholesaler/Retailer	24	5	5	3	37
Retailer	5	1	31	2	39
Total	**84**	**18**	**36**	**5**	**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

5.4 Constraints and Response Capacity

Besides actual volumes and flows, the goal of this section is to have a closer sight at the major constraints preventing traders to expand their business.

Table 17 attempts to roughly estimate the relative weight an additional demand from a planned voucher programme in IDP camps might have as compared to the town's market size. As official figures on volumes traded were not available, shares were computed from total sorghum production in South Darfur, population figures, and planned rations per capita. Inference by the number of beneficiaries in IDPs camps according to the tentative programme scale-up[24] returns the relevance of the camps compared to the city market that spans from 5 percent for Otash only, to some 13 percent when all the camps are considered. Even if these estimates are quite crude, as they rely on the unlikely assumption that local production entirely translates into local supply and meets the demand, they still provide useful insights to the extent of defining the magnitude of the programme caseload as compared to Nyala settings.

[24] See Table 22 in section 6.

Table 17 - IDP Camps Estimated Relevance in Sorghum Market

Location	Population	Sorghum Production in MT	Caseload based on 8.1 Kg per month per capita (MT)	Share on Nyala	Share on South Darfur
Otash	55,178 ψ		5,363	5%	3%
Otash, Derieg	75,944 ψ		7,382	7%	4%
Otash, Derieg, Mosey, Sakaley	87,512 ψ		8,506	8%	5%
Otash, Derieg, Mosey, Sakaley, Ed Daein	138,915 ψ		13,503	13%	8%
Nyala	2,960,000 ς	103,282 ε			
South Darfur	4,786,122 ϕ	167,000 ϕ			

SOURCE: (ψ) WFP; (ϕ) Robinson, 2012; (ς) Bartlett *et al* ., 2012; (ε) estimate based on total South Darfur sorghum production in 2011

Market-based interventions are deemed to increase the purchasing power of beneficiaries, therefore possibly to determine an exogenous enhancement of demand. Traders having an appropriate response capacity may be able to absorb such augmented call for goods, without stressing supply channels and therefore translating pressure on prices. Considering half rations are taken into account, implementing the voucher programme in Nyala is expected to overall amplify the demand by some 2.5 percent. As noted in page 7, actual figures on the overall population in town differs; using the same methodology, the estimates may be more conservative and return a 6 percent of share for Otash if only 1,300 thousands residents in Nyala were considered.

Limited resources available are the paramount constraint for 43 percent of the interviewed traders (Table 18), followed by insecurity issues for 15 percent, transport costs and high food prices (both 8 percent). Overall, these reported restraints are all interlinked and refer to the market environment *per se* rather than to the very single trader. In fact, limited assets hinder trading capacity especially when traders have to overcome, with their own capacity, environmental limitations that may change randomly, being overall insecurity linked to expensive transport cost or, more generically, to high food prices. Noteworthy, only 3 percent of traders report that few people control the market.

Table 18 - Major Constraints Preventing Business Expansion

	Major			Second		
Constraint to expand the business	Freq	*Percent*	*Cum.*	Freq	*Percent*	*Cum.*
No money	62	*43.4*	*43.4*	10	*7.0*	*7.0*
High food prices	11	*7.7*	*51.1*	19	*13.3*	*20.3*
Transport costs	11	*7.7*	*58.7*	10	*7.0*	*27.3*
Poor infrastructure	4	*2.8*	*61.5*	12	*8.4*	*35.7*
Insecurity issues	22	*15.4*	*76.9*	23	*16.1*	*51.8*
Low profit margin	7	*4.9*	*81.8*	13	*9.1*	*60.8*
Demand issues	7	*4.9*	*86.7*	11	*7.7*	*68.5*
Few people control the market	3	*2.1*	*88.8*	1	*0.7*	*69.2*
Other	8	*5.6*	*94.4*	10	*7.0*	*76.2*
No answer	8	*5.6*	*100*	34	*23.8*	*100*

SOURCE: WFP, Traders survey in Nyala, November 2012.

Table 19 confirms the overall picture above, with a breakdown of the major constraints by trader category. Specifically, one third of big-size wholesalers report limited resources as an issue (30 percent), and another third transport costs and insecurity along the roads (16 percent, each). Since this category of traders is often the entry point for commodities in Nyala, concerns that possible bottle necks in the supply may trickle down to smaller traders are well grounded. Incidentally, even if the remaining sub-categories are not statistically representative, it is worth noting that among respondents, 49 percent of wholesaler-retailers and 67 percent of retailers blame limited resources as their major constraint. In other words, when supply is poor, and big-size wholesalers are under

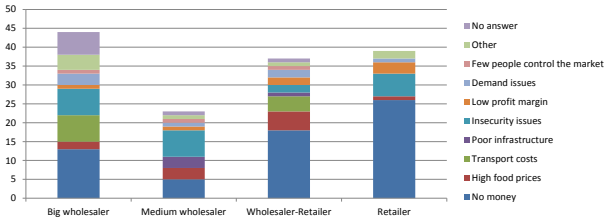
pressure, then those traders more involved in retailing activities may be severely limited in the provision of stocks for their sale points.

Table 19 - Major Constraints by Trader Type

Major constraint	Big wholesaler	Medium wholesaler	Wholesaler-Retailer	Retailer	Total
No money	13	5	18	26	62
High food prices	2	3	5	1	11
Transport costs	7	0	4	0	11
Poor infrastructure	0	3	1	0	4
Insecurity issues	7	7	2	6	22
Low profit margin	1	1	2	3	7
Demand issues	3	1	2	1	7
Few people control the	1	1	1	0	3
Other	4	1	1	2	8
No answer	6	1	1	0	8
Total	**44**	**23**	**37**	**39**	**143**

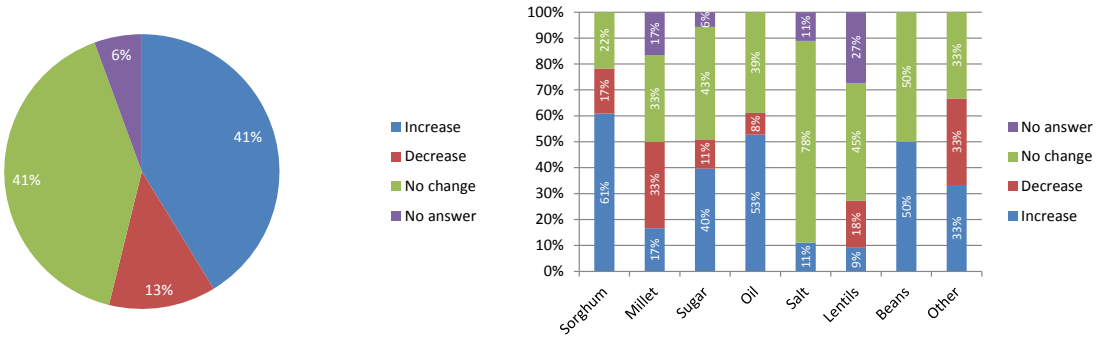
SOURCE: WFP, Traders survey in Nyala, November 2012.

Figure 22 - Major Constraints



Expressly, for 61 percent of traders in the sample, an increased demand by a quarter of actual volumes is likely to push sorghum prices up (Figure 23). Within the investigated food basket, in the expectations of most traders also oil (53 percent), beans (50 percent), and sugar (40 percent) prices would react with additional inflation. Overall, the possible price increase is potential for 41 percent of traders, even though for the same number of respondents, no changes are to be expected. These opposite views are the balance of expectations on different commodities, with millet, salt, lentils, and others less likely to be affected by increased demand.

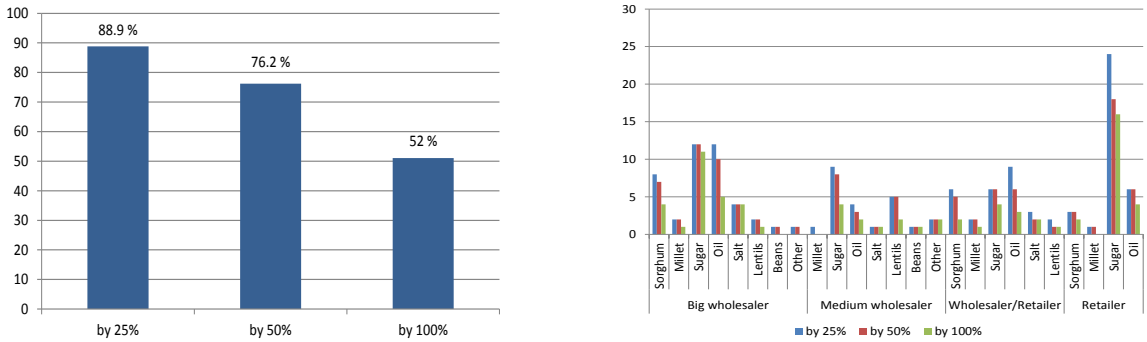
Figure 23 - Price Reaction Expectations with a 25% Demand Increase in Six Months



SOURCE: WFP, Traders survey in Nyala, November 2012.

Still, in terms of capacity to absorb the same increased demand by 25 percent, traders are largely confident to have the capacity to respond appropriately (Figure 24). However, this percentage is somehow biased by sugar retailers, and in general all those traders dealing with this commodity, possibly because this supply chain is less susceptible to be jeopardized by random factors. If only cereal traders are taken into account, all interviewees mostly trading millet are confident to have the capacity to cope with such increased demand. The confidence for sorghum traders hinges on their size, as all big-size wholesalers would be able to absorb increased demand by a quarter, while two out of three of the respondents within wholesaler/retailers and only half of the retailers would do so.

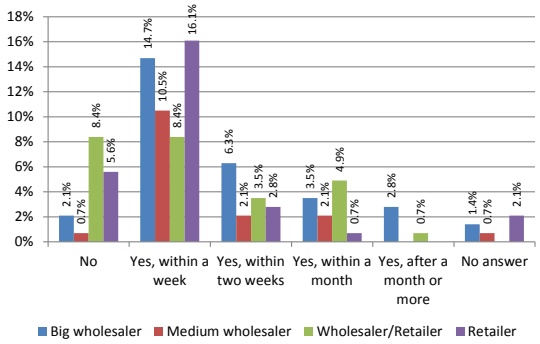
Figure 24 - Capacity to Absorb Increased Demand in Six Months



SOURCE: WFP, Traders survey in Nyala, November 2012.

Quite surprising, the capacity to deliver is estimated within a week for 50 percent of traders (for the four sub-categories, spanning from big-size wholesalers to retailers, respectively 15, 11, 8 and 16 percent), while only 17 percent put in advance that they would not be able to sustain such additional demand at all. These findings are ameliorative as compared to those reported by Al-Feel and El-Awad (2011), where a 10-day notice to meet increasing demand was required by traders in Nyala. In terms of start-up of the programme, claimed capacity to deliver is quite comfortable, as traders are expected to have one month advance warning in-between contracting and implementation. However, being able to forecast demand shifts becomes crucial as responses provided by the two smaller categories of sorghum traders raise some concerns during the implementation, considering that close to half of the respondents among those groups claimed they would not have the capacity to augment the deliveries at all[25].

Figure 25 - Capacity to deliver within a Month Assuming an Increase in Demand by 25 percent



SOURCE: WFP, Traders survey in Nyala, November 2012.

5.5 Credit

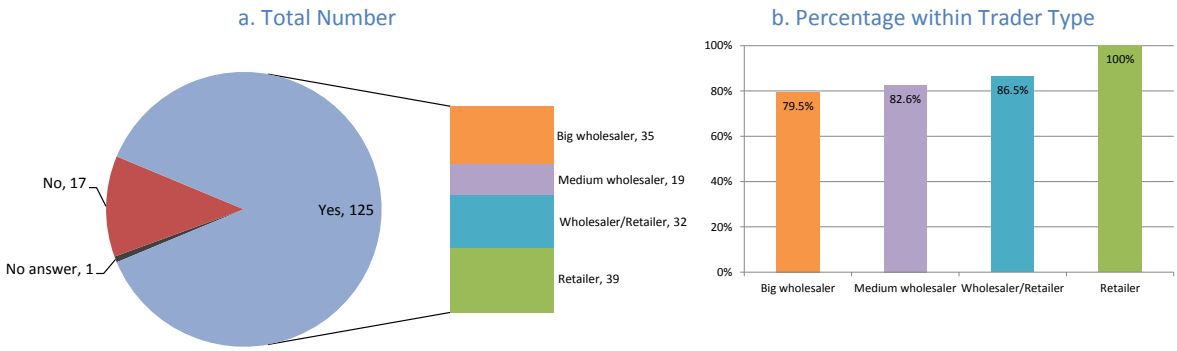
This section builds on the previous one, focusing on trader credit quest. While it takes also into account the households' perspective for retailers (and to a lesser extent for wholesaler-retailers), it is tailored to assess the supply chain from big-size wholesalers down to retailers under the specific perspective of credit provided; with the assumption that only the former traders are the entry point for commodities to the Nyala market, and the commodities cascade through the remaining

[25] As already noted, there is no statistical representativeness among those two sub-groups, thence these findings refer only to the respondents and may not apply to the broader categories.

categories up to the final customers. This may not be the case for all the commodities investigated, and exceptions to this rule or shortcuts are more than possible; yet it is quite a toll free assumption for the sake of understanding the link between the declared capacity to absorb increased demand and the effective means of traders to do so.

Among big-size wholesalers, 35 out of 44 (79.5 percent) provide credit to their customers (Figure 26). For the other sub-categories, this share is even larger. In the views of post-conflict market assessment findings where "*informal credit arrangements between traders was an essential lubricant to trade pre-conflict, not least in the absence of affordable and accessible formal credit arrangements*" (Buchanan-Smith and Fadul, 2008), this may be welcomed as a positive sign of a partially resumed credit system within traders.

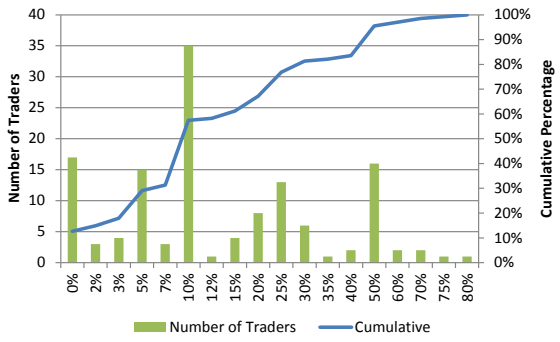
Figure 26 - Traders Providing Credit to Customers



SOURCE: WFP, Traders survey in Nyala, November 2012.

Yet, for more than half of respondents, the percentage of sales on credit is equal or less than 10 percent of total, while for some 80 percent of them the credit share is limited to a quarter of total sales (Figure 27). Hence, overdue payments may therefore not be a severe issue for most of the traders interviewed. Possibly, also a very limited delay in the redemption of vouchers may therefore be sustainable[26].

Figure 27 - Share of Total Sales in Credit



SOURCE: WFP, Traders survey in Nyala, November 2012.

Reportedly, sorghum, beans, and salt are the commodities where traders have higher changes in credit requests compared to the previous year, for some 44 percent of traders. Noticeably, the

[26] Besides, this may hardly be the case, as traders participating in the C&V programme will receive 90 percent of their entitled payment within seven days from the submission of redeemed vouchers and invoices.

former two were also pinpointed as commodities whose prices are inclined to inflate with additional demand (Figure 23); which may confirm that these supply chains had likely suffered from imbalances in the recent past. As most of the millet origin is local, purchases on credit are less requested than those for sorghum.

Table 20 - Change in Credit Request by Commodity Compared to the Previous Year

Change in Credit Requests

1st commodity	Yes, less	Yes, more	No, same	No answer	Total
Sorghum	6	10	5	2	23
Millet	4	0	0	2	6
Sugar	26	10	7	10	53
Oil	11	7	6	12	36
Salt	3	4	1	1	9
Lentils	3	3	3	2	11
Beans	1	1	0	0	2
Other	1	0	2	0	3
Total	**55**	**35**	**24**	**29**	**143**

Within Group

1st commodity	Yes, less	Yes, more	No, same	No answer	Total
Sorghum	26.1%	43.5%	21.7%	8.7%	100%
Millet	66.7%	0%	0%	33.3%	100%
Sugar	49.1%	18.9%	13.2%	18.9%	100%
Oil	30.6%	19.4%	16.7%	33.3%	100%
Salt	33.3%	44.4%	11.1%	11.1%	100%
Lentils	27.3%	27.3%	27.3%	18.2%	100%
Beans	50.0%	50.0%	0.0%	0%	100%
Other	33.3%	0%	66.7%	0%	100%

SOURCE: WFP, Traders survey in Nyala, November 2012.

5.6 Stock Strategy

Response capacity results are controlled in the questionnaire not only by credit but also by stocks availability questions. In fact, unless the market operational capacity is full to allow proper supply turnover, then limited stocks delay the fulfilment of increased demand.

Stock-to-sales ratio measures the relevance of stocks on total sales, being a proxy of the effectiveness of traders to meet demand, having appropriate rotation of goods without devoting overriding cash flow to setting up the stocks. Dash lines in Figure 28 set two thresholds; one at 3:1, provided as a reference of an appropriate ratio between stocks and sales, and another at 1:1. The first may be considered suitable to avoid stock out, while the second is at risk. The further the ratio diverges from 3:1, the more likely stocks are oversized and/or outliers are accountable to have biased results.

Figure 28 - Stock-to-sales Ratio

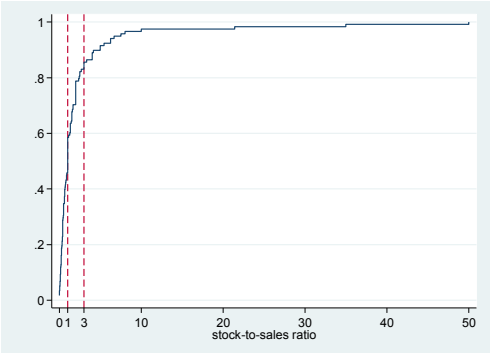


Table 21 - Stock Level Lasting in Weeks

	Big wholesaler	Medium wholesaler	Wholesaler/ Retailer	Retailer	Total
No answer	26	10	12	18	66
Less than 1 week	1	0	2	6	9
1 week	10	7	13	9	39
2 weeks	2	3	7	4	16
3-4 weeks	3	1	3	2	9
More than 1 month	2	2	0	0	4
	44	**23**	**37**	**39**	**143**

SOURCE: WFP, Traders survey in Nyala, November 2012.

For about 60 percent of traders, the stock-to-sales ratio stops below 1:1, for other 22 percent it is up to 3:1, while for the remaining it is above that ceiling. Even though traders were reluctant to provide an estimate of their stock life-expectancy in weeks, 62 percent of respondents (77 out of 143), declared that current stocks would be enough to meet only one week of demand, in line with stock-to-sales ratio findings.

However, stock out is seldom an issue, even if for 29 percent of respondents it is actually a menace at different degrees of likelihood (Figure 29), especially as regards to retailers. Limited availability of the product, probably also fuelled by erratic demand increases, are among the most reported roots for that.

Figure 29 - Stock Out and Reasons

		Big wholesaler	Medium wholesaler	Wholesaler-Retailer	Retailer	Total
Stock Out	No	34	12	26	25	97
	Yes, every week	0	1	3	10	14
	Yes, twice per month	2	1	1	1	5
	Yes, once per month	1	4	5	0	10
	Yes, less than once per month	5	3	2	1	11
	Not applicable	1	0	0	1	2
	No answer	1	2	0	1	4
	Total	**44**	**23**	**37**	**39**	**143**
Reason	Limited availability of the product	5	2	5	2	14
	Poor storage capacity	0	3	0	2	5
	No money	0	2	4	1	7
	Increased demand	3	1	2	2	8
	Not applicable	35	12	26	26	99
	No answer	1	3	0	6	10
	Total	**44**	**23**	**37**	**39**	**143**

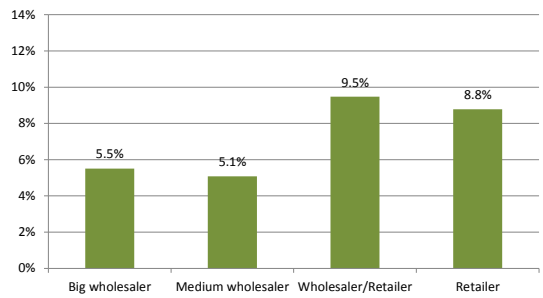
SOURCE: WFP, Traders survey in Nyala, November 2012.

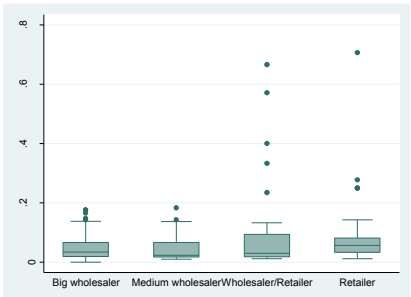
5.7 Pricing

Finally, the survey attempted to measure price margins. It has to be noted that this is a sensitive issue for traders; therefore the reported purchasing price tended to be overestimated to arbitrarily reduce margins. Still, at least for the 50th percentile, prices are in line with those collected for monitoring purpose, and will be exploited more in the next paragraph to gauge cost efficiency/effectiveness of different transfer modalities.

Allegedly, price margins span from 5 to 10 percent, being higher for wholesaler/retailers than for other categories (Figure 30). Noteworthy, there are more outliers in this and the retailers' category than in the remaining two. Therefore, it can be argued that price margins are quite in line within traders regardless of size and type, even though the recorded figures are probably downsized.

Figure 30 - Price Margins by Trader Type

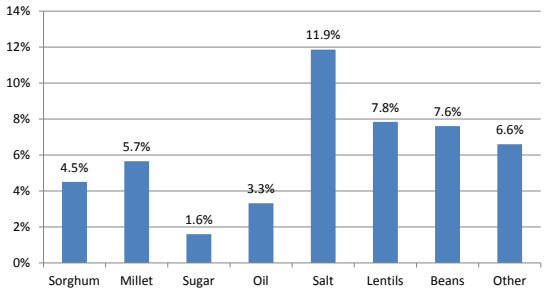


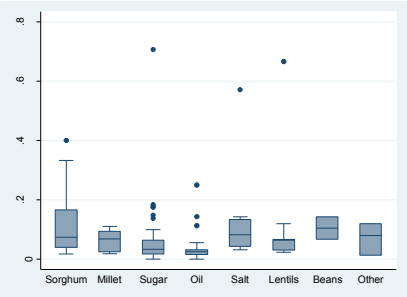


SOURCE: WFP, Traders survey in Nyala, November 2012.

More interestingly, by commodity sorghum presents the highest variability of price margins, in line with all the evidence so far described; thence a close monitoring of price fluctuations for that commodity is highly required to follow-up market-based interventions and eventually fine-tune the programme design (Figure 31).

Figure 31 - Price Margins by Commodity





SOURCE: WFP, Traders survey in Nyala, November 2012.

6. COMPARING TRANSFER MODALITIES

This section concludes the assessment conducted in Nyala, bridging the findings on market performance, structure and conduct with the insights derived from the comparison between in-kind food assistance provided so far by WFP in IDP camps close to the city, and vouchers.

As WFP is strategically moving towards food assistance interventions, the analysis relies not only on cost comparison between two different transfer modalities, but also sets the ground to the different outcomes to be achieved, including nutritional aftermaths likely to be embedded in a programme design perspective.

The rationales for the analysis are reported in the tables below, providing information a) on the scaling up of the caseload in terms of beneficiaries ideally reachable in the camps[27] by the programme (Table 22); and b) on the monthly half rations already provided in-kind[28] or planned for future voucher-based transfers[29], based on potential rations under discussion at the CO level (Table 23).

[27] At the time of writing, consultations in Otash camp (OT) are on-going to endorse at the community level the shift from in-kind into vouchers. The agreed starting of the piloting phase would likely be May 2013, while the scaling-up in the table is tentative and bound to evidence accrued from Otash experience. Other camps ideally covered will be: Derieg (DG), Mosey (MO), Sakaley (SK), Ed Daein (ED).
[28] Labelled as '*Before*' and '*Present*' in the table.
[29] Labelled as '*Future*' in the table.

Table 22 - Tentative Scaling up of Programme in 2013

Month	Location	Total Beneficiaries
Jan	OT	55,178
Feb	OT	55,178
Mar	OT	55,178
Apr	OT	55,178
May	OT	55,178
Jun	OT	55,178
Jul	OT, DG	75,944
Aug	OT, DG	75,944
Sep	OT, DG, MO, SK	87,512
Oct	OT, DG, MO, SK	87,512
Nov	OT, DG, MO, SK, ED	138,915
Dec	OT, DG, MO, SK, ED	138,915
		935,810

Table 23 - Food Rations

	Half ration kg/person/month			
Commodity	Before	Present	Future	Min. Healthy Food Basket
Sorghum	6.75	6.75	8.10	6.75
Pulses	0.90	0.05	0.90	
Sugar	0.45			0.60
Vegetable Oil	0.45			0.38
Salt	0.15			
CSB		0.48		
Dry Okra				0.75
Cow Meat				0.01
Goat Meat				0.08
Dry Tomatoes				0.38
TOTAL (KG)	**8.70**	**7.28**	**9.00**	**8.95**

SOURCE: WFP

Due to data limitations, the analysis compared only the food baskets under the first and third scenarios (*i.e.* the one with sorghum, pulses, sugar, vegetable oil and salt vs. the one with only sorghum and pulses), assessing cost efficiency and effectiveness of these alternative transfer modalities. While efficiency measures costs and benefits only on monetary terms, effectiveness compounds additional benefits in the evaluation of the available options beyond pure monetary evaluation.

The remainder of this section needs to be read with the following caveat in mind. If vouchers are value-based, the choice of the commodities and associated rations may be utterly hypothetical, because the purpose of such vouchers is to provide access to food of a predetermined monetary value. Thence, the selection of the commodities is only meant to assign a value in Sudanese pounds to vouchers, as if the beneficiaries would limit their purchases to only sorghum and beans, keeping the caloric in-take at the same level. Actually, this is hardly the case as they would redeem vouchers according to their needs and preferences, and actual consumption may differ substantially. In this case, unknown probabilities associated with purchasing patterns hinder the feasibility of the comparison, considering that the cost efficiency and effectiveness analyses proposed below are constrained by having at least two well defined food baskets.

Therefore, to the extent of this section, the analysis is based as if commodity-based vouchers were selected.

6.1 Cost Efficiency

Cost comparison, built on 2013 price forecasts, is grounded on the full costs likely to be undertaken with the two different food assistance scenarios proposed above. As the data requirement is quite demanding, a number of assumptions were taken into account:

1. The exchange rate was set at the value recorded in February 2013[30]. This assumption is based on historical data, showing that the SDG/USD rate held at around 0.369 since April 2011, with limited bouncing[31] for 15 months. After the currency devaluation, the exchange

[30] Data source is oanda.com. The SDG/USD exchange rate used is 0.2249.
[31] On average, 0.13 percent.

rate adjusted close to 0.255 in September 2012, again with almost null variations occurred since then[32].

2. In-kind costs include Free-On-Board (FOB) prices[33], external transportation and LTSH costs for landside transport, storage and handling (LTSH)[34]. For the former, price forecasts for April-December 2013 were derived from previous year observations, with the methodology described in section 4, while the remaining costs where held constant as of February, which seems a reasonable assumption as those costs may not change deeply in the short run.
3. Voucher costs are estimated using price forecasts based on 2008-2012 market prices for the commodities included in the food basket[35]. The cost comparison tackles three different settings by means of expected prices in addition to forecasted prices under the worst-case and best-case scenarios (respectively called upper and lower bands, see Annex on page 50). Furthermore, additional costs directly related to the implementation of cash and voucher based activities (ODOC) were estimated at 0.10 USD per beneficiary[36].

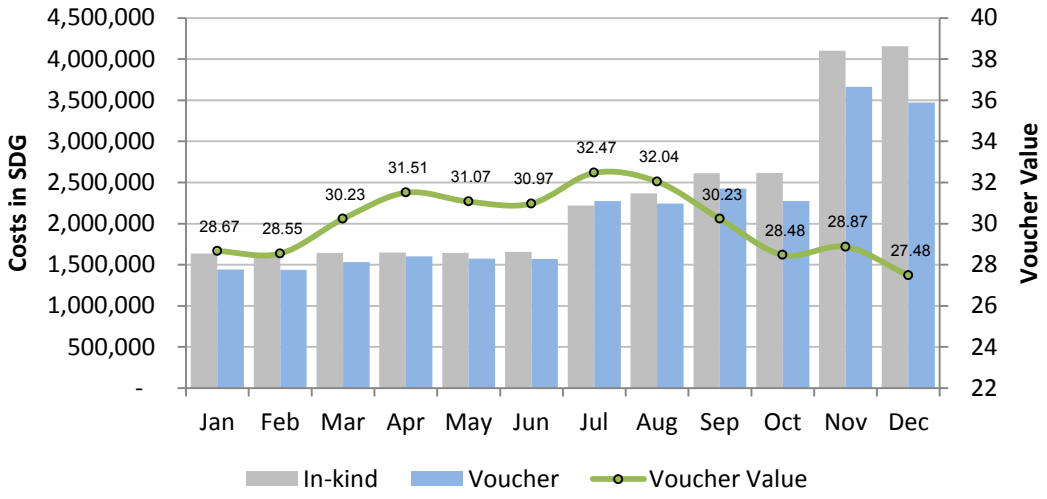
Taking into account only sorghum and pulses (*i.e.* white beans) to allow uniformity in the cost comparison exercise, if actual prices fall in-between[37] the upper and lower forecasted price bands, then voucher-based interventions would be always more cost efficient but in July, when in-kind modality transfer will be likely less expensive (Figure 32). Overall, cost efficiency of vouchers would return a 9 percent as compared to in-kind. Under this scenario, which not only depends on fairly 2012 harvest outcomes but also on satisfactory produce expectations in the next season, it would be a proper strategy to tailor the programme scale-up focusing on the last months of the year. In fact, as the beneficiary caseload increases, then voucher gains would reach the order of 11 and 17 percent respectively in November and December.

On the other hand, in case market prices switch closer to the upper band of price expectations (Figure 33), then the comparative advantage of vouchers would shrink to few months (*i.e.*, from October to February). Here, seasonality matters and cost efficiency would be only 5 percent in the selected period, albeit on a yearly perspective vouchers efficiency would turn below 2 percent compared with in-kind transfers.

As the programme carries on, the forthcoming harvest season will have deeper implications in terms of likelihood scenario applicable, and price increases may hinder the value of transfers or rather reduce cost efficiency. Thence, contingency planning is needed to be able to fine-tune the value of vouchers or move (*partially*) back to in-kind food assistance if need be.

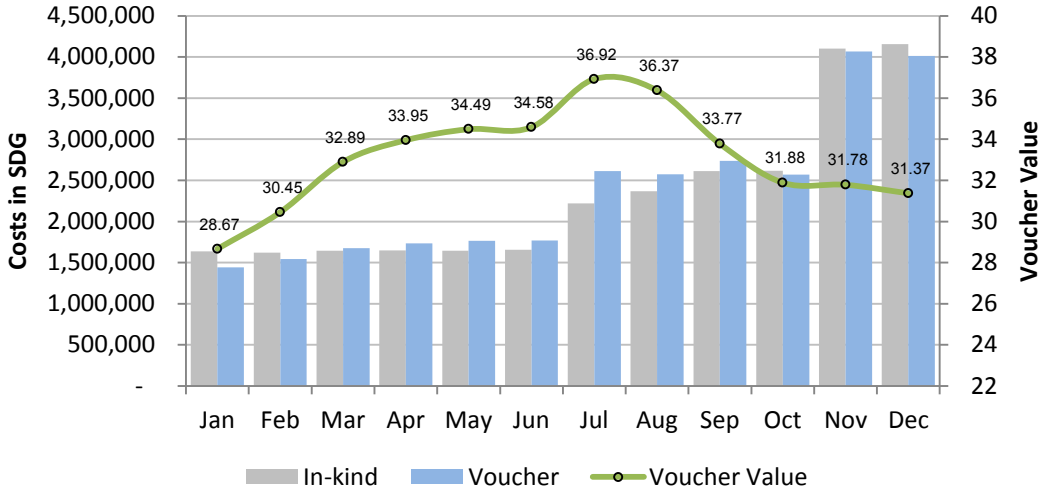
[32] On average, 0.07 percent.
[33] Data source WFP, Food Procurement FOB Prices Archive.
[34] Based on international delivery channel costs to Nyala.
[35] They also include SDG 2.5 for local milling costs, equivalent to the in-kind cereal ration added to the voucher value to mitigate bartering or selling of food aid to cover milling costs.
[36] This assumption is quite conservative, as start-up costs in Sudan for paper-based vouchers were estimated at 0.23 USD per beneficiary, while for e-vouchers at 2 USD (Harrison and Wagabi, 2011). However, the findings proposed hereinafter do not change with ODOC costs spanning in the range between 0 and 0.25 USD per beneficiary.
[37] Hereinafter referred as '*expected prices*'.

Figure 32 - In-Kind vs. Vouchers Cost Comparison (expected prices)



SOURCE: Author's elaborations.

Figure 33 - In-Kind vs. Vouchers Cost Comparison (upper band expected prices)



SOURCE: Author's elaborations.

Notwithstanding the price scenarios, as July is the month when in-kind transfers are always more cost efficient than vouchers, it is recommended not to scale-up the first step of the programme before September, and consider full scale-up only in November/December.

Figure 33 returns the value of vouchers and their difference under the three price set-ups. With expected prices, the value is always efficient except in July, where it would have been SDG 31.75 instead of SDG 32.47 if constrained to the less expensive between the two modalities. Still, it may reasonable refrain from interrupting the voucher programme for only one month and thus allowing for efficiency losses in that month. Ideally, the value of vouchers should span between SDG 31 and 32.5 until September, while in the remaining months of the year it may be lowered close to SDG 28.5.

Figure 34 - Voucher Values in SDG

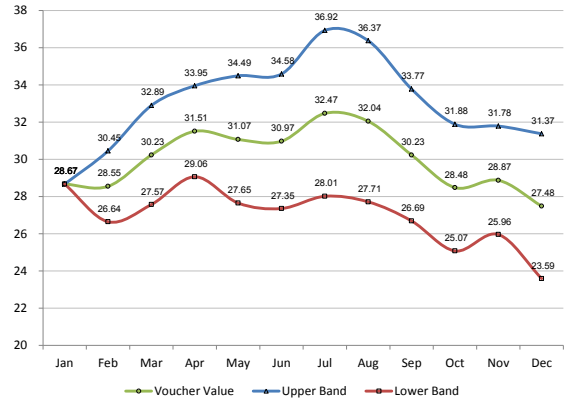
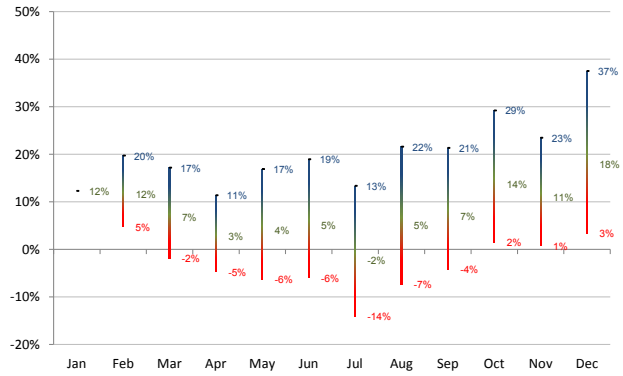


Figure 35 - Gain/Loss on the Value of Voucher per Beneficiary



SOURCE: Author's elaborations.

Within the upper band case scenario, the picture is completely dissimilar, and the value of vouchers from March to September would not be efficient, while in the remaining months the gain would not be significant. The values should be increased significantly every month, with a peak of SDG 37 in July, which would imply a loss per beneficiary on the value of each voucher by 14 percent, while in the other six months it would be between 5 and 7 percent (Figure 35).

Similar conclusions derive from alpha value analysis[38], the traditional tool used by WFP to gauge cost efficiency of different types of interventions. Table 24 summarizes these findings providing alpha values for 2013. A value greater than 1.0 indicates higher cost efficiency for WFP in delivering in-kind food as it is the case in July with expected prices.

Table 24 - Alpha Values

	Expected Price	Upper Band	Lower Band	
Jan	✓ 0.87	✓ 0.87	✓ 0.87	
Feb	✓ 0.87	! 0.92	✓ 0.83	
Mar	! 0.92	! 0.98	✓ 0.85	
Apr	! 0.95	! 1.01	✓ 0.89	
May	! 0.94	! 1.03	✓ 0.85	*Planned starting date of voucher programme*
Jun	! 0.93	! 1.03	✓ 0.84	
Jul	! 1.01	✗ 1.13	✓ 0.88	
Aug	! 0.93	! 1.05	✓ 0.82	
Sep	! 0.92	! 1.01	✓ 0.83	
Oct	✓ 0.87	! 0.95	✓ 0.78	
Nov	✓ 0.89	! 0.96	✓ 0.81	
Dec	✓ 0.83	! 0.94	✓ 0.73	

SOURCE: Author's elaborations. Legend: '**x**' with alpha values higher than 1.1, '**!**' between 0.9 and 1.1, '**v**' below 0.9. Red lines refer to months in 2013 when the voucher programme will not be implemented and are reported only for reference.

Voucher-based transfer are more cost efficient, even though as the index gets closer to the unity, results interpretation needs to be more nuanced, and a clear cut off between the two modalities becomes inaccurate. Still, these findings largely support the discussion so far conducted in terms of months and likely scenarios.

[38] The Alpha Value is derived by dividing the retail price available in the market by the WFP procuring, shipping and delivery costs for the same commodity. It is only based on sorghum and pulses as results are valid only when the same food baskets (including the quantities) are compared.

6.2 Cost Effectiveness

This sub-section tackles the issue of nutritional achievements deriving from different food baskets in the two transfer modalities under review, thence bridging programme costs with desired outputs. To assess effectiveness, the composition of the food basket and the choice of modality inducing it become critical.

A measure of the nutritional value is thence proposed in Table 25, setting as desirable target the achievement of nutritional outcomes corresponding to half of the requirements needed for an active and healthy life. Rations per commodity are assessed against the macro- and micro-nutrients provided[39].

As the proposed rations for sorghum in the voucher scenario have been increased from 6.75 to 8.10 kg per month per person, the energy contribution is quite similar and meets the target of half of the total requirements. Similarly, protein, iron, thiamine and niacin needs are over-achieved with both food baskets. Calcium improves slightly in the voucher scenario, even though it meets only a quarter of daily requirements, while fat contribution declines significantly. Both food baskets are quite poor in vitamin C. In contrast, by removing salt and vegetable oil from the food basket, iodine and vitamin A get completely discarded. It is therefore recommended monitoring beneficiaries' purchasing patterns. As beneficiaries may prefer purchasing local groundnut oil, it is not likely that additional vitamin A deficiencies would occur with the shift from the in-kind to the voucher-based food basket. Conversely, iodized salt may still be supplied in-kind if not available in the market. As an aggregate index, the Nutrient Value Score (NVS) averages the achievement of daily requirements per day, equally weighting nutrients.

Table 25 - Nutritional Value Scores

RATION CONTENTS	kg/person/ Month	ENERGY	PROTEIN	FAT	CALCIUM	IRON	IODINE	VIT. A	THIAMINE	RIBOFLAVIN	NIACIN	VIT. C	FULL FOOD BASKET (5 COMMODITIES)	REDUCED FOOD BASKET (SORGHUM AND WHITE BEANS)
Commodities delivered In Kind	*Rations*	kcal	g	g	mg	mg	µg	µg RE	mg	mg	mg NE	mg		
SORGHUM	6.75	754	25	7	59	10	0	0	1	0	11	0		
BEANS, KIDNEY, ALL TYPES (USA)	0.90	100	7	0	43	2	0	1	0	0	2	2		
OIL, VEGETABLE [WFP SPECS.]	0.45	133	0	15	0	0	0	135	0	0	0	0		
SUGAR	0.45	60	0	0	0	0	0	0	0	0	0	0		
SALT, IODISED [WFP SPECS.]	0.15	0	0	0	0	0	300	0	0	0	0	0		
Ration Total		1046	32	22	101	13	300	136	1	0	13	2		
Requirement		2100	52.5	40	450	22	150	500	0.9	1.4	13.86	28		
% of requirements supplied by (half) ration		50%	61%	55%	23%	57%	200%	27%	102%	28%	95%	5%		
% of energy supplied by protein or fat			12.2%	18.9%										
Nutritients Value Score (NVS) IN KIND		0.50	1.00	1.00	0.23	0.57	1.00	0.27	1.00	0.28	0.95	0.05	**6.86**	**4.93**

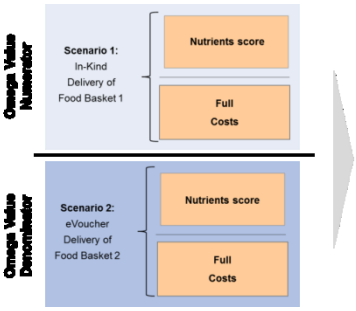
RATION CONTENTS		ENERGY	PROTEIN	FAT	CALCIUM	IRON	IODINE	VIT. A	THIAMINE	RIBOFLAVIN	NIACIN	VIT. C
Commodities under the Vouchers	*Rations*	kcal	g	g	mg	mg	µg	µg RE	mg	mg	mg NE	mg
SORGHUM	8.10	905	30	8	70	12	0	0	1	0	13	0
BEANS, KIDNEY, ALL TYPES (USA)	0.90	100	7	0	43	2	0	1	0	0	2	2
Ration Total		1004	37	8	113	15	0	1	1	0	15	2
Requirement		2100	52.5	40	450	22	150	500	0.9	1.4	13.86	28
% of requirements supplied by (half) ration		48%	70%	21%	25%	66%	0%	0%	119%	33%	112%	5%
% of energy supplied by protein or fat			14.6%	7.5%								
Nutritients Value Score (NVS) IN KIND		0.48	1.00	0.44	0.25	0.66	-	0.00	1.00	0.33	1.00	0.05	**5.22**	**5.22**

SOURCE: Author's elaborations.

The Omega Value indicator combines the nutritional value of transfer modalities with the full cost of delivering these nutrients (Ryckembusch *et al.*, 2013) being defined as the fraction of the ratios by transfer modality between NVS and the full costs (Figure 36).

[39] Data source for micro- and micro-nutrient contribution per commodity is NUTVAL.

Figure 36 - Omega Value



Omega Value > 1 :
In Kind Delivery will potentially be Nutritionally more Cost-Effective

Omega Value < 1 :
E voucher Delivery will potentially be Nutritionally more Cost-Effective

	Expected Price	Upper Band	Lower Band
Jan	1.07	1.07	1.07
Feb	1.07	1.13	1.01
Mar	1.13	1.22	1.04
Apr	1.18	1.26	1.10
May	1.16	1.28	1.05
Jun	1.15	1.28	1.03
Jul	1.24	1.40	1.08
Aug	1.16	1.30	1.01
Sep	1.13	1.24	1.01
Oct	1.06	1.17	0.94
Nov	1.08	1.17	0.99
Dec	1.01	1.15	0.88

SOURCE: Author's elaborations. Legend: '●' with omega values higher than 1.1, '●' between 0.9 and 1.1, '●' below 0.9. Red lines refer to months in 2013 when the voucher programme will not be implemented and are reported only for reference.

If bounded to only to sorghum and beans, the analysis shows that the food basket designed on these two commodities can be less cost effective than the one provided in-kind, in particular between March and September.

At the time of writing, the voucher transfer modality would rather be value-based than commodity-based. Monitoring of actual purchasing is therefore recommended to confirm the validity of the analysis, *i.e.* the cost-effectiveness of the food basket, or alternatively to trigger cost-effectiveness analysis based on actual purchasing patterns.

7. CONCLUDING REMARKS

This report attempted to analyse market functioning in Nyala and derive implications and recommendations for the CO, should the shift from in-kind food assistance towards market based interventions in IDP camps close to the city be decided.

Based on a piloting phase in Otash IDP camp, where inhabitants are some 55 thousands, the caseload of the programme is expected to gradually involve close to 140 thousands beneficiaries by the end of the year. Timing and feasibility of the scaling-up should be considered from the evidence acquired in the pilot phase. According to the different figures presented in the report, the share of Otash out of total Nyala sorghum market should span between 2.5 and 6 percent.

A number of preliminary indicators were assessed to evaluate the feasibility of cash and vouchers programmes in Nyala. Among those, the availability of food in South Darfur and the most recent accessible figures on cereal supply; the analysis of price trends in town, including volatility; and the proof of the extent of sorghum market integration with other relevant markets in Darfur and in the rest of the country.

Such information provided the basis for understanding market functioning, and backed up the findings derived from the trader survey. As market based interventions stimulate exogenously the demand, traders operating in Nyala were assessed against their actual volumes and flows, their constraints to actually expand their business and their response capacity, other than the credit and stocking strategies implemented, and the price margins.

Finally, cost comparison analysis of different food baskets under the on-going in-kind and the planned voucher scenarios was undertaken, both in terms of efficiency and effectiveness.

All the proposed evidence indicates that the feasibility of market-based interventions in Nyala is granted when local availability is enough to compensate the unbalances of the market functioning. As a matter of fact, market operational capacity is challenged by environmental restraints, mostly deriving by insecurity issues and wandering transaction costs. All traders have to handle pervasive resource scarcity that may affect the provision of stocks when the supply chain is under pressure, thus translating into delivery issues trickling down from bigger wholesalers to smaller retailers. As traders operating in the IDP camps usually run small-scale businesses, some concerns on relying only on them for implementing the programme can be raised. Additionally, stocks are in general poor and may support demand only for a week. Yet, traders interviewed are fairly confident to have the capacity to expand up to a quarter their current volumes. The involvement of different categories of traders may therefore provide a buffer against the failure of smaller retailers.

However, the sorghum market appears fairly competitive with no major price maker, and it is reasonably integrated with other markets in Sudan when supply is adequate, as price differences tend to reduce. Peculiarly, there is quite a disconnection between Nyala and other markets in Darfur, as exogenous factors hindering market operational capacity are stronger than in the rest of the country.

Sorghum plays a prominent role both in trade flows and in food consumption, and was amply analysed throughout the report, as well as millet, which is relatively more expensive and is mainly produced in South Darfur. Unfortunately, updated prices of wheat were not available, thence only inferences could be made on this commodity based on other local cereals. However, beyond sorghum consumption, beneficiaries are expected to purchase more wheat than millet, therefore it is recommended to carefully monitor wheat price evolution, which may also be driven by international prices.

Actually, wheat seasonal price peaks fall when sorghum is less expensive, thus the value of the vouchers would be likely hindered if beneficiaries were to hold their wheat consumption despite how the programme is designed. Monitoring of the actual purchasing patterns is therefore crucial during the implementation of the pilot, as vouchers tailored mostly on sorghum may dump in face of real expenditures.

The issue of understanding what beneficiaries will purchase with vouchers has implications in the choice of the transfer modality, when effectiveness under a nutritional perspective is taken into account. If considering a broader spectrum of macro- and micro-nutrients beyond the caloric intake, which is the reference indicator to determine the daily rations per person and consequently the value of the vouchers, concerns over the lack of fundamental nutrients contribution may be raised, thus imposing to closely monitor beneficiaries' choices.

However, vouchers in 2013 would be more cost efficient as compared to in-kind if prices were to follow the expected pattern derived in the text. The projected gain is in the order of nine percent, being skewed towards the last three months of the year, when the caseload is expected to achieve its *acme*, and market settings are more supportive to implement wider market based programmes.

In contrast, summer time would be quite a challenging time to run the programme, and fine-tuning of the voucher should be considered.

Unless prices get extraordinarily low, the efficiency loss in July is in fact expected to range between 2 and 18 percent. As already noted, should prices be subjected to additional pressure beyond the expectations, the above findings may completely differ and the efficiency of vouchers would be questionable.

According to the actual price scenario, the CO may evaluate fixing the value of vouchers also allowing for temporary cost inefficiency vs. moving back to in-kind. The latter option should be considered if harvest failure expectations were disclosed. Forthcoming harvest prospects may therefore reveal to what extent scaling-up the programme would be advisable. Additionally, it should be considered a timely contingency plan applicable under this scenario.

REFERENCE

Al-Feel M.A., and S.M. El-Awad, 2011, *Feasibility Assessment Report for the Provision of Assistance through Vouchers in the Darfur States – Sudan*, Department of Agricultural Economics, University of Khartoum.

Alix-Garcia J., and A. Bartlett, 2012 (a), *Occupations under Fire: the Labor Market under Complex Emergencies*.

Alix-Garcia J., A. Bartlett, and D. Saah, 2012 (b), *The Landscape of Conflict: IDPs, aid, and land use change in Darfur*, Journal of Economic Geography, forthcoming.

Aminu A., 2010, *Analysis of Seasonality and Gross Real Returns to Storage of Tomato in Selected Rural and Urban Markets in Nigeria*, Savannah Journal of Agriculture, Vol. 5, June 2010.

Bartlett A., J. Alix-Garcia, and D. Saah, 2012, *City Growth Under Conflict Conditions: The View from Nyala*, American Sociologic Association, City & Community, 11:2, Washington, DC.

Buchanan-Smith M., *et al.*, 2011, *City Limits: Urbanization and Vulnerability in Sudan, Nyala Case Study*, Humanitarian Policy Group, Overseas Development Institute, London.

Buchanan-Smith M., and A.A. Fadul, 2008, *Adaptation and Devastation: The Impact of the Conflict on Trade and Markets in Darfur*, Feinstein International Center, Tufts University, Medford, MA.

Dorosh P.A., and L. Subran, 2009, *Food Aid, External Trade and Domestic Markets: Implications for Food Security in Darfur*, Paper presented at the International Association of Agricultural Economists Conference, Beijing, China, August 16-22.

El-Dukheri I., H. Damous, and A. M. Khojali, 2004, *Rationale for a Possible Market Support Program in Darfur, Sudan: A Brief Look at Markets and Food Security*, CARE.

FAO, 2001, *Food Balance Sheets, a Handbook*, Rome.

Granger C.W.J., 1969, *Investigating Causal Relationships by Econometric Models and Cross Spectral Methods,* Econometrica, 37:424-438.

Hamid A.R., *et al.*, 2005, *Markets, Livelihoods and Food Aid in Darfur: A Rapid Assessment and Programming Recommendations*.

Harrison C., and C. Wagabi, 2011, *Operational Review of ODS Voucher Programme*, WFP.

Nugent B., and S. Zambakides, 2009, *Darfur: Profile of Nyala Town and Adjacent IDP Camps*, DFID and UNHABITAT.

Ollson O., 2010, *Market Collapse in Vulnerable Environments: A Model Applied to Darfur*, University of Gothenburg.

Omer A.M., 2011, *Agriculture Policy in Sudan*, Energy Research Institute, Nottingham, United Kingdom.

Robinson I., 2012, *Quasi Crop and Food Supply Assessment Mission to Sudan*, Special Report, FAO.

Robinson I., 2011, *Crop and Food Security Assessment Mission (CFSAM)*, Special Report, FAO and WFP.

Ryckembusch D., R. Frega, M.G. Silva, I. Sanogo, U. Gentilini, N. Grede, and L. Brown, 2013, *Enhancing Nutrition - A New Tool for Ex-Ante Efficiency and Effectiveness analysis for selection of one or a combination of transfer modalities: food, cash, or voucher,* in Impacts of Innovative Food Assistance Instruments, World Development, Elsevier, forthcoming.

Sassi M., 2012, *Impact of Climate Change and International Prices Uncertainty on the Sudanese Sorghum Market: A Stochastic Approach*, Paper prepared for presentation at the 1st AIEAA Conference "*Towards a Sustainable Bio-economy: Economic Issues and Policy Challenges*", 4-5 June, Trento, Italy.

SIFSIA project, 2011, *Price and Market-Structure Analysis for Some Selected Agricultural Commodities: Marketing Costs and Margins*.

USAID and FEWSNET, 2011, *Sudan Referendum Impacts on Market Flows and Livelihoods*.

Young H., A.M. Osman, Y. Aklilu, R. Dale, B. Badri, and A.J.A. Fuddle, 2005, *Darfur – Livelihoods under Siege*, Feinstein International Famine Center, Tufts University, Medford, MA, USA.

WFP, 2011, *Market Analysis Framework*, VAM Food Security Analysis, Rome.

WFP, 2007, *Sudan, Comprehensive Food Security and Vulnerability Analysis (CFSVA)*, VAM Food Security Analysis, Rome.

ANNEX 1 – Cost Efficiency by Price Expectation

EXPECTED PRICE

Voucher cost per beneficiary $ 0.10

			FULL-FOOD VOUCHERS											
			TOTAL COSTS		MORE COST-EFFICIENT			VOUCHER VALUE (SDG)						
Month	Location	Total Beneficiaries	In-kind	Voucher	Modality	Difference IK vs. Vch	%	Food Value	Milling Value	Total Value	Efficient Value	Efficiency loss		
Jan	OT	55,178	1,637,979	1,443,827	VOUCHERS	194,153	12%	26.17	2.5	28.67	28.67	0%		
Feb	OT	55,178	1,621,433	1,437,135	VOUCHERS	184,298	11%	26.05	2.5	28.55	28.55	0%		
Mar	OT	55,178	1,643,992	1,530,095	VOUCHERS	113,897	7%	27.73	2.5	30.23	30.23	0%		
Apr	OT	55,178	1,647,324	1,600,448	VOUCHERS	46,876	3%	29.01	2.5	31.51	31.51	0%		
May	OT	55,178	1,644,508	1,576,268	VOUCHERS	68,241	4%	28.57	2.5	31.07	31.07	0%		
Jun	OT	55,178	1,656,761	1,570,835	VOUCHERS	85,927	5%	28.47	2.5	30.97	30.97	0%		
Jul	OT, DG	75,944	2,221,100	2,275,858	IN-KIND	- 54,758	-2%	29.97	2.5	32.47	31.75	2%	not efficient	
Aug	OT, DG	75,944	2,368,694	2,243,514	VOUCHERS	125,180	5%	29.54	2.5	32.04	32.04	0%		
Sep	OT, DG, MO, SK	87,512	2,613,580	2,426,596	VOUCHERS	186,983	7%	27.73	2.5	30.23	30.23	0%		
Oct	OT, DG, MO, SK	87,512	2,615,462	2,273,379	VOUCHERS	342,083	13%	25.98	2.5	28.48	28.48	0%		
Nov	OT, DG, MO, SK, ED	138,915	4,102,972	3,663,296	VOUCHERS	439,676	11%	26.37	2.5	28.87	28.87	0%		
Dec	OT, DG, MO, SK, ED	138,915	4,156,817	3,469,907	VOUCHERS	686,910	17%	24.98	2.5	27.48	27.48	0%		
		935,810	27,930,623	25,511,159	VOUCHERS	2,419,464	9%	27.55	2.50	30.05	29.99			

UPPER BAND

Voucher cost per beneficiary $ 0.10

			FULL-FOOD VOUCHERS											
			TOTAL COSTS		MORE COST-EFFICIENT			VOUCHER VALUE (SDG)						
Month	Location	Total Beneficiaries	In-kind	Voucher	Modality	Difference IK vs. Vch	%	Food Value	Milling Value	Total Value	Efficient Value	Efficiency loss		
Jan	OT	55,178	1,637,979	1,443,827	VOUCHERS	194,153	12%	26.17	2.5	28.67	28.67	0%		
Feb	OT	55,178	1,621,433	1,542,204	VOUCHERS	79,229	5%	27.95	2.5	30.45	30.45	0%		
Mar	OT	55,178	1,643,992	1,677,009	IN-KIND	- 33,017	-2%	30.39	2.5	32.89	32.29	2%	not efficient	
Apr	OT	55,178	1,647,324	1,735,369	IN-KIND	- 88,046	-5%	31.45	2.5	33.95	32.35	5%	not efficient	
May	OT	55,178	1,644,508	1,764,993	IN-KIND	- 120,484	-7%	31.99	2.5	34.49	32.30	6%	not efficient	
Jun	OT	55,178	1,656,761	1,770,304	IN-KIND	- 113,542	-7%	32.08	2.5	34.58	32.53	6%	not efficient	
Jul	OT, DG	75,944	2,221,100	2,614,308	IN-KIND	- 393,208	-18%	34.42	2.5	36.92	31.75	14%	not efficient	
Aug	OT, DG	75,944	2,368,694	2,572,397	IN-KIND	- 203,703	-9%	33.87	2.5	36.37	33.69	7%	not efficient	
Sep	OT, DG, MO, SK	87,512	2,613,580	2,736,707	IN-KIND	- 123,127	-5%	31.27	2.5	33.77	32.37	4%	not efficient	
Oct	OT, DG, MO, SK	87,512	2,615,462	2,571,440	VOUCHERS	44,022	2%	29.38	2.5	31.88	31.88	0%		
Nov	OT, DG, MO, SK, ED	138,915	4,102,972	4,067,981	VOUCHERS	34,991	1%	29.28	2.5	31.78	31.78	0%		
Dec	OT, DG, MO, SK, ED	138,915	4,156,817	4,010,349	VOUCHERS	146,468	4%	28.87	2.5	31.37	31.37	0%		
		935,810	27,930,623	28,506,888	IN-KIND	- 576,265	-2%	30.59	2.50	33.09	31.79			

LOWER BAND

Voucher cost per beneficiary $ 0.10

			FULL-FOOD VOUCHERS											
			TOTAL COSTS		MORE COST-EFFICIENT			VOUCHER VALUE (SDG)						
Month	Location	Total Beneficiaries	In-kind	Voucher	Modality	Difference IK vs. Vch	%	Food Value	Milling Value	Total Value	Efficient Value	Efficiency loss		
Jan	OT	55,178	1,637,979	1,443,827	VOUCHERS	194,153	12%	26.17	2.5	28.67	28.67	0%		
Feb	OT	55,178	1,621,433	1,332,066	VOUCHERS	289,367	18%	24.14	2.5	26.64	26.64	0%		
Mar	OT	55,178	1,643,992	1,383,181	VOUCHERS	260,811	16%	25.07	2.5	27.57	27.57	0%		
Apr	OT	55,178	1,647,324	1,465,527	VOUCHERS	181,797	11%	26.56	2.5	29.06	29.06	0%		
May	OT	55,178	1,644,508	1,387,543	VOUCHERS	256,965	16%	25.15	2.5	27.65	27.65	0%		
Jun	OT	55,178	1,656,761	1,371,366	VOUCHERS	285,395	17%	24.85	2.5	27.35	27.35	0%		
Jul	OT, DG	75,944	2,221,100	1,937,408	VOUCHERS	283,692	13%	25.51	2.5	28.01	28.01	0%		
Aug	OT, DG	75,944	2,368,694	1,914,631	VOUCHERS	454,063	19%	25.21	2.5	27.71	27.71	0%		
Sep	OT, DG, MO, SK	87,512	2,613,580	2,116,486	VOUCHERS	497,094	19%	24.19	2.5	26.69	26.69	0%		
Oct	OT, DG, MO, SK	87,512	2,615,462	1,975,318	VOUCHERS	640,144	24%	22.57	2.5	25.07	25.07	0%		
Nov	OT, DG, MO, SK, ED	138,915	4,102,972	3,258,611	VOUCHERS	844,361	21%	23.46	2.5	25.96	25.96	0%		
Dec	OT, DG, MO, SK, ED	138,915	4,156,817	2,929,465	VOUCHERS	1,227,352	30%	21.09	2.5	23.59	23.59	0%		
		935,810	27,930,623	22,515,429	VOUCHERS	5,415,194	19%	24.50	2.50	27.00	27.00			

ANNEX 2 – Traders' Questionnaire

Nyala Traders' Questionnaire

To be completed by Interviewer:		_____	**To be completed by Team Leader:**		
1.1	**Interviewer NAME**		1.10	Date: |__|__| / |__|__| / 2012	
1.2	**Date:**	|__|__| / |__|__| / 2012 day month		*Day* *Month*	
			1.11	Team Leader NAME _____	
1.3	**Market code:**	|_____|	**Remarks:**		
1.4	**Market name if applicable:**	|_____|			
1.5	**City/Village name:**	|_____|			
1.6	**District name:**	|_____|			
1.7	**State name:**	|_____|			
1.8	**Y-coordinate (latitude):** N |__|__|, |__|__|__|__|__|		**Signature of Team Leader:** |_____|		
1.9	**X-coordinate (longitude):** E |__|__|, |__|__|__|__|__|		**To be completed by Data Entry**		
Please read the following consent form:			1.12	Date: |__|__| / |__|__| / 2012 *(dd/mm/yyyy)*	
My name is..... I am part of a team of the United Nations World Food Programme that is conducting a survey on food markets. I would like to ask you some questions about markets, which will take about thirty minutes. Your name will NOT be recorded and any information that you provide will be confidential and will not be disclosed to other people. Your participation is voluntary and you can choose not to answer any or all of the questions if you wish; however we hope you will participate since your views are important. Do you have any questions? May I begin the interview now? Yes |__| No |__| ***Signature of Interviewer:*** |_____|			1.13	Name of data entry operator |_____|	

Section 2 - General characteristics of the trader

2.1	Which is the trading activity you are involved in?	|__|	1 Big Wholesaler *(Purchasing from traders, selling to other traders, specialized in one/two commodities, using wholesale units (i.e. sacks, jerry can); selling the whole unit and not part of it)* 2 Medium-size Wholesaler *(Purchasing from traders, selling to other traders, specialized in many commodities, using wholesale units (i.e. sacks, jerry can); selling the whole unit and not part of it)* 3 Wholesaler/Retailer *(Purchasing from traders, selling to other traders/ultimate customers, specialized in many commodities, using retail units such as malwa; selling small quantities of the commodity)* 4 Retailer *(Purchasing from traders, selling to ultimate costumers)* 77 Other *(specify)* : _____ 88 **Not applicable** 99 **No answer**
	Note for the enumerator: please indicate exactly the commodity ordering (1st and 2nd). In case no 2nd commodity exists, fill in 2.2.2 with 88. PLEASE, DO NOT LEAVE BLANK SPACES.		
2.2	Can you please indicate the first two most important commodities you normally trade?	2.2.1 - 1st |__| 2.2.2 - 2nd |__|	1 Cereals (Sorghum) 2 Cereals (Millet) 3 Sugar 4 Oil **5** Salt 6 Pulses (Lentils) 7 Pulses (Beans) 77 Other *(specify)* : _____ 88 **Not applicable** 99 **No answer**

2.3	Has the most important commodity traded (see 2.2.1) changed in the past year?		2.3.1	If yes (see 2.3), which one was your most important commodity last year?
	|__| 1. Yes → 2. No → **99. No answer**			|__| 1. Cereals (Sorghum) 2. Cereals (Millet) 3. Sugar 4. Oil 5. Salt 6. Pulses (Lentils) 7. Pulses (Beans) 77. Other *(specify)* : _____ *write "88. Not applicable"* **88. Not applicable** **99. No answer**

Note for the enumerator: at this stage, skip the interview if either 77, 88, or 99 are the answers to questions 2.1 and 2.2.1. ***IN THE REMAINDER OF THE QUESTIONNAIRE, WHEN REFERRING AT THE SELECTED COMMODITY / MOST IMPORTANT COMMODITY, MAKE SURE THE TRADER PERTAINS TO THE COMMODITY SELECTED IN 2.2.1***

2.4	Trader gender:	|__|	1 Male 2 Female
2.5	What is your position in this shop?	|__|	1 Owner 2 Owner's relative 3 Clerk 77 Other (specify): _____ 99 **No answer**
2.6	Please, provide information on the ownership status of the shop	|__|	1 Owned 2 Rented 77 Other (specify): _____ **99 No answer**
2.7	When did you start your trading business?	|__|	1 Less than 1 year ago 2 Between 1-5 years ago 3 More than 5 years ago **99 No answer**

REMARKS SECTION 2:

Section 3 - Volumes and flows

Note for the enumerator: submit section 2 questions referring to the commodity selected in 2.2.1

3.1	Please, provide an estimate of the average quantities sold per week of the most important commodity (2.2.1)	3.1.1	*Harvesting season*	|_____| Unit _____
		3.1.2	*Rainy season*	|_____| Unit _____
			Report the conversion of one unit (i.e. sack, jerry can) into KG and Liters: 1 _____= _____	

3.2	Please, indicate if the sales in this period have increased, decreased, or remained the same compared to one year ago? |___| 1. Increased markedly *(by more than 50%)* 2. Increased moderately *(by 21%-49%)* 3. Increased slightly *(by 6%-20%)* 4. No change *(between -5%, +5%)* 5. Decreased slightly *(by 6%-20%)* 6. Decreased moderately *(by 21%-49%)* 7. Decreased markedly *(by more than 50%)* 77. Other (specify): **88. Not applicable** **99. No answer**		3.3	Please, provide the two most important reasons for this change (see 3.2) and rank by importance 3.3.1 - 1st |___| 3.3.2 - 2nd |___| 1. More production from South Darfur (good harvest) 2. More production from other Sudanese states 3. Less food aid provided by relief agencies to beneficiaries 4. Less traders/farmers selling the same commodity 5. More buyers from other markets in Nyala 6. More buyers from other markets in nearby IDP camps 7. More cash to invest 8. Enhanced security along trading routes 9. Improved infrastructures *write "88. Not applicable"* 10. Less production within South Darfur (bad harvest) 11. Less production from other Sudanese states 2. More food aid provided by relief agencies to beneficiaries 3. More traders/farmers selling the same commodity 4. Less buyers from other markets in Nyala 15. Less buyers from other markets in nearby IDP camps 16. Less cash to invest 17. Reduced security along trading routes 18. Deteriorated infrastructures 77. Other *(specify)* : _____ **88. Not applicable** **99. No answer**
	Note for the enumerator: please indicate exactly the commodity ordering (1st, and 2nd). In case no 2nd exists, fill in 3.4.2 with 88. Please, do not leave blank spaces.			
3.4	Which are the main two sources of the most important commodity traded?	3.4.1 - *1st* |___| 3.4.2 - *2nd* |___|		1 Local factories 2 Factories outside Nyala (specify): _____ 3 Farmers 4 Middlemen 5 Local traders 6 Traders outside Nyala (specify): _____ 77 Other (specify): _____ **88 Not applicable** **99 No answer**
	>>> Do you have any other options where purchasing the most important commodity traded?	3.4.3 |___|		1 Yes, only one 2 Yes, between 1-5 3 No, between 6-10 4 No, more than 10 **88 Not applicable** **99 No answer**
3.5	Is your principal source (see 3.4.1) different compared to the same period of one year ago? |___| 1. Yes 2. No **88. Not applicable** **99. No answer**		3.6	Please, provide the two most important reasons for this change (see 3.5) and rank by importance |___| 1. More production from South Darfur (good harvest) 2. More production from other Sudanese states 3. Less food aid provided by relief agencies to beneficiaries 4. Less traders/farmers selling the same commodity 5. More buyers from other markets in Nyala 6. More buyers from other markets in nearby IDP camps 7. More cash to invest 8. Enhanced security along trading routes 9. Improved infrastructures 10. Less production within South Darfur (bad harvest) 11. Less production from other Sudanese states 12. More food aid provided by relief agencies to beneficiaries 13. More traders/farmers selling the same commodity 14. Less buyers from other markets in Nyala 15. Less buyers from other markets in nearby IDP camps 16. Less cash to invest 17. Reduced security along trading routes 18. Deteriorated infrastructures *write "88. Not applicable"* 77. Other *(specify)* : _____ **88. Not applicable** **99. No answer**

3.7	Whom are you currently SELLING the main commodity traded?	3.7.1 - *1st* |___|	1 Local traders 2 Traders ourside Nyala 3 Government and Institutions 4 Commercial Banks 5 Relief agencies 6 Households 77 Other *(specify)* : _____ **88 Not applicable** **99 No answer**
		3.7.2 - 2nd |___|	
REMARKS SECTION 3:			

Section 4 - Constraints and response capacity

4.1	What are the two most important constraints preventing you expanding your business?	4.1.1 - 1st |___|	1 No money 2 High food prices 3 Transport costs 4 Poor infrastructure 5 Insecurity issues 6 Low profit margin (low sale price / high purchase price) 7 Demand issues 8 Few people are controlling the market 77 Other *(specify)* : _____ 99 No answer
		4.1.2 - 2nd |___|	

4.2	According to your opinion, would the sale PRICE of the most important commodity increase, decrease or stay put if DEMAND on this market would in the coming six months be 25% higher?		4.3	If you expect an INCREASE of prices (see 4.2), do you think it will be temporary (until supply has increased) or sustained (for the period of the demand increase)?
	|___|			|___|
	1. No change	→		*write "88. Not applicable"*
	2. Decrease	→		*write "88. Not applicable"*
	3. Increase	→		1. Temporarly 2. Sustained
	99. No answer			**88. Not applicable** **99. No answer**

4.4	Would you be able to absorb an increased demand…		
	…by 25%?	4.4.1 |___|	1 Yes 2 No *(skip to 4.5)*
	…by 50%?	4.4.2 |___|	1 Yes 2 No *(skip to 4.5)*
	…by 100%?	4.4.3 |___|	1 Yes 2 No
4.5	Assume that demand from your (existing or new) customers would increase by 25%, would you have the capacity to deliver, and in what time frame?	|___|	1 No 2 Yes, within a week 3 Yes, within two weeks 4 Yes, within a month 5 Yes, after a month or more **99 No answer**
REMARKS SECTION 4:			

5. Credit and stocks strategy

5.1	Do you provide credit to some of your customers?	|___|	1 Yes 2 No **99 No answer**
	>>> If yes, what share of your total sales is currently in credit?		|_____|%
5.2	Have there been any changes in the number of credit requests compared to the same period of one year ago?	|___|	1 Yes, less 2 Yes, more 3 No, same number **99 No answer**
5.3	Where do you stock your commodities?	|___|	1 No stocks 2 In my house 3 In the shop 4 In my warehouse 5 In a warehouse belonging to other companies 6 In a public warehouse 77 Other *(specify)* : _____ **99 No answer**
5.4	Is there a time gap between purchasing and selling your food items?	|___|	1 Yes, specify in weeks |_____| 2 No **99 No answer**
5.5	What is your current stock level in terms of quantities and duration?	5.5.1	|_____| Unit _____
		5.5.2	|_____| weeks

5.6 Have you ever experienced poor or stock out?		5.7 If yes, why?
|__|		|__|
1. No	→	*write "88. Not applicable"*
2. Yes, every week 3. Yes, twice per month 4. Yes, once per month 5. Yes, less than once per month	→	1. Limited availability of the product 2. Poor storage capacity 3. No money 4. Increased demand 5. Looting
99. No answer		**88. Not applicable** **99. No answer**

REMARKS SECTION 5:

6. Prices

6.1	**What is the purchasing price for ONE UNIT of the most important commodity (see 2.2.1)?**	|_____| **SDG**
6.2	**What is the selling price for ONE UNIT of the most important commodity (see 2.2.1)?**	|_____| **SDG**

Annex. Observations during the visit

Note for the enumerator: This section is not to be asked. Please fill it a at the end of the interview.

A.1	Activity levels in the shop during the visit	|___|	1 Limited 2 Normal 3 Abundant
A.2	Amount of products for sale in the shop	|___|	1 Limited 2 Normal 3 Abundant
A.3	Amount of quantities for sale in the shop	|___|	1 Limited 2 Normal 3 Abundant
A.4	Amount of brand per different commodity	|___|	1 Limited 2 Normal 3 Abundant
A.5	Similar shops in the neighborhood	|___|	1 None 2 Less than 5 3 Between 5-10 4 More than 10

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