

RESULTS OF THE

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

STRATEGIC RESERVE CORPORATION | FOOD SECURITY TECHNICAL SECRETARIAT OF THE MINISTRY OF AGRICULTURE  
(FAO-SIFSIA/ SUDAN INTEGRATED FOOD SECURITY INFORMATION FOR ACTION)

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## ACRONYMS AND ABBREVIATIONS

C.I.F	Cost, Insurance and Freight
EU	European Union
F.O.B	Free on Board
FAO	United Nations - Food and Agriculture Organization
GDP	Gross Domestic Product
GoNU	Government of National Unity
IPP	Import Parity Price
Kg	Kilogram
MoAF	Ministry of Agriculture and Forestry
MT	Metric ton
SDG	Sudanese Pound
SIFSIA	Sudan Integrated Food Security Information for Action
SRCo	Strategic Reserve Corporation
WFP	United Nations - World Food Programme

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## EXECUTIVE SUMMARY

FAO/Sudan commissioned a cereal availability study in the northern states of the Sudan in 2010. The overall objective of the cereal availability study was to assess the volume of marketable surplus and the availability of cereals during the 2010 marketing year with the view to explore and determine different courses of action for acquiring locally purchased cereals for relief and development activities.

The cereal availability study is based on both primary and secondary data sources, including key producers-irrigation, traditional rain-fed and mechanized rain-fed farms-as well as cereal traders and flour mills. A total of 209 producers, 124 cereal traders and 14 flour mills were interviewed in 12 northern states of Sudan. The three States of Darfur were not included in the study for security reasons. Samples were selected in consultation with the Directors of State Agricultural Planning Offices and other knowledgeable people. Attempts were made to include different categories of traders (large, medium and small) and producers (irrigated traditional rain-fed and mechanized rain-fed farms).

Highlights of the major issues and recommendations that emerge from the cereal availability study:

- In Sudan, crop production contributes approximately 45 per cent of the GDP originating in agriculture, and cereals alone provide nearly 53% of the daily energy supply to the population. Sorghum, millet and wheat are the principal staple foods. But, production of these staple food crops in 2010 declined considerably by nearly 42% from an average of 4.9 million metric tons in 2006-2009 to only 2.9 million metric tons. The magnitude of production decline varies by crop-46.8% for sorghum, 31.3% for wheat and 24.2% for millet. The largest production decrease occurred in the mechanized rain-fed farms that contribute nearly 32% of national cereal output.
  - The decrease in cereal production was due to both a reduction in area harvested (13.9%) and yield (32.7%). As regards to the most important food crop-sorghum-the decrease in production is considerably high in the major sorghum producing states, including Gedarif, Kassela, Sennar Blue Nile States, and Gezira, where production decrease was 65%, 52%, 53%, 47% and 41%, respectively.
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# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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- The reduction in cereal production in 2010 has also been ascertained by the producers covered by the cereal availability survey. About 63% of the producers stated that the overall cereal production in 2010 was lower compared to 2009 and of these some 52% said the decrease could be more than 50%. A number of reasons were provided for the decrease in production, including unfavourable weather and rainfall conditions, management problems related to irrigation water, decrease in fertilizer use, and unavailability of improved seed varieties, etc.
- As a result of the decrease in cereal production, it is estimated that there would be a deficit of about 2.2 million metric tons in 2010 between the population's annual food requirement and the net domestic supply available for consumption (gross production less seed use and post-harvest loss). With a carryover stock of 594,000 metric tons (281,000 metric tons with the Strategic Reserve Corporation as well as 44,000 metric tons, 131,000 metric tons and 138,000 metric tons in the hands of producers, traders, and flour mills, respectively), the actual cereal deficit in 2010 could be in about 1.6 million metric tons. If this shortfall is closed through the importation of wheat, as it has been done in the past, the market could apparently be stabilized. Otherwise, the market could be destabilized, market flows could be disrupted and prices could rise significantly from their normal seasonal pattern.
- In 2010 some 1.15 million metric tons of cereals is estimated to flow to the different markets by producers and traders. Traders and producers are also expected to release their carryover stocks during the marketing year. The irrigated and rain-fed commercial farms contribute more than 70% of the marketable quantity. As of mid-April 2010, producers and traders had about 189,000 metric tons of trading stock in their warehouses, of which 65% is that of the producers. If wheat import is effected, producers and traders will be prompted to release their stocks, and thus limited amount of local purchase of food aid could be carried out.
- It may appear implausible to procure local food aid when cereal production has declined considerably, but lessons of experience show that such undertaking is possible in certain surplus areas even when there is a national overall cereal deficit. For example, in Ethiopia where there is always a sizeable gap between national food requirement and domestic supply, EU and WFP have successfully carried out substantial quantities of local food aid purchase for many years.
- Most of the available stock is sorghum and is mainly available in few locations, including White Nile and Gedarif. Thus, a limited amount of

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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sorghum, to the tune of 40,000 metric tons to 60,000 metric tons, can be locally bought in these locations, but the timing of the local purchase should be synchronized with the importation of wheat in order to avoid any market disruptions.

- Moreover, the local purchase should be carried out innovatively through a transparent tender system so as to make the market competitive and avoid unnecessary speculation. In this regard, the Strategic Reserve Corporation could play an important role. At present the level of domestic wholesale price of sorghum is 76% higher than its import parity price, but with the timely import and distribution of wheat and the introduction of a competitive tender system, domestic wholesale prices of sorghum could decrease to a level of about 20%-30% above the import parity price. In that case, it would be appropriate to locally procure a limited amount at above the IPP.
- Since 2007 sorghum wholesale price in Khartoum has increased by about 3.7% per month, millet by 3.0% and wheat by 1%, and without any market interventions, prices will continue to increase up to December 2010. It is projected that sorghum price will increase from SDG 130/bag in May 2010 to SDG 145 in August and SDG 168 in December. Millet is also expected to increase from SDG 155 in May to SDG 170 in August and SDG 191 in December. Expected price increase of wheat is modest-SDG 124 in August and SDG 128 in December. The price of Sorghum has also been increasing in many of the major markets at a monthly rate of 3.3% in Kadguli to 4.4% in Damazin.
- Moreover, inter-market price differences have changed significantly since February 2009. While sorghum prices in many of the markets were 42%-55% of those of Khartoum before February 2009, now they are only 10%-20%, indicating absence of a conducive marketing environment for inter-market cereal flow, because inter-market price differential of 10%-20% is not sufficient to cover traders' transport and handling expenses as well as net trader's profit margin.
- Traders and producers have difficulty accessing bank credit facilities. Their limited working capital is also tied-up in their trading stocks. Thus, provision of a limited amount of advanced payment to traders and producers involved in the local cereal purchase could help facilitate the smooth and effective implementation of the local purchase operations. This will also help in building thrust between traders and producer on one hand and the organizations involved in local purchase on the other.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

## TABLE OF CONTENTS

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ACRONYMS AND ABBREVIATIONS .....	1
EXECUTIVE SUMMARY .....	i
TABLE OF CONTENTS .....	1
1. INTRODUCTION .....	2
2. OBJECTIVES OF THE STUDY .....	5
3. DATA AND METHODOLOGY .....	6
4. MAIN FINDINGS AND DISCUSSION .....	7
4.1. Cereal Production and Consumption Estimate for 2010 .....	7
4.1.1. Cereal Production .....	7
4.1.2. Sorghum .....	9
4.1.3. Millet .....	11
4.1.4. Wheat.....	13
4.1.5. Cereal Consumption .....	17
4.2. Estimate of Marketable Quantity.....	20
4.3. Cereal Purchase and Sales Activities.....	21
4.3.1. Producers .....	21
4.3.2. Wholesale Traders .....	25
4.3.3. Flour Mills.....	31
4.4. Spatial and Temporal Cereal Market Flow.....	31
4.4.1. Spatial pattern of Cereal Flow .....	31
4.4.2. Seasonal Pattern of Cereal Sales .....	35
4.5. Cereal Inventory Held by Market Actors .....	36
4.6. Domestic Cereal Price Trends .....	38
5. CONCLUSION AND RECOMMENDATION .....	44

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

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## 1. INTRODUCTION

The agricultural sector is the core of Sudanese life and a main driving force for its economy even with the emerging oil sector. Although oil accounts for about 22% of Sudan's GDP, the economy is still predominately agricultural providing employment and livelihood to more than two-thirds of the population (African Economic Outlook, 2010). Agriculture generates more than one-third of the country's GDP and more than 90 percent of the non-oil export earnings. Agriculture also supplies about 60 percent of the raw material processed by the manufacturing sector (NEPAD, 2005).

According to FAO (FAOSTAT), the total area of Sudan is about 251.0 million hectares, including land area of 238.0 million hectares and inland water of about 13.0 million hectares. Of the total land area of Sudan, about 58% is considered suitable for agricultural production; but currently, only 19.5 million hectares or 14.3% is cultivated under temporary and permanent crops (FAOSTAT). Crop production alone contributes approximately 45 per cent of the GDP originating in agriculture, livestock contributing most of the remainder, with forestry and fishery contributing just over 5 per cent (WFP 2006). The major agricultural commodities produced in Sudan are cereals, oilseeds, sugarcane, cotton, vegetables and animal products.

In terms of export, sesame seed, cotton lint, sorghum, molasses, raw sugar and vegetables are the most important foreign exchange earners. In 2007, for example, Sudan exported about 105,000 metric tons of sesame seed worth US\$ 86.8 million; 23,000 metric tons of cotton lint (US\$ 34.4 million); 113,000 metric tons of sorghum (US\$ 26.5 million); 179,000 metric tons of molasses (US\$ 20.8 million); 29,000 metric tons of sugar (US\$ 17.5 million); and 11,000 metric tons of different vegetable products worth US\$ 10.6 million. On the other hand, Sudan also imports various agricultural products including wheat (1.2 million metric tons or US\$ 286.9 million), refined sugar (169,000 metric tons or US\$ 153.8 million), dried whole milk (23,000 metric tons or US\$ 82.0 million), palm and vegetable oils (136,000 metric tons or US\$ 107.0 million), sorghum (199,000 metric tons or US\$ 39.9 million), lentils and broad beans (89,000 metric tons or US\$ 43.3 million), and rice milled (52,000 metric tons or US\$ 16.2 million). Other food item imported include processed foods, sugar raw, and milk (FAOSTAT)



# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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Most of the agricultural commodities produced and imports are mainly destined for local human consumption. Cereals and animal products represent the main food groups in terms of supply for human consumption. Cereals provide more than half of the daily energy supply in Sudan (53%), milk and eggs rank second (13%) and sweeteners provide 8% of the daily energy supply. Thus, almost three-fourths of the energy supply comes from three foods groups, cereals, milk and sweeteners (FAO 2005).

In the Sudan, cereals are produced under three major production systems-irrigated, traditional rain-fed and mechanized rain-fed. The average annual production of the three major cereals-sorghum, millet and wheat-during the period 2006-2009 was about 4,925,125 metric tons; of which 1,552,375 metric tons or 31.5% was produced under irrigation, 1,795,750 metric tons or 36.5% was produced by traditional farmers and 1,577,000 metric tons or 32.0% was produced by rain-fed mechanized farms. Most of the cereal is grown in the northern states of Sudan.

In 2010 weather and rainfall conditions in the northern states of Sudan were not favourable for cereal production. According to the assessment made jointly by the GoNU/MoAF and FAO/Sudan-SIFSIA in 2010, the cereal production estimate in all sectors is considerably lower compared to the previous years.

Inadequate domestic production will result in an overall cereal deficit in 2010, but the situation varies by state. Some states produce surplus, while others would face serious shortfall. Since the food security of the Sudanese people is mainly based on consumption of own production and other livelihood strategies, the availability and size of domestic marketable surplus is crucial particularly for those that are expected to face food shortage in 2010. The availability of domestic marketable surplus is also crucial for those engaged in local procurement of cereals for relief and development. Thus, the FAO/Sudan has commissioned a cereal availability study to assess the volume of marketable surplus and the availability of cereals during the 2010 marketing year.

This report presents the results of the 2010 cereal availability study conducted by the FAO/Sudan SIFSIA and the Strategic Reserve Corporation. In addition to assessing the availability of cereals for local purchase, the report also analyzes producers' and traders' perception of production and market flow conditions in 2010, stocks available in the marketing channel, traders' buying and selling intentions, seasonal cereal

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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purchase and sales patterns during the marketing year and inter-regional cereal movement by the market actors..

The report is structured as follows: Section two describes the objectives of the market study and the issues it attempts to address. Section three elaborates the scope of the study and methodology of data collection and analysis. Section four presents the findings of the study including grain production and market flow conditions in 2010, grain purchase, sales, and size of grain inventory held by different market participants. This section also attempts to analyze past prices trend obtained from the FAO/Sudan and the Strategic Reserve Corporation and forecast price movements during the course of the marketing year. Finally, section five summarizes the major conclusions and provides recommendations.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

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## 2. OBJECTIVES OF THE STUDY

The objective of this study is to assess the volume of marketable surplus and the availability of cereals during the 2010 marketing year with the view to explore and determine different courses of action for acquiring cereals for relief and development activities. Its specific objectives include the following:

- Estimate the size of the expected cereal harvest and market supply in 2010,
- Assess the perception of the different market actors regarding the 2010 cereal production and market flow conditions in terms of both quantity and quality as compared to the previous years',
- Determine the magnitude of the gap (surplus or deficit) between the expected market supply and demand for cereals,
- Assess cereal stocks held by the different market participants during the beginning of the peak marketing season and analyze where and by who the stocks are being held,
- Analyze the seasonal and spatial patterns of market flow of the different cereals,
- Assess market flow of cereals between the major source and destination markets'
- Identify and characterize the principal suppliers and buyers of the different cereals,
- Assess the seasonal pattern of cereal prices and forecast the feasibility of local food purchase taking into account the level of import parity prices,
- Analyze existing and potential cereal marketing problems and opportunities in 2010,
- Identify the types of cereals that could be locally purchased by major actors (SRC, Agricultural Bank of Sudan, etc.) in 2010,
- Recommend effective cereal purchase procedures that should be followed by major market actors in 2010, and
- Set up the cereal availability study standards so as to be repeated in the years to come

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

## 3. DATA AND METHODOLOGY

The study is based on both primary and secondary data sources. The primary data sources include key producers including irrigation, traditional rain-fed and mechanized rain-fed farms; cereal traders and flour mills. All in all, 209 producers, 124 cereal traders and 14 flour mills were interviewed in 12 northern states of Sudan. The geographical distribution of the sample units covered by the survey is shown in Table 1.

**Table 1: Type and Number of Sample Market Actors Interviewed**

State	Type of producer				Traders	Mills	Total
	Rainfed	Irrigated	Both	Total			
Gedarif	15	5		20	11		31
Sennar	15	11		26	9	1	36
Blue Nile	15			15	10		25
White Nile	14	20	1	35	11		46
South Kordofan	15			15			15
Gezira	10	22	1	33	12		45
Northern State		10		10	10		20
River Nile		20		20	10	1	31
North Kordofan	15			15	20	2	37
Kassala	10	10		20	10		30
Khartoum					10	9	19
Red Sea					11	1	12
Total	109	98	2	209	124	14	347

Source: Cereal Availability Survey 2010

Samples were selected after sampling frames were constructed in consultation with the Directors of State Agricultural Planning Offices and other knowledgeable people. In constructing the sampling frame, attempts were made to categorize traders according to their size-large, medium and small-and producers into different production systems-irrigated, traditional rain-fed and mechanized rain-fed.

As it was difficult to utilize a formal sampling procedure due to lack of complete data on the total number of key market actors, a practical approach was adopted in selecting the sample, taking into consideration such factors as time allowed for field data collection and the dispersion of sampling units within each state. Data from primary sources were collected using pre-coded questionnaires by an interview method. A total of 12 supervisors and 27 enumerators were selected and trained for the field data collection.

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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The main secondary data sources include: FAO/Sudan SIFSIA, Planning Department of the MoAF, the Strategic Reserve Corporation, and various recent studies conducted in Sudan.

## 4. MAIN FINDINGS AND DISCUSSION

### 4.1. Cereal Production and Consumption Estimate for 2010

#### 4.1.1. Cereal Production

The major cereal crops produced in Sudan include sorghum, millet and wheat. During the period 2006-2009, the average cereal area annually harvested was about 8.2 million hectares, of which nearly 726,000 hectares or 8.8% was irrigated, 3.4 million hectares or 41.4% was under mechanized rain-fed, and 4.1 million hectares or 49.7% was under traditional rain-fed farming system. The average cereal production obtained during the same period was about 4.9 million metric tons, consisting of 3.7 million metric tons of sorghum or 75.6% of total cereal production, 622,000 metric tons of millet (12.6%), and 578,000 metric tons of wheat or 11.7% of total cereal production.

The irrigated farming system accounts for about 8.8% of the total area harvested, but contributes nearly 31.5% of annual cereal production. The mechanized rain-fed farming system also accounts for nearly 41.4% of area harvested and contributes some 32% of cereal production; whereas the traditional rain-fed farming system accounts for 49.7% of total cereal area harvested, but contributes 36.5% to total cereal output. Thus, the irrigated farming system is the major contributor to annual cereal production, because of its relatively higher productivity-about 2.1 metric tons/hectare. The average yields in the other farming system are 0.5 metric tons/hectare for mechanized rain-fed and 0.4 metric tons/hectare for the traditional rain-fed farming system (see table 2).

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 2: Cereal Production Trend in Northern States of Sudan (2006-2010)**

Year	Production (MT)			Area Harvested (Ha)			Yield (MT/Ha)		
	Irrigated	Mechanized rain-fed	Traditional	Total	Irrigated	Mechanized rain-fed	Traditional	Total	
2006	1,228,000	1,938,000	2,196,000	5,362,000	614,226	3,884,100	4,406,276	8,904,603	2.0
2007	1,873,500	1,939,000	1,813,000	5,625,500	817,155	3,500,418	3,764,435	8,082,008	2.3
2008	1,408,000	1,090,000	1,715,000	4,213,000	681,172	2,943,933	3,879,079	7,504,184	2.1
2009	1,700,000	1,341,000	1,459,000	4,500,000	790,377	3,266,946	4,261,088	8,318,410	2.2
2010	1,092,000	663,000	1,101,000	2,856,000	617,155	2,617,155	3,828,033	7,062,343	1.8
Average (2006-2009)	1,552,375	1,577,000	1,795,750	4,925,125	725,732	3,398,849	4,077,720	8,202,301	2.1
Share % (2006-2009)	31.5	32.0	36.5	100.0	8.8	41.4	49.7	100.0	
2010 Compared to Avg. (%)	70.3	42.0	61.3	58.0	85.0	77.0	93.9	86.1	82.7
Crop Share of Total Prod. (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Source: Sudan MoAF

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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According to the data obtained from the MoAF, the cereal area harvested in 2010 is about 7.1 million hectares-about 13.9% lower than the average for the period 2006-2009. Cereal production in 2010 was also nearly 2.9 million metric tons or 42% lower than the average of the previous four years. The major factors for the low level of cereal production recorded in 2010 were low yields and reduced harvested areas due to unfavourable weather and rainfall conditions.

### 4.1.2. Sorghum

Sorghum is widely grown in many parts of Sudan, but production is highly concentrated in few states. Six states jointly contribute about 72% of the national sorghum production. The most important sorghum producing states include: Gedarif with 18.8% share of annual sorghum production, Gezira (16.6%), South Kordofan (12.9%), Kassala (8.4%), Sennar (8.2%), and White Nile (7.6%). Blue Nile and South Darfur also contribute 5.4% and 4.8% of total sorghum production, respectively.

Sorghum is mainly produced in the mechanized and traditional rain-fed agricultural systems, and only 25% is contributed by irrigated agriculture. However, the average yield of sorghum—about 2.4 metric tons/Ha—is relatively much better compared to mechanized rain-fed (0.5 MT/Ha) and traditional rain-fed (0.6 MT/Ha)-see table 3.

As can be seen from table 3, in 2010, overall sorghum production has decreased by nearly 46.8% compared to the average of the previous four years. The production decrease was mainly due to decrease in the area harvested by 18.4% and decrease in yield by 34.8%. The decrease in sorghum production was particularly considerably high in the major sorghum producing states, except White Nile State. For example, sorghum production in 2010 decreased by 65% in Gedaref, 52%-53% in Kassala and Sennar, 47% in Blue Nile and 41% in Gezira.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 3: Sorghum Production Trend in Northern States of Sudan (2006-2010)**

Year	Production (MT)				Area Harvested (Ha)				Yield (MT/Ha)			
	Irrigated	Mechanized rain-fed	Traditional	Total	Irrigated	Mechanized rain-fed	Traditional	Total	Irrigated	Mechanized rain-fed	Traditional	Total
2006	808,000	1,877,000	1,642,000	4,327,000	434,310	3,715,063	2,463,598	6,612,971	1.9	0.5	0.7	0.7
2007	1,201,000	1,868,000	1,164,000	4,233,000	528,033	3,334,728	1,769,038	5,631,799	2.3	0.6	0.7	0.8
2008	822,000	1,064,000	1,191,000	3,077,000	378,243	2,864,854	2,428,452	5,671,548	2.2	0.4	0.5	0.5
2009	1,061,000	1,276,000	928,000	3,265,000	388,703	3,080,335	2,283,682	5,752,720	2.7	0.4	0.4	0.6
2010	690,000	622,000	670,000	1,982,000	392,887	2,495,816	1,941,423	4,830,126	1.8	0.2	0.3	0.4
Average (2006-2009)	973,000	1,521,250	1,231,250	3,725,500	432,322	3,248,745	2,236,192	5,917,259	2.3	0.5	0.6	0.6
Share % (2006-2009)	26.1	40.8	33.0	100.0	7.3	54.9	37.8	100.0				
2010 Compared to Avg. (%)	70.9	40.9	54.4	53.2	90.9	76.8	86.8	81.6	78.0	53.2	62.7	65.2
Crop Share of Total Prod. (%)	62.7	96.5	68.6	75.6	59.6	95.6	54.8	72.1				

Source: Sudan MoAF



# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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### **4.1.3. Millet**

Like sorghum, millet is also grown in many states of North Sudan, but production seems highly concentrated in very few states. Out of the average annual millet production of some 622,000 metric tons during the period 2006-2009, about 62% comes from South Darfur (34.5%), North Darfur (14.9%), West Darfur (7.5%), and White Nile State (5.3%). Nearly 90.8% of the millet is produced by traditional farmers under rain-fed conditions (see table 4). Average yield levels for mechanized and traditional rain-fed farms are about 0.3 metric tons/hectare, while that of the irrigated farms is about 0.7 metric tons/hectare. Millet is the second most important cereal crop, following sorghum, with about 12.4% share in total annual cereal production in the Sudan.

Year	Production (MT)			Area Harvested (Ha)			Yield (MT/Ha)		
	Irrigated	Mechanized rain-fed	Total	Irrigated	Mechanized rain-fed	Total	Irrigated	Mechanized rain-fed	Total
2006	6,000	59,000	554,000	6,276	167,364	1,942,678	1.0	0.4	0.3
2007	6,000	69,000	649,000	7,113	164,854	1,995,397	0.8	0.4	0.3
2008	3,000	22,000	524,000	5,858	75,732	1,450,628	0.5	0.3	0.4
2009	2,000	61,000	531,000	3,347	183,264	1,977,406	0.6	0.3	0.3
2010	3,000	37,000	431,000	3,766	117,992	1,886,611	0.8	0.3	0.2
Average (2006-2009)	4,250	52,750	564,500	5,649	147,803	1,841,527	0.7	0.3	0.3
Share % (2006-2009)	0.7	8.5	90.8	0.3	7.4	92.3			
2010 Compared to Avg. (%)	70.6	70.1	76.4	66.7	79.8	102.4	109.5	90.0	73.7
Crop Share of Total Prod. (%)	0.3	3.3	31.4	0.8	4.3	45.2			

12

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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As can be seen from table 4, millet production in 2010 was about 471,000 metric tons or about 24.2% lower than the average production of 2006-2009, and it is the lowest production level recorded in the past five years. The decrease in millet production in 2010 was for the most part due to the low yield obtained by the traditional rain-fed farms. The overall millet area harvested in 2010 was more or less similar to that of the average of the period 2006-2009, but significant decrease were observed in the mechanized rain-fed and the irrigated farming system.

### **4.1.4. Wheat**

Average annual production of wheat during the period 2006-2009 was about 578,000 metric tons and represented about 11.7% of total cereal production. The average wheat area harvested was about 290,000 hectares, of which some 99.2% was mainly cultivated by irrigated farms. Wheat yield varied from 1.5 metric tons/hectare for traditional rain-fed farms to 2.1 metric tons/hectare for irrigated farms.

In 2010 the area under wheat in the irrigated farms declined by 23.7% from the average of the 2006-2009 period, while yield decreased by 12.9%. The combined effect of the reduction in area harvested and yield was an overall reduction of wheat production by about 30.6% in the irrigated farming system.

Like the other cereal crops, wheat production is largely comes from four states-Gezera, Northern State, River Nile State and White Nile State-which account for about 40%, 35%, 13% and 6% of total annual wheat production, respectively.

Table 5: Wheat Production Trend in Northern States of Sudan (2006-2010)

Year	Production (MT)			Area Harvested (Ha)			Yield (MT/Ha)		
	Irrigated	Mechanized rain-fed	Traditional	Total	Irrigated	Mechanized rain-fed	Traditional	Mechanized rain-fed	Total
2006	414,000	2,000		416,000	173,640	1,674		2.4	175,314
2007	666,500	2,000		668,500	282,008	837		2.4	282,845
2008	583,000	4,000		587,000	297,071	3,347		2.0	300,418
2009	637,000	4,000		641,000	398,326	3,347		1.2	401,674
2010	399,000	4,000		403,000	220,502	3,347		1.2	223,849
Average (2006-2009)	575,125	3,000		578,125	287,762	2,301		2.1	290,063
Share % (2006-2009)	99.5	0.5		100.0	99.2	0.8			100.0
2010 Compared to Avg. (%)	69.4	133.3		69.7	76.6	145.5		80.0	77.2
Crop Share of Total Prod. (%)	37.0	0.2		11.7	39.7	0.1			3.5

Source: Sudan MoAF

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

### Assessment of 2010 Cereal Production by Producers

During the cereal availability survey field work, cereal producers were asked to compare the production of 2010 with those of a normal year and 2009 harvest seasons. Analysis of the responses of a total of 209 producers (109 rain-fed and 98 irrigated farms) in 10 states shows that 68.9% reported that overall cereal production in 2010 was lower than that of a normal year, 24.8% said it was higher and 6.3% said it was the same. Similarly, about 63% of the producers feel that the overall cereal production in 2010 was lower compared to 2009, while 31.7% said it has increased and 5.3% said it was the same as last year (see tables 6 and 7).

With respect to producers' crop specific responses, the trend is almost similar for sorghum and wheat; but for millet, a relatively large proportion of millet producers-85.7%-reported that millet production in 2010 was lower compared to a normal year and to that of 2009.

**Table 6: Producers' Perception of 2010 Production Compare to Normal Year**

State	Perecent of Producers Reporting Production Increase/Decrease in 2010 Compared to Normal Year (N=206)		
	Increased	Decreased	Same
Gedarif	5	90	5
Sennar	12	88	
Blue Nile		100	
White Nile	43	49	9
South Kordofan	33	67	
Gezira	26	58	16
Northern State	10	80	10
River Nile	47	47	5
North Kordofan	40	53	7
Kassela	15	80	5
Total	25	69	6

Source: Cereal Availability Survey 2010

N= total number of respondents

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 7: Producers' Perception of 2010 Production Compared to 2009**

State	Percent of Producers Reporting Production Increase/Decrease in 2010 Compared to 2009 (N=208)		
	Increased	Decreased	Same
Gedarif	15	75	10
Sennar	23	73	4
Blue Nile		100	
White Nile	59	35	6
South Kordofan	53	47	
Gezira	21	67	12
Northern State	10	90	
River Nile	65	35	
North Kordofan	27	67	7
Kassala	20	75	5
Total	32	63	5

Source: Cereal Availability Survey 2010

N= total number of respondents

About 51.7% of the cereal producers who reported that the 2010 production was lower than that of 2009 estimated the magnitude of the decrease to be more than 50%, while 30.9% said the decrease was between 31% and 50% and 17.4% said it was less than 30%. Likewise, producers' estimate of the magnitude of decrease in cereal production varies by state and cereal type as well as by producer type (table 8).

**Table 8: Producers' Estimate of Magnitude of Production Decrease in 2010**

Magnitude of prod decrease (%)	Percent of producers responding
up to 30%	17.4
31% to 50%	30.9
More than 50%	51.7
N	149.0

Source: Cereal Availability Survey

According to the interviewed producers, the main reasons for the reduction of cereal production in 2010 include primarily bad weather and rainfall conditions, problems

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

related to management of irrigation schemes, unavailability of improved seed varieties and decreased use of fertilizers (see tables 9 and 10).

**Table 9:- Producers' First Reason for Production Decrease**

First reason for production decrease	Percent of producers responding
Bad weather and rainfall conditions	66.0
Decrease of area planted	1.4
Decrease of fertilizer use	3.4
Damage by pests and other factors	6.1
Decrease of improved seed use	2.0
Irrigation water problem	12.9
Other (specify)	8.2
N (Total number of producers)	147

Source: Cereal Availability Survey

**Table 10: Producers' Second Reason for Production Decrease**

Second reason for production decrease	Percent of producers responding
Bad weather and rainfall conditions	11.4
Decrease of area planted	3.5
Decrease of fertilizer use	5.3
Damage by pests and other factors	21.1
Decrease of improved seed use	15.8
Irrigation water problem	13.2
Other (specify)	29.8
N (Total number of producers)	114

Source: Cereal Availability Survey

### 4.1.5. Cereal Consumption

Data on food consumption patterns by geographical area and socio-economic group is not available in the Sudan. Some studies, however, indicate that there are considerable variation in food consumption, because of regional differences in food availability, climatic factor and eating habits. The Food and Agricultural Organization (FAO), for example, indicates that sorghum and millet are the main staple foods in the rural areas of Northern Sudan, while wheat and broad beans are principally consumed in the urban areas.

According to the FAO/Sudan Production and Food Security Assessment conducted in 2010, cereals-mainly sorghum, millet and wheat- account for about 53% of the per capita per daily energy requirement of the population, and the remaining balance comes from groundnuts (6%), sugar and milk each contributing about 10%, and other food items (21%). According to FAO (2010), per capita annual cereal requirements in the northern states of Sudan are assumed to be about 146 kg; including sorghum (73

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

kg), millet (15 kg), wheat (55 kg), rice (2 kg), and maize (1 kg). Based on these consumption data and the estimates of production and population in each state, attempts have been made to estimate the cereal consumption-supply gap of the three important cereals in 2010 (see table 11). In computing the regional cereal supply and demand gaps, the assumptions made by FAO regarding seed requirements and post-harvest losses were also considered.

As can be seen from table 11, the net domestic production available for consumption of the principal three crops-sorghum, millet and wheat-in 2010 is estimated to be about 2.54 million metric tons. This figure represents the net production, that is, gross production less seed requirement, animal feed and post-harvest loss that could be used for human consumption. The net domestic production available for consumption includes about 1.75 million metric tons of sorghum, 433,000 metric tons of millet, and 359,000 metric tons of wheat. Nearly 59% of the net domestic production available for consumption comes from Gezera (20.2%), South Kordofan (13.8%), South Darfur (13.6%), and White Nile (11.1%); whereas the remaining 41% is from the other states of north Sudan. Almost 69% of the amount available for domestic consumption comprises sorghum.

Table 11 also shows that the overall consumption requirement for the three cereal crops in 2010 is about 4.8 million metric tons; of which sorghum, millet and wheat account for 51%, 10% and 38%, respectively. The major cereal consumption centres are Khartoum (representing 20% of the overall annual requirement), Gezera (13.1%), and South Darfur (11.3%). The share of the other states in the overall cereal demand ranges from 2.5% to 5.9% (see table for details).

Comparison of the net domestic production available for consumption and the annual cereal consumption requirement reveals that there will be shortfall of some 2.2 million metric tons in 2010; however, the actual magnitude of the shortfall could be about 1.6 million metric tons if the estimated carryover stock of 594,000 metric tons (281,000 metric tons-Strategic Reserve Corporation, 44,200 metric tons carryover stock of producers, 131,000 metric tons-traders' carryover stock and 138,000 metric tons of imported wheat in the hands of mills) is considered.

With the exception of White Nile, South Kordofan, and Northern States, there will be significant deficit in all states, notably in Khartoum (929,000 metric tons), North Darfur (258,000 metric tons), West Darfur (205,000 metric tons), South Darfur (190,000 metric tons), and West Kordofan (184,000 metric tons).

Sudan has been importing some 1.5 to 2.0 million metric tons of wheat annually over the past few years; and if this trend continues in 2010 and import is carried out in time, the cereal market could on the whole be stabilized.



# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 11: Cereal Consumption Requirement and Supply in 2010**

State	Net Domestic Production Available for Consumption (MT)			Total	Consumption Requirement (MT)			Total	Cereal Demand/Supply Gap (MT)			Total	Gap/Surplus as % of requirement
	Sorghum	Millet	Wheat		Sorghum	Millet	Wheat		Sorghum	Millet	Wheat		
Northern	12,817	0	109,050	121,868	49,640	10,200	37,400	97,240	(36,823)	(10,200)	71,650	24,628	25
River Nile	32,919	0	21,503	54,422	77,672	15,960	58,520	152,152	(44,753)	(15,960)	(37,017)	(97,730)	(64)
Khartoum	10,362	0	11,471	21,834	485,377	99,735	365,695	950,807	(475,015)	(99,735)	(354,224)	(928,973)	(98)
Gezira	330,807	935	180,955	512,697	317,769	65,295	239,415	622,479	13,038	(64,360)	(58,460)	(109,782)	(18)
Sennar	117,955	12,803	7,098	137,856	107,529	22,095	81,015	210,639	10,426	(9,292)	(73,917)	(72,783)	(35)
White Nile	240,082	17,765	25,709	283,557	134,831	27,705	101,585	264,121	105,251	(9,940)	(75,876)	19,436	7
Blue Nile	95,267	10,249	0	105,517	60,371	12,405	45,485	118,261	34,896	(2,156)	(45,485)	(12,744)	(11)
Gedaref	203,001	6,352	0	209,353	142,934	29,370	107,690	279,994	60,067	(23,018)	(107,690)	(70,641)	(25)
Kassal	130,537	-8	0	130,529	134,320	27,600	101,200	263,120	(3,783)	(27,608)	(101,200)	(132,591)	(50)
Red Sea	2,691	2,825	0	5,516	54,385	11,175	40,975	106,535	(51,694)	(8,350)	(40,975)	(101,019)	(95)
North Kordofan	49,793	83,674	0	133,466	124,173	25,515	93,555	243,243	(74,380)	58,159	(93,555)	(109,777)	(45)
West Kordofan	0	0	0	0	93,805	19,275	70,675	183,755	(93,805)	(19,275)	(70,675)	(183,755)	(100)
South Kordofan	325,531	26,054	0	351,585	91,761	18,855	69,135	179,751	233,770	7,199	(69,135)	171,834	96
North Darfur	2,425	15,372	0	17,797	141,036	28,980	106,260	276,276	(138,611)	(13,608)	(106,260)	(258,479)	(94)
West Darfur	27,544	44,711	1,733	73,988	142,277	29,235	107,195	278,707	(114,733)	15,476	(105,462)	(204,719)	(73)
South Darfur	168,432	175,891	1,733	346,056	273,677	56,235	206,195	536,107	(105,245)	119,656	(204,462)	(190,051)	(35)
<b>Total Sudan</b>	<b>1,751,992</b>	<b>433,134</b>	<b>359,252</b>	<b>2,544,378</b>	<b>2,431,557</b>	<b>499,635</b>	<b>1,831,995</b>	<b>4,763,187</b>	<b>(679,565)</b>	<b>(66,501)</b>	<b>(1,472,743)</b>	<b>(2,218,809)</b>	<b>(47)</b>

Source: Sudan/MoAF and FAO/Sudan

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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### 4.2. Estimate of Marketable Quantity

Estimate of cereals annually marketed by different producers and states is not available. According to FAO/Sudan (2010), the overall marketable surplus is estimated at 26% of annual cereal production, but it varies by crop type-28.4% for sorghum, 24.2% for millet and 15.2% for wheat. On the other hand, data collected during the cereal availability survey from 109 rain-fed producers, mostly mechanized rain-fed farms and 98 irrigated farms, in 10 northern states of Sudan show that they sell about 61% of their sorghum output to the market. Millet and wheat producers also reported that they sell 100% and 6.4% of their produce to the market.

As mentioned earlier, sorghum is the single most important staple food in Sudan, accounting for nearly 76% of total annual cereal production. It also represents about 96.5% of all cereals produced in the mechanized rain-fed agriculture. Unlike the traditional/subsistence sorghum producers, whose primary objective is food self-sufficiency, the mechanized farms are believed to be more market-oriented in their production decisions. The mechanized sorghum producers use more purchased inputs including improved seed varieties, modern agricultural machinery and implements as well as other inputs such as herbicides. Such farms allocate a considerable amount of resources with the view to selling a large portion of their output to the market and generate cash income. Thus, the proportion of sorghum output reported by the mechanized farms is considered more realistic than the FAO estimate. However, the FAO estimates of the marketable proportion of the other crops have been maintained.

The marketable quantity of the three cereal crops, which have been computed from secondary and primary data sources, are shown in table 12. As shown in the table, the total marketable produce of sorghum, millet and wheat expected in 2010 is about 1.15 million metric tons or 40.4% of total production. Approximately 84.8% of the marketable quantity consists of sorghum; while millet and wheat account for only 9.9% and 5.3%, respectively. The most important sources of the overall marketed quantity are the irrigated farms and mechanized rain-fed producers which contribute 41.2% and 33.2% of the total volume expected to be marketed in 2010. The share of the traditional sector is about 25.6%.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 12: Estimate of Cereal Marketable Quantity in 2010**

Crop Type	Agriculture Sector	2010 production (MT)	Estimated % of production marketed	Estimated marketable quantity (MT)	% share of marketed quantity
Sorghum	Irrigated	690,000	60.00	414,000	35.9
	Mech. Rain-fed	622,000	60.00	373,200	32.4
	Traditional	670,000	28.40	190,280	16.5
	Sorghum Total	1,982,000	49.32	977,480	84.9
Wheat	Irrigated	399,000	15.16	60,482	5.3
	Mech. Rain-fed				
	Traditional				
	Wheat Total	399,000	15.16	60,482	5.3
Millet	Irrigated	3,000	24.19	726	0.1
	Mech. Rain-fed	37,000	24.19	8,951	0.8
	Traditional	431,000	24.19	104,273	9.1
	Millet Total	471,000	24.19	113,950	9.9
Cereals Total	Irrigated	1,092,000	43.52	475,208	41.3
	Mech. Rain-fed	663,000	57.64	382,151	33.2
	Traditional	1,101,000	26.75	294,553	25.6
	Cereals Total	2,852,000	40.39	1,151,912	100.0

Source: FAO/Sudan and Cereal Availability Study 2010

## 4.3. Cereal Purchase and Sales Activities

### 4.3.1. Producers

As mentioned earlier, the quantity of marketable cereals that is expected to flow into the market in 2010 is estimated at 1.15 million metric tons or nearly 40.4% of the annual output. According to the interviewed producers the marketed volume in 2010 is much less than the previous year. A total of 209 producers (including 109 rain-fed and 98 irrigated farms) were asked to rate this year marketable volume against the previous year. While the majority-64.9%-said this year's marketable quantity is lower compared to the previous year, 27.6% reported it is higher and 7.6% said it is the same as last year. A large number of producers in White Nile, South Kordofan, River Nile, North Kordofan, and Kassala reported an increase in marketed volume in 2010 compared to 2009. In the other states, the majority said it is lower (see table 13).

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 13: Producers' Perception of 2010 Cereal Sales Compared to 2009**

State	Percent of Producers Reporting Increase/Decrease of Cereal Sales in 2010 Compared to 2009 (N=185)		
	Increased	Decreased	No change
Gedarif	17	72	11
Sennar	14	73	14
Blue Nile	0	100	0
White Nile	52	39	10
South Kordofan	57	43	0
Gezira	19	74	6
Northern State	0	80	20
River Nile	33	60	7
North Kordofan	44	56	0
Kassala	30	65	5
Total	28	65	8

Source: Cereal Availability Survey 2010

N= total number of respondents

Out of those producers who reported an increase in marketed volume in 2010, 43% said the magnitude of the increase could be up to 30%; 30.4% said it could range between 31% and 50% and 26.6% said the increase could be more than 50%. Likewise, those who reported a decrease in marketed volume gave their estimate of the magnitude of the decrease as follows: 17.4% up to 30% decrease, 30.9% said 31%-50% decrease, and 51.7% said more than 50% decrease.

In both cases the increase or decrease in marketable volume significantly varies by crop type and state.

There are numerous cereal buyers from producers, including local retailers, wholesale cereal traders, seed companies, Agricultural Bank, farmers, Strategic Reserve Corporation and consumers. In 2009, the majority of the producers-more than 85% said they mainly sold to local retailers and wholesale cereal traders. Local retailers and wholesale cereal traders bought 32.8% and 61.6% of the total cereal marketed by producers. Seed companies and Agricultural bank had 2.3% and 1.8% share of the total sales (see table 14).

Assuming that the amount sold to the Strategic Reserve Corporation in 2009 included that of the banks, the market share of the Corporation would be roughly 2.1%. However, the 2009 performance report of the Strategic Reserve Corporation shows that it procured

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

about 39,000 metric tons of sorghum through direct purchase (2,500 metric tons) and through banks (36,000 metric tons) in 2009. Thus, the local purchase of the Corporation represents about 3.3% of the total marketed quantity in 2009, which indicates that producers have, to some extent, understated their sales to the Corporation.

Although some local purchase of food aid is believed to be conducted in Sudan, the interviewed producers did not mention donors or NGOs as their major cereal buyers in 2009.

**Table 14: Share of Different Buyers in Total Producers' Cereal Sales in 2009**

Major cereal buyers from producers	Percent share (%)
Local retailers	32.76
Wholesalers	61.57
Flour mills	0.07
Seed companies	2.29
Animal feed factories	0.61
Other (specify)	0.42
Agricultural bank	1.85
Alaaliab	0.10
Consumers	0.07
Farmers	0.03
Strategic Reserve Corporation	0.24
Total	100.00

Source: Cereal Availability Survey

Cereal producers have access to various types of market facilities, including access to storage facilities, bank credit, market information and transport services. The magnitude of accessibility, however, varies by state and service type. As shown in table 15, producers' access to market information and transport services are relatively better-nearly 89% and 94% of those interviewed reported that they access to transport services and market information services, respectively. Although 50% said they have access to bank credit, there are a significant number of producers who do not have access to bank credit in some states, including Blue Nile, South Kordofan, Gezira, River Nile, and North Kordofan. Access to storage facilities is also a limiting factor for producers in some states such as Gedaref, Kassala, North Kordofan and River Nile (see table 15).

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 15: Percentage of Producers Having Access to Different Services**

State	Access to storage facility	Access to bank credit	Access to market information	Access to transport services
Gedarif	40	75	100	90
Sennar	69	50	100	92
Blue Nile	73	47	100	100
White Nile	100	57	97	100
South Kordofan	73	20	80	73
Gezira	60	47	80	87
Northern State	60	50	100	80
River Nile	55	35	95	80
North Kordofan	57	33	100	73
Kassala	53	68	95	100
Total	67	50	94	89

Source: Cereal Availability Survey

With regard to storage facility, the survey result shows that most of the producers' storage capacity is concentrated in few states, namely, White Nile, Gedaref, Sennar, and Blue Nile. Average storage capacity/producer is about 341 metric tons, but it varies from 1,549 metric tons in Gedarif to less than 15 metric tons in South Kordofan (table 16).

**Table 16: Regional Distribution of Producers' Storage Facilities**

State	Regional distribution of storage capacity (%)	Mean Capacity (MT/producer)
Gedarif	27.1	1,549
Sennar	16.6	422
Blue Nile	7.2	297
White Nile	40.7	532
South Kordofan	0.3	13
Gezira	1.3	34
Northern State	2.9	218
River Nile	0.7	29
North Kordofan	1.7	112
Kassala	1.6	75
Total	100.0	341

Source: Cereal Availability Survey

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

### 4.3.2. Wholesale Traders

Wholesale traders are expected to handle some 710,000 metric tons or about 62% of the total marketed quantity sold nationally. The total number of wholesale traders operating in the market is not known, but according to key informants their number could be more than 1,500. Wholesale traders vary by size; for example, a big trader handles more than 9,000 bags or 810 metric tons/year and the smallest trader purchases less than 500 bags or 45 metric tons. A medium size trader's average annual volume of cereal purchase is the range of 45-180 metric tons. The size distribution of wholesale traders considerably varies by state. For example, in Gedaref State nearly 82% of the traders are classified under "big merchant" category; whereas in the Northern State and Red Sea more than 60% of the traders fall under the small trader category (see table 17).

**Table 17: Size Distribution of Traders by 2009 Cereal Purchase (%)**

State	Category of traders by 2009 purchase				Total
	Up to 45 MT	45.1 MT to 180 MT	180.1 MT to 810 MT	More than 810 MT	Total number of traders
Gedarif	0.0	0.0	18.2	81.8	11
Sennar	10.0	10.0	50.0	30.0	10
Blue Nile	11.1	33.3	33.3	22.2	9
White Nile	0.0	27.3	18.2	54.5	11
Gezira	33.3	41.7	25.0	0.0	12
Northern State	66.7	22.2	11.1	0.0	9
River Nile	40.0	30.0	30.0	0.0	10
North Kordofan	35.7	28.6	28.6	7.1	14
Kassala	30.0	20.0	30.0	20.0	10
Khartoum	11.1	33.3	22.2	33.3	9
Red Sea	60.0	20.0	20.0	0.0	10
Total	27.0	24.3	26.1	22.6	115

Source: Cereal Availability Survey

Analysis of the size distribution of wholesale cereal traders show that the market is highly dominated by the few. For example, of the total traders' cereal purchase in 2009, the top 25% bought 84.9% and lowest 25% only 0.7%. The share of the medium size traders was about 12% (see table 18). Similarly the mean purchase of the biggest and smallest traders was 25 metric tons and 3,582 metric tons, respectively.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 18: Market Share of Different Category of Traders**

Category of traders by 2009 purchase	Market Share (%)	Mean purchase (MT/trader
Up to 45 MT	0.7	24.8
45.1 MT to 180 MT	2.7	110.3
180.1 MT to 810 MT	11.7	443.5
More than 810 MT	84.9	3,581.9
Total	100.0	981.7

Source: Cereal Availability Survey

According to the interviewed traders, the majority stated that they have adequate access to different facilities/supports such as storage, transport logistics and market information. However, they reported they have severe constraint in obtaining bank credit for their business operations. Access to bank credit is severe in most states, including Blue Nile, White Nile, Northern State, River Nile, Northern Kordofan, Khartoum and Red Sea (see table 19). Most of the traders' storage capacity is concentrated in Sennar (48%), Gedarif (33%), and White Nile State (10%). The mean storage capacity per trader is about 837 metric tons.

**Table 19: Percentage of Traders with Access to Different Services**

State	Access to bank credit	Access to storage facility	Access to transport services	Access to logistics supplies such as sacks and twines	Access to market information?
Gedarif	55	82	91	91	100
Sennar	56	78	89	100	100
Blue Nile	0	90	100	100	100
White Nile	18	100	64	64	73
Gezira	58	75	100	100	100
Northern State	10	100	90	90	100
River Nile	0	33	50	90	100
North Kordofan	5	35	85	90	90
Kassala	100	60	90	70	100
Khartoum	0	0	100	90	100
Red Sea	0	40	60	57	55
All states	26	61	84	87	92

Source: Cereal Availability Survey

In 2010, wholesale traders' cereal purchase is low compared to the previous year, because of the considerable decrease in production and the subsequent decline in cereal market flow. In many of the Northern states, traders reported a substantial decline in market flow in 2010 compared to 2009. Nearly 83.1% said that market flow decreased in 2010, while 12.1% and 4.8% reported an increase and a more or less similar flow, correspondingly. Although the 2010 cereal market flow situation is more or less similar across states, a



# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

significantly large number of traders in two states-White Nile and North Kordofan have reported an increase in cereal flow this year compared to last year.

**Table 20: Traders' Perception of 2010 Cereal Flow Compared to 2009**

State	Percent of Traders Who Reported Increase/Decrease of Cereal Market Inflow in 2010 Compared to 2009 (N=124)		
	Same as last year	Increased	Decreased
Gedarif			100
Sennar			100
Blue Nile			100
White Nile		55	45
Gezira			100
Northern State			100
River Nile	10		90
North Kordofan		35	65
Kassala	30	10	60
Khartoum	10	10	80
Red Sea	9	0	91
Total	5	12	83

Source: Cereal Availability Survey 2010

N= total number of respondents

The 2010 cereal market flow also varies by crop type. Nearly 79% and 86% of the traders said sorghum and millet market flow is low, while 33% of the traders said wheat market inflow in 2010 is better than the previous year. Overall, however, the survey indicates a reduction in the cereal market flow in 2010.

**Table 21: Perceived Market Flow by Type of Cereal**

Cereal Type	Percent of Traders Who Reported Increase/Decrease of Cereal Market Inflow in 2010 Compared to 2009 (N=124)		
	Same as last year	More than last year	Less than last year
Sorghum	5	16	79
Millet	12	2	86
Wheat	9	33	59
Total	8	17	75

Source: Cereal Availability Survey 2010

N= total number of respondents

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

Regarding the magnitude of the reduction in cereal market flow in 2010, more than 60% of the traders said the 2010 cereal inflow to the market could be more than 30%, while some 24% indicated a reduction of up to 21%-30% (see table 22). Decrease in cereal production, low quality of harvested grain, and holding of on-farm stocks by producers have been reported to have contributed to the poor market flow in 2010.

As a result of the weak cereal market flow in 2010, traders were able to achieve less than 30% of their planned annual cereal purchase for 2010 or about 37% of the previous year's actual purchase up to the end of April 2010. Similarly, their cereal sales performance was low compared to the 2010 target by nearly 70%.

**Table 22: Traders' Perception of the Magnitude of Decrease of Flow**

State	Percent of Traders Reporting Different Magnitudes of Cereal Inflow Decrease in 2010 Compared to 2009 (N=103)				
	Less than 5%	5% to 10%	11% to 20%	21% to 30%	More than 30%
Gedarif				36	64
Sennar		11		11	78
Blue Nile				20	80
White Nile			20	40	40
Gezira			8	8	83
Northern State		10	20	20	50
River Nile		0	11	22	67
North Kordofan		15	15	15	54
Kassala			0	17	83
Khartoum	13		13	38	38
Red Sea				50	50
Total	1	4	8	24	63

Source: Cereal Availability Survey 2010

N= total number of respondents

Normally, the major cereal buyers from wholesale traders are local retailers, wholesalers in different states, flour mills, seed companies, animal feed factories, consumers and the Strategic Reserve Corporation. Local retailers, other wholesale traders, animal feed factories and seed companies have the major share of traders' annual cereal sales (see table 23). The market share of the Strategic Reserve Corporation in traders' total cereal sale in 2009 is almost negligible-2% of the total cereal sales by traders.

The Strategic Reserve Corporation has been established with the view to buy major staple foods as well as to hold and manage strategic stocks to ensure the country's food security situation. The Strategic Reserve Corporation is expected to build up its stock of nearly 600,000 metric tons-about 12% of the national cereal requirement-of different staple

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

foods within a period of three years. The Strategic Reserve Corporation has its own and rented storage facilities in different parts of the country. In 2009, because of the anticipated production increase, the SRCo planned to procure about 162,000 metric tons of various cereals, including 107,000 metric tons of sorghum, 30,000 metric tons of wheat and 25,000 metric tons of millet from the domestic market; but it managed to accomplish only 39,000 metric tons of sorghum (SRCo, 2009 Performance Report).

**Table 23: Share of Different Buyers in Traders' Cereal Sales in 2009**

Major buyers	Percent share in traders' annual sale (%)
Local retailers	51
Wholesalers	28
Flour mills	3
Seed companies	2
Animal feed factories	12
Other (specify)	2
Consumers	1
Strategic Reserve Corporation	2
Total	100

The traders reported that they sell their cereal supplies in different markets. They have identified a total of 31 markets where they sold their cereals in 2009, but the most important are Omdurman, Elobied, Kassela, Rebak, Atbara, Kosti, Alnhoud, and Gedaref. Omdurman, particularly, is the single most important cereal market where the wholesale traders sell nearly 55% of their supplies (see table 24).

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Table 24: Traders' Major Cereal Sales Markets in 2009**

No.	Markets where traders sell their cereal supplies	Percent share of market of total annual cereal sale by traders
1	Atbara	4.09
2	Demazin	0.76
3	Dilling	0.37
4	Elobied	6.65
5	Gedarif	2.75
6	Gongola	0.61
7	Kassela	6.02
8	Omdurman	54.47
9	Port Sudan	2.98
10	Rebak	4.73
11	Sennar	1.85
12	Wade Medni	0.26
13	Other (specify)	2.92
14	New Halfa	0.04
15	Abu Hogar	1.32
16	Alborgag	0.05
17	Aldaba	0.20
18	Aldamer	0.90
19	Aldeawam	0.09
20	Aldinder	0.35
21	Algolid	0.23
22	Alnhoud	3.87
23	Alsilam	0.00
24	Darfur	0.04
25	Kadgli	0.11
26	Karima	0.62
27	Khartoum	0.08
28	Kosti	3.26
29	Sawaken	0.00
30	Southern Sudan	0.12
31	Tandalti	0.27
	Total	100.00

Source: Cereal Availability Survey

Traders reported a number of constraints that impede their operations. These include business tax, poor quality of cereals, poor quality of warehouse facilities, lack of access to bank credit, shortage of storage facilities for rent, local fees, market fees, fluctuation of cereal prices, and lack of buyer.

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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### 4.3.3. Flour Mills

The country's flour mills are also major users of cereal as a raw material. There is no data on the total number of flour mills in the Sudan, but different sources (FAO) indicates that their annual flour production is about 831,000-1,245,000 metric tons, which implies their annual wheat requirement (at 72% extraction rate) would be some 1,554,000 to 1,731,000 metric tons, most of which-97%- is imported hard wheat. According to the 14 mills surveyed, their average annual capacity utilization is about 65%. The mills sell their wheat flour mainly in urban areas.

The major products of the mills include wheat flour which represents about 87% of their annual output and pasta/macaroni (3.3%). Their current selling price of wheat flour is SDG 1,448/metric ton (ex-factory). It is estimated that the mills had some 137,000 metric tons of wheat stock at the end of the 2009 marketing year and 132,000 metric tons as at mid-April 2010.

The mills are constrained by lack of access to foreign currency, electric power disruption, lack of access to bank credit, and high cost of electric power.

## 4.4.Spatial and Temporal Cereal Market Flow

### 4.4.1. Spatial pattern of Cereal Flow

Data regarding the inter-regional cereal flow was collected from a sample of wholesale traders and producers in 10 states. The states covered by the study are important sorghum and wheat producing areas, but their contribution to overall national millet production is insignificant. Thus, the flow analysis presented in this section is believed to represent the reality with respect to overall cereal flow and particularly the flow pattern of the most important crop-sorghum-and wheat. According to a study conducted by WFP Sudan VAM Unit in 2008 regarding grain routes and flows, millet is mainly traded within the greater Darfur Area as shown in figure 1.

The interviewed producers and wholesale traders jointly handled nearly 103,137 metric tons of different cereals in 2009, of which sorghum accounts for more than 90%. Most of the marketed quantity originates from Gedarif (43.7%), White Nile (18.0%), Khartoum (9.9%), Sennar (8.4%), Blue Nile (5.9%), and others (23.3), including Gezira, Northern State, River Nile, North Kordofan, Kassala, Khartoum, and Red Sea State.

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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On the receiving end, producers and traders identified more than 40 markets where they sell their cereals. The single most important receiving market is Omdurman, which takes delivery of more than 50% of the total flow coming from the different supplying markets. Other important receiving markets include Gedarif, Kosti, Elobied, Atbara, Demazin, Abu Hogar, Alduiem, Kassela, Rebak, Sennar, Singa, Tandalti, Tambul, and Gongola.

Omdurman, the key terminal market in Sudan, receives cereals mainly from Khartoum, Gedarif, Sennar, White Nile, Blue Nile and Gezira. Nearly 77% of the shipment from Gedarif, 38% of the total shipment from Sennar, 38.4% of the total consignment from White Nile, 91% of the supply from Khartoum and 48.6% of the outflow from Gezira is destined from Omdurman.

Gedarif-the second most important cereal receiving market-obtains its supplies from different markets within the state and from Blue Nile State.

Elobied is the third most important market, which is supplied from Gedarif, Blue Nile, White Nile, South and Northern Kordofan and Kassela.

Atbara, another important cereal market receives cereals from Northern State, River Nile, Kassela and Khartoum.

Demazin also receives from Gedarif and different localities of Blue Nile. Kosti takes delivery of cereal shipment from Blue Nile and White Nile. Abu Hogar is solely supplied from Sennar. Details of the cereal flow pattern are shown in the origin/destination matrix shown in table 25.

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Figure 1: Grain Routes and Flows**

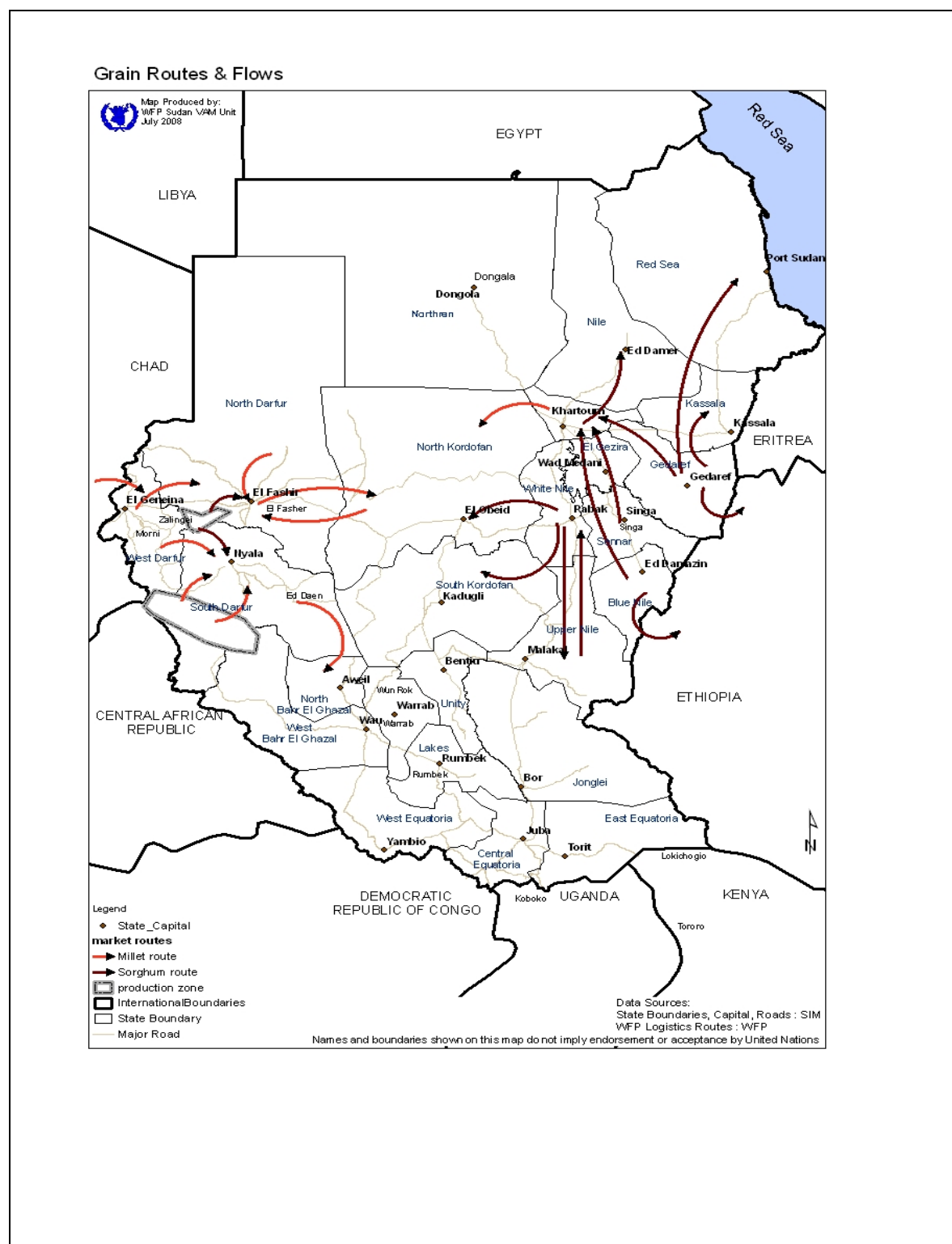


Table 25: Origin and Destination of Overall Cereal Market Flow (2009)

Destination markets	Origin/State											Total
	Gedarif	Sennar	Blue Nile	White Nile	Gezira	Northern State	River Nile	North Kordofan	Kassala	Khartoum	Red Sea	
Abu Hogar		27.4										2,358.0
Al Shagrab										0.1		9.0
Alaaliab								0.3				9.5
Alborgag						2.7	0.7					76.0
Aldamer						11.5		0.1		0.0		239.5
Aideawam				3.9			21.1					1,410.8
Algirba				0.3						0.1		75.6
Algolid		3.1		0.7			1.4					452.3
Almanasir						13.3		0.0				270.3
Alarahad						0.2			0.5			20.3
Alzidab								2.8				92.1
Aroma										0.8		79.2
Atbara						0.1	72.9		54.7	0.2		4,128.1
Barbar								0.1				4.1
Demazin	0.4		50.9					0.0				3,285.0
Dibbaibat					0.1		1.4	11.7				434.0
Dilling					3.5							48.9
Elfao												10.4
Elobied	0.4		26.7	7.9				36.9	1.4			4,522.5
Gedarif	20.7		5.9									9,666.9
Gongola						8.1	1.9			5.3		765.7
Hafawa									0.2			7.0
Kadgli					0.4			3.8				131.6
Kassala	0.4				38.9				33.5	0.0		1,774.0
Khamisa Arab		1.0										90.0
Khartoum		2.1										180.0
Kosti			7.4	29.2								5,860.4
Managil		0.1										6.8
Mazmoom		3.1										270.0
New Halfa										1.6		168.0
Nomair									0.0			0.4
Omdurman	77.1	37.6	8.9	38.4	48.6				0.0	91.4		55,613.7
Others		3.1		0.0			0.7	40.2	6.0	4.4		1,882.0
Rebak			0.2	11.2								2,086.7
Sennar		22.3										1,922.4
Singa		0.0								95.6	1,927.2	1.9
Soki	1.0									0.1	5.3	0.0
Tambul						42.6						865.8
Tandalti				8.4								1,549.4
Um Elgora						5.2			3.6			104.8
Umrwaba												112.5
Wad Almaak						0.1						1.4
Wad Ehilaw										0.3		34.8
Wade Medni					8.4	16.4						450.0
Southern Sudan									4.1			135.0
Group Total	45,066.2	8,615.5	6,075.0	18,516.2	1,388.4	2,032.3	3,286.0	3,295.7	3,128.7	10,190.9	1,541.9	103,136.7
% Share of state	43.7	8.4	5.9	18.0	1.3	2.0	3.2	3.2	3.0	9.9	1.5	100.0



# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

### 4.4.2. Seasonal Pattern of Cereal Sales

According to the FAO (2005), in the northern states of Sudan, sorghum and millet are planted in June-July and harvested in November-December. Wheat is planted in November and harvested in March. Thus, the post harvest season when cereal availability in the market is expected to be relatively abundant is Jan - April, and the food shortage season when supplies dwindle coincides with the rainy season, that is, August-October.

The data obtained from producers and traders confirms this pattern of cereal flow to the market. For example, producers sell a large part of their output in January (16.7%), February (12.8%), March (10.0%) and April (10.5%), indicating that about 50% of producers' cereal output is sold during the peak marketing season following the harvest. In the subsequent months producers' cereal supply gradually decreases to 4.8% of marketable output in August, 2.9% in September and 2.7% in October (see table 26 and figure 2).

Traders' cereal sales pattern, however, appears to be comparatively constant throughout the entire marketing season. This indicates that traders are playing a crucial role in temporal price arbitrage, besides their important role in inter-market cereal flow.

**Table 26: Seasonal Pattern of Cereal Sale by Producers and Traders (2009)**

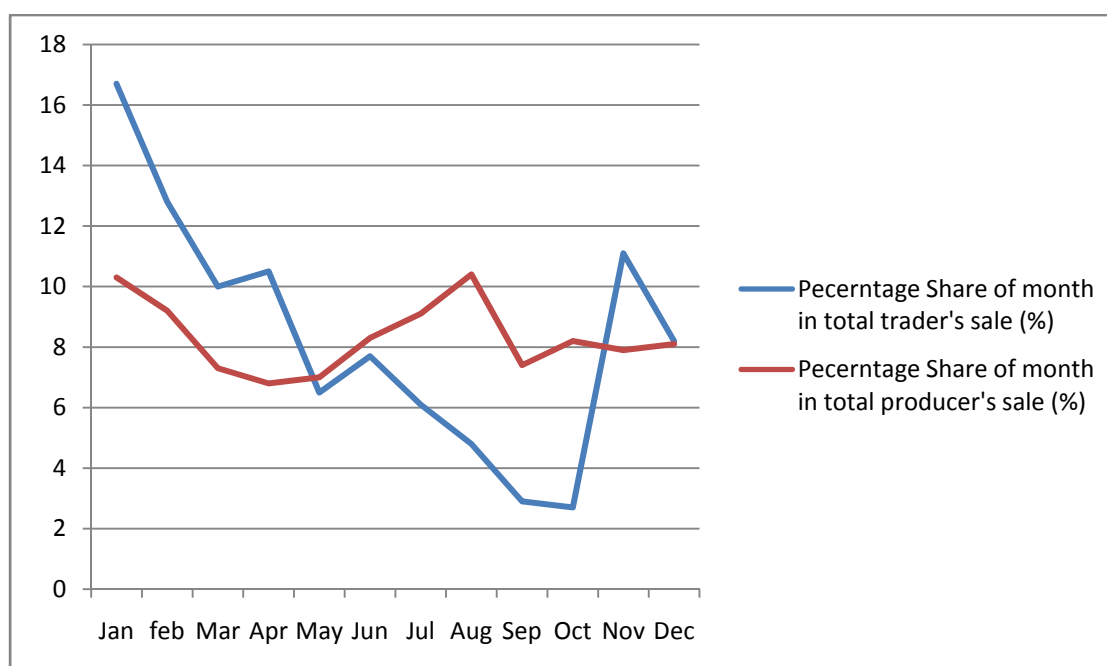
Month of cereal sale	Percent share of month in total producers' sale (%)	Percent share of month in traders' total sale (%)
January	16.7	10.3
February	12.8	9.2
March	10.0	7.3
April	10.5	6.8
May	6.5	7.0
June	7.7	8.3
July	6.1	9.1
August	4.8	10.4
September	2.9	7.4
October	2.7	8.2
November	11.1	7.9
December	8.2	8.1
Total	100.0	100.0

Source: Cereal Availability Survey

# CEREAL AVAILABILITY STUDY

IN THE NORTHERN STATES OF SUDAN

**Figure 2: Seasonal Pattern of Cereal Sales by Traders and Producers.**



Source: Cereal Availability Survey 2010

## 4.5. Cereal Inventory Held by Market Actors

Because of the limited scope of the cereal availability study, it was difficult to accurately estimate the type and quantity of cereal stocks held by the different market actors. However, based on the data obtained from the interviewed producers and wholesale traders, the average cereal carryover stock held at the end of the 2009 marketing year was 20.4 metric tons for producers and 242 metric tons for wholesalers. During the fieldwork producers and traders were also asked to provide data on the type and quantity of stocks they had as at mid-April 2010 (duration of the cereal availability survey fieldwork). Accordingly, it has been estimated that the mean stock held by producers and traders was 57 metric tons and 121 metric tons, respectively.

Attempts were also made to roughly estimate the total number of producers and wholesale traders operating in the states covered by the cereal availability survey using

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

the knowledge of key informants. Thus, the total number of commercial farmers and wholesale traders was estimated to be roughly 2,160 and 540, respectively<sup>1</sup>.

A combination of the pieces of information obtained from the survey and the key informants provides rough estimates of the total cereal inventories that were in the hands of producers and traders as well as flour mills at the end of the 2009 marketing year and around mid-April 2010. As shown in table 27, the cereal inventory held by producers, traders and flour mills at the end of the 2009 marketing year, was about 313,000 metric tons, of which 44,000 was held by producers, 131,000 metric tons by traders and 138,000 metric tons by flour mills.

**Table 27: Carryover Stocks of Traders and Producers**

Type of market participant	Carryover stock at the end of 2009 (MT)	% Share	Cereal stock as at mid-April 2010 (MT)	% Share
<b>Cereal Producers</b>				
Small	3,772	1.2	238	0.1
Medium	1,634	0.5	4,604	1.4
Large	38,760	12.4	118,929	37.0
Total	44,167	14.1	123,771	38.5
<b>Wholesale Traders</b>				
Small	339	0.1	475	0.1
Medium	22,682	7.3	18,492	5.8
Large	107,625	34.4	46,364	14.4
Total	130,645	41.8	65,332	20.3
Flour Mills	137,720	44.1	132,500	41.2
Grand Total	312,532	100.0	321,603	100.0

Source: Cereal Availability Study 2010

The total cereal inventory held by producers and traders at the end of the 2009 marketing year corresponds roughly to about 16% of the total marketed quantity during the year. As shown in the table, almost 42% of the total stock was in the hands of traders and 44% was with the flour mills. The balance is stock held by producers.

The major actors in stock holding are the large producers that produce more than 387 metric tons, and the big traders who handle more than 9,000 bags or 810 metric tons/year. These two categories of producers and traders have 12.7% and 70.5% of the total year-end stock (excluding stock of imported wheat).

At the time of the fieldwork of the cereal availability study (mid-April), producers, traders and flour mills had approximately 322,000 metric tons of cereal stock, of which close to 59% belonged to producers and traders, while the remaining balance was stock of

<sup>1</sup> The number could be more, but only those actors who play significant role have been considered.

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

imported wheat held by flour mills. As the time of the field work coincided with the peak period of the post harvest season, it seems reasonable for producers to hold a comparatively large grain inventory, probably in anticipation of higher prices later in the lean supply season in response to the expected large supply shortfall in 2010.

The cereal carryover stock held by producers at the end of the 2009 marketing year includes sorghum (87%) and wheat (13%); while the carryover stock of traders was composed of sorghum (96%) and millet (3.4%). Flour mills' stock was entirely imported wheat. The geographical distributions of producers' and traders' cereal stocks are shown in table 28.

**Table 28: Geographical Distribution of Producers' and Traders' Cereal Stocks**

State	Producers' carryover stock end of 2009 (%)	Producers' cereal stock mid-April 201 (%)	Traders' carryover stock end of 2009 (%)	Traders' cereal stock mid-April 201 (%)
Gedarif	26.0	7.0	46.0	27.9
Sennar	10.2	3.8	0.6	1.8
Blue Nile	23.1	7.8	10.8	4.2
White Nile	14.8	65.7	9.8	45.2
South Kordofan	0.2	0.4		
Gezira	1.4	0.6	1.1	2.6
Northern State	12.3	8.8		0.2
River Nile	1.5	1.8	1.8	1.4
North Kordofan	4.9	3.5	0.1	3.1
Kassala	5.5	0.6	29.7	3.6
Khartoum				3.6
Red Sea			0.0	6.3
Total	100.0	100.0	100.0	100.0

Source: Cereal Availability Survey

## 4.6.Domestic Cereal Price Trends

Cereal prices have been consistently increasing in Khartoum since 2007. During the period 2007-2010, sorghum wholesale price in Khartoum has increased by about 3.7% per month, millet by 3.0% and wheat by 1%<sup>2</sup>. Without any market interventions, prices will continue to rise up to December 2010. For example, Sorghum price in Khartoum will increase from SDG 130/bag in May 2010 to SDG 145 in August and SDG 168 in December. Millet is also expected to increase from SDG 155 in May to SDG 170 in

<sup>2</sup> The exponential equation:  $Y=e^{bt}$  was used to estimate the rate of increase of sorghum prices in the selected markets. The equation estimates that the rate of growth was 3.8% to 4.1%/month, with  $R^2$  more than 0.8.

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

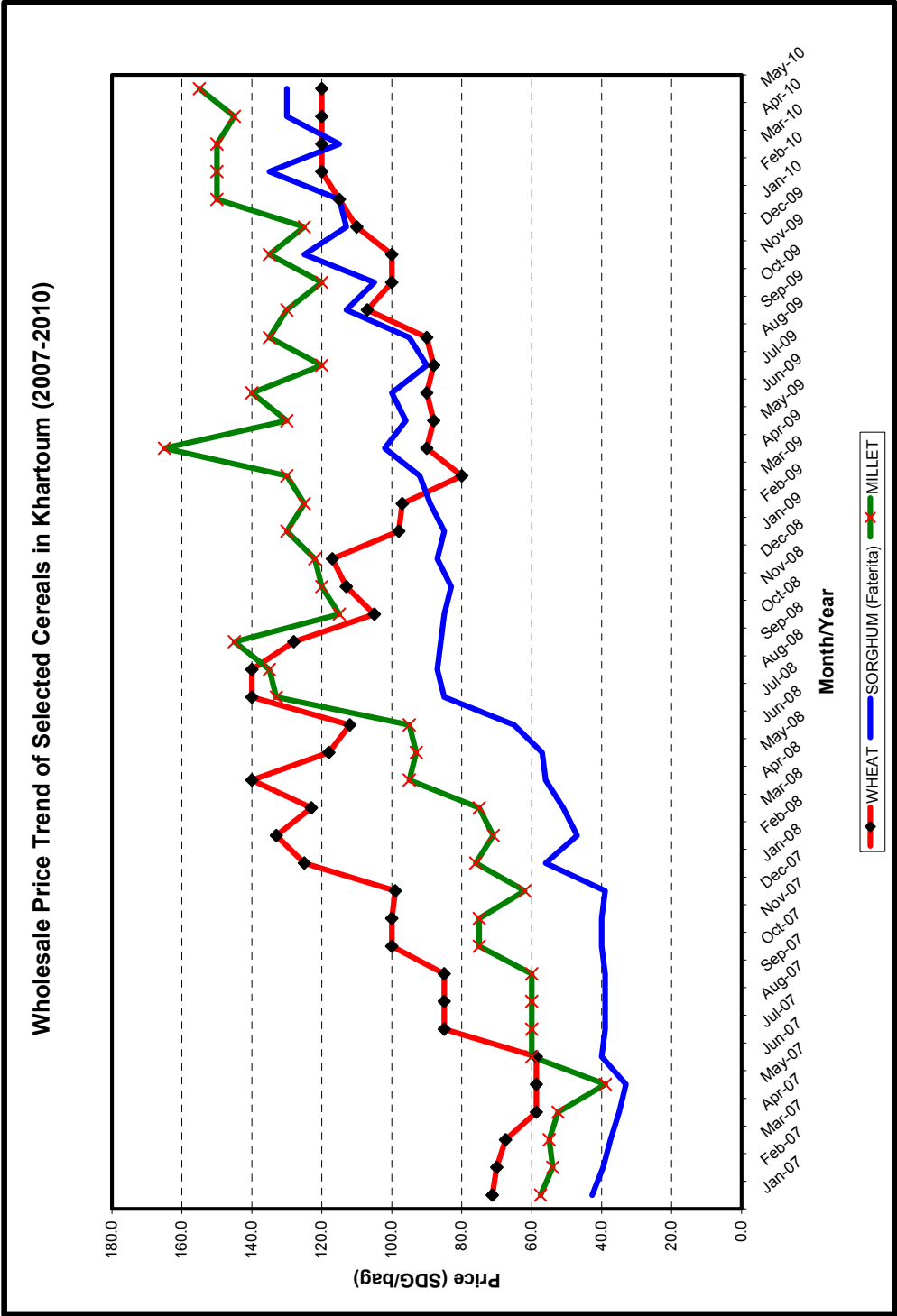
August and SDG 191 in December. Expected price increase of wheat is modest-SDG 124 in August and SDG 128 in December (see table 29)

**Table 29: Expected Monthly Cereal Prices in Khartoum (May-December 2010)**

Crop type	Estimated monthly growth rate (%)	Price (May 2010)	Expected price in						
			Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
Sorghum	3.7%	130.0	134.8	139.8	145.0	150.4	156.0	161.8	167.8
Millet	3.0%	155.0	159.7	164.6	169.5	174.7	180.0	185.5	191.1
Wheat	1.0%	120.0	121.2	122.4	123.5	124.7	126.0	127.2	128.4

Source: FAO/Sudan

Figure 3: Price Trend of Selected Cereals in Khartoum (2007-2010)



# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

Price of Sorghum has also been increasing in many of the major markets during the same period. The rate of monthly price increase of sorghum was almost similar in all markets- 3.3% (Kadguli) to 4.4% (Damazin) over the 2007-2010 period, but inter-market price differences have changed significantly since February 2009. During the period January 2007-February 2009, sorghum prices in many of the markets were 42%-55% of those of Khartoum, indicating that the marketing environment was conducive for inter-market flow, because inter-market price differential of 45% to 58% is reasonable to include transport and handling expenses as well as net trader's profit margin.

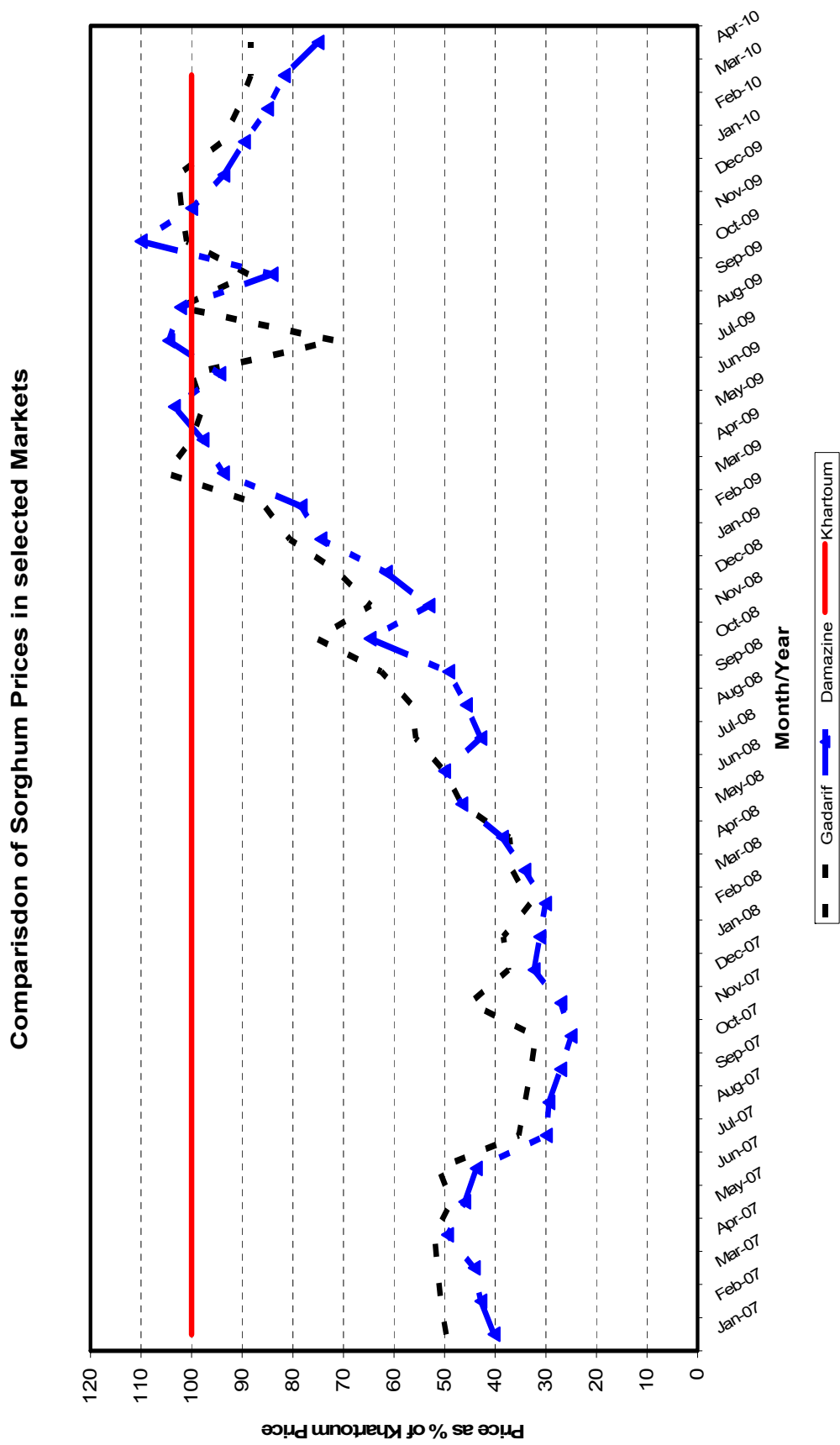
Since February 2009, however, the price difference between Khartoum and the other major markets has been getting narrower and narrower (see figure 4). Thus, with this low inter-market price differential, the situation does not seem to encourage traders to move cereals from supplying to consuming areas. The current price differential does not even match up traders' profit expectation, let alone to cover the various handling and transport expenses, including transport cost, cost of bags and twines, interest, spillage and waste, storage, loading and unloading, etc. Normally, price differential of 10%-15% is believed to represent only traders' net profit margin. The expected prices of sorghum in selected markets during the period May to December 2010 is shown in table 30.

**Table 30: Expected Sorghum Prices in Selected Markets (May-December 2010)**

Market	Estimated monthly growth rate	Price (May 2010)	Expected price (SDG/bag) in:						
			Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
Khartoum	3.8%	130	135	140	145	151	156	162	168
Gedarif	3.9%	106	110	114	119	123	128	133	138
El Obeid	3.8%	108	112	116	121	125	130	135	140
Kadugli	3.3%	97	100	103	107	110	114	118	121
Red Sea	3.4%	119	123	127	131	136	140	145	150
Al Fashir	4.2%	161	168	175	182	190	198	206	215
Damazin	4.4%	90	94	98	102	107	112	116	122

Source: FAO/Sudan

Figure 4: Comparison of Sorghum Prices in Selected Markets (2007-2010)





# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

Comparison of the domestic wholesale price of sorghum and Import Parity Price in Khartoum in April/May 2010 shows that the domestic price is nearly 76% higher than the import parity price. As shown in table 31, the IPP sorghum price was about SDG 74/bag and domestic wholesale price was SDG 130/bag.

**Table 31: IPP and Domestic Wholesale Prices of Sorghum (April/May 2010)**

No.	Cost Component	Sorghum
1	F.o.b prices -US Gulf Ports (USD/MT)	166.0
2	Ocean freight (USD/MT)	26.0
3	Insurance; 1% of f.o.b (USD/MT)	1.7
4	C.I.F -Port Sudan (USD/MT) (1+2+3)	193.7
5	Standard	0.6
6	Health certificate (USD/MT)	3.4
7	Transportation from Port Sudan to Khartoum (USD/MT)	43.5
8	Storage (USD/MT)	0.5
9	Clearance (USD/MT)	8.0
10	Disperse (USD/MT)	13.0
11	Loading (USD/MT)	4.3
12	Agriculture quarantine (USD/MT)	22.2
13	Losses	5.4
14	Transportation from port to storage	5.4
15	shipping agency	9.7
16	Total inland handling and transport cost (5-15)	116.0
17	Total cost (USD/MT) 4 + 16	309.7
18	Trader's net profit margin (15% of 17)	46.5
19	IPP wholesale selling price (USD/MT, Khartoum) 17 + 18	356.2
20	IPP wholesale selling price (SDG/bag, Khartoum)	73.7
21	Domestic wholesale price (SDG/bag, Khartoum)	130.0
	Domestic price as % of IPP	176.3

Notes:

- 1 FOB price of US #2 Yellow Sorghum Gulf ports has been used (source: FAO Crop Prospects and Food Situation, May 2010)
- 2 Ocean Freight is taken from FAO Food Outlook, May 2010
- 3 Exchange rate: 1 USD=2.3 SDP (Assumption)
- 4 Insurance 1% of FOB - Assumption
- 5 Inland handling and transport costs based on 2008 data)
- 6 Domestic wholesale price from FAO/Sudan

### 5. CONCLUSION AND RECOMMENDATION

The major issues and recommendations that emerge from the cereal availability study are the following:

- In Sudan, crop production contributes approximately 45 per cent of the GDP originating in agriculture, and cereals alone provide nearly 53% of the daily energy supply to the population. Sorghum, millet and wheat are the principal staple foods. But, production of these staple food crops in 2010 declined considerably by nearly 42% from an average of 4.9 million metric tons in 2006-2009 to only 2.9 million metric tons. The magnitude of production decline varies by crop-46.8% for sorghum, 31.3% for wheat and 24.2% for millet. The largest production decrease occurred in the mechanized rain-fed farms that contribute nearly 32% of national cereal output.
- The decrease in cereal production was due to both a reduction in area harvested (13.9%) and yield (32.7%). As regards to the most important food crop-sorghum-the decrease in production is considerably high in the major sorghum producing states, including Gedarif, Kassala, Sennar Blue Nile States, and Gezira, where production decrease was 65%, 52%, 53%, 47% and 41%, respectively.
- The reduction in cereal production in 2010 has also been ascertained by the producers covered by the cereal availability survey. About 63% of the producers stated that the overall cereal production in 2010 was lower compared to 2009 and of these some 52% said the decrease could be more than 50%. A number of reasons were provided for the decrease in production, including unfavourable weather and rainfall conditions, management problems related to irrigation water, decrease in fertilizer use, and unavailability of improved seed varieties, etc.
- As a result of the decrease in cereal production, it is estimated that there would be a deficit of about 2.2 million metric tons in 2010 between the population's annual food requirement and the net domestic supply available for consumption (gross production less seed use and post-harvest loss). With a carryover stock of 594,000 metric tons (281,000 metric tons with the Strategic Reserve Corporation as well as 44,000 metric tons, 131,000 metric tons and 138,000 metric tons in the hands of producers, traders, and flour mills, respectively), the actual cereal deficit in 2010 could be in about 1.6 million metric tons. If this shortfall is closed through the importation of wheat, as it

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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has been done in the past, the market could apparently be stabilized. Otherwise, the market could be destabilized, market flows could be disrupted and prices could rise significantly from their normal seasonal pattern.

- In 2010 some 1.15 million metric tons of cereals is estimated to flow to the different markets by producers and traders. Traders and producers are also expected to release their carryover stocks during the marketing year. The irrigated and rain-fed commercial farms contribute more than 70% of the marketable quantity. As of mid-April 2010, producers and traders had about 189,000 metric tons of trading stock in their warehouses, of which 65% is that of the producers. If wheat import is effected, producers and traders will be prompted to release their stocks, and thus limited amount of local purchase of food aid could be carried out.
- It may appear implausible to procure local food aid when cereal production has declined considerably, but lessons of experience show that such undertaking is possible in certain surplus areas even when there is a national overall cereal deficit. For example, in Ethiopia where there is always a sizeable gap between national food requirement and domestic supply, EU and WFP have successfully carried out substantial quantities of local food aid purchase for many years.
- Most of the available stock is sorghum and is mainly available in few locations, including White Nile and Gedarif. Thus, a limited amount of sorghum, to the tune of 40,000 metric tons to 60,000 metric tons, can be locally bought in these locations, but the timing of the local purchase should be synchronized with the importation of wheat in order to avoid any market disruptions.
- Moreover, the local purchase should be carried out innovatively through a transparent tender system so as to make the market competitive and avoid unnecessary speculation. In this regard, the Strategic Reserve Corporation could play an important role. At present the level of domestic wholesale price of sorghum is 76% higher than its import parity price, but with the timely import and distribution of wheat and the introduction of a competitive tender system, domestic wholesale prices of sorghum could decrease to a level of about 20%-30% above the import parity price. In that case, it would be appropriate to locally procure a limited amount at above the IPP.
- Since 2007 sorghum wholesale price in Khartoum has increased by about 3.7% per month, millet by 3.0% and wheat by 1%, and without any market interventions, prices will continue to increase up to December 2010. It is

# CEREAL AVAILABILITY STUDY

## IN THE NORTHERN STATES OF SUDAN

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projected that sorghum price will increase from SDG 130/bag in May 2010 to SDG 145 in August and SDG 168 in December. Millet is also expected to increase from SDG 155 in May to SDG 170 in August and SDG 191 in December. Expected price increase of wheat is modest-SDG 124 in August and SDG 128 in December. The price of Sorghum has also been increasing in many of the major markets at a monthly rate of 3.3% in Kadguli to 4.4% in Damazin.

- Moreover, inter-market price differences have changed significantly since February 2009. While sorghum prices in many of the markets were 42%-55% of those of Khartoum before February 2009, now they are only 10%-20%, indicating absence of a conducive marketing environment for inter-market cereal flow, because inter-market price differential of 10%-20% is not sufficient to cover traders' transport and handling expenses as well as net trader's profit margin.
- Traders and producers have difficulty accessing bank credit facilities. Their limited working capital is also tied-up in their trading stocks. Thus, provision of a limited amount of advanced payment to traders and producers involved in the local cereal purchase could help facilitate the smooth and effective implementation of the local purchase operations. This will also help in building thrust between traders and producer on one hand and the organizations involved in local purchase on the other.

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## **Annexes**

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**Sorghum : Five years (2006-2010) Planted, Harvested Area, Production and Yield by State and Sector**

Region	State	Agriculture Sector	Centre of Production	2010				2009				2008				2007				2006				
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv			
Northern	Nother	Irrigated	Northern	20	18	14	778	18	18	21	1,167	20	19	19	1,000	19	19	19	1,000	21	21	20	952	
		Mech. Rain-fed																						
		Traditional																						
	Total Northern State			20	18	14	778	18	18	21	1,167	20	19	19	1,000	19	19	19	1,000	21	21	20	952	
	River Nile	Irrigated	River Nile	35	32	28	875	58	58	55	948	75	60	60	1,000	175	155	155	1,000	83	77	49	636	
		Mech. Rain-fed																						
Traditional				29	25	8	320	65	55	14	255	351	281	73	260	390	280	76	271	53	38	10	263	
Total River Nile State			64	57	36	632	123	113	69	611	426	341	133	390	565	435	231	531	136	115	59	513		
Total Northern Region		Irrigated		55	50	42	840	76	76	76	1,000	95	79	79	1,000	194	174	174	1,000	104	98	69	704	
		Mech. Rain-fed		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Traditional		29	25	8	320	65	55	14	255	351	281	73	260	390	280	76	271	53	38	10	263	
		Total		84	75	50	667	141	131	90	687	446	360	152	422	584	454	250	551	157	136	79	581	
Khartoum	Khartoum	Irrigated	Khartoum																					
		Mech. Rain-fed																						
		Traditional		216	68	12	176	40	34	3	88	100	82	8	98	90	55	6	109	90	55	6	109	
Total Khartoum		Irrigated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mech. Rain-fed		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Traditional		216	68	12	176	40	34	3	88	100	82	8	98	90	55	6	109	90	55	6	109	
		Total		216	68	12	176	40	34	3	88	100	82	8	98	90	55	6	109	90	55	6	109	
Central	Gezira	Irrigated	Gezira Schar	650	455	319	701	513	482	578	1,199	474	446	446	1,000	604	580	580	1,000	470	453	386	852	
			Outside Rotation																					
		Mech. Rain-fed																						
		Traditional	Gezira	941	428	46	107	798	771	89	115	1,248	1,159	195	168	524	393	67	170	1,183	885	186	210	
	Total Gezira State			1,591	883	365	413	1,311	1,253	667	532	1,722	1,605	641	399	1,128	973	647	665	1,653	1,338	572	428	
	Sennar	Irrigated	Suki	41	34	29	853	24	22	28	1,273	24	19	19	1,000	32	30	31	1,033	31	30	27	900	
			Sennar	82	76	61	803	73	70	52	743	65	56	40	714	82	65	49	754	101	80	56	700	
		Mech. Rain-fed	Sennar	3,226	968	43	44	1,290	1,127	182	161	833	704	103	146	2,000	1,300	240	185	1,709	1,162	198	170	
		Traditional	Sennar	400	140	8	57	167	152	21	138	294	282	60	213	300	174	35	201	500	355	71	200	
	Total Sennar State			3,749	1,218	141	116	1,554	1,371	283	206	1,216	1,061	222	209	2,414	1,569	355	226	2,341	1,627	352	216	
	White Nile	Irrigated	White Nile	109	103	75	728	85	82	81	988	60	54	38	704	116	103	68	660	114	111	53	477	
		Mech. Rain-fed	White Nile	1,112	874	133	152	632	274	33	120	599	509	68	134	1,047	820	248	302	1,345	1,005	163	162	
		Traditional	White Nile	550	435	59	136	680	476	79	166	600	494	121	245	550	440	158	359	150	107	14	131	
		Total White Nile State			1,771	1,412	267	189	1,397	832	193	232	1,259	1,057	227	215	1,713	1,363	474	348	1,609	1,223	230	188
	Blue Nile	Irrigated	Blue Nile																					
		Mech. Rain-fed	Blue Nile	831	569	83	146	459	425	89	209	375	289	62	215	732	647	268	414	684	607	244	402	
		Traditional	Blue Nile	180	123	24	195	148	140	60	429	100	90	15	167	130	109	39	358	88	79	27	342	
		Total Blue Nile State			1,011	692	107	155	607	565	149	264	475	379	77	203	862	756	307	406	772	686	271	395
Total Central Region		Irrigated		882	668	484	725	695	656	739	1,127	623	575	543	944	834	778	728	936	716	674	522	774	
		Mech. Rain-fed		5,169	2,411	259	107	2,381	1,826	304	166	1,807	1,502	233	155	3,779	2,767	756	273	3,738	2,774	605	218	
		Traditional		2,071	1,126	137	122	1,793	1,539	249	162	2,242	2,025	391	193	1,504	1,116	299	268	1,921	1,426	298	209	
		Total		8,122	4,205	880	209	4,869	4,021	1,292	321	4,672	4,102	1,167	284	6,117	4,661	1,783	383	6,375	4,874	1,425	292	
Eastern	Gedaref	Irrigated	Rahad	94	80	49	613	70	67	107	1,597	83	79	80	1,013	96	86	94	1,093	94	89	85	955	
		Mech. Rain-fed	Gedaref	5,871	2,097	192	92	5,260	3,671	713	194	4,374	3,232	429	133	4,619	3,030	521	172	4,567	3,750	765	204	
		Traditional	Gedaref																					
		Total Gedaref State			5,965	2,177	241	111	5,330	3,738	820	219	4,457	3,311	509	154	4,715	3,116	615	197	4,661	3,839	850	221
	Kassal	Irrigated	New Halfa	72	68	52	765	79	68	88	1,294	80	76	46	605	87	82	94	1,146	80	73	58	795	
			Gash	63	61	58	951	45	43	38	884	80	75	64	853	82	78	70	897	74	70	53	757	
			Kassal				2	2	1	500	1	1	1	1,000	50	45	36	800	6	6	5	833		
			Mech. Rain-fed	Kassal	1,450	435	33	76	1,147	1,041	156	150	1,656	1,242	214	172	1,200	800	144	180	1,100	600	90	150
		Traditional	Kassal	500	100	6	60	240	205	18	88	167	126	20	159	200	120	22	183	200	120	22	183	
		Total Kassal State			2,085	664	149	224	1,513	1,359	301	221	1,984	1,520	345	227	1,619	1,125	366	325	1,460	869	228	262
	Red Sea	Irrigated	Tokar	7	7	2	286	8	8	4	500	11	11	4	364	22	16	3	188	20	19	11	579	
		Mech. Rain-fed																						
Traditional		Red Sea	15	6	1	167	50	43	9	209	50	43	9	209	49	30	6	200	19	8	1	125		
Total Red sea State			22	13	3	231	58	51	13	255	61	54	13	241	71	46	9	196	39	27	12	444		
Total Eastern Region		Irrigated		236	216	161	2,614	204	188	238	4,775	255	242	195	3,835	337	307	297	4,124	274	257	212	3,919	
		Mech. Rain-fed		7,321	2,532	225	167	6,407	4,712	869	344	6,030	4,474	643	305	5,819	3,830	665	352	5,667	4,350	855	354	
		Traditional		515	106	7	227	290	248	27	297	217	169	29	368	249	150	28	383	219	128	23	308	
		Total		8,072	2,854	393	3,008	6,901	5,148	1,134	5,416	6,502	4,885	867	4,508	6,405	4,287	990	4,860	6,160	4,735	1,090	4,581	

**Sorghum : Five years (2006-2010) Planted, Harvested Area, Production and Yield by State and Sector**

Region	State	Agriculture Sector	Centre of Production	2010				2009				2008				2007				2006			
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv		
Kordofan	North Kordofan	Irrigated	North Kordofan	2	2	1	500	6	5	5	1,000	5	4	3	750	3	3	2	667	9	7	4	571
		Mech. Rain-fed	North Kordofan	20	12	1	83	20	15	3	200	20	15	3	200	19	18	4	222	125	90	16	178
		Traditional	North Kordofan	1,408	1,269	57	45	1,828	1,261	106	84	1,178	845	128	151	630	530	112	211	845	638	91	143
	Total North Kordofan State			1,430	1,283	59	46	1,854	1,281	114	89	1,203	864	134	155	652	551	118	214	979	735	111	151
	West Kordofan	Irrigated																					
		Mech. Rain-fed	West Kordofan																				
		Traditional	West Kordofan																				
	Total West Kordofan State			0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	South Kordofan	Irrigated																					
		Mech. Rain-fed	South Kordofan	1,266	1,010	137	136	1,000	586	59	101	825	605	124	205	1,158	977	332	340	1,371	1,053	249	236
Traditional		South Kordofan	1,127	958	225	235	1,368	1,163	313	269	1,368	1,195	313	262	1,173	1,038	343	330	821	659	186	282	
Total South Kordofan State			2,393	1,968	362	184	2,368	1,749	372	213	2,193	1,800	437	243	2,331	2,015	675	335	2,192	1,712	435	254	
Total Kordofan Region	Irrigated			2	2	1	500	6	5	5	1,000	5	4	3	750	3	3	2	667	9	7	4	571
	Mech. Rain-fed			1,286	1,022	138	135	1,020	601	62	103	845	620	127	205	1,177	995	336	338	1,496	1,143	265	232
	Traditional			2,535	2,227	282	127	3,196	2,424	419	173	2,546	2,040	441	216	1,803	1,568	455	290	1,666	1,297	277	214
	Total			3,823	3,251	421	129	4,222	3,030	486	160	3,396	2,664	571	214	2,983	2,566	793	309	3,171	2,447	546	223
Darfur	North Darfur	Irrigated																					
		Mech. Rain-fed	North Darfur																				
		Traditional	North Darfur	400	100	4	40	420	231	14	61	501	286	17	59	89	67	4	60	147	65	12	185
	Total North Darfur State			400	100	4	40	420	231	14	61	501	286	17	59	89	67	4	60	147	65	12	185
	West Darfur	Irrigated																					
		Mech. Rain-fed	West Darfur																				
		Traditional	West Darfur	311	187	31	166	155	132	36	273	188	160	51	319	180	132	46	348	200	127	44	346
	Total West Darfur State			311	187	31	166	155	132	36	273	188	160	51	319	180	132	46	348	200	127	44	346
	South Darfur	Irrigated																					
		Mech. Rain-fed	South Darfur																				
Traditional		South Darfur	1,736	801	189	236	1,200	780	164	210	1,071	663	159	240	974	780	226	290	937	620	167	269	
Total South Darfur State			1,736	801	189	236	1,200	780	164	210	1,071	663	159	240	974	780	226	290	937	620	167	269	
Total Darfur Region	Irrigated			0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Mech. Rain-fed			0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Traditional			2,447	1,088	224	206	1,775	1,143	214	187	1,760	1,109	227	205	1,243	979	276	282	1,284	812	223	275
	Total			2,447	1,088	224	206	1,775	1,143	214	187	1,760	1,109	227	205	1,243	979	276	282	1,284	812	223	275
Southern States	Upper Nile	Irrigated	Upper Nile	4	3	2	667	4	4	3	750	4	4	2	500					2	2	1	500
		Mech. Rain-fed	Renk					228	223	41	184	267	251	61	243	445	378	111	294	706	612	152	248
		Traditional																					
	Total Upper Nile State			4	3	2	667	232	227	44	194	271	255	63	247	445	378	111	294	708	614	153	249
	Other Southern State	Irrigated																					
Mech. Rain-fed																							
Traditional						15	15	2	133	100	98	22	224	100	80	24	300	2,508	2,132	805	378		
Total Other Southern State			0	0	0		15	15	2	133	100	98	22	224	100	80	24	300	2,508	2,132	805	378	
Total Southern Region	Irrigated			4	3	2	667	4	4	3	750	4	4	2	500	0	0	0		2	2	1	500
	Mech. Rain-fed			0	0	0		228	223	41	184	267	251	61	243	445	378	111	294	706	612	152	248
	Traditional			0	0	0		15	15	2	133	100	98	22	224	100	80	24	300	2,508	2,132	805	378
	Total			4	3	2	667	247	242	46	190	371	353	85	241	545	458	135	295	3,216	2,746	958	349
Total Sudan	Irrigated			1,179	939	690	735	985	929	1,061	1,142	982	904	822	909	1,368	1,262	1,201	952	1,105	1,038	808	778
	Mech. Rain-fed			13,776	5,965	622	104	10,036	7,362	1,276	173	8,949	6,847	1,064	155	11,220	7,970	1,868	234	11,607	8,879	1,877	211
	Traditional			7,813	4,640	670	144	7,174	5,458	928	170	7,316	5,804	1,191	205	5,379	4,228	1,164	275	7,741	5,888	1,642	279
	Total			22,768	11,544	1,982	172	18,195	13,749	3,265	237	17,247	13,555	3,077	227	17,967	13,460	4,233	314	20,453	15,805	4,327	274



Millet : Five years(2006-2010) Planted, Harvested Area, Production and Yield by State and Sector

Region	State	Agriculture Sector	Centre of Prod.	2010				2009				2008				2007				2006			
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv		
Central	Gezira	Irrigated																					
		Mech. Rain-fed																					
		Traditional	Gezira	9	5	1	200	4	3	1	333	15	14	3	214	21	16	2	125	10	7	1	143
	Total Gezira State			9	5	1	200	4	3	1	333	15	14	3	214	21	16	2	125	10	7	1	143
	Sennar	Irrigated	Sennar																				
		Mech. Rain-fed		252	107	12	112	142	113	10	88	96	59	7	119	128	100	18	180	90	63	9	143
		Traditional		45	19	2	105	14	12	2	167	12	9	2	222	122	92	18	196	60	42	8	190
	Total Sennar State			297	126	14	111	156	125	12	96	108	68	9	132	250	192	36	188	150	105	17	162
	White Nile	Irrigated																					
		Mech. Rain-fed	White Nile	17	10	2	200	111	92	11	120	47	38	7	184	148	127	25	197	60	45	7	156
		Traditional	White Nile	153	92	17	185	55	35	3	86	87	87	13	149	200	172	41	238	217	170	29	171
	Total White Nile State			170	102	19	186	166	127	14	110	134	125	20	160	348	299	66	221	277	215	36	167
	Blue Nile	Irrigated																					
		Mech. Rain-fed	Blue Nile	85	50	8	160	17	16	3	188	39	36	3	83	52	41	8	195	38	29	5	172
		Traditional	Blue Nile	35	24	3	125	25	23	5	217	73	60	11	183	14	12	2	167	12	9	2	222
	Total Blue Nile State			120	74	11	149	42	39	8	205	112	96	14	146	66	53	10	189	50	38	7	184
Total Central Region		Irrigated		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Mech. Rain-fed		354	167	22	132	270	221	24	109	182	133	17	128	328	268	51	190	188	137	21	153
		Traditional		242	140	23	164	98	73	11	151	187	170	29	171	357	292	63	216	299	228	40	175
		Total		596	307	45	147	368	294	35	119	369	303	46	152	685	560	114	204	487	365	61	167
Eastern	Gedaref	Irrigated																					
		Mech. Rain-fed	Gedaref	178	71	7	99	192	175	29	166	35	26	2	77	68	45	5	111	157	110	10	91
		Traditional																					
	Total Gedaref State			178	71	7	99	192	175	29	166	35	26	2	77	68	45	5	111	157	110	10	91
	Red Sea	Irrigated		9	9	3	333	8	8	2	250	14	14	3	214	18	17	6	353	16	15	6	400
		Mech. Rain-fed																					
		Traditional	Tokar	6	2		120	8	6	1	167	21	17	3	176	19	13	2	154	10	5	1	200
	Total Red sea State			15	11	3	273	16	14	3	214	35	31	6	194	19	13	2	154	26	20	7	350
	Kassala	Irrigated																					
		Mech. Rain-fed																					
		Traditional	Kassala	5	4		95																
	Total Kassal State			5	4		95	0	0	0		0	0	0		0	0	0		0	0	0	
Total Eastern Region		Irrigated		9	9	3	333	8	8	2	250	14	14	3	214	18	17	6	353	16	15	6	400
		Mech. Rain-fed		178	71	7	99	192	175	29	166	35	26	2	77	68	45	5	111	157	110	10	91
		Traditional		11	6	0	0	8	6	1	167	21	17	3	176	19	13	2	154	10	5	1	200
		Total		198	86	10	116	208	189	32	169	70	57	8	140	105	75	13	173	183	130	17	131

Millet : Five years(2006-2010) Planted, Harvested Area, Production and Yield by State and Sector

Region	State	Agriculture Sector	Centre of Prod.	2010				2009				2008				2007				2006			
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv						
Kordofan	S. Kordofan	Irrigated																					
		Mech. Rain-fed	S. Kordofan	3	2		190												-	-	-	-	
		Traditional	S. Kordofan	323	245	28	114	12	8	1	125	20	16	4	250	20	15	2	133	12	9	1	111
	Total South Kordofan State			326	247	28	113	12	8	1	125	20	16	4	250	20	15	2	133	12	9	1	111
	N. Kordofan	Irrigated																					
		Mech. Rain-fed																					
		Traditional	N. Kordfan	2,794	1,816	93	51	24	16	2	125	40	32	8	250	40	30	4	133	24	18	2	111
	Total North Kordofan State			2,794	1,816	93	51	24	16	2	125	40	32	8	250	40	30	4	133	24	18	2	111
	W. Kordofan	Irrigated																					
		Mech. Rain-fed																					
Traditional		W. Kordfan					2,976	1,577	65	41	383	227	27	119	2,145	1,652	181	110	2,900	2,230	140	63	
Total West Kordofan State							2,976	1,577	65	41	383	227	27	119	2,145	1,652	181	110	2,900	2,230	140	63	
Total Kordofan Region	Irrigated			0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Mech. Rain-fed			3	2	0	0	0	0	0		0	0	0		0	0	0		0	0	0	
	Traditional			3,117	2,061	121	59	3,012	1,601	68	42	443	275	39	142	2,205	1,697	187	110	2,936	2,257	143	63
	Total			3,120	2,063	121	59	3,012	1,601	68	42	443	275	39	142	2,205	1,697	187	110	2,936	2,257	143	63
Darfur	S. Darfur	Irrigated																					
		Mech. Rain-fed	S. Darfur																				
		Traditional	S. Darfur	2,186	1,118	189	169	2,000	1,240	279	225	2,750	1,485	126	85	2,200	1,848	230	124	2,000	1,300	247	190
	Total South Darfur State			2,186	1,118	189	169	2,000	1,240	279	225	2,750	1,485	126	85	2,200	1,848	230	124	2,000	1,300	247	190
	N. Darfur	Irrigated																					
		Mech. Rain-fed																					
		Traditional	N. Darfur	1,600	640	19	30	2,450	1,274	76	60	1,980	1,068	203	190	1,030	442	34	77	1,530	673	69	103
	Total North Darfur State			1,600	640	19	30	2,450	1,274	76	60	1,980	1,068	203	190	1,030	442	34	77	1,530	673	69	103
	W. Darfur	Irrigated																					
		Mech. Rain-fed																					
Traditional		W. Darfur	531	319	48	150	330	231	51	221	250	175	39	223	280	200	48	240	260	180	54	300	
Total West Darfur State			531	319	48	150	330	231	51	221	250	175	39	223	280	200	48	240	260	180	54	300	
Total Darfur Region	Irrigated			0	0	0	0	0	0	0		0	0	0		0	0	0		0	0	0	
	Mech. Rain-fed			0	0	0	0	0	0	0		0	0	0		0	0	0		0	0	0	
	Traditional			4,317	2,077	256	123	4,780	2,745	406	148	4,980	2,728	368	135	3,510	2,490	312	125	3,790	2,153	370	172
	Total			4,317	2,077	256	123	4,780	2,745	406	148	4,980	2,728	368	135	3,510	2,490	312	125	3,790	2,153	370	172
Southern	Upper Nile	Irrigated																					
		Mech. Rain-fed	Upper Nile	48	42	8	190	48	42	8	190	22	22	3	136	124	81	13	160	180	153	28	183
		Traditional																					
	Total Upper Nile State			48	42	8	190	48	42	8	190	22	22	3	136	124	81	13	160	180	153	28	183
	S. States	Irrigated																					
		Mech. Rain-fed																					
Traditional		S. States	275	225	31	138	372	301	45	150	340	277	85	307	330	277	85	307					
Total Southern States			275	225	31	138	372	301	45	150	340	277	85	307	330	277	85	307	0	0	0	0	
Total Southern Region	Irrigated			0	0	0	0	0	0	0		0	0	0		0	0	0		0	0	0	
	Mech. Rain-fed			48	42	8	190	48	42	8	190	22	22	3	136	124	81	13	160	180	153	28	183
	Traditional			275	225	31	138	372	301	45	150	340	277	85	307	330	277	85	307	0	0	0	
	Total			323	267	39	146	420	343	53	155	362	299	88	294	454	358	98	274	180	153	28	183
Total Sudan	Irrigated			9	9	3	333	8	8	2	250	14	14	3	214	18	17	6	353	16	15	6	400
	Mech. Rain-fed			583	282	37	131	510	438	61	139	239	181	22	122	520	394	69	175	525	400	59	148
	Traditional			7,962	4,509	431	96	8,270	4,726	531	112	5,971	3,467	524	151	6,421	4,769	649	136	7,035	4,643	554	119
	Total			8,554	4,800	471	98	8,788	5,172	594	115	6,224	3,662	549	150	6,959	5,180	724	140	7,576	5,058	619	122

Wheat : Five years(2006-2010) Planted, Harvested Area, Production and Yield by State and Sector

Region	State	Agriculture Sector	Centre of Prod.	2010				2009				2008				2007				2006			
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv		
Northern	Nother	Irrigated	Northern	141	134	121	903	293	285	253	888	138	137	129	942	210	198	238	1,200	152	152	213	1,401
		Mech. Rain-fed																					
		Traditional																					
	Total Northern State			141	134	121	903	293	285	253	888	138	137	129	942	210	198	238	1,200	152	152	213	1,401
	River Nile	Irrigated	River Nile	31	29	24	828	111	106	59	557	52	51	35	686	153	140	154	1,100	75	70	50	714
		Mech. Rain-fed																					
		Traditional																					
Total River Nile State			31	29	24	828	111	106	59	557	52	51	35	686	153	140	154	1,100	75	70	50	714	
Total Northern Region		Irrigated		172	163	145	890	404	391	312	798	190	188	164	872	363	338	392	1,159	227	222	263	1,185
		Mech. Rain-fed		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		172	163	145	890	404	391	312	798	190	188	164	872	363	338	392	1,159	227	222	263	1,185
Khartoum	Khartoum	Irrigated	Khartoum	21	19	13	684	34	34	23	676	7	7	6	857								
		Mech. Rain-fed																					
		Traditional																					
Total Khartoum		Irrigated		21	19	13	684	34	34	23	676	7	7	6	857	0	0	0		0	0	0	
		Mech. Rain-fed		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		21	19	13	684	34	34	23	676	7	7	6	857	0	0	0		0	0	0	
Ceteral	Gezira	Irrigated	Other	307	292	204	699	443	429	245	571	426	420	353	840	300	281	226	804	156	153	122	797
		Mech. Rain-fed																					
		Traditional																					
	Total Gezira Sate			307	292	204	699	443	429	245	571	426	420	353	840	300	281	226	804	156	153	122	797
	White Nile	Irrigated	Private	44	42	29	690	73	70	42	600	52	48	34	708	56	51	46	900	35	32	24	750
		Mech. Rain-fed																					
		Traditional																					
	Total White Nile Sate			44	42	29	690	73	70	42	600	52	48	34	708	56	51	46	900	35	32	24	750
	Blue Nile	Irrigated	Blue Nile																				
		Mech. Rain-fed																					
		Traditional																					
	Total Blue Nile Sate			0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
	Sennar	Irrigated	Sennar	8	7	5	714	8	7	3	429	2	2	2	1,000								
		Suki		4	4	3	750	4	4	2	500	13	11	10	909								
		Mech. Rain-fed																					
		Traditional																					
Total Sennar State			12	11	8	727	4	4	2	500	15	13	12	923	0	0	0		0	0	0		
Total Central Region		Irrigated		363	345	241	699	528	510	292	573	493	481	399	830	356	332	272	819	191	185	146	789
		Mech. Rain-fed		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		363	345	241	699	528	510	292	573	493	481	399	830	356	332	272	819	191	185	146	789

Wheat : Five years(2006-2010) Planted, Harvested Area, Production and Yield by State and Sector

Region	State	Agriculture Sector	Centre of Prod.	2010				2009				2008				2007				2006			
				Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed	Area (000fed)		Prod. (000ton)	Yiel Kg/Fed
				Plan	Harv			Plan	Harv			Plan	Harv			Plan	Harv						
Eastern	Gedaref	Irrigated	Rahad					19	17	10	588	1	1	1	700								
		Mech. Rain-fed																					
		Traditional																					
	Total Gedaref State			0	0	0		19	17	10	588	1	1	1	1,000	0	0	0		0	0	0	
	Kassal	Irrigated	New Halfa									33	33	13	394	5	4	3	750	9	8	5	625
		Mech. Rain-fed																					
		Traditional																					
Total Kassal State			0	0	0		0	0	0		33	33	13	394	5	4	3	750	9	8	5	625	
Total Eastern Region		Irrigated		0	0	0		19	17	10	588	34	34	14	412	5	4	3	750	9	8	5	625
		Mech. Rain-fed		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		0	0	0		19	17	10	588	34	34	14	412	5	4	3	750	9	8	5	625
Darfur	S. Darfur	Irrigated																					
		Mech. Rain-fed	S. Darfur	4	4	2	500	4	4	2	500	4	4	2	500	2	1	1	500	3	2	1	500
		Traditional																					
	Total South Darfur State			4	4	2	500	4	4	2	500	4	4	2	500	2	1	1	1,000	3	2	1	500
	W. Darfur	Irrigated																					
		Mech. Rain-fed	W. Darfur	4	4	2	500	4	4	2	500	4	4	2	500	2	1	1	500	3	2	1	500
		Traditional																					
Total West Darfur State			4	4	2	500	4	4	2	500	4	4	2	500	2	1	1	1,000	3	2	1	500	
Total Darfur Region		Irrigated		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Mech. Rain-fed		8	8	4	500	8	8	4	500	8	8	4	500	4	2	2	1,000	6	4	2	500
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		8	8	4	500	8	8	4	500	8	8	4	500	4	2	2	1,000	6	4	2	500
Total Sudan		Irrigated		556	527	399	757	985	952	637	669	724	710	583	821	724	674	667	989	427	415	414	998
		Mech. Rain-fed		8	8	4	500	8	8	4	500	8	8	4	500	4	2	2	1,000	6	4	2	500
		Traditional		0	0	0		0	0	0		0	0	0		0	0	0		0	0	0	
		Total		564	535	403	753	993	960	641	668	732	718	587	818	728	676	669	989	433	419	416	993

Date	Sorghum						Wheat	Sorghum	Millet
	Al Fashir	Gadarif	Red Sea	Damazine	El Obeid	Kadugli	Khartoum	Khartoum	Khartoum
Jan-07	40.0	35.4	47.5	28.7	40.0	35.0	71.3	42.8	57.5
Feb-07	45.0	35.5	46.7	30.0	42.0	45.0	70.0	39.6	54.0
Mar-07	42.0	34.7	44.7	29.8	35.0	40.0	67.5	37.5	55.0
Apr-07	29.3	30.5	42.6	29.0	36.7	40.0	58.7	35.0	52.5
May-07	32.0	28.6	39.0	27.0	34.0	35.0	58.7	33.1	39.0
Jun-07	30.0	30.0	40.7	25.7	35.5	40.0	58.7	40.0	60.0
Jul-07	25.0	30.0	41.0	25.4	34.3	35.0	85.0	39.0	60.0
Aug-07	18.0	29.0	40.0	25.0	30.0	43.0	85.0	39.0	60.0
Sep-07	17.0	28.0	36.0	23.0	31.0	45.0	85.0	39.0	60.0
Oct-07	25.0	32.0	39.0	25.0	36.0	46.0	100.0	40.0	75.0
Nov-07	30.0	45.0	40.0	27.0	38.0	54.0	100.0	40.0	75.0
Dec-07	30.0	37.0	52.0	32.0	46.0	60.0	99.0	39.0	62.0
Jan-08	40.0	48.0	59.0	39.0	58.0	75.0	125.0	56.0	76.0
Feb-08	38.0	44.0	53.0	40.0	49.0	90.0	133.0	47.0	71.0
Mar-08	42.0	45.0	54.0	42.0	50.0	60.0	123.0	51.0	75.0
Apr-08	42.0	52.0	58.0	54.0	56.0	70.0	140.0	56.0	95.0
May-08	55.0	55.0	65.0	55.0	58.0	73.0	118.0	57.0	93.0
Jun-08	58.0	56.0	69.0	56.0	64.0	75.0	112.0	65.0	95.0
Jul-08	63.0	78.0	92.0	60.0	77.0	105.0	140.0	85.0	133.0
Aug-08	68.0	79.0	97.0	64.0	88.0	117.0	140.0	87.0	135.0
Sep-08	50.0	80.0	92.0	63.0	83.0	95.0	128.0	86.0	145.0
Oct-08	56.0	79.0	93.0	68.0	81.0	100.0	105.0	85.0	115.0
Nov-08	45.0	73.0	84.0	60.0	86.0	90.0	113.0	83.0	120.0
Dec-08	65.0	83.0	97.0	72.0	108.0	100.0	117.0	87.0	122.0
Jan-09	70.0	79.0	91.0	73.0	89.0	90.0	98.0	85.0	130.0
Feb-09	115.0	83.0	95.0	76.0	92.0	100.0	97.0	89.0	125.0
Mar-09	93.0	84.0	96.0	75.0	91.0	103.0	80.0	92.0	130.0
Apr-09	95.0	90.0	104.0	88.0	95.0	115.0	90.0	102.0	165.0
May-09	63.0	86.0	99.0	91.0	100.0	120.0	88.0	96.0	130.0
Jun-09	77.0	90.0	103.0	85.0	103.0	115.0	90.0	100.0	140.0
Jul-09	83.0	63.0	106.0	92.0	105.0	120.0	88.0	90.0	120.0
Aug-09	103.0	92.0	109.0	92.0	101.0	120.0	90.0	95.0	135.0
Sep-09	95.0	95.0	105.0	90.0	102.0	115.0	107.0	113.0	130.0
Oct-09	96.0	101.0	100.0	110.0	113.0	115.0	100.0	105.0	120.0
Nov-09	102.0	102.0	120.0	100.0	106.0	117.0	100.0	125.0	135.0
Dec-09	98.0	113.0	124.0	103.0	123.0	117.0	110.0	113.0	125.0
Jan-10	125.0	108.0	123.0	103.0	112.0	110.0	115.0	115.0	150.0
Feb-10	89.0	109.0	121.0	102.0	106.0	105.0	120.0	135.0	150.0
Mar-10	95.0	106.0	95.0	98.0	108.0	90.0	120.0	115.0	150.0
Apr-10	161.0	106.0	119.0	90.0	108.0	97.0	120.0	130.0	145.0
May-10	145.0	112.0	88.0	88.0	120.0	96.0	120.0	130.0	155.0

Source: FAO/Sudan