SPECIAL REPORT

ANNUAL CROP AND FOOD SUPPLY ASSESSMENT MISSION, SUDAN

January 2013

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ABREVIATIONS AND ACRONYMS

ABS	Agricultural Bank of Sudan
CBOS	Central Bank of Sudan
CBS	Central Bureau of Statistics
EIU	Economist Intelligence Unit
ERCU	Emergency and Rehabilitation Coordination Unit (FAO-Sudan)
FAO	Food and Agriculture Organization of the United Nations
fAPAR	fraction of Absorbed Photo synthetically Active Radiation
FEWS NET	Famine Early Warning Systems Network
FSMS	Food Security Monitoring System
FSTS	Food Security Technical Secretariat
GDP	Gross Domestic Product
ha	hectare
HAC	Humanitarian Aid Commission
IMF	International Monetary Fund
MOAI	Ministry of Agriculture and Irrigation
MoARF	Ministry of Animal Resources and Fisheries
NDVI	Normalized difference vegetation index
NGO	Non-governmental organization
SIFSIA	Sudan Institutional Capacity Programme: Food Security Information for Action
SRC	Strategic Reserve Corporation
t	tonne
UN	United Nations
USD	United States dollar
WFP	World Food Programme

ASSESSMENT MISSION HIGHLIGHTS

- Rainfall in 2012 was generally good in terms of both amount and distribution.
- Agricultural inputs were readily available, though expensive. Small farmers cited inadequate access to credit as a major constraint of the season.
- There was a shortage of labour in many states, and the cost of labour was high.
- The summer season was relatively free of crop pests and diseases.
- Planting was timely. The area planted to sorghum and millet was more than double that of last year and exceeded the recent five-year average by slightly more than 10 percent. The greatest increases were in the rain fed semi-mechanized and the rain fed traditional sectors.
- Yields of sorghum and millet increased relative to last year. Millet yields were some 43 percent higher than the recent five-year average.
- Because of the shortage and high cost of labour, this year's harvesting of sorghum is expected to continue later than normal, with some consequent loss to production.
- With increased area and increased yields, sorghum production for 2012 is estimated at approximately 4.3 million tonnes and millet production at approximately 1.1 million tonnes. This is estimated to result in surpluses of 0.98 million tonnes of sorghum and 0.43 million tonnes of millet, which contrasts very favourably with last year's reported shortfall of 0.96 million tonnes of sorghum and 0.25 million tonnes of millet.
- The ban that was placed on the export of sorghum last year in response to that year's poor harvest has now been removed. This year there will be a substantial surplus for export and for building up the strategic reserve.
- The area under wheat as a winter crop is expected to be similar to that of last year, as is its total production of approximately 346 000 tonnes. Both will, however, be below the recent five-year average.
- Sesame and groundnut production both show a substantial increase compared with last year. However, cotton area and production are both down on last year.
- With good pasture and water availability resulting from this year's satisfactory rains, livestock condition is generally very good.
- Cereal prices, already high following last year's poor harvest, peaked in July- September. The fall in prices in anticipation of this year's good harvest has happened to a lesser extent than might have been expected, and prices remain high; in some markets prices even began to increase marginally in November having shown a slight decline in October.
- Livestock prices are high and are expected to remain high for as long as pasture conditions remain favourable.
- Although there has been some improvement since last year, civil insecurity remains a problem in Darfur, South Kordofan and Blue Nile.

1. OVERVIEW

1.1. Assessment mission

Between 18 November and 1 December 2012, a crop and food-supply Assessment Mission was carried out by the Ministry of Agriculture and Irrigation and the Ministry of Animal Resources and Fisheries, supported by FAO, WFP, USAID and FEWSNET, to determine crop production and food supply throughout the 17 states of the Republic of Sudan. The mission consisted of six core teams comprising members from FAO, the Ministry of Agriculture and Irrigation (MoAI), the Food Security Technical Secretariat (FSTS) of the MoAI, the Ministry of Animal Resources and Fisheries (MoARF), the Humanitarian Aid Commission (HAC), the Strategic Reserve Corporation (SRC),

Economic Security, FEWS NET, WFP and USAID. Prior to departure, team members and representatives from WFP attended a preliminary workshop in Khartoum to standardize the methodology to be used in the field and to prepare teams for the visits.

The team visits were designed to a) collect data and information from state ministries, irrigation schemes, enterprises; and, b) audit such data and information through observational transects, field observations, farmer interviews and independent key informant interviews. The combined quantitative / qualitative information from both direct and secondary sources allowed teams to assess the current season's cereal (sorghum and millet) and other field crop production, and, where appropriate, forecast wheat production from areas being prepared for planting. The returning teams prepared summaries of data and information acquired during the visits for discussion and explanation in detailed debriefings before inclusion in the mission report. Data are compiled by state, crop and sub-sector (irrigated, rain fed-mechanized and rain fed-traditional) to give overall area and production estimates. From these data a national cereal balance sheet is drawn up comparing total cereal requirement for the coming marketing year with domestic cereal availability. The balance sheet gives an indication of whether the country is in surplus or deficit with regard to cereals, and hence of its import requirements.

This year's six mission teams received full cooperation from the relevant state authorities. Discussions on factors affecting crop and livestock conditions were held with representatives from the relevant line agencies, local government offices, selected credit institutions, United Nations (UN) agencies and non-governmental organizations (NGOs). Field visits were supported by local specialists from state ministries and irrigation schemes, who also provided the latest information on all aspects of production within their domains, including the provision of follow-up data where required. The six teams carried out their tasks to the extent possible, the main constraint being civil insecurity, which severely limited field observation and farmer interviews in Darfur, South Kordofan and Blue Nile. Where possible, teams cross-checked the official data estimates received by conducting extensive field inspections, rapid case studies with sample farmers and interviews with herders and traders.

At national level, the latest available information and data were collected concerning the year's rainfall, vegetation growth, crop protection campaigns, and market trends (crops and livestock). Periodic food-security reports were perused, and national socio-economic indicators were provided by the Central Bank of Sudan and extracted from recent reports by the Economist Intelligence Unit.

1.2. Findings of assessment mission

The 2012 summer cropping season has seen a very significant improvement in crop production compared with the poor performance of 2011/2012. Most areas received normal or above-normal quantities of rain with generally good distribution. The rains started on time allowing timely planting in the rain fed sector and a substantial increase in cropped area; very little re-planting was necessary.

The incidence of crop pests and diseases was low, and there was satisfactory control of the perennial notifiable pests - locusts, grasshoppers and *Quelea quelea*. Weeds, however, were plentiful in many areas as a result of the good rains.

Fertilizer and herbicides prices rose significantly this year, with the result that less was applied, especially in the irrigated sector.

The irrigated sector encountered some problems on the Gezira Scheme where canals were affected by silting and low water levels, and at Tokar which received fewer flush floods than usual.

There was a widespread shortage of farm labour as a consequence of the movement of Southerners to South Sudan, the diversion of local labour to casual gold-mining, and the expansion in planted areas. Available labour was consequently much more expensive than last year. The shortage of labour will have a negative impact on the harvesting of sorghum still standing in the field. Late harvesting is expected to result in increased losses at the time of harvesting and may, in certain areas, lead to conflict between farmers and herders. Some farmers with low productivity may sell their standing crop as fodder for livestock, considering harvest to be not economically viable. Small farmers who depend on family labour have suffered less from the general labour shortage.

Sorghum production this year is estimated at 4.3 million tonnes, and millet production at 1.1 million tonnes. These figures represent increases of 127 percent and 192 percent respectively over last year's production, and increases of 26 percent and 81 percent over the 5-year average of 2006/07-2010/11. Wheat production is forecast to be about 346 000 tonnes, which is similar to last year's production but still below the 5-year average.

This year's cereal production gains were made in the rain fed sector, both semi-mechanized and traditional. Despite registering a slightly larger area this year, production from the irrigated sector was marginally lower than that of last year and only 75 percent of the 5-year average. Reduced yields were attributed to irrigation problems at the country's largest scheme, Gezira, to lower fertilizer application, and to labour shortages.

The area under sesame showed an increase of more than 160 percent compared with last year and a production increase of 200 percent. Groundnut area increased by one-third while its production rose by 70 percent. On the other hand, the area under cotton this year was only 41 percent of last year's area, reflecting low international cotton prices and high production costs; production amounted to less than one-third.

With this year's satisfactory rains, pasture is relatively plentiful, the amount of water stored in most hafirs is sufficient for several months, and livestock condition is good. Livestock prices are consequently high and are likely to remain so for as long as the water and fodder situation remains favourable.

Cereal prices rose steadily throughout 2011 and, because of that year's very poor crop production, showed limited evidence of the reduction usually expected at harvest time. Prices continued to rise for most of 2012, reaching a peak in most markets during the period June-September. Prices have now started to ease but are still about double what they were at the beginning of 2011.

2. SOCIO-ECONOMIC CONTEXT

2.1 General

As a result of the secession of the south, Sudan has lost around 75% of its productive oilfields, which were formerly its principal source of export income. The country has substantial debt arrears with multilateral and bilateral lenders, for which the government is seeking large-scale debt relief as a reward for its acceptance of southern secession. However, the success of this effort is likely to be limited. Sudan remains unable to borrow from the IMF, even though its debt-servicing payments to the Fund exceeded obligations in the most recent financial year. The Sudanese government has already announced a three-year emergency austerity programme in response to the economic impact of southern secession, and stated in late 2012 that further austerity measures introduced in

mid-year would be carried over into 2013. The Economist Intelligence Unit estimates that GDP will have contracted by 7.6% in 2012. With oil production dropping to around 135,000 barrels/day (Sudan became an importer of fuel in mid-2011), the EIU expects that government consumption will have declined, with a knock-on effect on private consumption. The Central Bank of Sudan, however, estimated GDP growth rate for 2012 at 1.5 percent, down from 2.5 percent in 2011, and predicts a recovery to 3.6 percent in 2013 (Table 1).

Table 1. Sudan. GDP and growth rate during the period 2010 - 2013

Item	**2010**	**2011**	**2012**	**2013**
GDP (billion SDG)	162.2	186.6	222.7	297.7
GDP (billion USD)	68.4	70.1	71.2	73.7
Growth rate (%)	5.2	2.5	1.5	3.6

Source: Central Bank of Sudan

Inflation rates have exhibited a generally increasing trend over the last seven years, as is shown by the figures in Table 2 obtained from the CBS and the CBOS. The CBS's estimate of inflation rate at the end of 2012, however, shows a very sharp rise to 46 percent, as is illustrated in Figure 1. The Economist Intelligence Unit (EIU), however, puts the 2012 inflation rate rather lower at a still-high 32 percent and predicts a gradual easing over the next three years (Table 3)

Table 2. Sudan. Inflation rates, 2005 - 2012

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Inflation rate at end of year [a]	8.4	7.2	8.1	14.3	11.2	13.1	18.9	46
Average annual inflation rate [b]		15.7	8.8	14.9	13.4	15.4	18.9	

Sources: a. Central Bureau of Statistics (2012 estimate for November; all others for December)
b. Central Bank of Sudan

Figure 1. Sudan inflation rates, 2005-2012

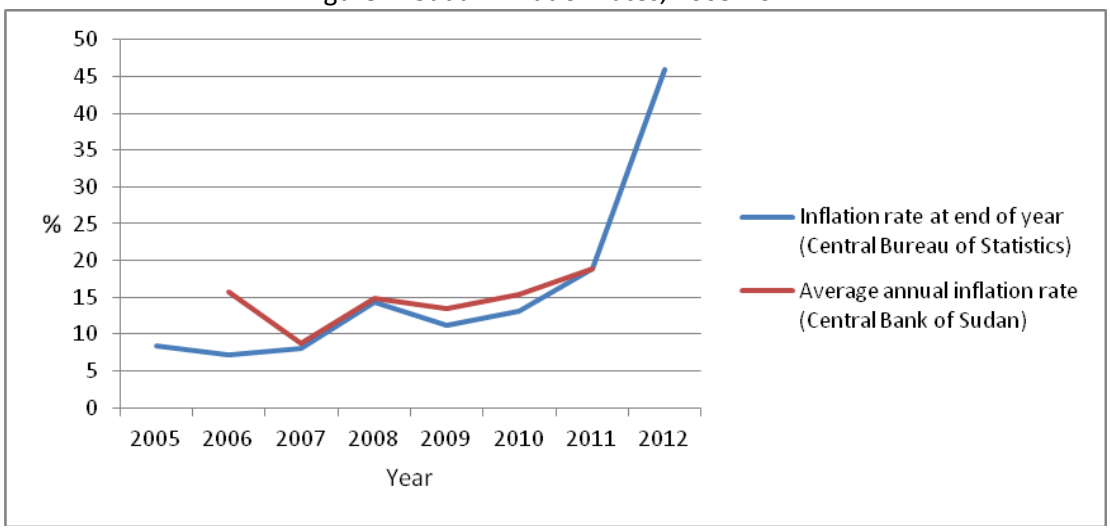


Table 3. Average consumer price inflation forecast till 2017

	2012	2013	2014	2015	2016	2017
Consumer price inflation (av)	32.1	25.6	11.4	11.1	12	14.9

Source: EIU Sudan Country Report, November 2012

Consumer prices indices since the second quarter of 2010, as estimated by the EIU, are shown in Table 4 and Figure 2. It may be noted that by the third quarter of 2011 consumer prices had more

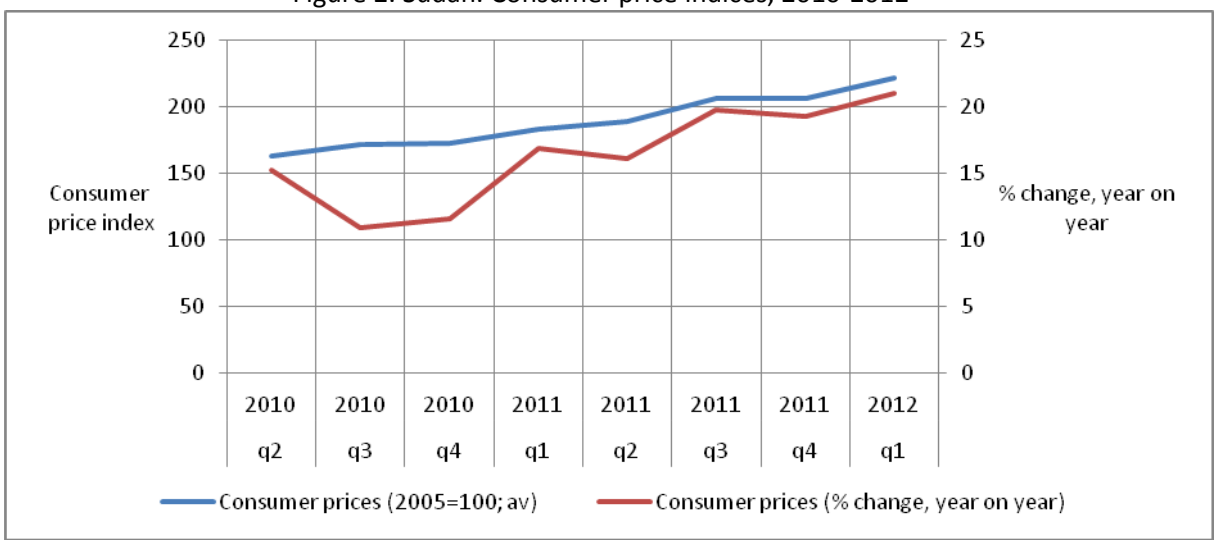
than doubled compared with those of the base year 2005. The year-on-year change in consumer prices has shown a steady rise since the third quarter of 2010.

Table 4. Sudan. Consumer price indices, 2010-2012

Consumer price indices	q2 2010	q3 2010	q4 2010	q1 2011	q2 2011	q3 2011	q4 2011	q1 2012
Av, compared with 2005 (=100)	163	172	173	183	190	207	206	222
% change, year on year	15.3	10.9	11.6	16.9	16.1	19.8	19.3	21

Source: EIU Sudan Country Report, November 2012

Figure 2. Sudan. Consumer price indices, 2010-2012



Source: EIU Sudan Country Report, November 2012

According to the CBOS, agriculture has increased its share of GDP over the last three years (Table 5). This reflects the Government's policy of increasing the production of four important commodities, three of which are agricultural, in which Sudan may have a comparative advantage - namely cotton, gum Arabic, livestock products and gold. The quantities and values of the main agricultural products exported during 2012 are shown in Table 6. Imports of cereals (wheat and rice) and cereal products over the same period amounted to USD 211 million, and 55 million USD worth of fertilizers were imported (Sudan Customs Police, December 2012).

Table 5. Sudan. Comparison of sectors share (%) of GDP, 2010-12

Sector	**2010**	**2011**	**2012**	**Average**
Agriculture	32.5	34.1	39.4	35.3
Industry	24.7	20.3	15.9	20.3
Services	42.8	45.6	44.7	44.4
Total	100	100	100	100

Source: Central Bank of Sudan

Table 6. Agricultural exports, January-November 2012

Commodity	Quantity, 000 tonnes	Value, million USD
Sesame	165	206
Gum Arabic	41	63
Hibiscus	23	16
Cotton	23	12.5
Sorghum	31	8.2

Source: Sudan Customs Police

2.2 Population

The last census was carried out in 2008. Since then, a specific population growth rate has been applied to each state to extrapolate the current population. According to the CBS, Sudan's population by mid-2013 will total 36.164 million (Table 7).

Table 7. Sudan. Population estimate (,000) by state for mid-2013, extrapolated from Population Census 2008.

State	Population		Percentage change, 2009-13
	2009	2013	
Northern	721	814	13
River Nile	1158	1309	13
Red Sea	1308	1367	5
Kassala	1821	2134	17
Gedaref	1419	1739	23
Khartoum	5515	6535	18
Gezira	3710	4285	16
White Nile	1796	2087	16
Sennar	1340	1580	18
Blue Nile	858	966	13
N Kordofan	2954	3074	4
S Kordofan	1598	1812	13
N Darfur	2140	2231	4
W Darfur	1349	1530	13
S Darfur	4211	4701	12
Sudan	31899	36164	13

Source: Central Bureau of Statistics

2.3 Agriculture

After services, agriculture is the main source of non-oil contributions to Sudan's GDP (Table 5). Agriculture provides employment for about 70-80 percent of the labour force in rural areas reflecting the predominantly non-subsistence nature of most of the country's farming systems. Agriculture is usually divided into three sectors: irrigated, semi-mechanized rain fed and traditional rain fed. The irrigated sector usually accounts for some 1.7 million ha and provides 25 - 30 percent of domestic cereal production, while the rain fed sector (semi-mechanized and traditional) accounts for

the remaining 70 -75 percent of cereals grown in Sudan. About 12 million ha of rain fed food crops are produced from an estimated arable area of 19 million ha in the whole country.

The main bulk of food crops are grown on large farms for sale through the urban and rural markets. The rain fed sector is subject to huge production fluctuations owing to variations in rainfall and market conditions, whereas production and productivity levels in the irrigated sector are relatively stable.

Under plans to diversify the economy, the Government is placing renewed emphasis on improving the performance of the agricultural sector. These efforts include the completion of three dams in 2009, including the $1.7 billion Merowe dam which has now been fully operational for a year. The National Agricultural Revival Program, which was originally launched in 2005 aims to improve the implementation of the large irrigation schemes, encourage development of the agro-industry by establishing a number of sugar factories, improve infrastructure, and increase spending on irrigation, land preservation, fertilizers, and credit services. Effects of this policy change are evident in the recent reductions in sugar imports, in the termination of the state-owned Gum Arabic Company's monopoly on the production and export of gum Arabic, and in the easing of the prohibition on leasing agricultural land to foreign investors.

2.3.1 Irrigated sector

Irrigated agriculture is practised on some 1.7 million ha in mostly gravity-fed schemes, 93 percent of which were, until 2010, government-owned with aging and inefficient infrastructure and practices. These schemes were set up prior to independence to produce cotton for export and food crops for share-croppers and labourers. The largest scheme, Gezira, had a complete change in management in 2009/10 through the implementation of the 2005 Gezira Act, effectively privatizing the scheme and transferring the responsibility for irrigation to land-owner and water-user associations, thereby allowing planting flexibility within the water delivery regimes. Other major schemes including the Rahad Scheme (about 65% in Gezira State and 35% in Gedaref State), the New Halfa Scheme in Kassala State and Suki Scheme in Sennar State have different management systems. Farming practices in the irrigated sector have always been far more intensive than in the rainfed sector, but invariably fail to match promise as land occupancy rarely achieves planned figures as a result of water shortages/ delivery problems and managerial shortcomings. Practices include crop-rotations, mechanized land preparation supported by tractor-hire services and private contractors, and the regular use of improved seeds, fertilizers, pesticides and herbicides. Average yields of cereals are higher in the irrigated sector than in the rain fed sectors in most years.

2.3.2 Semi-mechanized sector

The semi-mechanized sector consists of individual big farmers and companies farming a total registered area of nearly 6.7 million ha. The sector is historically a very low-input-low-output system, comprising mechanized clearing, ploughing, sowing, and occasionally weeding and harvesting on vast scattered areas of land leased at very low rents from local authorities. Given that the return to investment dictates the crops that are grown, the investor-farmers alternate from crop to crop, usually from sorghum to sesame and vice versa, depending on current prices and the availability of loans and government incentives.

2.3.3 Traditional sector

The traditional sector is made up of small family units farming from 2 to 50 hectares for both income and subsistence; on the larger units there may be a modicum of mechanization in the form of land preparation, but most operations are carried out manually.

2.3.4 Livestock

Livestock form an essential component of the agriculture sector, with production almost entirely based on traditional pastoral systems. The export of livestock has become an increasingly important part of the economy, competing with cash crop sales as the fastest growing non-oil export sector. This is largely due to initiatives such as the recent rehabilitation of livestock export facilities (including veterinary quarantine centres) and revisions to livestock marketing and taxation policy. Across the country, the surge in commercial livestock marketing of camels, goats, sheep and cattle is connected to export links with Egypt, with the Arab states of the Gulf and Saudi Arabia showing strong demand for Sudanese output since the lifting of the import ban on Horn of Africa livestock in 2009. Data from the Bank of Sudan reveal that in 2005 livestock exports reached USD 154 million, making it the second largest export earner after crude oil. Increased export sales have had a knock-on effect across the country which is presently manifested in high livestock prices in all markets.

3 AGRICULTURAL PRODUCTION 2012/13

3.1 Main factors affecting cereal production in 2012/13

3.1.1 Agricultural finance and credit

The provision of short-term agricultural credit through the Agricultural Bank of Sudan (ABS) is a regular operational procedure in both the irrigated and rain fed sectors, and particularly in the entrepreneurial semi-mechanized sector. Loan uptake for cereal production is generally by entrepreneurs with strong business connections with the ABS and other banks; farmers in the traditional sector are rarely able to raise the necessary collateral. Farmers with poor repayment histories, those without collateral, and last year's defaulters are excluded, except in Darfur, where micro-credit is available through livelihoods programmes. In all other states, short –term seasonal loans to eligible farmers are made through the non-interest *selem* system. Under *selem,* bank charges are levied but no interest is paid. The farmers agree to pay back their loans, in kind, at a value fixed at planting time by the Ministry of Finance, the SRC, the ABS and the Farmers' Union.

The availability of credit improved slightly in 2012 but still benefited relatively few farmers. The Agricultural Bank of Sudan provided a total of 314.2 million SDG this year (Table 8) and a further 119.5 million SDG was made available by the Faisal Islamic Bank.

Table 8. Finance from the Agricultural Bank of Sudan, 1 June - 15 November 2012 (million SDG)

State / Region	For crops	For machinery and equipment	Total
Eastern	122.7	45.1	167.8
Sennar	38.9	5.0	43.9
White Nile	27.5	4.0	31.6
N Kordofan	6.4	0.9	7.4
S Kordofan	6.9	10.6	17.5
Gezira	13.9		13.9
Darfur	7.9		7.9
Northern			
R Nile	3.1	13.4	16.5
Khartoum			
Headquarters	2.8	5.1	7.8
Total	**230.0**	**84.2**	**314.2**
Percent	**73**	**27**	**100**

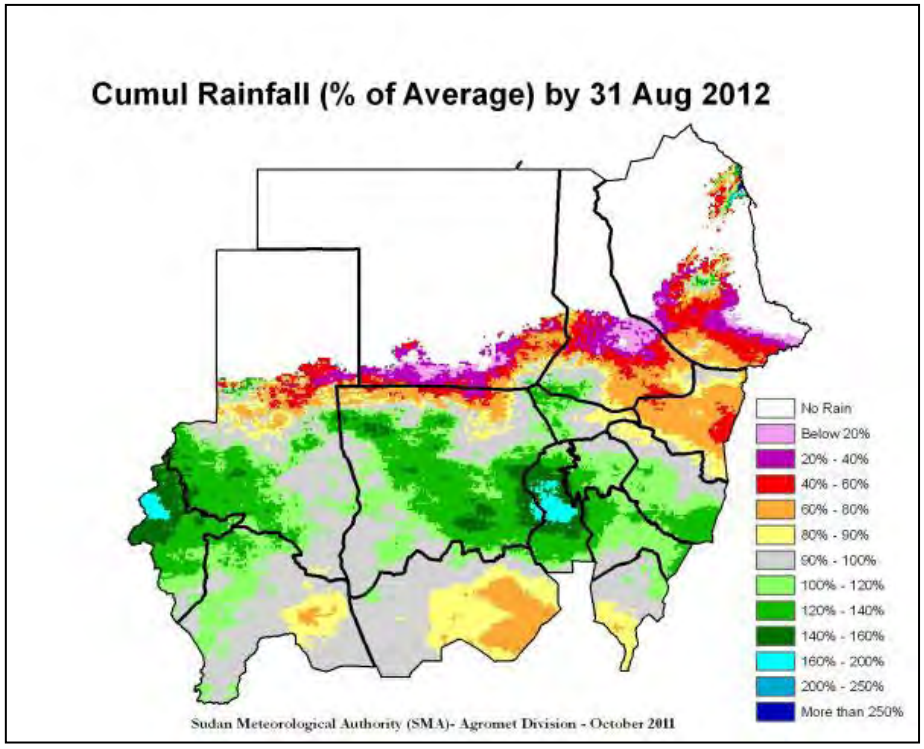
Source: Agricultural Bank of Sudan

3.1.2 Rainfall

Average annual rainfall in northern states of the Sudan ranges from almost zero in the north of the country to almost 900 mm in the southern parts of South Darfur and South Kordofan and the eastern areas of Blue Nile. Rainfall in 2012 was generally favourable, especially in terms of distribution, and showed a significant improvement on last year. The rains in most areas started on time and finished either on time or later than usual. By the end of August a broad band extending from Blue Nile State across to Darfur had received above-average amounts of rain (Figure 3), while in September rainfall was generally below average except in West Darfur, parts of South Darfur and parts of Blue Nile State (Figure 4). Heavy rains led to minor flooding and damage to hafirs in some areas, while the wet conditions generally encouraged weed growth.

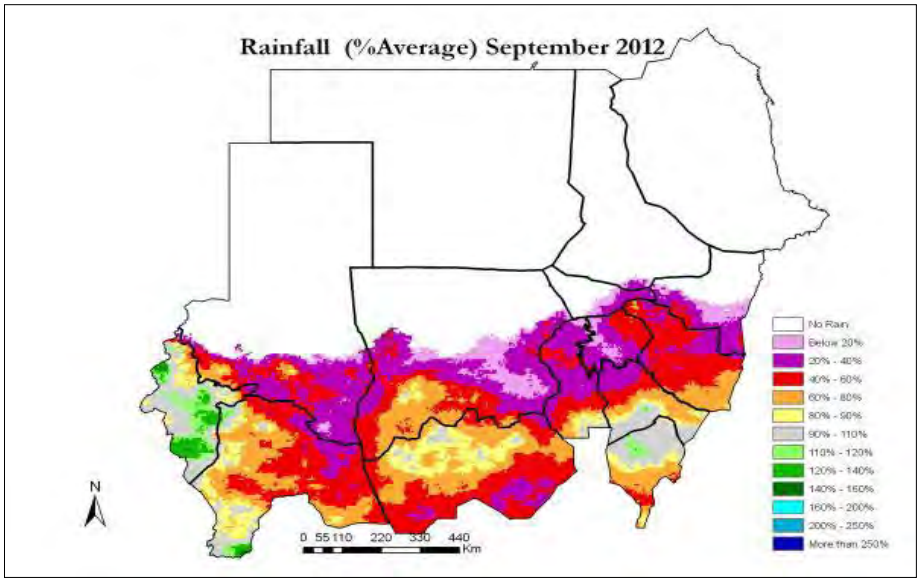
Figure 5 shows the fAPAR image for Sudan for October and Figure 6 compares the October 2012 fAPAR with the 5-year average. The fAPAR value shows the fraction of Absorbed Photo synthetically Active Radiation, which represents the fraction of the solar energy which is absorbed by active vegetation. fAPAR can therefore be used as an indicator of the state and evolution of the vegetation cover, thereby advantageously replacing the normalized difference vegetation index (NDVI). Rainfall charts for several states are presented in the Annex, as are comparative fAPAR images for each individual state.

Figure 3. Cumulative rainfall (% of average) by 31 August 2012



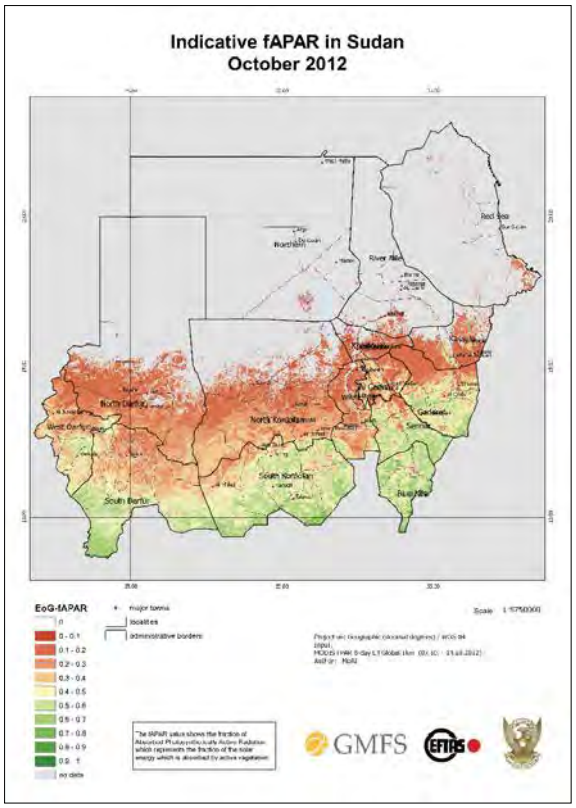
Source: Sudan Seasonal Monitor, October 2012

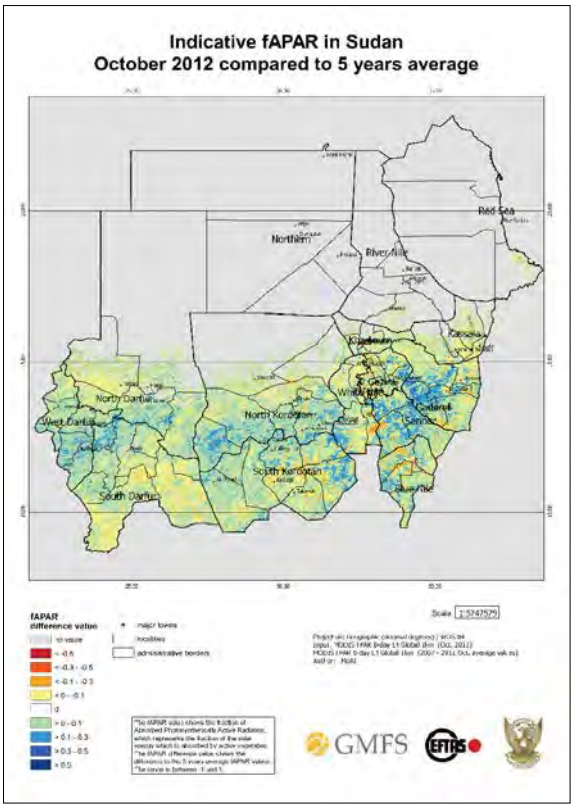
Figure 4. Rainfall (% of average) September 2012



Source: Sudan Seasonal Monitor, October 2012

Figures 5 and 6. fAPAR images for Sudan; October 2012 and comparison with 5-year average





3.1.3 Area planted and harvested

The total areas of sorghum and millet harvested this year - 7.2 and 2.8 million ha respectively - represent 72 percent and 74 percent of the planted areas. This is in stark contrast to the situation last year when only 50 percent and 49 percent of the planted areas were harvested. This year, too, the planted areas of the two crops were significantly larger than last year's; and in the case of millet, this year's estimated harvested area even exceeds last year's planted area.

The closure of the border with South Sudan meant that many large Sudan-based farmers in the semi-mechanized sector were unable to access land south of the border (especially in Upper Nile State, which is now part of South Sudan), that they would, in previous years, have planted to sorghum.

The area to be planted to wheat is expected to be similar to that of last year, 178 000 ha. Whether this will be achieved could not be ascertained at the time of the mission; progress was being made with land preparation but only a fraction of the intended area had been seeded.

3.1.4 Agricultural inputs

Seed was readily available this year, and, because there was rarely any need for re-seeding, less seed was required. The MoAI distributed a total of 3 851 t of seed throughout the country (Table 9), and FAO distributed a further 1 216 t of cereal seed, as well as various oilseed, legume and vegetable seeds, to selected centres (Table 10).

Table 9. Seed Distribution to the Rain fed Sector by Federal MoAI, 2012

State	Finance (000 SDG)	Quantity (t)
N Kordofan	2 034	337
S Kordofan	2 250	486
N Darfur	1 500	291
S Darfur	1 500	201
E Darfur	1 663	258
W Darfur	1 500	300
Central Darfur	1 630	240
Blue Nile	2 000	507
Gefaref	2 000	410
Kassala	2 000	562
Red Sea	550	150
Gezira	200	50
Sennar	260	61
Total	**19 086**	**3851**

Table 10. FAO seed distribution, 2012 summer season (t)

Crop	S Kordofan	Blue Nile	Kassala	Red Sea	N Darfur	S Darfur	W Darfur	C Darfur	Total
Sorghum	202	131	165	50	57	50	34	23	712
Millet				20	115	98	69	46	348
Maize	61	95							156
Sesame	31	13			4				48
Groundnut					19	65	32	31	147
Cowpea	46	20	10						76
Pigeonpea	1.2	0.6			4	4		3	13
Vegetables	3.0	1.7							5
Total									**1505**

Seed rates in the rain fed sector are generally much lower than seed rates used in neighbouring countries. At the same time, the value of fodder has caused plant densities to be increased in the irrigated sector, where over-planting is also being used to combat weeds. Last year the mission suggested that a short survey be undertaken at sowing time in both the rain fed traditional subsector and the irrigated sector to determine the actual rates used in sample areas.

Fertilizers were available but prices, at around 200 SDG/50 kg, were more than double those of last year. Farmers and schemes reported using less for this reason. Pesticides and herbicides were available in most states for those who could afford them. Farmers report, however, that there are many cheap and spurious products on the market which are ineffective.

In most parts of the country there was a very evident shortage of labor, attributable to the movement of Southerners back to South Sudan and the diversion of much of the local agricultural labor force to casual gold-mining. The labor that is available has become very expensive compared with previous years and in some instances farmers have resorted to trucking labor in from the border with Ethiopia at some considerable expense. The shortage of labor and its unusually high cost may hinder the harvest, which is expected to continue for some time yet, and increase the percentage of crop losses in the field.

FAO distributed some 76 000 hand-tools to farmers in four selected locations during 2012 (Table 11). Tools included malodas, hoes and sickles.

Table 11 Hand-tools distributed by FAO to selected locations during 2012 (000)

S & E Darfur	W Darfur	C Darfur	N Darfur	S Kordofan	Blue Nile	Kassala	Red Sea	Total
4.2	2.1	2.0	4.8	36.3	25.4	10	4.3	89

Source: FAO

3.1.5 Weeds, pests and diseases

Weed growth was encouraged this year by the favourable rainfall. However, 2012 was relatively free of crop pests and diseases, apart from some locally serious outbreaks of watermelon bug in North Kordofan.

Quelea quelea and other granivorous birds were effectively controlled by aerial spraying of nesting sites; aircraft were on stand-by in all states for immediate response to alerts of infestation. Routine federal spraying against locusts and grasshoppers was carried out over about 121 000 ha, as shown in Table 12. In addition, almost 7 000 ha were treated against fruit fly and 3 700 ha against watermelon bug. Sorghum bug was successfully controlled during the hibernation period.

Table 12. Areas (000 ha) surveyed for, infested with, and treated against, locusts and grasshoppers, 2012

Species	**Surveyed**	**Infested**	**Treated**
Desert locust	476.4	32.5	15.9
Tree locust	326.8	97.9	58.0
Grasshoppers	338.0	94.5	43.0
'Bou'	66.7	12.4	0
'Kaboura'	29.5	6.7	4.2
Total	1 237.2	243.9	121.1

Source: Crop Protection Administration

3.1.6 Crop yields

This year, overall average sorghum and millet yields have exceeded both last year's yields and the average yields of the 5-year period 2006/07-2010/11. This increase is accounted for by the two rain fed sectors - the semi-mechanized and the traditional. In the irrigated sector, the average sorghum yield was below both last year's average and the 5-year average, while that of irrigated millet was below last year's average but exceeded the 5-year average (Table 15).

3.2 Sudan cereal production forecast

Sudan's cereal production for 2012/13 is forecast to be 5.78 million tonnes. This includes sorghum, millet, maize, wheat and rice. Sorghum, millet and wheat alone account for 5.709 million tonnes. Detailed area, yield and production figures for sorghum, millet and wheat by sector and state are given in Tables 14 - 16. Summarised production parameters of the three main cereals by sector are given in Tables 17 - 20. In the absence of recorded imports or exports of maize, it is assumed that all maize used is locally produced and that the amount produced is roughly equal to the amount used. The amount used equates to human and livestock consumption, post-harvest losses and seed requirements for the following year. Based on the assumptions made for each of these parameters

(see below), maize production in 2012 has been estimated as 43 000 tonnes, and rice production 28 000 tonnes.

3.3 Other crops

3.3.1 Sesame

Sesame production in 2011 was very disappointing with less than 50 percent of the more than 1.7 million hectares planted being harvested. In 2012 however, 2.6 million hectares were planted, of which 2.2 million hectares (84 percent) were harvested. The resulting production was 563 000 t, which is three times last year's production of 187 000 tonnes.

3.3.2 Groundnut

Groundnut registered a 33 percent increase in area compared with 2011. This year's favourable rains brought about a higher average yield of over 0.8 t/ha, and a 71 percent increase in production to 1.76 million tonnes.

3.3.3 Sunflower

The harvested area of sunflower increased this year by just 6 percent, but yields were lower, resulting in a slightly reduced production of 86 000 tonnes compared with last year's 92 000 tonnes. Being drought-tolerant, sunflower suffered less from the poor rains of 2011 than did most other crops. Yields of sunflower in 2012 were similar to those of groundnut at just over 0.8 t/ha.

3.3.4 Sugar

Sugar production from the country's two biggest producers, Kenana and Sudanese Sugar, came to 710 000 tonnes this year, a 5 percent increase on last year's 675 000 tonnes (Table 13). The increase resulted from both an expansion in area and an increase in yield. In addition, Kenana expects, in 2013, to refine about 180,000 tonnes of sugar from imported raw sugar. A new company, White Nile Sugar, produced 137 000 tonnes of sugar from 16 800 ha, a yield of approximately 8.2 t/ha.

Table 13. Sugar production at Kenana and Sudanese Sugar

Year	Company	Area of cane (000 ha)	Sugar production (000 t)	Sugar yield (t/ha)
2011/2012	Kenana	34.1	350	10.3
	Sudanese Sugar	37.3	325	8.7
2012/2013	Kenana	33.9	370	10.9
	Sudanese Sugar	37.0	340	9.2

Sources: Kenana Sugar Co. Ltd. and Sudanese Sugar Co. Ltd.

3.3.5 Cotton

The Gezira Act of 2005 gave farmers the right to grow crops according to their economic preference. Because of falling international prices for cotton since they peaked in 2011, the area under cotton this year was only 42 percent of last year's and approximately half of the five-year average of 2005/06 - 2009/10. This year's yield, however, at more than 1.9 t/ha of seed cotton, is slightly higher

than last year's, but not enough to bring production up to the level of the average of 2005/06 - 2009/10 (Figure 7).

Figure 7. Sudan cotton production

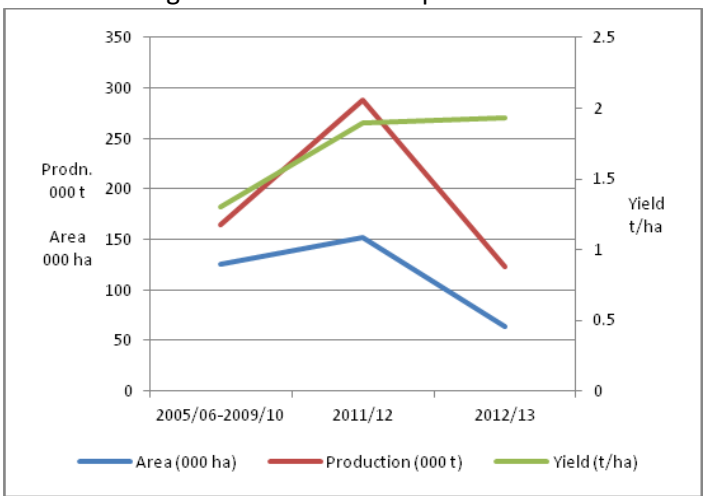


Table 14. Harvested cereal area (000 ha) by state and sector. (2006/07-2010/11, 2011/12 & 2012/13)

	Sorghum					Millet					Wheat				
	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average
Irrigated															
Northern	7	3	2	57	23						70	29	41	142	59
R Nile	28	12	29	250	106						30	16	25	151	82
Khartoum											5	1	1	100	23
Suki	13	8	15	184	115						1	1	0	0	0
Sennar	30	28	22	80	74						3				0
White Nile	36	46	51	110	139						20	20	21	102	103
Gezira	214	181	173	96	81						138	88	69	79	50
Rahad	37	29	45	155	121						2				0
New Halfa	32	29	34	119	107						5	9	8	91	154
Gash	28	25	31	123	112										
Tokar	4	10	7	70	157	6	4	6	150	104					
Kassala	4														
N Kordofan	1	3	2	50	125										
Total irrigd	435	373	410	110	94	6	4	6	150	104	274	165	165	100	60
Semi-mechanized															
Kassala	371	8	336	4000	91										
Gedaref	1398	939	2100	224	150	49	67	103	153	209					
Blue Nile	234	221	432	195	184	18	19	36	191	203					
Sennar	538	369	812	220	151	62	90	136	150	220					
White Nile	272	484	370	76	136	32	21	46	218	145					
N Kordofan	6	11	13	120	205										
S Kordofan	331	206	241	117	73	4	2	8	360	214					
Total semi-mech	3150	2237	4303	192	137	164	200	328	164	200					
Traditional															
Khartoum	24	0	63	-											
Gezira	307	116	271	235	88	4	0	3	800	85					
Blue Nile	48	38	82	217	170	8	12	21	169	258					
Sennar	101	175	260	149	259	24	21	32	154	133					
White Nile	179	109	189	173	105	33	13	32	234	95					
Kassala	93	74	63	86	68	2				0					
R Nile	70	9	8	91	12										
Red Sea	12	6	12	187	95	4	5	6	136	147					
N Kordofan	427	147	322	219	75	774	122	824	677	106					
S Kordofan	425	185	189	102	44	120	63	80	127	66					
N Darfur	82	37	119	319	145	401	210	325	155	81					
S Darfur	344	390	495	127	144	548	494	696	141	127	3	6	6	100	203
W Darfur	71	118	387	326	545	111	158	429	271	385	2	6	6	100	268
Total traditional	2184	1404	2461	175	113	2030	1099	2448	223	121	5	13	13	100	231
Total Sudan	5768	4015	7174	179	124	2200	1303	2782	214	126	279	178	178	100	64

Table 15. Cereal yields (t/ha)by state and sector.2006/07-2010/11, 2011/12 & 2012/13

	Sorghum					Millet					Wheat				
	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average
Irrigated															
Northern	2.4	2.4	2.4	100	100						2.3	2.4	2.4	100	103
R Nile	2.3	2.0	1.9	97	83						2.0	2.1	2.1	100	107
Khartoum											1.7	1.4	1.4	100	83
Suki	2.5	1.8	1.9	109	76						1.7	1.2		0	0
Sennar	1.8	1.8	1.9	105	103										
White Nile	1.7	2.6	1.9	75	116						1.7	1.9	1.9	100	110
Gezira	2.3	1.9	1.6	84	69						1.7	1.7	1.8	107	106
Rahad	2.4	1.7	1.8	109	75										
New Halfa	2.3	2.1	1.7	79	74						1.1	1.7	1.7	100	152
Gash	2.2	2.3	2.4	103	109										
Tokar	0.8	1.1	0.9	79	114	0.6	1.0	0.8	83	126					
Kassala	1.9				0										
N Kordofan	1.8	0.9	0.6	72	36										
Total irrigd	2.2	2.0	1.8	89	80	0.6	1.0	0.8	83	126	1.9	1.9	2.0	107	107
Semi-mechanized															
Kassala	0.4	0.5	0.5	110	130										
Gedaref	0.4	0.2	0.5	352	142	0.3	0.3	0.5	169	133					
Blue Nile	0.6	0.6	0.4	73	72	0.4	0.6	0.4	62	84					
Sennar	0.4	0.2	0.6	300	154	0.3	0.2	0.5	256	176					
White Nile	0.5	0.3	0.5	173	94	0.4	0.5	0.4	75	97					
N Kordofan	0.5	0.3	0.4	150	88										
S Kordofan	0.5	0.5	0.5	94	95	0.4	0.5	0.4	90	102					
Total semi-mech	0.4	0.3	0.5	202	126	0.3	0.3	0.5	157	135					
Traditional															
Khartoum		-	0.5	-											
Gezira	0.4	0.2	0.4	217	92			0.3							
Blue Nile	0.7	0.6	0.5	82	70	0.4	0.6	0.3	59	80					
Sennar	0.4	0.3	0.6	200	151	0.4	0.2	0.5	221	121					
White Nile	0.6	0.4	0.6	149	117	0.5	0.4	0.4	96	92					
Kassala	0.4	0.3	0.4	160	102										
R Nile	0.6	0.4	0.5	110	81										
Red Sea	0.5	0.5	0.5	105	103	0.4	0.4	0.4	102	118					
N Kordofan	0.2	0.1	0.4	373	156	0.2	0.1	0.1	134	89					
S Kordofan	0.7	0.4	0.4	100	65	0.3	0.4	0.3	88	107					
N Darfur	0.2	0.2	0.4	237	203	0.2	0.1	0.3	271	170					
S Darfur	0.7	0.4	0.4	88	57	0.4	0.2	0.4	160	92	1.2	1.3	1.3	100	110
W Darfur	0.7	0.9	0.8	83	112	0.4	0.7	0.9	121	203	1.2	1.3	1.3	100	107
Total traditional	0.5	0.4	0.5	132	106	0.3	0.3	0.4	133	142	1.2	1.3	1.3	100	109
Total Sudan	0.6	0.5	0.6	128	102	0.3	0.3	0.4	136	143	1.9	1.8	1.9	107	105

Table 16. Cereal production (000 tonnes) by state and sector. 2006/07-2010/11, 2011/12 & 2012/13

	Sorghum					Millet					Wheat				
	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average	5-yr av. 2006/07-2010/11	2011/12	2012/13	2012/13 as % 2011/12	2012/13 as % 5-yr average
Irrigated															
Northern	17	7	4	57	23						162	69	98	142	61
R Nile	64	23	56	243	88						60	35	53	151	88
Khartoum											9	2	2	100	19
Suki	32	14	28	200	87						1	1	0	0	0
Sennar	55	50	42	84	77						4				0
White Nile	61	119	98	82	162						34	38	39	102	114
Gezira	496	345	277	80	56						232	147	124	84	53
Rahad	89	48	81	169	91						2				0
New Halfa	73	61	58	94	79						6	15	14	91	233
Gash	60	58	74	127	122										
Tokar	3	11	6	55	179	4	4	5	125	131					
Kassala	8				0										
N Kordofan	2	3	1	36	45										
Total irrigd	961	739	725	98	75	4	4	5	125	131	512	308	330	107	
Semi-mechanized															
Kassala	150	4	176	4400	118										
Gedaref	536	145	1145	788	214	17	18	47	259	277					
Blue Nile	139	130	185	142	133	8	11	13	118	171					
Sennar	224	79	522	661	233	19	19	73	384	388					
White Nile	138	133	176	132	128	12	10	16	164	141					
N Kordofan	3	3	5	180	180										
S Kordofan	165	104	115	110	69	1	1	3	324	219					
Total semi-mech	1355	598	2324	388	172	56	59	152	258	270					
Traditional															
Khartoum	8		30	-	385										
Gezira	119	19	97	511	82	2	0	1	-	56					
Blue Nile	33	22	39	177	118	3	7	7	100	206					
Sennar	43	56	167	298	390	11	5	17	340	160					
White Nile	99	47	122	259	123	15	6	14	225	88					
Kassala	40	20	27	137	69	1				0					
R Nile	41	4	4	100	10										
Red Sea	6	3	6	196	98	2	2	3	139	173					
N Kordofan	104	15	123	818	118	125	13	118	906	94					
S Kordofan	281	79	81	103	29	36	23	26	112	71					
N Darfur	18	7	53	755	294	73	24	100	419	138					
S Darfur	224	166	185	111	82	228	118	266	225	117	4	8	8	100	223
W Darfur	48	107	290	271	610	49	117	382	326	783	3	8	8	100	287
Total traditional	1064	545	1224	225	115	543	315	933	296	172	6	16	16	100	251
Total Sudan	3380	1882	4273	227	126	603	374	1090	292	181	519	324	346	107	67

Table 17. Sudan. Cereal production by sector (million tonnes)

Sector	Sorghum			Millet			Wheat**		
	5-yr av*	2011/12	2012/13	5-yr av*	2011/12	2012/13	5-yr av*	2011/12	2012/13
Irrigated	0.961	0.739	0.725	0.004	0.004	0.005	0.512	0.308	0.330
Rainfed semi-mechanized	1.355	0.598	2.324	0.056	0.059	0.152			
Rainfed traditional	1.064	0.545	1.224	0.543	0.315	0.933	0.006	0.016	0.016
Total	3.380	1.882	4.273	0.603	0.374	1.090	0.519	0.324	0.346

* 2006/07 - 2010/11 ** 2012/13 figures for wheat are forecasts

Table18. Sorghum production parameters by sector

Sector	5-yr average 2006/07-2010/11			2011/12			2012/13		
	Area 000 ha	Yield t/ha	Prodn 000 t	Area 000 ha	Yield t/ha	Prodn 000 t	Area 000 ha	Yield t/ha	Prodn 000 t
Irrigated	435	2.2	961	373	2.0	739	410	1.8	725
Rainfed semi-mechanized	3150	0.4	1355	2237	0.3	598	4303	0.5	2324
Rainfed traditional	2184	0.5	1064	1404	0.4	545	2461	0.5	1224
Total	5768	0.6	3380	4015	0.5	1882	7174	0.6	4273

Table19. Millet production parameters by sector

Sector	5-yr average 2006/07-2010/11			2011/12			2012/13		
	Area 000 ha	Yield t/ha	Prodn 000 t	Area 000 ha	Yield t/ha	Prodn 000 t	Area 000 ha	Yield t/ha	Prodn 000 t
Irrigated	6	0.6	4	4	1.0	4	6	0.8	5
Rainfed semi-mechanized	164	0.3	56	200	0.3	59	328	0.5	152
Rainfed traditional	2030	0.3	543	1099	0.3	315	2448	0.4	933
Total	2200	0.3	603	1303	0.3	374	2782	0.4	1090

Table20. Wheat production parameters by sector

Sector	5-yr average 2006/07-2010/11 Area 000 ha	Yield t/ha	Prodn 000 t	2011/12 Area 000 ha	Yield t/ha	Prodn 000 t	2012/13 Area 000 ha	Yield t/ha	Prodn 000 t
Irrigated	274	1.9	512	165	1.9	308	165	2.0	330
Rainfed semi-mechanized	0	0.0	0	0	0.0	0	0	0.0	0
Rainfed traditional	5	1.2	6	13	1.3	16	13	1.3	16
Total	279	1.9	519	178	1.8	324	178	1.9	346

3.4 Livestock

With the good rainfall of 2012, grazing and fodder are relatively plentiful and the condition of livestock is generally satisfactory. Regular vaccination programmes have been carried out to control endemic diseases. Most hafirs have been well replenished, but some have been damaged by especially heavy rains. Most hafirs are expected to remain usable up to at least March or April 2013.

Estimated livestock numbers in 2011/12 compared with 2010/2011 (Table 21) reflect the reduction in numbers of cattle and small ruminants following the secession of South Sudan. Conflict between pastoralists and settled farmers remains as a potential threat, especially in Darfur Region. However, this threat is expected to be mitigated slightly by the opening-up of agreed pastoralist routes. The closure of the border with South Sudan, which prevented the traditional movement of herds from Sudan into South Sudan during the rainy season, resulted in further pressure being put on grazing lands the north of the border.

Table 21. Estimated livestock numbers (millions), 1988/89, 2010/11 and 2011/2012

	Cattle	Sheep	Goats	Camels	Total
1988/1989	20.2	19.7	14.5	2.7	57.1
2010/2011	41.8	52.1	43.4	4.6	141.9
2011/2012*	29.6	39.2	30.6	4.7	104.1

* after separation from South Sudan

Source: MoARF

4 CURRENT MARKET SITUATION

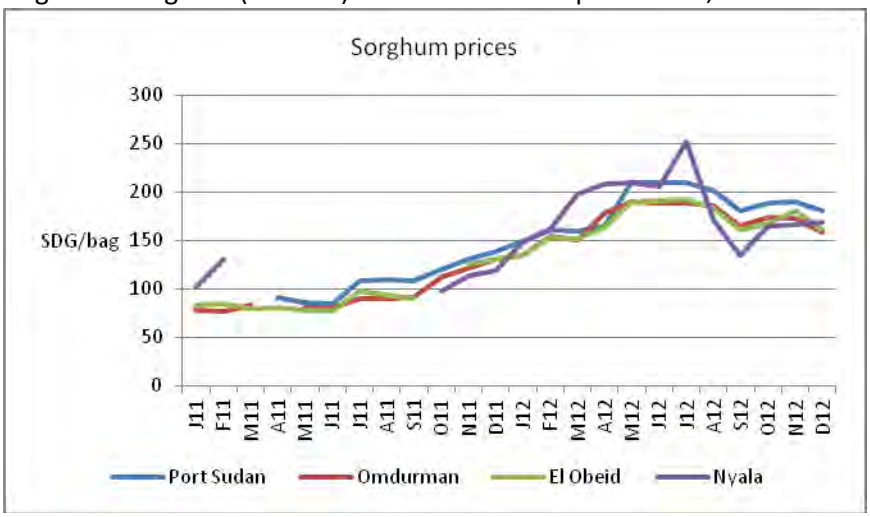
4.1 Cereal prices

Cereal prices rose in 2011 as a result of that year's poor harvest and they continued to rise in most markets until July-August 2012. It was expected that they would start to fall by September in anticipation of a good harvest, and this has happened, but to a limited extent; in some cases, after a brief dip, they started to rise again in November before easing slightly in December. Prices in November 2012 were significantly higher than in November 2011. Reasons for the continuing high grain prices include general inflation, which has affected the price of agricultural inputs; the high demand for sorghum created by the increase in livestock exports; the loss of production from Upper Nile State which is now part of South Sudan; the high price of relatively scarce agricultural labour

due to the loss of a significant pool of labour with the movement of Southerners back to South Sudan and the movement of labour away from agriculture to gold-mining.

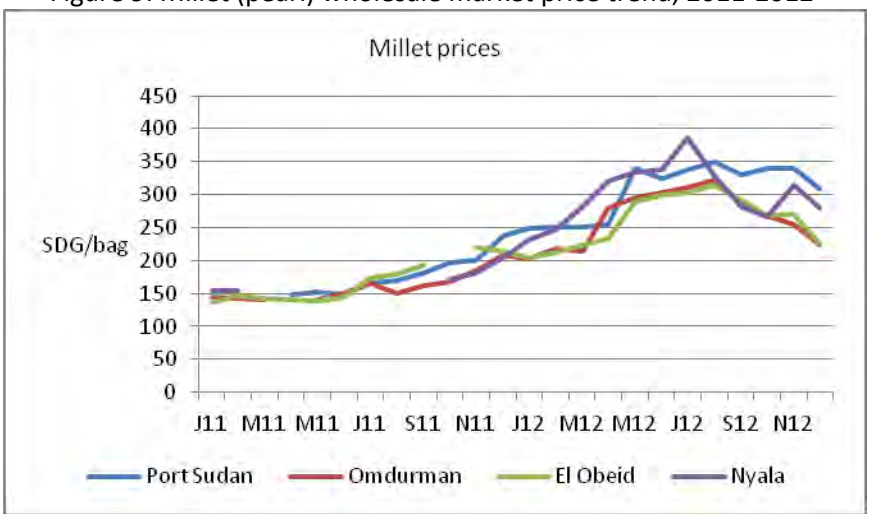
Figures 8 - 10 show the average monthly cereal prices recorded at four major markets. The extreme fluctuations in sorghum and wheat prices recorded in Nyala reflect the changing levels of insecurity, which, as might be expected, affect staple food prices much more than they do the prices of cash crops such as groundnuts.

Figure 8. Sorghum (Feterita) wholesale market price trend, 2011-2012



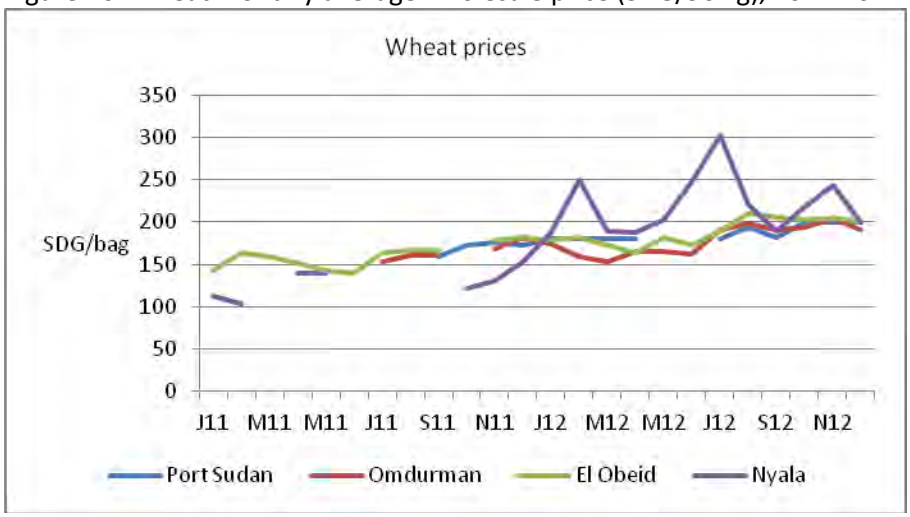
Sources: FSTS and FEWS NET

Figure 9. Millet (pearl) wholesale market price trend, 2011-2012



Sources: FSTS and FEWS NET

Figure 10. Wheat monthly average wholesale price (SDG/90 kg), 2011-2012



Sources: FSTS and FEWS NET

4.2 Livestock prices

Livestock prices vary considerably depending on location and condition, but all are high compared with the same time last year, and they are expected to remain so. This is a normal consequence of good livestock condition and favourable pasture, but the increased emphasis on the export of livestock probably acts as an extra stimulus to high prices. Some typical livestock price ranges as recorded by the mission are shown in Table 22.

Table 22. Some representative livestock prices (SDG) at different locations in Sudan, November 2012

	Darfur	**Khartoum**	**Gedaref**	**Red Sea**
Bull	3 000 - 5 000			
Steer		3 000 - 7 000		
Heifer		5 000 - 7 000		
Cull cow	1 200	5 000 - 7 000		
Cattle			2 000	5 000 - 9 000
Goat	200 - 700	400		500 - 700
Sheep	550 - 1 000	550 - 1 000	950	900 - 1 000
Camel			5 000	5 000

5. CEREAL SUPPLY/DEMAND BALANCE, 2012/13

The cereal supply/demand balance sheet (Table 24) takes account of the opening stocks (cereal stocks currently stored in the country); the agricultural year's cereal production (including the forecast for wheat); the population's cereal consumption requirement; the livestock feed requirement; the seed requirement for the coming agricultural year; harvest and post-harvest losses; cereal exports; and closing stocks (the quantities that are expected to remain in the country at the end of the marketing year). The quantities of cereals held by the Strategic Reserve Corporation during the first week of December 2012 are shown in Table 23.

Table 23. Cereals held by the Strategic Reserve Corporation (tonnes)
as at 6 December 2012

	Sorghum	Millet	Wheat	Total
Eastern	50 904			50 904
Central	85 964			85 964
Darfur		1 067		1 067
Agricultural Bank	6 585		1 567	8 152
Total	143 453	1 067	1 567	146 087

Source: Strategic Reserve Corporation

In drawing up the national cereal balance sheet, the following assumptions have been made:

- Opening stocks of cereals for marketing year 2012/13 are estimated at 346 000 tonnes. These comprise an estimated 200 000 tonnes of wheat, held by the main importing companies and flour mills, plus 146 000 tonnes of sorghum, millet and wheat stocks held by the Strategic Reserve (Table 23). Private and community underground stores are known to exist in the central and eastern clay plains, but the amounts held in them are expected to be minimal, given last year's very poor harvest.
- In the absence of recorded imports or exports of maize, it is assumed that all maize used is locally produced and that the amount produced is roughly equal to the amount used. The amount used equates to human and livestock consumption, post-harvest losses and seed requirements for the following year. Based on the assumptions made for each of these parameters (see below), maize production in 2012 has been estimated as 43 000 tonnes.
- Since there has been no indication of any change in the level of rice production in recent years, the 28 000 tonnes reported for 2011 has also been assumed for 2012; this includes swamp rice in White Nile state.
- The mid-year 2013 population in Sudan is estimated to as 36.164 million (Table 7)**.**
- No changes in consumption patterns have been indicated since last year, so the same levels of annual per caput cereal requirements that were used last year have been assumed, viz. a total of 146 kg of cereal, comprising 73 kg of sorghum, 15 kg of millet, 1 kg of maize, 55 kg of wheat, and 2 kg of rice.
- In the absence of any survey data, and based on discussions with farmers, it is estimated that about 5 percent of the sorghum, millet and maize produced is used as livestock feed.
- Seed requirements for next season are based on average rounded planted areas and the following seed rates: sorghum 7.5 kg/ha x 9 million ha; millet 4 kg/ha x 3 million ha; maize 20 kg/ha x 12 000 ha; wheat 120 kg/ha x 250 000 ha; and rice 75 kg/ha x 27 000 ha.
- Post-harvest losses are estimated at 10 percent for maize, and 5 percent for other cereals. This year, however, an extra 7-percent harvest loss has been added to sorghum's assumed 5-percent post-harvest loss in order to reflect losses of between 5 and 10 percent in the field at harvest time; these are expected to result from late harvesting because of labour shortages. This brings sorghum's combined harvest and post-harvest losses up to 12 percent.
- Commercial imports of cereals are normally in the order of 1.9 million tonnes of wheat and 50 000 tonnes of rice; similar amounts are expected to be imported in 2013.
- Closing stocks of wheat are expected to be normal at around 100 000 tonnes. The figures for the closing stocks of sorghum and millet reflect the surplus production of those two crops this year.

Table 24. Sudan. Cereal supply/demand balance, January - December 2013 (000 tonnes)
(NB Figures have been rounded.)

	Total	Sorghum	Millet	Maize	Wheat	Rice
Availability	6126	4417	1091	43	548	28
Opening stocks	346	143	1.1	0	202	0
Production	5780	4273	1090	43	346	28
Total utilization	7763	4417	1091	43	2136	76
Food	5280	2640	542	36	1989	72
Feed	270	214	55	2	0	0
Seed	112	68	12	0.2	30	2
Harvest and post-harvest losses	590	513	55	4	17	1
Closing stocks	1511	983	428	0	100	0
Estimated import requirements	1637	0	0	0	1589	48
Anticipated commercial imports	1950	0	0	0	1900	50
Estimated gap	0	0	0	0	0	0

Table 24 indicates substantial surplus production this year for both sorghum and millet. In terms solely of production (i.e. excluding opening stocks) sorghum and millet exceed annual total utilization requirements by approximately 980 000 tonnes and 427 000 tonnes respectively. The ban that was placed on the export of sorghum last year in response to that year's poor harvest has now been removed. Up to one million tonnes may now be exported, so there will be the option to retain part of this year's surplus as strategic reserve while also exporting some. Sudan's formal grain-storage capacity, excluding private traders' warehouses and residential storage, amounts to some 648 715 tonnes, of which 165 000 tonnes capacity is accounted for by the Strategic Reserve Corporation and the rest by the Agricultural Bank of Sudan.

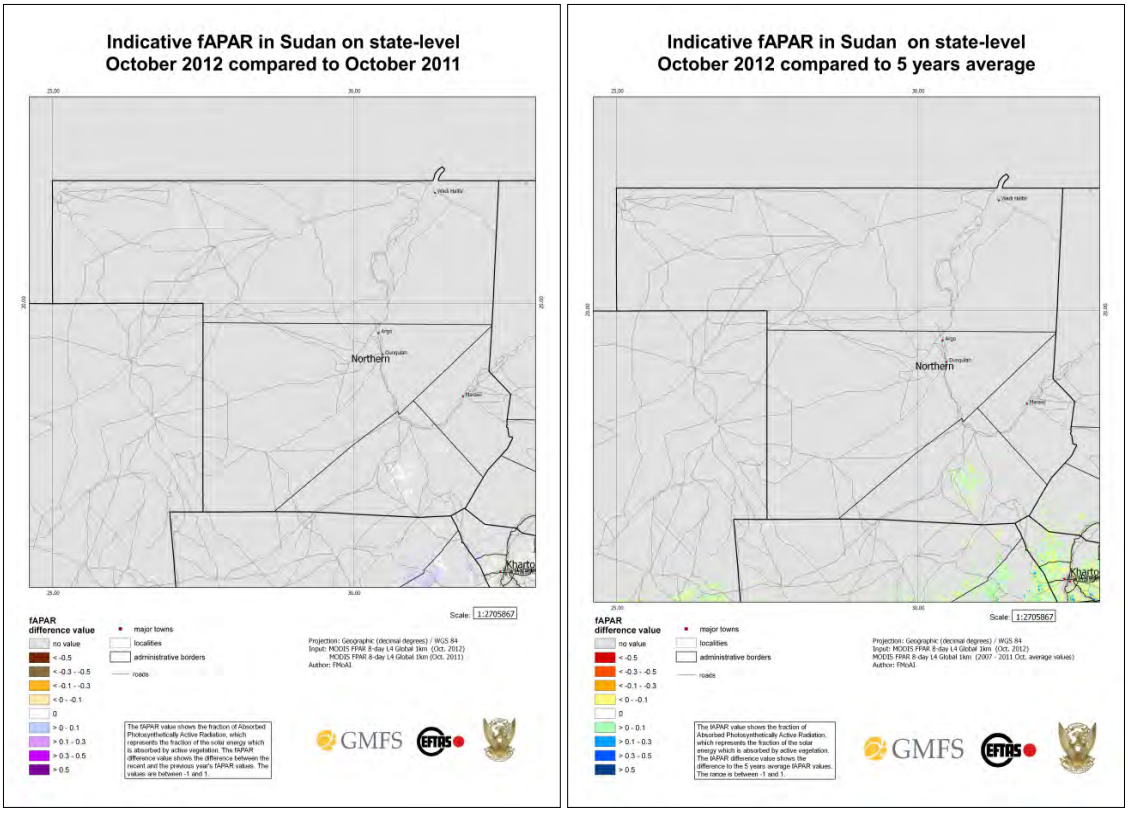
The perennial gap between wheat production and wheat consumption is expected to be more than compensated by normal levels of commercial imports.

ANNEX. SUMMARY OF AGRICULTURAL SITUATION BY REGION AND STATE

As well as brief summaries of the agricultural situation state by state, this annex also presents fAPAR images for each state. The fAPAR value shows the fraction of Absorbed Photosynthetic ally Active Radiation, which represents the fraction of the solar energy which is absorbed by active vegetation. fAPAR can therefore be used as an indicator of the state and evolution of the vegetation cover, thereby advantageously replacing the normalized difference vegetation index (NDVI). In most states the image on the left (comparison with October 2011) shows very clearly the superiority of this year's rainfall compared with that of 2011, while the image on the right shows a generally favourable comparison with the 5-year average.

Northern Region (Northern, River Nile, Khartoum)

Northern State



- Crop production in Northern State is almost exclusively irrigated, and winter is the main production season.
- Summer sowing was timely but planted areas of sorghum and maize were reduced compared with 2011 for four main reasons:
    - large fluctuations in the water levels of the River Nile resulting from releases from Merowe Dam.
    - high prices of agricultural inputs.
    - shortage of labour; much of the labour force was occupied with gold-mining.
    - shortage of machinery.
- More than 10 percent of the area planted to sorghum, maize, fodder and vegetables was washed away by higher-than-average floods with the release of water from Merowe Dam.

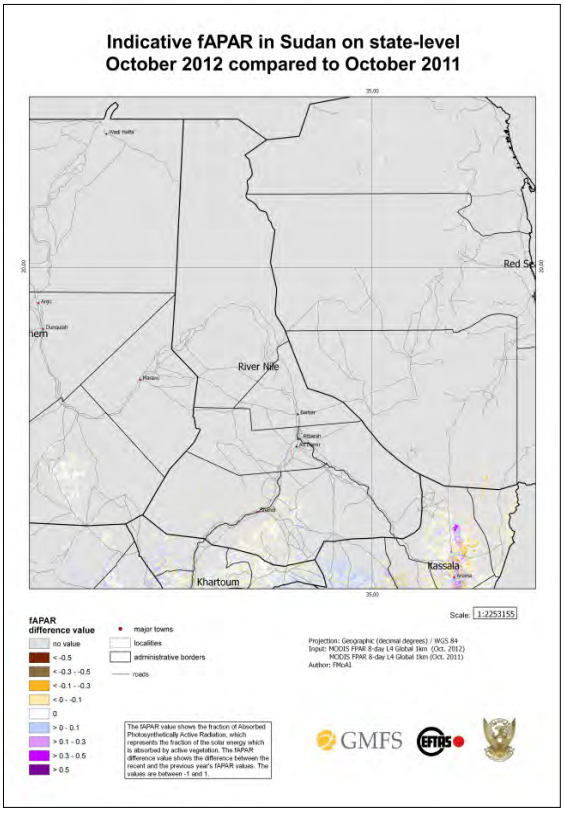
There appears to be inadequate communication between the Dam authority and farmers. On the other hand, electrification resulting from the Dam has reduced the cost of pumping for irrigation.

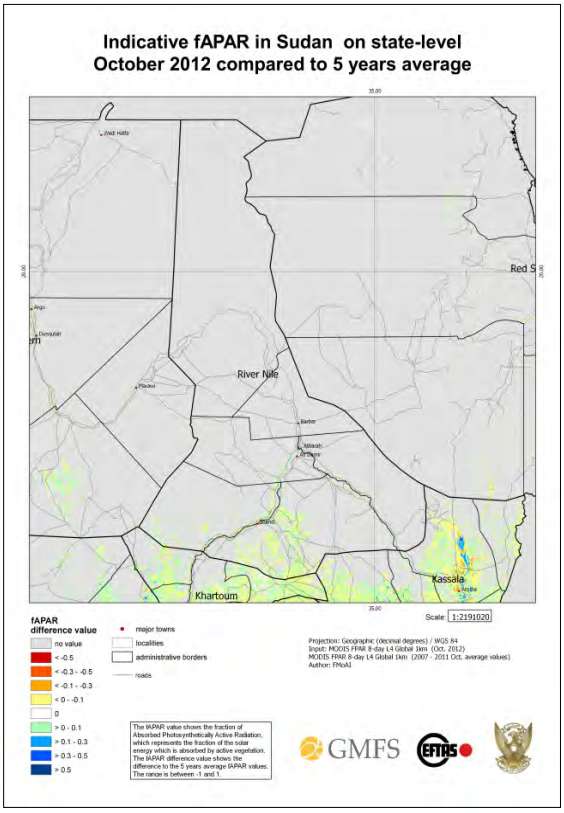
- The area under summer tomato production was estimated to be more than 800 ha with yields of 7 - 12 t/ha.
- At just over 40 000 ha, the anticipated area under winter wheat will be larger than last year but still significantly smaller than the long-term average.
- More than 22,000 ha of faba beans are anticipated for the winter season, in addition to about 10 000 ha of other winter vegetables, including potatoes, onions, tomatoes and spices.
- Livestock condition is good, and there is no shortage of water as livestock drink from perennial sources.
- Fish production increased as a result of the Merowe Dam.
- Food prices were higher than at the same time last year.
- Trade activity has increased following the construction of new tarmac roads.

Total cereal production in Northern State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	17	7	4				162	69	98

River Nile State



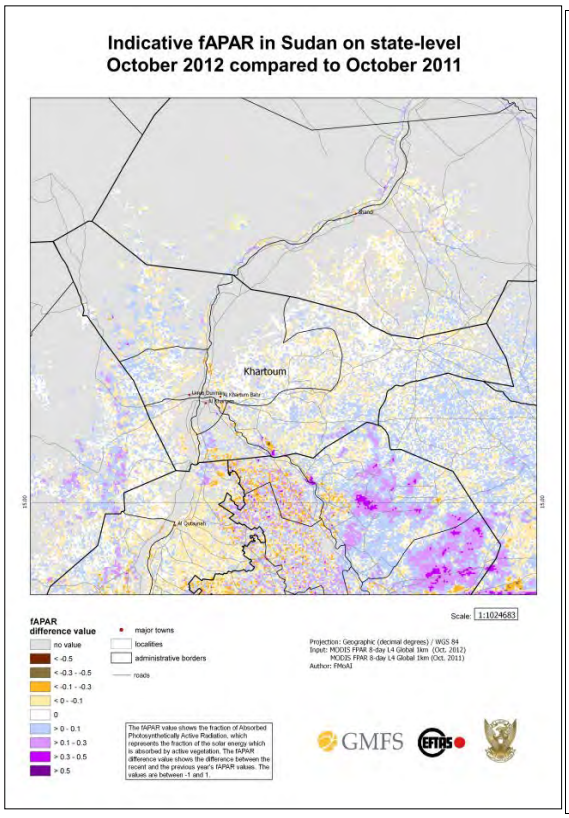


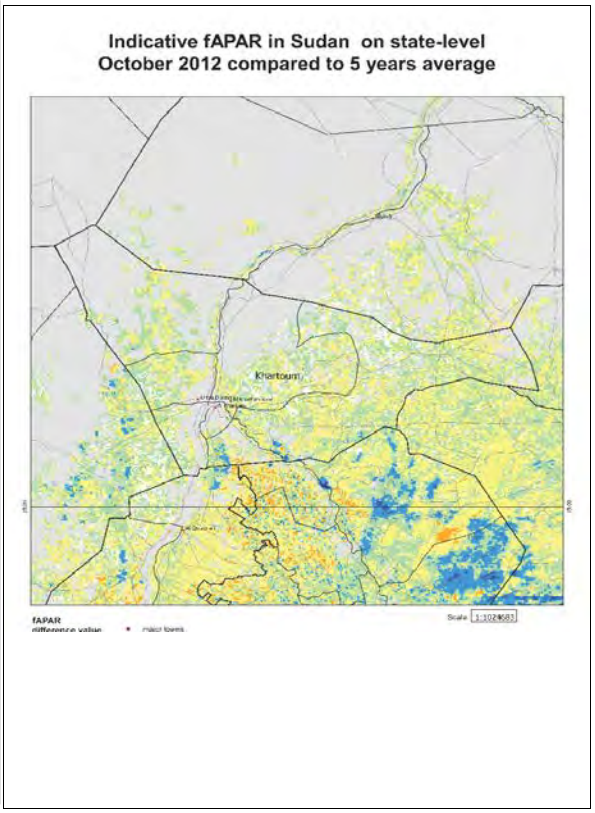
- Summer crop production in River Nile State comprises (1) early irrigated, (2) late flooded and (3) spate irrigated. This year the rains were above average, and the Nile and Atbara floods were better than last year.
- Planting was timely; the planted area was larger than last year but still smaller than the long-term average.
- Cotton, sesame, groundnuts and hibiscus have recently been introduced to the state.
- Good water availability for livestock. Areas of natural pasture are better than last year.
- Increased poultry production, and increased fish production from Merowe Dam.
- Food prices higher than at the same time last year.
- The increase income from gold-mining has led to increased food consumption.
- More economic irrigation resulting from electrification has led to Increased investment in agriculture.

Total cereal production in River Nile State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	64	23	56				60	35	53
Traditional	41	4	4						

Khartoum State





- Rainfall was average at around 80 mm, but flash floods and flooding from the Nile were better than average.
- The area planted to sorghum was significantly larger than the long-term average, and yields were higher.

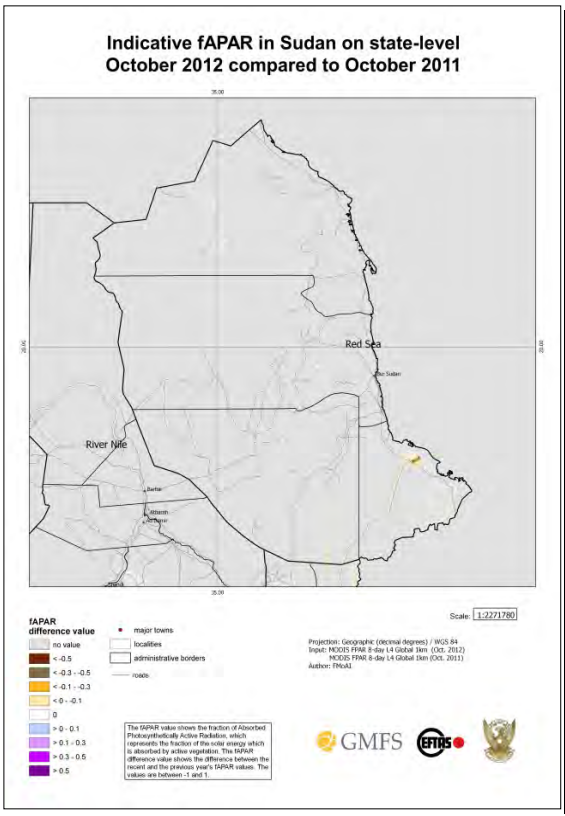
- More than 25 000 ha of vegetables, fodder and other field crops were produced during the summer under irrigation.
- About 1 300 ha of wheat are expected to be planted under irrigation during the winter months. Labour was and is available, but at a significantly higher cost than in previous years.
- Excellent pasture and water availability have resulted in very good livestock condition.
- Food prices are higher than at the same time last year.

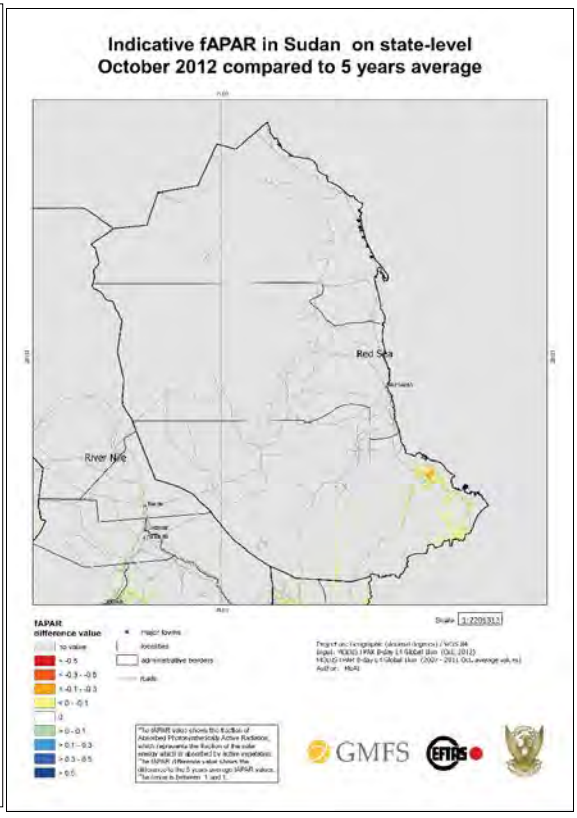
Total cereal production in Khartoum State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated							9	2	2
Traditional	8	0	30						

Eastern Region (Red Sea, Gedaref and Kassala)

Red Sea State





Tokar scheme

- Rainfall started on time.
- 12 floods; first flood 24 June, last flood 18 September. Four of the 12 floods were average, one was above average, and seven were below average.
- Cotton area down because of seed shortage and possibly because of low international prices and because farmers are no longer compelled to grow a certain percentage of cotton.
- Sorghum area down and millet area up on 2011.

- Some crop loss due to locusts and birds.

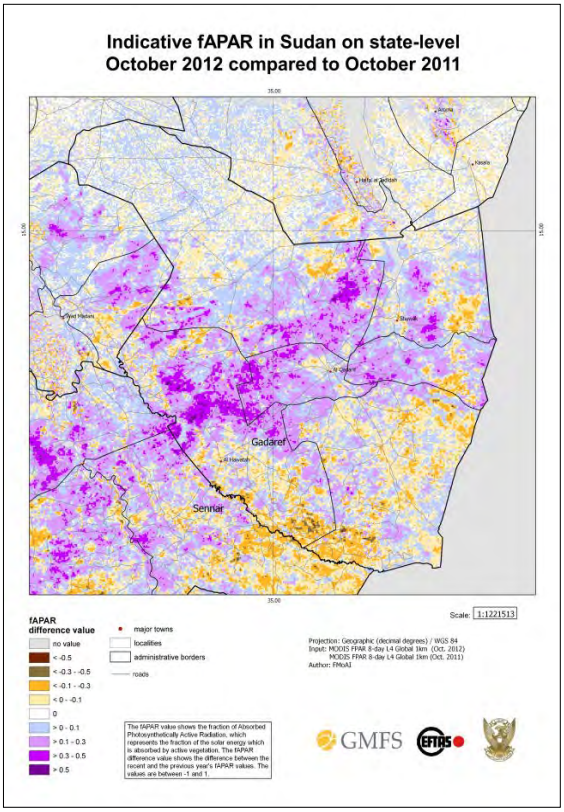
Traditional

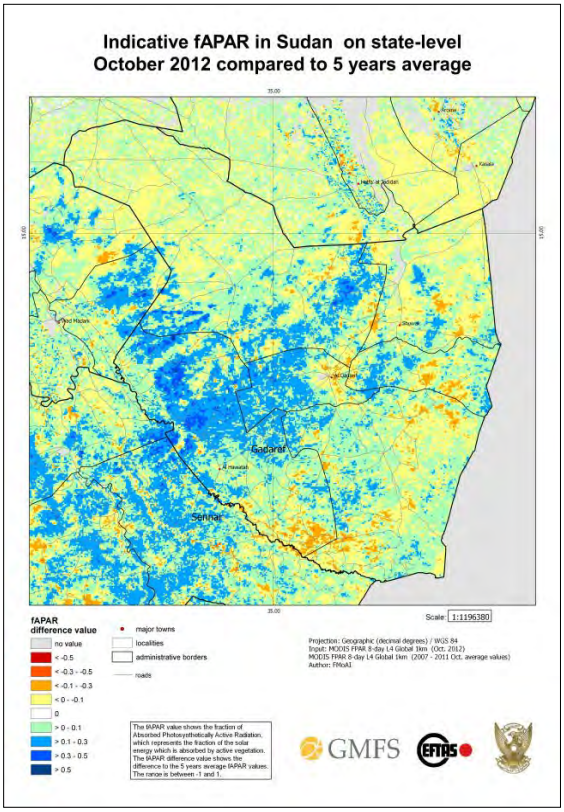
- The rains started later than usual, but amounts and distribution were generally better than last year.
- The cropped area was larger than last year and cereal production was higher. Sorghum production was similar to the long-term average, but millet production was significantly higher.
- The number of farmers benefiting from credit was, at 331, similar to last year.
- Food prices began to fall in October.

Total cereal production in Red Sea State (000 t)

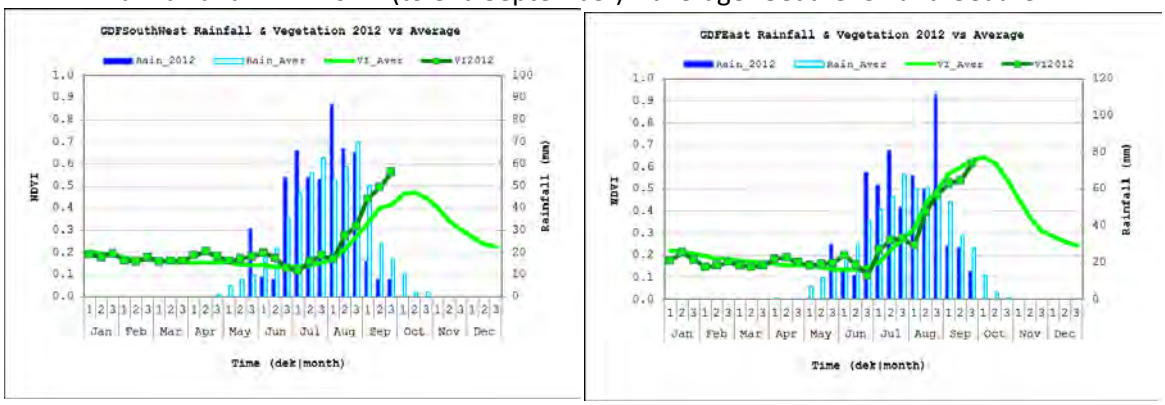
	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	3	11	6	4	4	5			
Traditional	6	3	6	2	2	3			

Gedaref State





Rainfall and NDVI 2012 (to end September) v average: Gedaref SE and Gedaref E



Source: Sudan Seasonal Monitor, October 2012

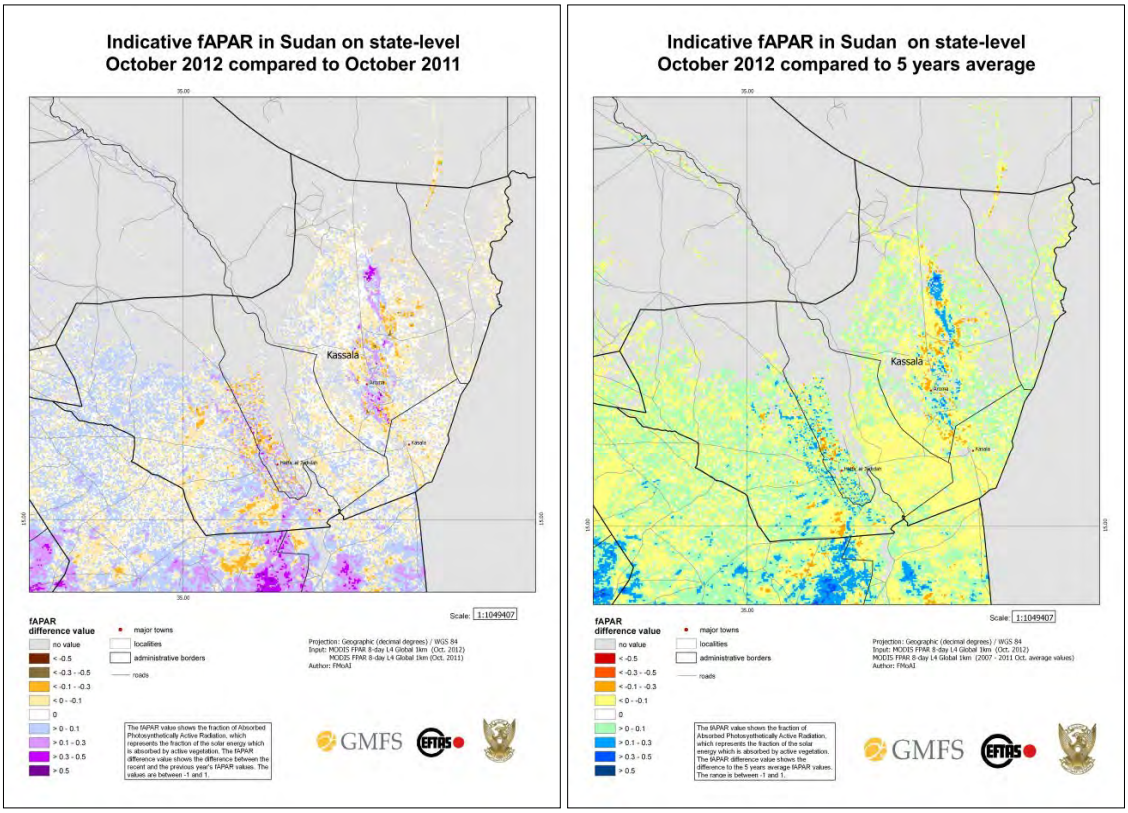
- Good rainfall (more than 2011) with excellent distribution. Started May, ended mid-October. 43 rainy days. Water-logging in parts of southern block.
- Timely sowing.
- Better access to credit.
- Sorghum, sesame and sunflower areas all up on 2011.
- Increase in number of tractors.
- Grain prices higher than in 2011, but falling.
- Serious labour shortages, and high cost.

Total cereal production in Gedaref State (000 t)

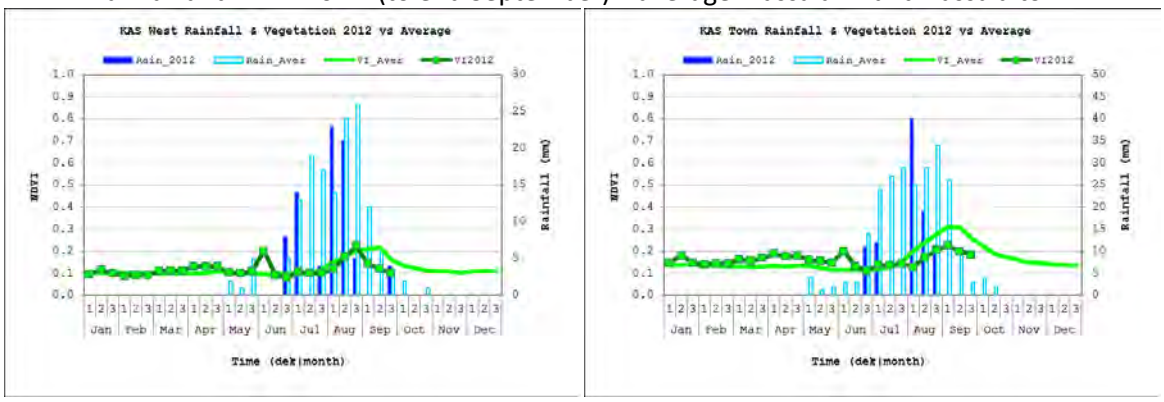
	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated*	36	19	32				2	0	0
Semi-mechanized	536	145	1145	17	18	47			

* Represents 40 percent of production from Rahad Scheme, 40 percent of which lies within Gedaref State

Kassala State



Rainfall and NDVI 2012 (to end September) v average: Kassala W and Kassala town



Source: Sudan Seasonal Monitor, October 2012

- Rains started in most areas in early July and ended in September. Amounts were above average, at 700 mm, in the north of the state and below average in the south.
- The good rains allowed a huge expansion of area under semi-mechanized sorghum this year compared with last year's very poor showing. The area, however, was still just below the five-year average.
- The area under sesame also expanded significantly compared with both last year and the five-year average. Yields too were up at 0.43 t/ha.
- Food prices have begun to fall.

Gash scheme

- Floods better than in 2011; started end of June, finished end of September.

- The area and production of sorghum were both greater than last year and both exceeded the long-term average.
- Some crop loss from birds.

New Halfa scheme

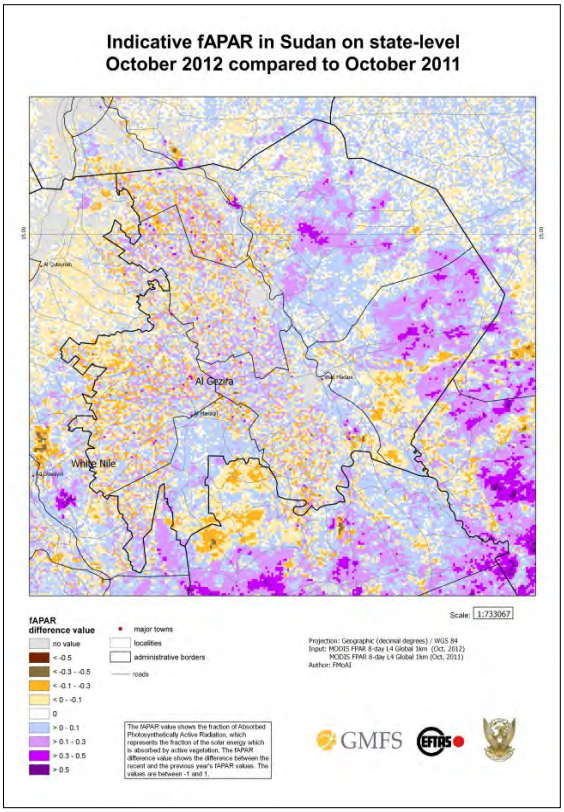
- Rains started normally in June but ended earlier than usual at the end of August. Nevertheless, the quantities received were average. September was dry, adversely affecting the tails of some irrigation canals.
- About 5 000 were affected by water logging.
- Improvements in irrigation water delivery resulted in an expansion of cropped area. However, the area under wheat is expected to be slightly smaller than last season.
- Sorghum production was up on last year and also exceeded the five-year average.
- At 30 000 ha, the area under groundnuts almost equalled that of sorghum. Groundnut yields were excellent at over 3.5 t/ha (in shell).

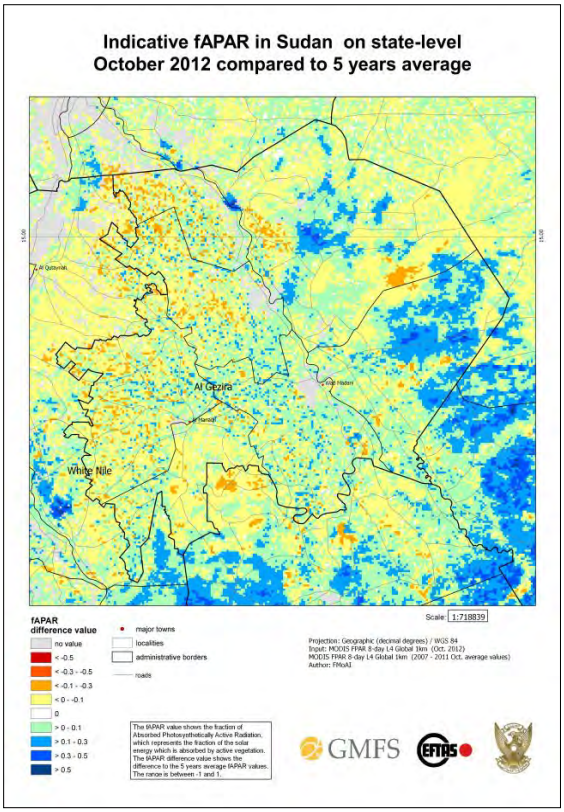
Total cereal production in Kassala State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	142	119	131				6	15	14
Semi-mechanized	150	4	176						
Traditional	40	20	27	1	0	0			

Central East Region (Gezira, Sennar and Blue Nile)

Gezira State





Traditional

- Rains started early and ended either normally or late. Amounts were better than last year and above average, but there was a dry spell in September of 2 - 4 weeks.
- Timely planting. The area under sorghum was more than double that of last year but was still below the five-year average.
- With relatively good yields (close to the 5-year average) production is expected to be more than five times that of last year.
- Good livestock condition with satisfactory pasture and water situation much better than last year.
- High sorghum prices showed a slight decline with the beginning of the harvest.
- General shortage of agricultural labour.

Gezira scheme

- Early start to the rains. Excessive rain in some areas in August, which caused water logging, followed by a dry spell of 3 - 4 weeks in September.
- Timely sowing.
- Some silting-up of irrigation canals, and low water levels in some.
- Less fertilizer applied this year because of high price.
- Cotton has seen a significant decline in area this year compared with last and compared with the long-term average.
- 64 percent of the intended wheat area had been prepared by 20 November, and about 15 percent had been sown and irrigated. The planted area is expected to be less than the target.
- Good livestock condition. No shortage of fodder or water.
- Sorghum prices began to fall with the beginning of the harvest.

Rahad scheme (60 percent of the scheme lies within Gezira State)

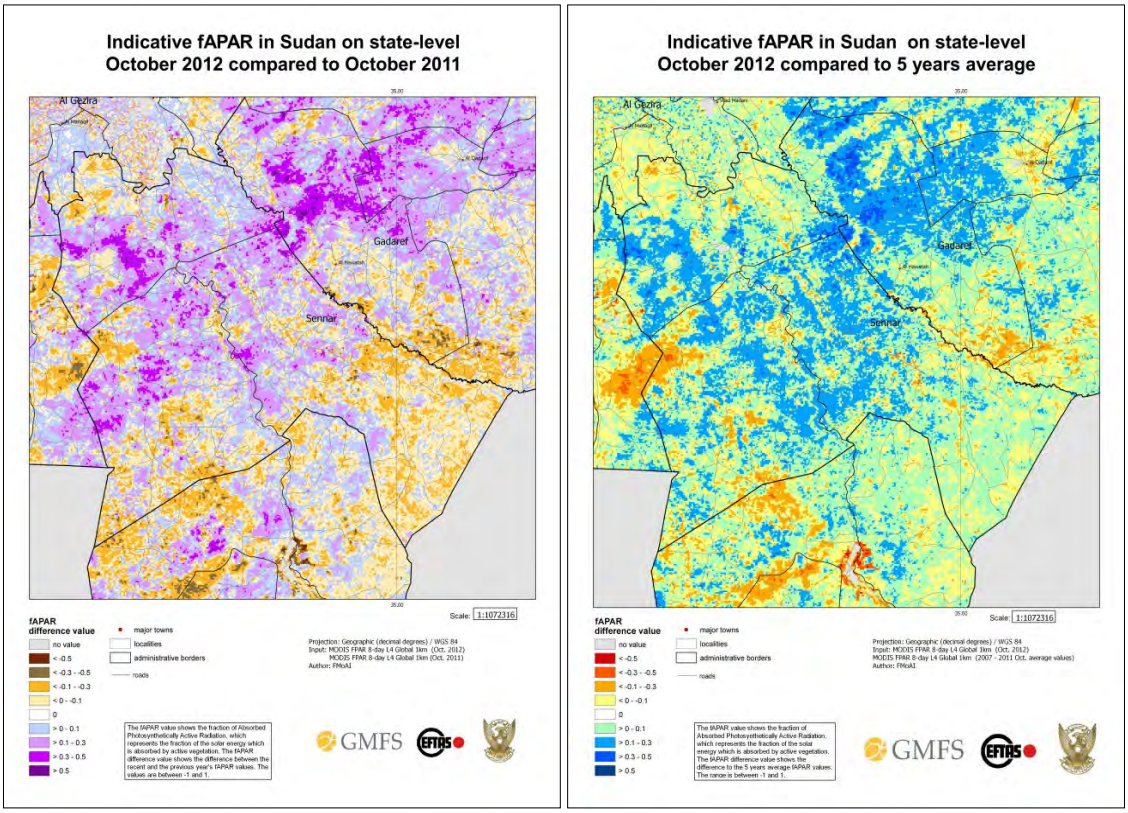
- Rains started early June, finished October, with a total of about 310 mm. Irrigation was better than in 2011.
- The area planted to sorghum was significantly larger than last year and exceeded the five-year average.
- Production of sorghum is expected to be almost 70 percent higher than in 2011/12 but still slightly below the five-year average.
- Some water logging of sorghum, groundnut and cotton. Sunflower was planted as a substitute crop in those areas that were worst affected.
- Groundnut production is expected to be well above last year's despite being grown on a smaller area. It will nevertheless be below the long-term production average.
- Shortage of labour for cotton-picking. Both area and production are down on last year. The delivery of fertilizers from the Agricultural Bank was delayed until late September.
- Sorghum and groundnut prices falling; wheat prices rising. Livestock prices rising

Total cereal production in Gezira State (000 t)

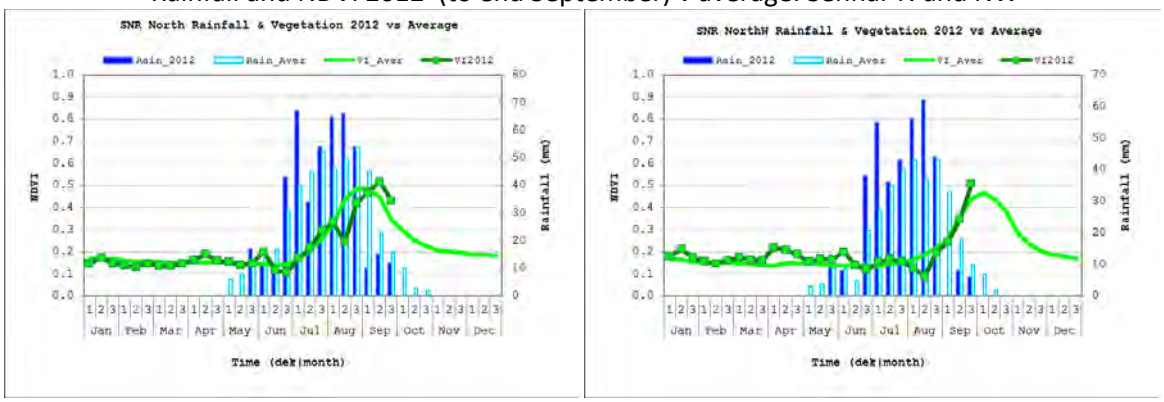
	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated*	549	374	326				234	147	124
Traditional	119	19	97	2	0	1			

* Includes 60 percent of production from Rahad Scheme, 60 percent of which lies within Gezira State

Sennar State



Rainfall and NDVI 2012 (to end September) v average: Sennar N and NW



Source: Sudan Seasonal Monitor, October 2012

Rainfed

- Rains started early; good distribution and above-average quantities (up to 700 mm).
- Timely planting.
- Planted area of sorghum exceeded target.
- Very high price of sunflower seed resulted in only one third of the targeted area being sown.
- Shortage of labour, and high cost. Consequently some farmers considering selling their crop as a standing crop for fodder. Others have trucked labour in from the Ethiopian border at relatively high cost.
- Generally good pasture, and livestock condition from satisfactory to excellent.
- High cereal prices are beginning to fall.

Irrigated

- Early start and late finish to rains. Average amount with generally good distribution, although heavy rains delayed some sorghum planting.
- Wad Ahmed variety prominent.
- Reduced application of fertilizer because of high cost.
- Slight sorghum midge damage to late-sown sorghum.
- Timely planting of cotton.
- Harvesting is expected to be delayed (especially that of cotton) because of a shortage of labour.
- There is a need for training in the proper and efficient use of farm machinery.
- Good livestock condition.

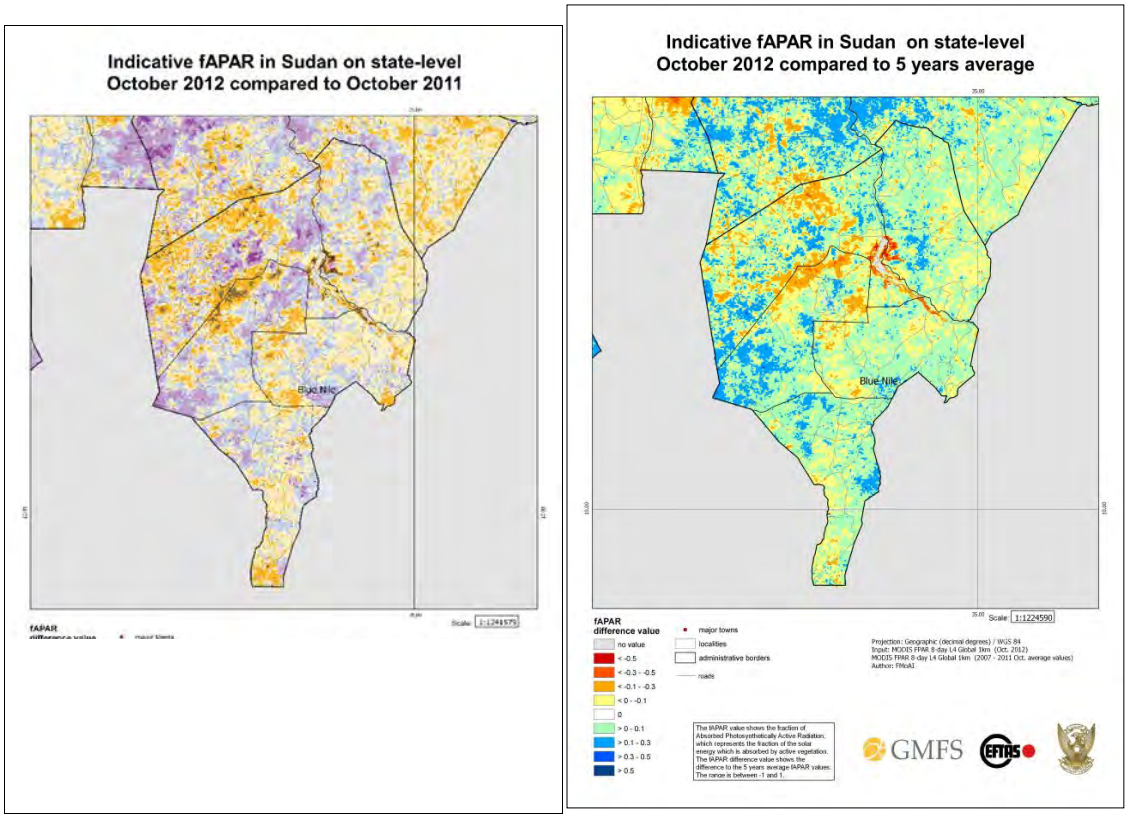
Suki scheme

- Early start to the rains and normal end.
- Sowing of cotton and sorghum was generally on time.
- Some late sowing due to low levels of Blue Nile and silting-up of canals.
- Reduced fertilizer application because of high price.
- Some flooding and some areas short of water.
- Large proportion of cotton had to be re-sown.
- Sorghum area almost double that of last year, and larger than the five-year average. However, with a yield similar to that of last year, production will be below the five-year average.
- Some mild damage from sorghum bug.
- Good livestock condition; fodder and water availability both very good.
- Slight downward trend in prices.

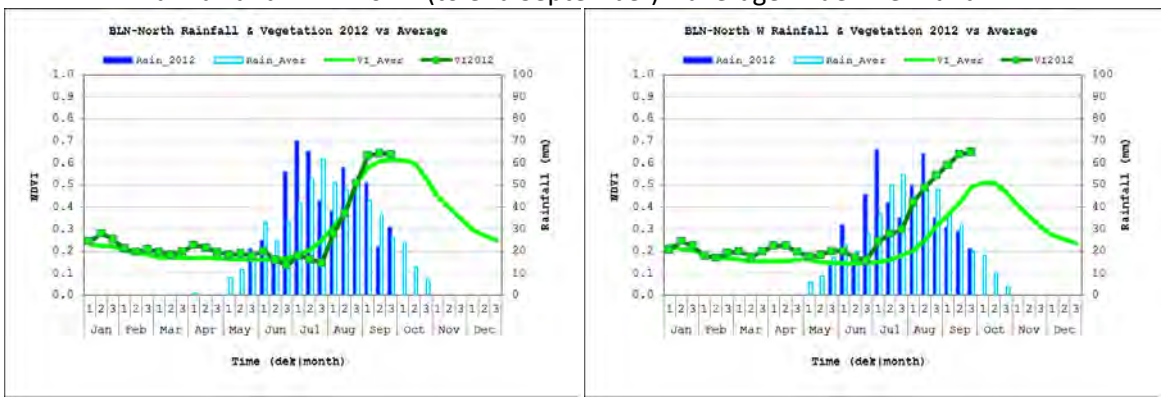
Total cereal production in Sennar State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated Sennar	55	50	42				4	0	0
Irrigated Suki	32	14	28				1	1	0
Semi-mechanized	224	79	522	19	19	73			
Traditional	43	56	167	11	5	17			

Blue Nile State



Rainfall and NDVI 2012 (to end September) v average: Blue Nile N and NW



Source: Sudan Seasonal Monitor, October 2012

- Rainfall: early start and late finish. Amounts above average; mostly about 700 mm, but 927 mm was recorded at one rain gauge. There was flooding in many areas.
- Late planting (late August, early September) in many areas because of heavy rains. Late plantings may be vulnerable to sorghum midge.
- Weed infestation (grasses and Striga).
- Only 5% of sorghum harvested by the end of November. It is estimated that at least 30% of planted area will be unproductive.
- Labour shortage, and high cost.
- Some farmers are selling their standing crop for fodder.
- Poor sunflower performance except on commercial land.

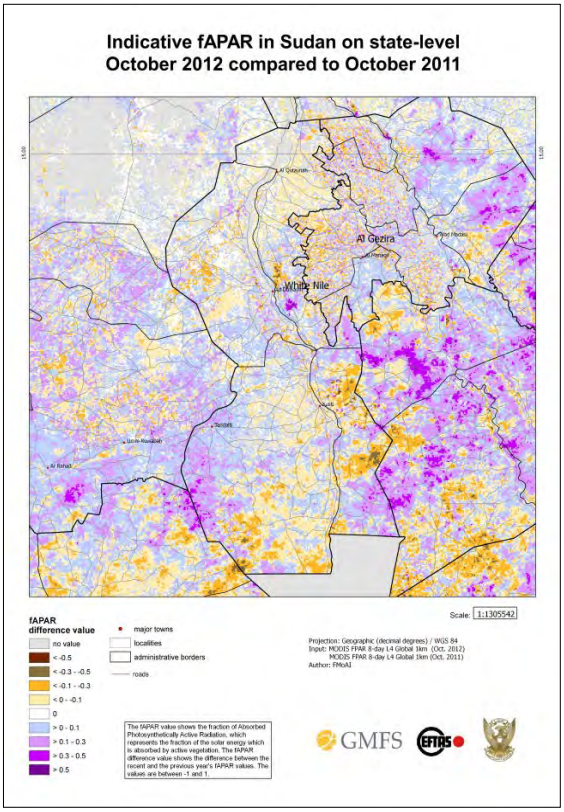
- Increased height of Rosaires Dam resulted in flooding and crop loss. Is also expected to more than double fisheries potential.
- Good livestock condition; extensive vaccination.
- Grain prices high; beginning to fall by end of November.

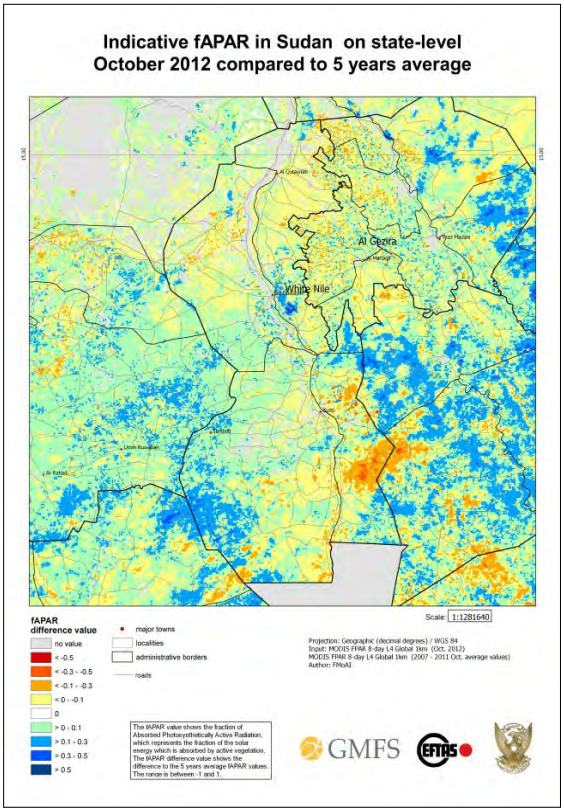
Total cereal production in Blue Nile State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Semi-mechanized	139	130	185	8	11	13			
Traditional	33	22	39	3	7	7			

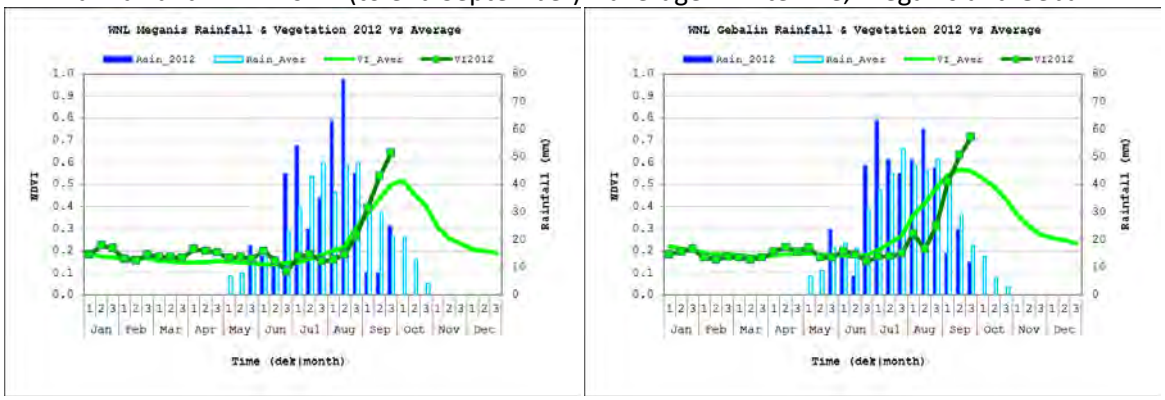
Central West Region (White Nile, N Kordofan and S Kordofan)

White Nile State





Rainfall and NDVI 2012 (to end September) v average: White Nile; Meganis and Gebalin



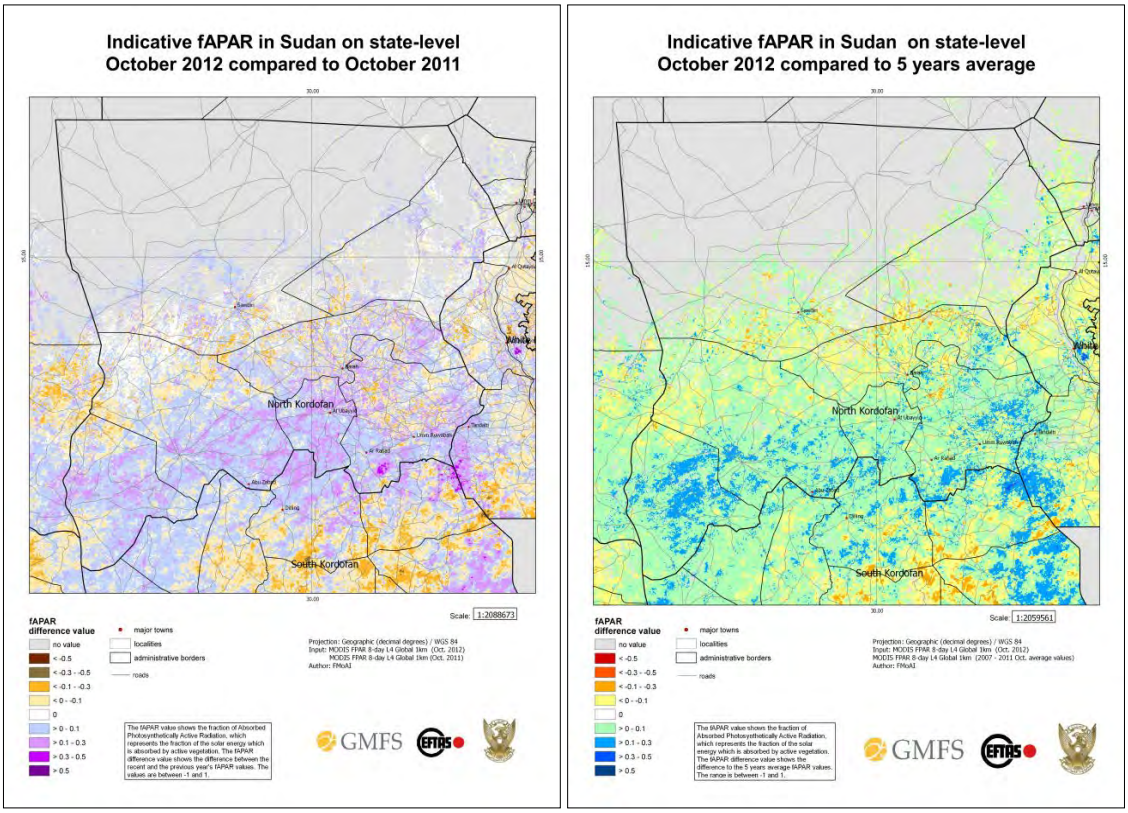
Source: Sudan Seasonal Monitor, October 2012

- The rains started early and were generally well distributed, many farmers reporting that they were the best rains they had witnessed for many years.
- Crop areas in the irrigated and traditional sectors were larger than both last year and the long-term average. In the semi-mechanized sector, however, there was a reduction in the area under sorghum relative to last year, although this year's area was larger than the long-term average.
- Sorghum and millet production are up on last year in the rain fed sectors and slightly down in the irrigated sector.
- Production of both sesame and groundnut is significantly higher than last year.
- The good rains caused heavy weed infestation.
- Farmers complained that the Plant Protection Department could have done more to protect crops against pests.
- There was a general shortage of agricultural labour.
- Pastures are good, water is available, and livestock condition is excellent. There were fears of possible conflict at the time of the AM's visit since cattle were beginning to move through semi-mechanized farm land that had not yet been harvested.
- Prices of cereals and livestock are very high and had shown few signs of falling by the end of November.

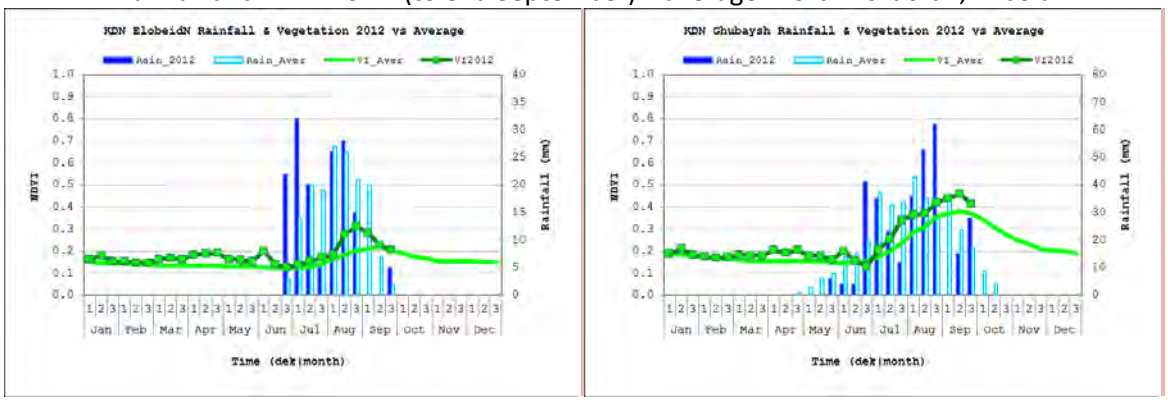
Total cereal production in White Nile State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	61	119	98				34	38	39
Semi-mechanized	138	133	176	12	10	16			
Traditional	99	47	122	15	6	14			

N Kordofan State



Rainfall and NDVI 2012 (to end September) v average: North Kordofan; El beid



Source: Sudan Seasonal Monitor, October 2012

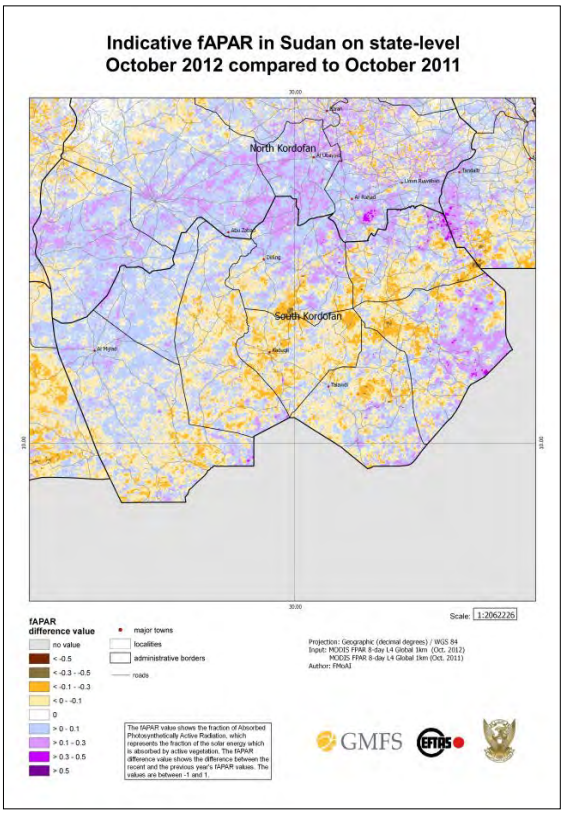
- The rains started early in June and continued in many regions until November. Rainfall amounts and distribution were good, although some agricultural areas experienced flooding.
- Both sorghum and millet areas were up compared with last year.
- Sorghum and millet showed respectively an eight- and a nine-fold increase in production on last year's very poor production in the traditional sector. Sorghum production was slightly higher than the long-term average while millet production remained slightly lower.
- Sesame witnessed a very significant increase in area and production. The area under groundnut was smaller than last year but production was higher.
- Pastures are good, water is available, and livestock condition is excellent. The state is free of livestock diseases.

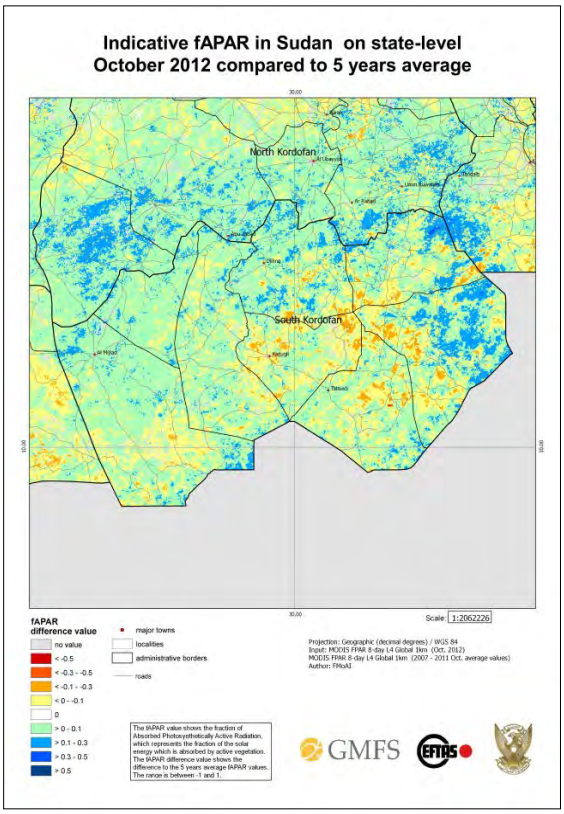
- Grain prices are higher than last year but had begun to fall slightly by the end of November.

Total cereal production in N Kordofan State (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Irrigated	2	3	1						
Semi-mechanized	3	3	5						
Traditional	104	15	123	125	13	118			

South Kordofan State





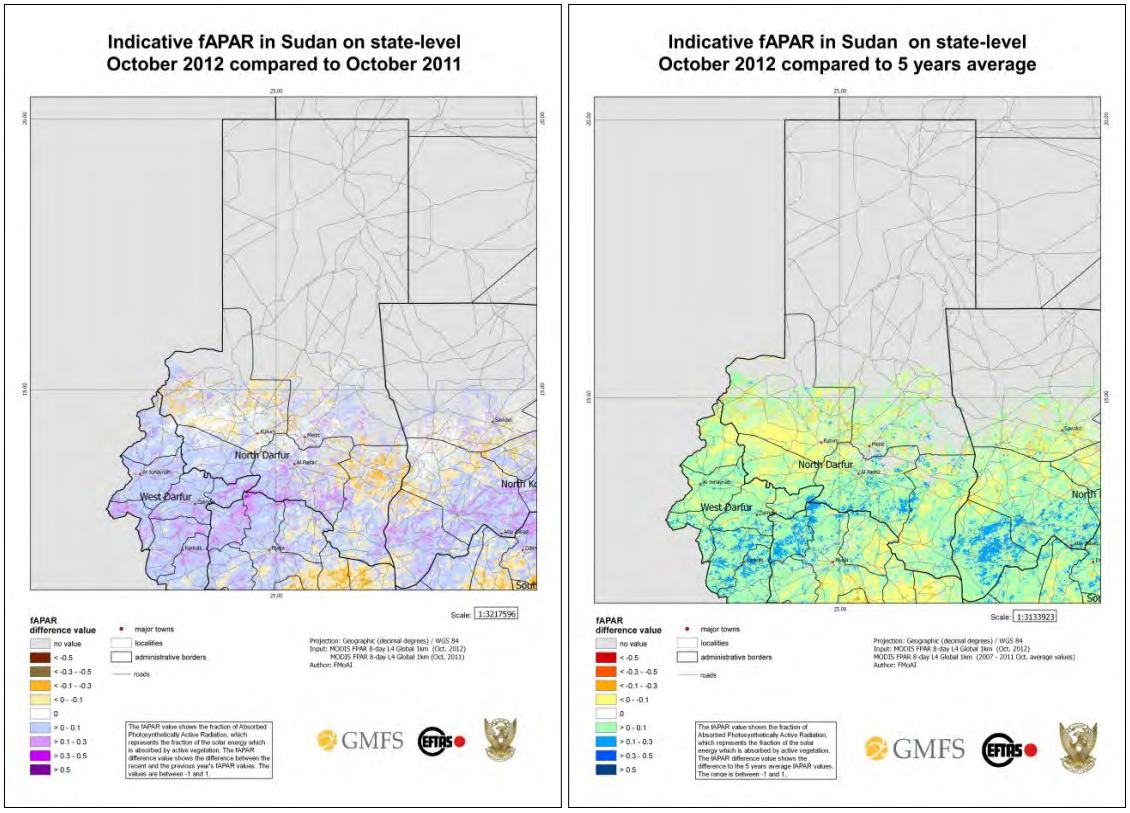
- The rains started early in June and continued in most parts until early November. Rainfall amounts were above average and distribution was generally good, although some areas experienced dry spells of up to four weeks.
- Sorghum and millet areas and production were greater than last year but below the long-term average.
- Livestock condition is generally excellent as a result of plentiful pasture and water. However, large numbers of livestock are concentrated on the border with North Kordofan because of insecurity further south, while in the western part of the state there are problems of water shortage for animals in many areas because of the destruction of hafirs by this year's heavy rains.
- Cereal prices are high but have started to decline.

Total cereal production in S Kordofan State (000 t)

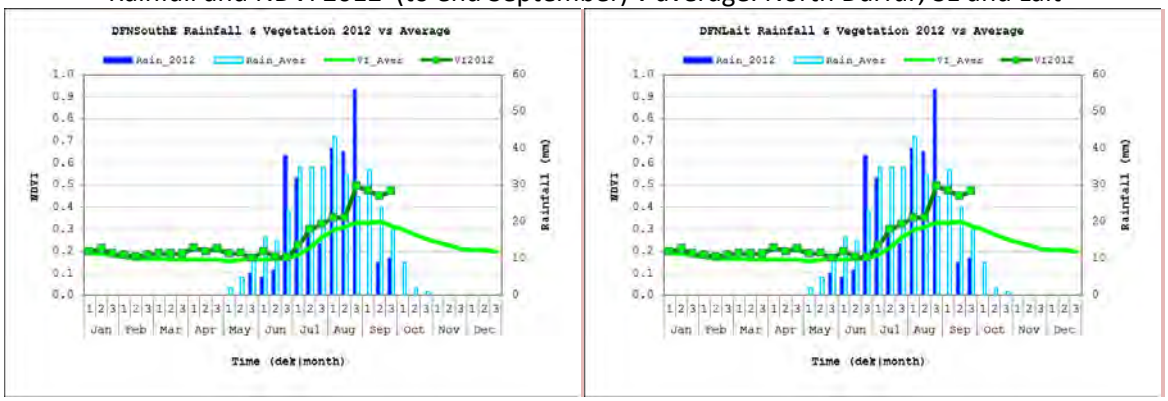
	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Semi-mechanized	165	104	115	1	1	3			
Traditional	281	79	81	36	23	26			

Darfur Region

North Darfur State



Rainfall and NDVI 2012 (to end September) v average: North Darfur; SE and Lait



Source: Sudan Seasonal Monitor, October 2012

- Good rainfall amount (more than 2011), well distributed; started late May-early June, ended later than usual in October; no dry spells.
- Some flash flooding in Malha (north) with heavy loss of sheep.
- Timely planting.
- Planted and harvestable areas both up on 2011. 75% of planted area expected to be harvested.
- Crops: millet and sorghum, 75%; groundnuts, 16%; sesame, 5%; watermelon, 4%.
- Crop production up on 2011. Estimated to be sufficient for consumption needs.
- Essentially pest- and disease-free.
- Pasture good in quantity and quality. Good water availability except in Dar Zaghawa (far NW) where heavy rains damaged reservoirs.
- Grain prices higher than 2011 but now falling. Livestock prices high and expected to remain so.
- High level of civil insecurity.
- Gold-mining and return of South Sudanese have reduced labour availability.

Total cereal production in N Darfur State (000 t)
(for Annex)

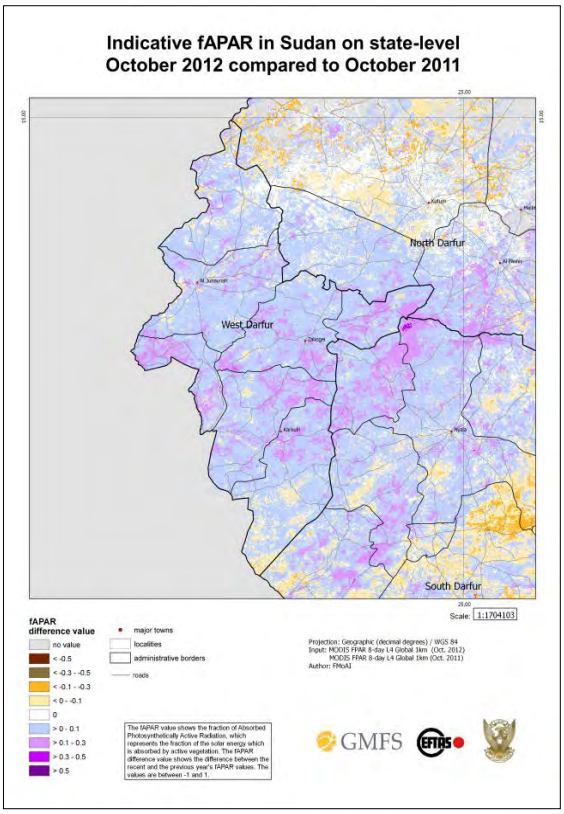
Total cereal production in N Darfur State (000 t)

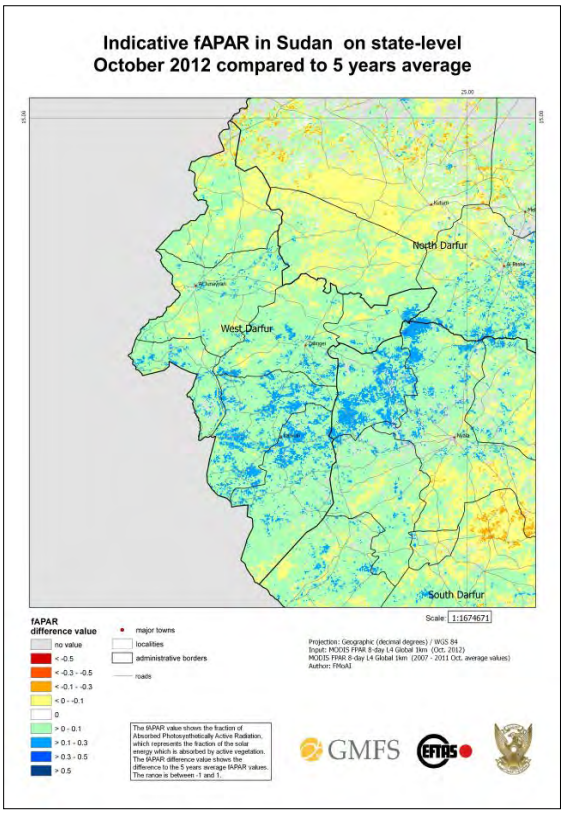
	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Traditional	18	7	53	73	24	100			

West Darfur (West Darfur State and Central Darfur State)

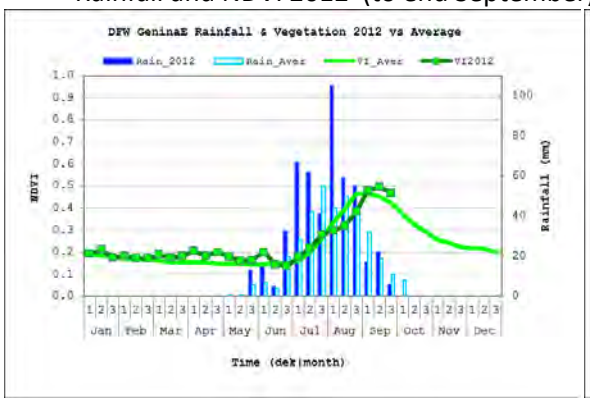
As part of the on-going peace process, what was formerly West Darfur State was divided in January 2012 into two smaller states - West Darfur (capital Al-Geneina) and Central Darfur (capital Zalingei).

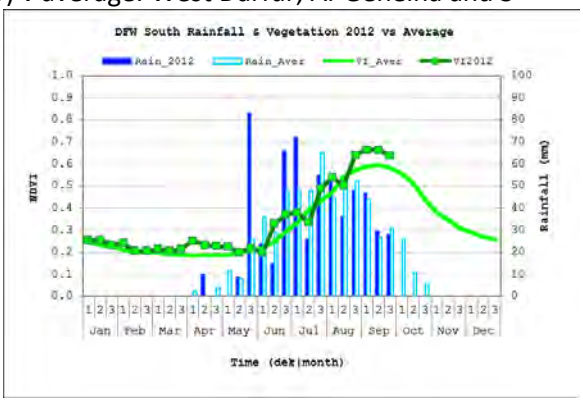
For ease of comparison with previous years, fAPAR images, rainfall graphs and crop production figures are given for the two new states together, i.e. for the previous state of West Darfur.





Rainfall and NDVI 2012 (to end September) v average: West Darfur; Al-Geneina and S





Source: Sudan Seasonal Monitor, October 2012

Total cereal production in West Darfur (W Darfur State and Central Darfur State) (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Traditional	48	107	290	49	117	382	3	8	8

West Darfur State

- Sufficient seed and hand-tools distributed to small farmers and returnees.
- Reasonable access to micro-credit.
- Total planted area up about 50% on 2011. Expect 70% to be harvested.
- Timely sowing of food and cash crops. Good crop establishment.
- Essentially pest- and disease-free.

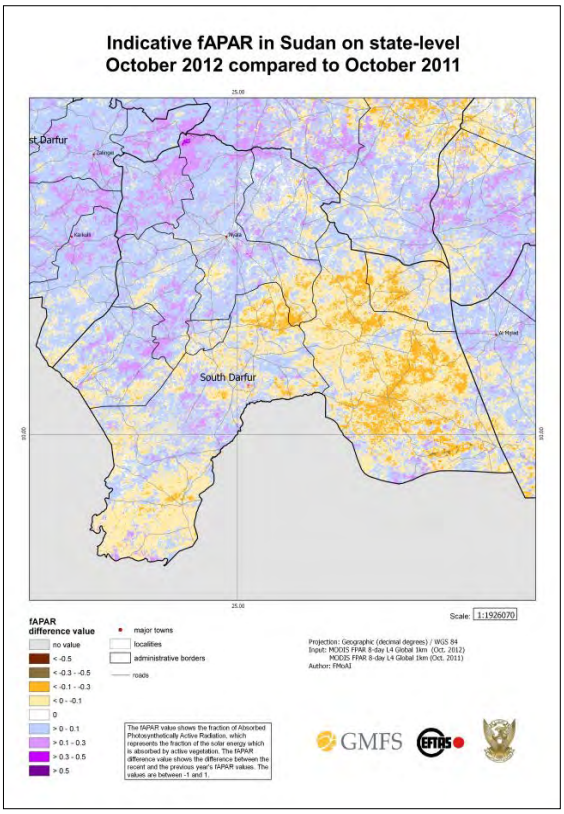
- High crop yields.
- High production of sorghum, millet, sesame and groundnuts.
- Rainfall good in quantity (more than in 2011) and distribution. Started May, ended October.
- Good livestock condition. Good vaccination coverage.
- Excellent water availability and pasture.
- Grain prices beginning to fall; good market supply. Livestock prices rising.
- Ongoing civil unrest.

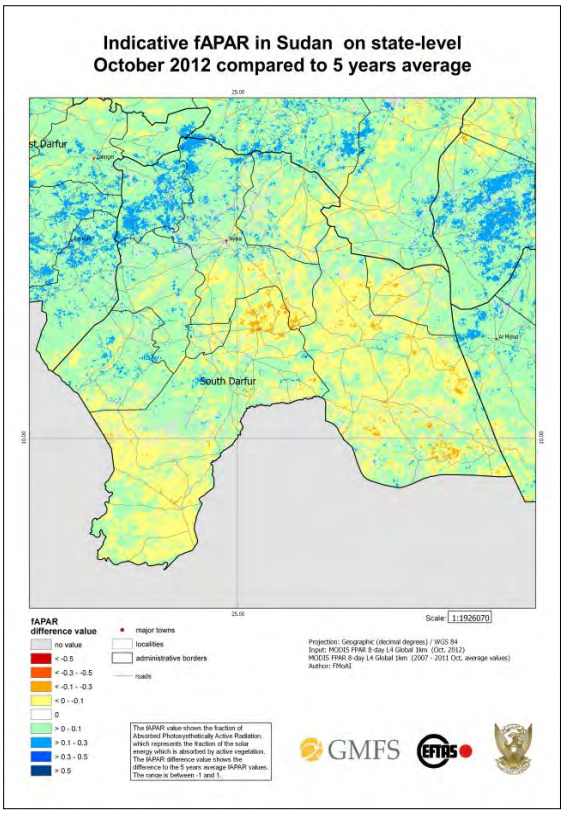
Central Darfur State

- Rainfall good in terms of quantity (more than 2011) and distribution. Started May, ended October.
- Timely planting.
- Planted area estimated to be 2.8 times greater than 2011.
- Main crops: sorghum, pearl millet, groundnuts, sesame.
- Sorghum, millet and groundnut yields up; sesame yield slightly down.
- Livestock condition, pasture and access to water all very good.
- Some improvement in security; some transhumance routes still closed.
- Grain prices higher than in 2011, but falling. Livestock prices high and expected to remain so.

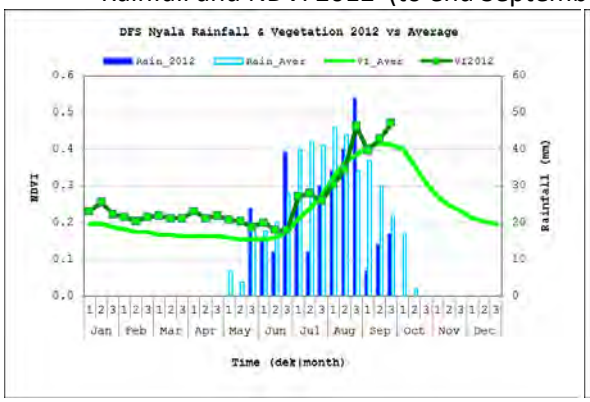
South Darfur (South Darfur and East Darfur)

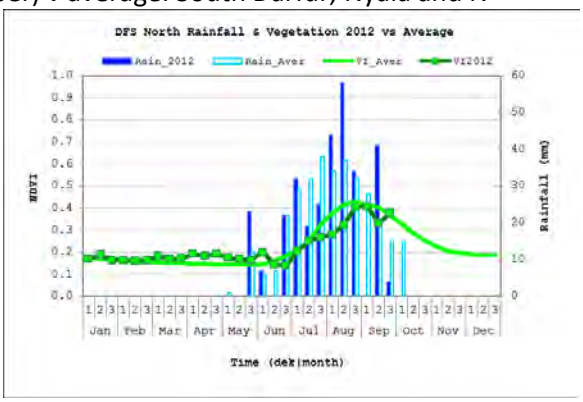
As part of the on-going peace process, what was formerly South Darfur State was divided in January 2012 into two smaller states - South Darfur (capital Nyala) and East Darfur (capital Ed-Daein). For ease of comparison with previous years, fAPAR images, rainfall graphs and crop production figures are given for the two new states together, i.e. for the previous state of South Darfur.





Rainfall and NDVI 2012 (to end September) v average: South Darfur; Nyala and N





Source: Sudan Seasonal Monitor, October 2012

Total cereal production in South Darfur (South Darfur State and East Darfur State) (000 t)

	Sorghum			Millet			Wheat		
	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13	06/07-10/11	2011/12	2012/13
Traditional	224	166	185	228	118	266	4	8	8

South Darfur State

- Rainfall amounts above normal and considerably better than last year. The rains started in May and continued till November, with no dry spells.
- Planted area increased (especially under groundnut) in response to (1) good rains, (2) high prices resulting from last year's poor harvest, and (3) improved security.

- Harvestable area is expected to be reduced by more than 25 percent as a result of labour shortages and the high cost of labour.
- Crop yields (especially millet) are generally better this year than last.
- Livestock are in good condition. More than 6 million vaccine doses were administered.
- Pasture is plentiful, but hafirs are expected to start drying up by March-April.
- Food prices remain high and have not shown the expected fall in anticipation of the harvest. Livestock prices continue to increase in response to favourable pasture conditions.

East Darfur State

- Cumulative rainfall was slightly less than last year and below average. The rains started normally in June, but there was a prolonged dry spell of about 40 days during the critical period of flowering and grain-filling in August and September.
- Heavy rains in November caused some sprouting of groundnuts just prior to harvest.
- Substantial increase in planted area, especially under groundnuts, in response to last year's high prices and the favourable start to this year's rains.
- Harvestable areas were reduced by the dry spell and the heavy rains in November.
- High cost of production, and labour shortages resulting from the return of Southerners to South Sudan and the movement of labour to gold-mining. Labour costs increased threefold over the last 12 months.
- The state is expected to produce about 460 000 tonnes of groundnuts this year.
- The condition of both livestock and pasture is good, but hafirs are expected to start drying out by April. More than 1.9 million head of cattle were vaccinated.
- Livestock prices, already high, continue to rise.
- Food prices rose early in the year and, contrary to expectations at harvest time, have remained high.
- Micro financing by the ABS has increased slowly; nevertheless, less than 5 percent of farmers benefited from it.