



High-Level Conference on:

Water for Agriculture and Energy in Africa: the Challenges of Climate Change

Sirte, Libyan Arab Jamahiriya, 15-17 December 2008

National Investment Brief

SUDAN

EXECUTIVE SUMMARY

Sudan is generally self-sufficient in basic foods, albeit with important inter-annual and geographical variations, and with wide regional and household disparities in levels of food security prevailing across the country. The high-risk areas are North Kordofan, North Darfur, the Red Sea, Butana, and the fringes of the major irrigation schemes in addition to the Southern States. Major constraints to higher farm productivity and incomes are high marketing margins on agricultural produce and inadequate investments in infrastructure and other facilities. In the wake of the food shortages experienced in the 1980s, a high priority has been given by the Government to producing food crops. This has resulted in large expansions in sorghum and wheat areas and output. Much of this has been at the expense of the main cash crop, cotton.

Rainfed agriculture covers by far the largest area in Sudan. The area actually cultivated and total yield may, however, vary considerably from year to year depending on variability of rainfall. The rainfed farming system is characterized by a small farm size, labor-intensive cultivation techniques employing hand tools, low input levels, and poor yields. Crops grown in the rainfed sector include sorghum, millet, sesame, sunflower, and groundnuts. Traditional rainfed farming sector contributes all the production of millet, and 11% of sorghum, 48% groundnuts, and 28% of sesame production. Mechanized rainfed agriculture comprises about 10,000 large farmers with farm sizes of 400-850 ha and a few large companies with holdings of 8,400-84,000 ha.

Sudan has the largest irrigated area in sub-Saharan Africa and, after Egypt, the second largest on the continent. The irrigated sub-sector plays a very important role in the country's agricultural production. Although the water managed area constitutes only about 11 percent of the total cultivated land in Sudan, it contributes more than half of the total volume of the agricultural production. Irrigated agriculture has become more and more important over the past few decades as a result of drought and rainfall variability and uncertainty. Irrigation development remains a priority option to boost the economy in general and increase the living standard of the majority of the population.

In 2004, Sudan had 760 megawatts (MW) of electricity generation capacity. The country generated 3.8 billion kilowatthours (Bkwh) of electricity in 2004, and consumed 3.6 Bkwh. The majority of electricity in Sudan is generated by conventional thermal sources (76 percent), with the remainder coming from hydroelectricity (24 percent). The country's main hydroelectricity generating facility is the 280-MW Roseires dam located on the Blue Nile River. Low water levels sometimes cause the facility's capacity to fall to 100 MW. Expansion of hydropower capacity in conjunction with the construction of multi-purpose dams is a priority policy of the Government.

The total amount of the financial envelope is US\$5,028 million. The envelope is divided into a short-term period (2008-2011) - US\$1,278 million; medium-term period (2012-2015) - US\$2,750 million; and long-term period (2015 onwards) - US\$1,000 million. The Project Portfolio includes 18 ongoing and future projects that range from an irrigation rehabilitation project of US\$17.8 million to the Marewo Project which is costing US\$1,966 million. There are 4 bankable water related projects totaling around US\$150 million that have been identified for immediate implementation under the NEPAD-DAADP initiative. At least three other large dam projects are identified for the medium to long-term periods. It is hoped to increase hydropower capacity by 1,250 in the short-term period, and by as much as 2,000MW in the medium to long-term periods.

1. CONTEXT

1.1 AGRICULTURE AND FOOD SECURITY

Agriculture

In 2007, Sudan's GDP was US\$ 47.63 billion, translating into a GDP per capita of some US\$1,235. Approximately one-third of the total area of Sudan, the largest country on the African continent, is suitable for agricultural development and heavier rainfall in the south permits both agriculture and herding by nomadic tribes. The value added in agriculture was 32% of GDP in 2006. Around 56% of the economically active population is dependent on agriculture, and 39% of the people working in the agriculture sector are women. Problems of irrigation and transportation remain the greatest constraints to a more dynamic agricultural economy. The cultivated area comprises around 19.5 million ha or 7.8% of the areas of the country. Despite the enormous resources the country has at hand, for a long time Sudan's agricultural sector has performed a long way below its potential. The sector represents a mixture of subsistence farming and the production of crops for export. Crop cultivation has traditionally been divided between a modern, market-oriented sector comprising mechanised, large-scale irrigated and rainfed farming (mainly in central Sudan) and a subsistence farming sector that follows traditional practices. The latter is carried out in parts of the country where rainfall or other water sources are sufficient for cultivation.

Rainfed agriculture covers by far the largest area in Sudan. The area actually cultivated and total yield may, however, vary considerably from year to year depending on variability of rainfall. The rainfed farming system is characterized by a small farm size, labor-intensive cultivation techniques employing hand tools, low input levels, and poor yields. Crops grown in the rainfed sector include sorghum, millet, sesame, sunflower, and groundnuts. Traditional rainfed farming sector contributes all the production of millet, and 11% of sorghum, 48% groundnuts, and 28% of sesame production. Mechanized rainfed agriculture comprises about 10,000 large farmers with farm sizes of 400-850 ha and a few large companies with holdings of 8,400-84,000 ha.

Irrigation and water control

The total irrigable land of Sudan was estimated to be 2.79 million ha in 2007. The total area equipped for irrigation is estimated to be around 1.86 million ha, and only about 43% of the irrigation-equipped area is actually irrigated. Out of the land that is irrigation-equipped, 1.73 million ha are fully equipped. By size of scheme, the total area equipped for irrigation can be divided into the following categories: small-scale (<100,000 ha) – around 0.47 million ha; medium-scale (100,000 – 500,000 ha) – 0.52 million ha; and large-scale (>500,000 ha) – 0.87 million ha. About 0.132 million ha is categorised under equipped low lands, and the amount of land under non-equipped cultivated lowlands and flood recession is negligible. About 93 percent of the irrigated area is government projects; the remaining 7 percent belongs to private operations. At 0.78 million ha, the Ghezira-Managil Scheme is one of the biggest irrigation schemes in the world. The Nile and its tributaries are the source of water for 93 percent of irrigated agriculture, and of this the Blue Nile accounts for about 67 percent. Gravity flow is the main form of irrigation, but about one-third of the irrigated area is served by pumps. Early emphasis on cotton growing on irrigated land has decreased; although cotton remains the most important crop in Sudan, peanuts, wheat and sugarcane have become major crops, with large amounts of sesame also being grown.

Food security

In 2003, Sudan portrayed a high level of undernourishment; one out of four persons is undernourished. Both the number and the proportion of undernourished people decreased from 1990-92, benchmark period of the World Food Summit (WFS) and the Millennium Declaration (MD), to 1999-2001, the last period available. However, this trend has changed in recent years.

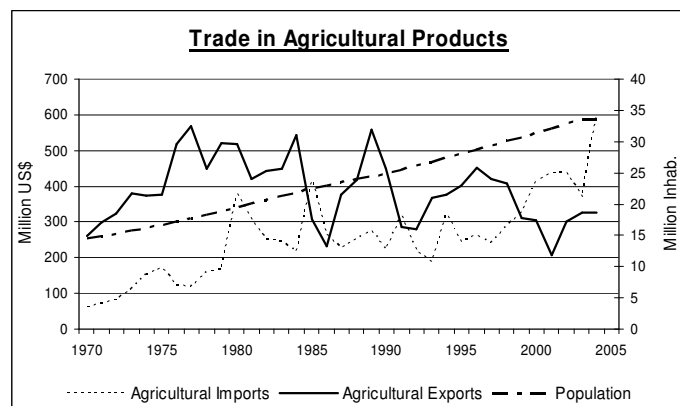
Sudan is generally self-sufficient in basic foods, albeit with important inter-annual and geographical variations as well as the prevalence of wide regional and household disparities in levels of food security across the country. The high-risk areas are North Kordofan, North Darfur, the Red Sea, Butana, and the fringes of the major irrigation schemes. This is in addition to the Southern States which experienced a complex humanitarian emergency situation for a long time. Historically, the

major constraints to higher farm productivity and incomes have been high marketing margins on agricultural produce and an inadequate investment of budgetary resources and foreign exchange earnings in the sector. As a result, the low input/low-productivity model of production continues to prevail, and small farmers' incomes remain depressed. In the wake of the food shortages experienced in the 1980s, in the last two decades, a high priority has been given by the Government to producing food crops. This has resulted in large expansions in sorghum and wheat areas and output. Much of this has been at the expense of the main cash crop, cotton, whose production has declined by more than 40 percent since the mid-1980s.

Food and agriculture trade and import balance

Sudan's primary resources are agricultural, but oil production and export have taken on greater importance since October 2000. In 2007 total imports were valued at US\$8.9 billion and imports at US\$7.7 billion. Although the country is trying to diversify its cash crops, cotton and gum arabic remain its major agricultural exports. Grain sorghum (dura) is the principal food crop, and millet and wheat are grown for domestic consumption. Sesame (of which Sudan is the world's third largest producer after India and China) and peanuts are cultivated for domestic consumption and increasingly for export. Livestock production has vast potential, and many animals, particularly camels and sheep, are exported to Egypt, Saudi Arabia, and other Arab countries.

According to the figure aside, Sudan has been generally a net agriculture exporter until late 90s while since 2000 the country converted into a net importer. In 2001, agricultural exports reached a minimum of US\$ 207 million while in 2005 imports reached a peak of nearly 600 US\$ million.



1.2 WATER RESOURCES AND HYDROPOWER

Surface water and groundwater resources are mostly shared with neighboring countries. Irrigation as well as hydropower development takes place within the framework of the amount of water allocated by the Nile Water Agreement with Egypt as well as other transboundary considerations. The Nile River, which is shared between 10 countries, is the primary source of Sudan's water. The four main non-nilotic streams are also shared with neighboring countries. The largest groundwater aquifer, the Nubian Sandstone system, is shared with Chad, the Libyan Arab Jamahiriya, and Egypt. Sudan, together with Algeria, Cameroon, the Central African Republic, Chad, Niger, and Nigeria, is located in the Lake Chad basin.

Average annual rainfall is 416 mm, but ranges between 25 mm in the dry north and over 1,600 mm in the tropical rain forests in the south. Sudan's total natural renewable water resources are estimated to be 149 km³/yr, of which 30 km³/yr are internally produced. In a 10th frequency dry year, the internal water resources are reduced to about 22.3 km³/yr. Of the internal water resources, 28 km³/yr are surface water and 7 km³/yr are groundwater, while the overlap between surface water and groundwater is estimated at 5 km³/yr. As a result of the Nile Waters Agreement with Egypt, total actual renewable water resources of the country amount to 64.5 km³/yr. Surface water is provided mainly by the Nile River. Apart from the Nile system, there are also the seasonal rivers of Gash and Baraka in eastern Sudan. The water balance of Sudan is very complex, due in part to extensive evaporation from the swamps. Furthermore, from year to year variations in water resources greatly reduce the amount of water actually available for use.

There are main four dams in Sudan: the *Roseires Dam* (Blue Nile - 1950), the *Sinnar Dam* (Blue Nile - 1926), the *Jabal Awlia Dam* (White Nile - 1937), and the *Khashm Al-Gerba Dam* (Atbara - 1964). The original storage capacity of these four reservoirs is estimated at 8.73 km³, reduced to about 6.90 km³

owing to sedimentation and debris. In 1995, total water withdrawal was estimated at 17.8 km³, of which 94.4% was for agricultural purposes.

In 2004, Sudan had 760 megawatts (MW) of electricity generation capacity. The country generated 3.8 billion kilowatthours (Bkwh) of electricity in 2004, and consumed 3.6 Bkwh. The majority of electricity in Sudan is from conventional thermal sources (76 percent), with the remainder coming from hydroelectricity (24 percent). More than 70% of Sudan's hydropower comes from is the 280-MW Roseires Dam (1950) located on the Blue Nile River. The facility has sometimes been attacked by rebel groups, and low water levels often cause its capacity to fall to 100 MW. Sudan is seeking to expand its installed capacity of electrical generation. At least four multi-purpose dam projects (targeting hydropower, irrigation and other purposes) have been identified. One of these, the Merowe Dam Project is expected to come commence operation in 2009, and will add 1,250MW capacity to the national grid.

1.3. CLIMATE CHANGE

In 2007, an assessment by UNEP pointed out that Sudan, along with other countries in the Sahel Belt, has suffered several long and devastating droughts in the past few decades. The most severe drought seems to have occurred in 1980-1984 and was accompanied by widespread displacement and localised famine. The report also listed the erosion of natural resources caused by climate change as among the root causes of social strife and conflict. In particular, the Report highlighted the scale of climate change as recorded in Northern Darfur as almost unprecedented. As desertification has added significantly to the stress on traditional agricultural and pastoral livelihoods, the report pointed to the close linkage of desertification's impacts to conflict in the region. In addition, the Report points out that, in the whole Sahel Belt, climate change is expected to further reduce food production due to declining rainfall and increased variability with a drop in crop yields of up to 70 per cent is forecast for the most vulnerable areas.

2. NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY

2.1 POLICY CONTEXT

Sudan's economy is booming on the back of increases in oil production, high oil prices, and large inflows of foreign direct investment. GDP growth registered more than 10% per year in 2006 and 2007. On the political front, in 2005 the Comprehensive Peace Agreement (CPA) and the Eastern Sudan Peace Agreement (ESPA) led to a cessation of long-running hostilities and guided the formation of the Government of National Unity (GONU) and the Government of Southern Sudan (GOSS). The country has also continued to take some steps toward transitioning from a socialist to a market-based economy, and to evolve a policy framework within which to tackle national issue and guide the development process. However, instability in the Darfur Region, the aftermath of two decades of civil war in the south, the lack of basic infrastructure in large areas, reliance by much of the population on subsistence agriculture pose strong challenges to development. At the same time, Sudan is one of the most heavily indebted countries in the world, with an external debt of US\$27.7 billion (or 100% of GDP) in 2005. Unless they are comprehensively tackled, these issues are likely to ensure that much of the population will remain at or below the poverty line for years despite rapid rises in average per capita income.

Overall, Sudan is focusing its development agenda on five key results areas, outlined in GONU's Five-Year Plan 2007-2011 and GOSS' Budget Sector Plans: (1) sustained peace and stability; (2) sustainable economic development; (3) expanded basic services; (4) strengthened public accountability, good governance and the rule of law; and (5) strengthened social fabric. Programmes for the development of agriculture, water and hydropower are under the policy purview of the sustainable economic development results area. In 2007 the Government established the Five Year Agricultural Revival programme with a domestically funded budget of US\$5 billion.

There is a strong water development component in agriculture programmes since in Sudan agriculture is irrigation-orientated. The development plans for the irrigation sector include the

rehabilitation of the existing irrigation schemes, a shift of emphasis towards the development of small scale irrigation schemes, and phased development and vertical expansion.

International water issues are another area that is critical to water policy in Sudan. In 1959, the Nile Waters Agreement between Egypt and Sudan assigned to Sudan 18.5 km³/yr, measured at Aswan at the border with Egypt. The other riverside nations are still not included in this agreement. Recently, the Nile Basin Initiative (NBI) has been created and a Strategic Action Programme has been prepared, consisting of two sub-programs: Shared Vision Programme (SVP) and Subsidiary Action Programme (SAP). Sudan, Ethiopia, and Egypt have also adopted a strategy of cooperation in which all projects to be launched on the river should seek the common benefit of all member states and this should be included in accompanying feasibility studies. Sudan is also participating in other regional initiatives.

2.2 INVESTMENT ENVELOPE

The investment envelope for the short, medium and long term is presented in the Table below and expressed in million US\$. The figures are based on CAADP investment projections.

Time scale	Type of investment (million US\$)			Total
	Small scale water control	Rehabilitation of irrigation	Large scale hydraulic projects	
Short-term	656	728	52	1436
Medium-term	415	1699	310	2423
Long-term	207	324	638	1169
Total	1278	2750	1000	5028

2.3 PROJECT PORTFOLIO

Section 3 presents recently achieved, active and pipeline projects related to the above investment envelope. Various multipurpose projects are proposed to expand hydropower, thermal generation, and other sources of energy. Agricultural and irrigation projects feature community-based and community-driven processes, working with local people to ensure food security and income from agriculture within a framework of sustainable natural resource management.

A new multi-purpose dam is scheduled to open in 2009 at Merowe at the fourth cataract on the River Nile at an estimated cost of \$1.97 billion. Already plans are under way for three multi-purpose dam projects in Southern Sudan. Three additional multi-purpose dam projects are planned, respectively, at the Third Cataract, Fifth Cataract and Athara River. Funding is by the Government of Sudan, various Arab/Gulf Development Funds, and China. For some time after defaulting on loan repayments in 1994, the government had difficulty arranging sufficient financing. However this scenario is being reversed by increased oil revenues and opening up of Arab and other funding sources.

To address transboundary concerns, the Shared Vision Programme (SVP) is designed to help create an enabling environment for action on the ground through building trust and skill, while the Subsidiary Action Programme (SAP) is aimed at the delivery of actual development projects involving two or more countries. Projects are selected by individual riparian countries for implementation and submitted to the Council of Ministers of the Nile Basin Initiative for approval.

3. PROJECT PROFILES (ON-GOING AND PROJECTED)

Project title	Funding Partners	Lifeline	Total Budget	Description
I. PROJECTS RECENTLY IMPLEMENTED				
North Kordofan Rural Development Project	IFAD	1999-2007	US\$23.7 million	Support systems to assist communities in devt; resource mngt, sustainable participatory financial institutions
II. ON-GOING PROJECTS				
National Programme for Food Security	Belgium; Italy, Spain, UNDP, Administ. Trust Fund		Funds committed: US\$11.7 million	
Nile Equatorial Subsidiary Action Programme (NELSAP)	AfDB, SIDA, NORAD	Began in 1999		6 projects in Fisheries Mngt, River basin Mngt, Hydropower, Agriculture
South Kordofan Rural Development Programme	IFAD	2001-2011	US\$39.6 million	Service access by small holder + herder families
Gash Sustainable Livelihoods Regeneration Project	IFAD	2004-2012	US\$39.0 million	Irrigation rehab; forest and livestock production
Western Sudan Resources Management Programme	IFAD	2007-2014	US\$49.0 million	Improved rainfed agric. and economic conditions in three Kordofan states
White Nile Sugar Project	Govt, IsDB, Others	2003-2009	US\$420 million	5,700ha irrigation system and factory for cane sugar, linked with Kenana Sugar; generate 80MW of power.
Rehab. of Rahad, Hurga, Tyba and Kimar Irrigation Schemes	IDB	2005-2009	US\$17.8 million	Irrigation rehabilitation
Marowe Dam Project	Arab Funds, China, Govt	2004-2008	US\$ 1,966 million	Multipurpose scheme for hydropower generation.
Nile Basin Initiative - Shared Vision Programme	WB - Consortium	Start 2004		7 Projects in Environment, Training , Agriculture, Hydropower, Water Resource Mngt, etc
Nile Basin Water Resources Project	Italy, FAO	1996-2008		Nile Basin information products for decision making
III. PIPELINE PROJECTS				
Abu Hamad Agricultural Project	AAAID - Abu Dhabi Dev Fund	2009-2014		30,000ha irrigation project in north Sudan , near north end of the Merowe dam reservoir
Abu Hogar Agricultural project	AAAID - Abu Dhabi Dev Fund	2009-2014		
Rice Production Project	AAAID - Abu Dhabi Dev Fund	2009-2014		
<u>Bankable Investment Profiles (NEPAD-CAADP)</u>	FAO-NEPAD			
• Smallholder Water-Harvesting & Productivity Enhancement		5 Years	US\$37.5	Water Harvesting; Small-scale Well Irrigated Plots; Potable Water Facility Rehabilitation/ Construction
• Integrated Traditional Farming & Pastoralism		5 Years	US\$47.0 million	Traditional Farming Systems Enhancement; Livestock Prod'n Range Devt; Community Support Services; Water Harvesting; Crop and Livestock Information System
Three Dam Building Projects in Southern Sudan - Wau, Juba and Tori	Not identified	After 2015	US\$ 600 million	Irrigation and hydropower

Kajabar Dam Project (Third Cataract)	Not identified	After 2015	US\$ 1,500 million	200MW hydropower generation
Saiteet Dam (Atbara River)	Not identified	After 2015		Irrigation and hydropower
Al-Sheraik Dam (Fifth Cataract - north of Atbara City)	Not identified	After 2015		Irrigation and hydropower
Southern Sudan Livelihoods Development Project	FIDA, Gouvernement, Bénéficiaires	2009-2016	US\$25.9 million	The project will have two components: (i) Community development; (ii) Rural infrastructure and market facilities. This component aims to develop support services to enable communities to improve production and market access. There are four subcomponents: (i) water, roads and market facilities; (ii) county coordination through county coordination units to be set up; (iii) county level support in the form of capacity-building for county offices; and (iv) the establishment of a conflict resolution platform.

ANNEX 1: MAP OF WATER CONTROL IN SUDAN:



ANNEX 2: COUNTRY STATISTICS

Country and population			
Area of the country	2005	250581	1000 ha
Cultivated area as % of the total area of the country	2005	7.8	%
Total population	2005	36233	1000 inhab
• of which rural	2005	59	%
Population economically active in agriculture	2005	8220	1000 inhab
• as % of total economically active population	2005	56	%
• female	2005	39	%
• male	2005	62	%
Economy and Development			
Gross Domestic Product (GDP) (current US\$)	2007	47632	million US\$/yr
• value added in agriculture (% of GDP)	2006	32.29	%
• GDP per capita	2007	1235	US\$/yr
Access to improved drinking water sources			
Total population	2006	70	%
Urban population	2006	78	%
Rural population	2006	64	%
Water Resources and management			
Average precipitation	2007	1042.0	10 ⁹ m ³ /yr
Total actual renewable water resources	2007	64.5	10 ⁹ m ³ /yr
Dependency ratio (transboundary rivers)	2007	76.9	%
Total actual renewable water resources per inhabitant	2007	1780	m ³ /yr
Total dam capacity	1995	8.8	10 ⁹ m ³
Total water withdrawal	2000	37.32	10 ⁹ m ³ /yr
• as % of total actual renewable water resources	2000	57.86	%
IRRIGATION AND DRAINAGE			
Irrigation potential	2007	2784	1000 ha
Water Management			
Area equipped for irrigation: full control - total	2000	1730.97	1000 ha
Equipped lowlands	2000	132.03	1000 ha
Total area equipped for irrigation	2000	1863.00	1000 ha
• Area equipped for irrigation as % of cultivated area	2000	11.2	%
• Annual increase rate		-0.9	%
• Power irrigated area as % of area equipped for irrigation	2000	18.6	%
• Area actually irrigated as % of area equipped for irrigation	2000	42.9	%
Non-equipped cultivated lowlands and flood recession	2000	-	1000 ha
Total agricultural water managed area	2000	1863.00	1000 ha
• Agricultural water managed area: as % of cultivated area	2000	11.2	%
• Drained cultivated area as % of total cultivated area	2000	3.36	%
Typology of irrigation schemes			
Small-scale schemes (< 100 000 ha)	2000	473.85	1000 ha
Medium-scale schemes (100 000 – 500 000 ha)	2000	518.40	1000 ha
Large-scale schemes (> 500 000 ha)	2000	870.75	1000 ha
Irrigated crops			
Wheat	2000	102.69	1000 ha
Rice	2000	3.62	1000 ha
Maize	2000	67.62	1000 ha
Sorghum	2000	355.32	1000 ha
Other cereals	1985	330.12	1000 ha
Potatoes	2000	16.22	1000 ha
Other roots and tubers	2000	16.22	1000 ha
Sugar cane	2000	70.38	1000 ha
Pulses	1998	46.00	1000 ha
Vegetables	2000	96.82	1000 ha
Bananas	1998	2.00	1000 ha
Citrus	1998	12.00	1000 ha
Cotton	2000	166.90	1000 ha
Fodder	2000	141.90	1000 ha
Oil palm	1985	136.92	1000 ha
Groundnuts	2000	91.14	1000 ha
Sunflower	2000	21.28	1000 ha
Other annual crops	1998	1.00	1000 ha
Other perennial crops	1998	95.00	1000 ha
ENERGY INDICATORS			
Energy Production	2005	31.13	Mtoe
Net Imports	2005	-12.42	Mtoe
TPES	2005	18.40	Mtoe
- TPES/Pop	2005	0.51	toe/capita
- TPES/GDP	2005	1.10	toe/thousand 2000 US\$
- TPES/GDO (PPP)	2005	0.27	toe/thousand 2000 US\$ PPP
Electricity Consumption	2005	3.48	TWh
- EC/Pop	2005	96	kWh/capita

ENERGY SUPPLY AND CONSUMPTION								
	Coal	Gas	Crude oil	Petroleum products	Hydro	Other Renewable & Waste	Others	TOTAL
Production	0	0	16390	0	107	14631	0	31128
Imports	0	0	0	536	0	0	0	536
Exports	0	0	-12183	-777	0	0	0	-12960
International Marine Bunkers	0	0	0	-8	0	0	0	-8
Stock Changes	0	0	0	-297	0	0	0	-297
Total Primary Energy Supply (TPFS)	0	0	4206	-546	107	14631	0	18398

* in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis.

REFERENCES

- Abu Dhabi Fund for Development.
<http://www.adfd.ae/>
- African Development Bank.
http://www.afdb.org/portal/page?_pageid=473,1&_dad=portal&_schema=PORTAL
- AQUASTAT - FAO's Information System on Water and Agriculture.
<http://www.fao.org/nr/water/aquastat/main/index.stm>
- Arab Authority for Agricultural Investment and Development – Annual Report 2007
<http://www.aaaid.org/pdf/annualreport2007%20english/13%20Scientific%20Research.pdf>
- FAO – Water Reports - Irrigation in the Near East Region in Figures – Sudan
<http://www.fao.org/docrep/W4356E/w4356e0s.htm>
- Global Environment Facility (GEF) - Nile Transboundary Environmental Action Project (NTEAP)
http://www.google.com/search?q=Sudan+regional+water+projects&sourceid=navclient-ff&ie=UTF-8&rlz=1B3GGGL_enCA263CA264
- IFAD – Country Strategic Opportunities Paper, 2002
<http://www.ifad.org/gbdocs/eb/76/e/EB-2002-76-R-11.pdf>
- IFAD – IFAD Operations - IFAD in Sudan - Projects
<http://www.ifad.org/english/operations/pn/sdn/index.htm>
- NEPAD, FAO. 2004. National Medium Term Investment Programme
<ftp://ftp.fao.org/docrep/fao/007/ae415e/ae415e00.pdf>
- Sudan Development Programme – Water, Agriculture, 2007
<http://www.sudandevlopmentprogram.org/sp/industry/water.htm>
<http://www.sudandevlopmentprogram.org/sp/industry/agricul.htm>
- Sudan – Government of Southern Sudan – Sudan Recovery Fund for Southern Sudan
http://siteresources.worldbank.org/INTAFRMDTF/Resources/Annex_7_SS_Revised_06_02_08.pdf
- Sudan – Government of Sudan – Merowe Dam Project
<http://www.merowedam.gov.sd/en/location.html>
- Sudan – Government of Sudan – National Council for Strategic Planning - The Five-Year Plan (2007-2011)
<http://www.unsudanig.org/workplan/support/docs/GoS%20Five-year%20Strategic%20Plan%202007-2011.pdf>
- UNDP - – Sudan Recovery Fund for Southern Sudan
<http://www.sd.undp.org/SRF-SS.htm>
- United National Environment Programme - Environmental Degradation Triggering Tensions and Conflict in Sudan
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=512&ArticleID=5621&l=en>

- United Nations Mission in Sudan – Sudan Consortium 2008 – Summary of Proceedings
<http://www.unmis.org/english/2008Docs/SC%20Communique-consortium-may08.pdf>
- United Nations – OCHA – IRIN - SUDAN: Climate change - only one cause among many for Darfur conflict
<http://www.irinnews.org/Report.aspx?ReportId=72985>
- United Nations – Sudan Information Gateway – Sector Information
<http://www.unsudanig.org/sector/index.php>
- U.S. Department of Energy - Energy Information Administration (EIA) – Country Analysis Briefs – Sudan – April 2007
<http://www.eia.doe.gov/emeu/cabs/Sudan/Full.html>
- U.S. Department of State – Background Note – Profile – Sudan, 8 July 2008
<http://www.state.gov/r/pa/ei/bgn/5424.htm>
- World Bank – Project Database.
<http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:115635~pagePK:64020917~piPK:64021009~theSitePK:40941,00.html>