Drought conditions and management strategies in Sudan

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Background:

During the 20th century Sudan experienced major drought. The most devastating ones were in 1913, 1940, and 1954 which covered many parts of the country. In 1913 and 1940, about 1.5 million people were affected. In the 1984, 4.5 million people went hungry. Some of the affected people became relief-recipient and less work-oriented. Different tribes responded differently to recurring drought.

Insufficient and highly variable annual precipitation is a defining feature of the climate of most of Sudan. Availability analysis of rain fall retoured from 1961 to 1990 in northern and southern Kordofan that annual precipitation ranged from 350 to 850 mm, within average annual variation of 65 percent in the northern parts of Northern Kordofan and 15 percent in the southern parts of Southern Kordofan.

Annual variability and relative scarcity of rainfall in the north of Sudan in particular – have a dominant effect of agriculture and food security, and are strongly linked to displacement and related conflicts. Drought events also change the ecosystem, as dry spells kill otherwise long lived trees and result in a general reduction of the vegetation cover, leaving land more vulnerable to overgrazing and erosion.

Together with other countries in the Sahel belt, Sudan has suffered a number of long and devastating droughts in the past decades. All regions have been affected, but the worst state, particularly in the Northern Kordofan state, North states, Northern and Western Darfur, and Red Sea and White Nile states.

The most severe drought occurred in 1980 – 1984, and localized famine. Localized and less severe droughts (affecting between one and five state) were also recorded in 1967 – 1973, 1987, 1989, 1991, 1993 and 2000. Isolated drought years generally have little permanent effect on the environment. In the case of central Sudan, however, the eighteen recorded years of drought within the last half – country are certain to have had a major influence on the vegetation profile and soil conditions seen in 2006. (UMEP, 2007).

Drought monitoring and early warning systems

Insufficient and highly variable annual precipitation is a define feature of the climate of most of Sudan. A variable analysis of rain fall records from 1961 to 1990 in Northern and Southern Kordofan found that annual precipitation ranged from 350 to 850 mm, with an average annual variation of 65 percent in the northern parts of the Northern Kordofan and 15 percent in the southern parts of Southern Kordofan.

Rain gauge location	Average annual rainfall (mm) 1964 - 1975	Average annual rainfall (mm) 1976 - 2005	Average annual rainfall (mm)2006 - 2013	Reduction (-)
El Fasher Northern Darfur	272. 36	178.90	210.73	61-63
Nyala Southern Darfur	448.71	376.50	440.10	8.61
El Geneina Western Darfur	564. 20	427. 70	482.85	81.35

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The system of the early warring used is a (Climate out Look Seasonally Forecasts) as a regional cooperation with IGAD.

The Sudan climate change study conducted in the 2003 provides as solid technical basis for discussion. Moreover, a ranger of very recent regional assessments of the potential impacts of climate change, indicate good agreement with earlier work. Following is a concise of this work, to set the context for findings of UNEPs assessment. (Nur, 2007).

The 2003 study select Northern and Southern Kordofan for detailed analysis: all the results presented thus related to those area only. A baseline climate was determined using rain fall and temperature data from 1961 to 1990. A rang of global warming scenarios were then modeled to practical changes in temperature and rainfall from the baseline to the years 2030 to 2060.

The climate model results indicates a 0.5 to 1.5 C rise in the average annual temperature and an approximate five percent 5% drop in rainfall, though results varied across the study area. These findings were then used to project of scale potential change in crop yields for sorghum, millet and gum arabic.

The final result was alarming; the crop models show a major and potentially disastrous decline in the crop production for Northern Kordofan and lesser but significant drops further south. (UNEP, 2008).

Vulnerability assessment

The vulnerability to drought is partly related to social and development factors such as the tendency to maximize herd size rather than herd quality, and the lack of source water resources such deep boreholes which can be relied short – term drought.

This work has focus on the demands for the internally displaced person camps because this population is placing new demands on the quilters – beyond those that history has proven they can support. However, the humanitarian imperatives demand that water securities for host communities are also addressed. Water demanded at camps is more complex than those discard in text on emergency responses such as the sphere project. This is because of the arid context in which people are used to being sparing with water demand, but also the water demands associated with livelihoods which are over and above the minimum supplies provided in an emergency context.

Whilst drought preparedness at camps is rightly part of (Darfur's emergency response) this work must not be seen in the isolation form lager scale water resource management activities, and the development of drought preparedness strategy for these communities should be seen as supporting agricultural and environmental recovery returned. This work will need to be matched by efforts on government, water supply for livelihoods and recovery planning. This needs to be part of a wider water resources strategy supporting areas of projected return and for rural populations including nomadic groups. These issues will be addressed under the integrated water resources management program. (IWRM).

Study for water use for livelihoods in order to better under stand water demands at camps, assessments of water use are needed at household level. In addition to the potentially vulnerability comps other areas require strategy for water resources management. The priorities would be:

- Large towns on Basement Complex geology, (Nyala, EL Fasher).
- UNAMID camps.
- Rural populations arid areas (such as a camps in Northern Darfur and the Northern part of West Darfur: Umm Baru, Kondobe, Ed Daein, Morni, Geniena, Gereida)
- Rural in less arid areas. (NAPA, 2010).

Emergency relief and drought response:

Emergency relief during drought provided as a food, no cash but cash work in a limit scales. In food nutrition gaps and water shortage. Local reacceptances as small holder farmers and animals, with their indigenes experiences throw their traditional tools manage the case as:

- Feeding using a locality fruit plants like Mukhied (*Basica senegalensis*) (Abuasabi millet mixture made as soups. Godiam fruits (*Grewia mallis Juss*) use to support the human blood, after burned use instead of food salt. (Hassan, 2008).
- Storage water in the huge trees (Tabaldi) (Adansonia digitata Linn), collection water runoff in small lakes (Fula) as a type of traditional water harvest to avoided water shortage. (Figure. 2).
- Migration to the humid areas to save their animal live.
- Mixed crop and livestock systems which integrate the use of drought-tolerant crops and manure, which can help increase agricultural productivity while at the same time diversifying risks across different products.
- Systems of crop rotation which consider both food and fodder crops, which can reduce exposure to climate threats while also improving family nutrition.
- Combinations of agro forestry systems and communal ponds, which can improve the quality of soils, increase the availability of water during dry periods, and provide additional income.

Drought impacts on crop production and live stock show remarks decreasing in yield of both food and cash crops, recording of yields for the period 1953/54 to 2004/05. Result show that the yield in mechized rain fed in 1983/84 was dropped to 12 kg / fed. In White Nile comparing to 334 kg. In 2003/04 good rain season. Millet which yields a minimum of 200kg. In a good rainy season, showed only 8 kg/ fed. In North Kordofan. (Figure. 3).

Degradation of grazing resources in one of the major livestock production problems as result of drought coupled with other factors namely overgrazing and the expansion of large scale mechanized farming on marginal grazing lands (Figure . 4). Land sat STM map of 1983/84 showed that the semi desert (455,000 sq. km) and some parts of the northern fringes of the low rainfall wood land savannah were severely affected by drought and environmental degradation. Range and postural administration report noted that 177 million faddans of range lands area is considered as severely degraded lands.(Abdelrrahman, 2008).

Practices to alleviate drought impacts:

The National Drought and Desertification Programs Coordinating Unit (NDDPCU) will host plate form of the Intergovernmental Authority of Development (IGAD) for Dialer Resilience and Sustainability Intuitive (IDDRSI) monitoring and evaluation system. The invite will assessment the (IGAD) to adapt the effect system foe monitoring and evaluation that can help the IGAD to identify the needs for member status in the future for drought management.

National Adaptation Program of Action (NAPA), funded throws UNEP applied many practical programs to mitigate drought impacts as governmental projects:

- Enhancing resilience to increasing rainfall variability through rangeland rehabilitation and water harvesting in the *Butana* area of Gedarif State;
- Reducing the vulnerability of communities in drought-prone areas of southern Darfur State through improved water harvesting practices;
- Improving sustainable agricultural practices under increasing heat stress in the River Nile State.
- Environmental conservation and biodiversity restoration in northern Kordofan State as a coping mechanism for rangeland protection under conditions of increasing climate variability.

  The Sudanese Society for Environment Protection (SSEP) applied many activities that enroll drought and desertification impacts mitigation as major environmental issues, as apart of non governmental organization (NGOs).

The need for knowledge and skills on drought management

Building capacity development would be massive on-the-job training of staff in government, NGOs, the private sector, and community-based institutions— in specific interventions to help meet the awareness Goal. In this case, policies should also be implemented to promote local university education in nutrition, agriculture, and business. Such broad training efforts will create The absorptive and implementation capacity for larger investments. A corps of paraprofessional extension workers could be created for agriculture, nutrition, and health, residing in villages identified as awareness hotspots.

Other capacity development efforts might deal more with structural incentives that lead to poor performance. People concerned remain healthy and actively engaged in relevant work; policies aimed at human capacity development will have highly positive long-term effects. Investments in capacity building at the local level should cover the education, childhood nutrition, and healthcare sectors in addition to agriculture and natural resource management. Across sectors, special attention should be placed on the needs of children and women, with a sharp focus on gender equality.

Policies to build capacity should encourage the participation of communities in the planning, implementation, and monitoring of ant hunger programs. Decentralization without attention to governance issues will fail if it merely establishes new local elites and does not liberate the skills and talents of ordinary people.

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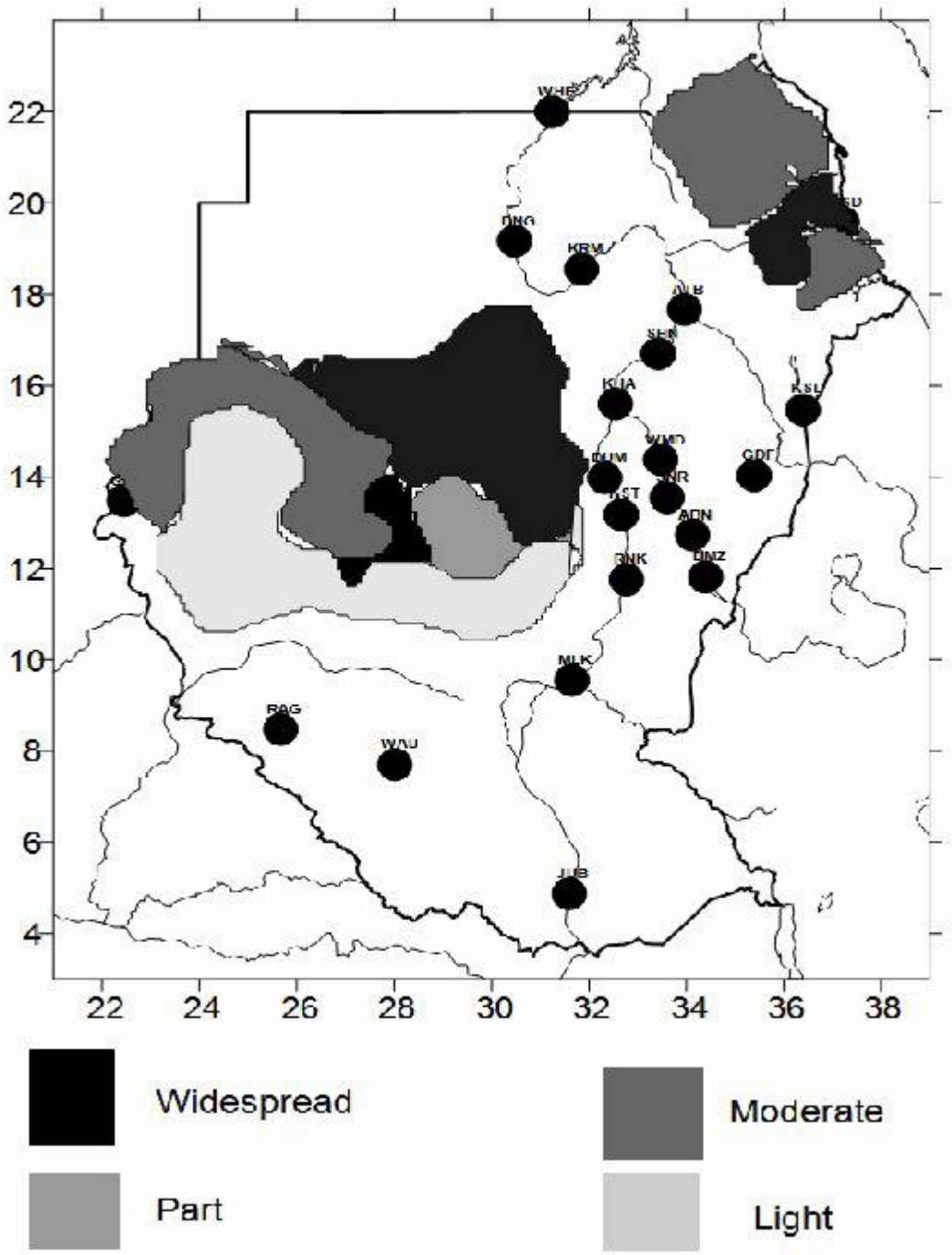
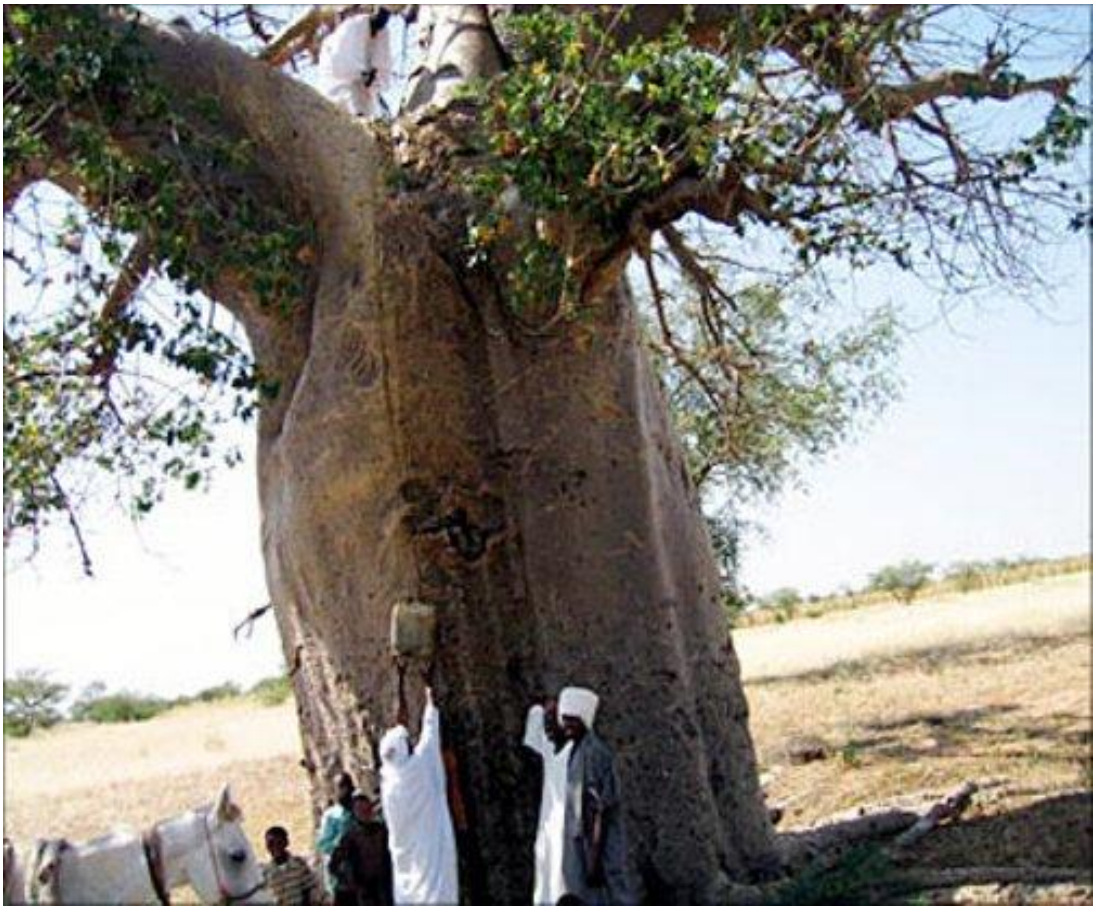
Figure 1. Drought areas in Sudan, 1987



Figur 2. Storage water in Tabaldi tree



Foula: storage water

Figure .3 Droughts in cultivated land

Figure. 4 Livestock drought impacts