MAPPING AND CONSULTATIONS TO CONTEXUALIZE THE ECONOMICS OF LAND DEGRADATION (ELD) INITIATIVE IN SUDAN

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1. INTRODUCTION

1.1 Background

Land degradation in drylands, referred to as desertification, is one of the most critically important issues facing the contemporary world. The United Nations portrays it as one of the most important global change issues facing mankind[1]. Land degradation is a vital societal concern because of its impacts on human population (food security, economics, sustainability) and environmental quality (climate change). Land degradation as a causation of poverty, population displacement and violent conflict has been widely recognized and documented. The collapse of ancient states and civilizations caused principally by land degradation has also been documented. A taxonomy of failed States (e.g. Sudan, Somalia, Haiti) also tend to reflect a positive correlation between land degradation and State failure. Like global climate change and biodiversity, desertification is the subject of an international framework convention, the United Nations Convention to Combat Desertification (UNCCD), the aim of which is to "target poverty, drought and food insecurity in dryland countries experiencing desertification, particularly those in Africa"[2].

However, in spite of its high profile and acknowledged importance, the economics of land degradation has remained largely untraceable. Part of the problem is that land degradation and desertification are composite phenomena that have no single, easily identifiable attribute.

The UNDP Drylands Development Centre (UNDP-DDC) supports the activities of the Options and Pathways for Policy Outreach Working Group of the Economics of Land Degradation (ELD) Initiative, implemented under the framework of UNDP's Integrated Drylands Development Programme in close collaboration with the UNDP Country Offices.

ELD is an initiative for a global study on the economic benefits of land and land-based ecosystems. The initiative highlights the value of sustainable land management and provides a global approach for analyzing the economics of land degradation. It aims to make the economics of land degradation an integral part of policy strategies and decision making by increasing the political and public awareness of the costs and benefits of land and land-based ecosystems. Findings of this global study will be presented in a report envisaged to become available in early 2015 with a view to impact the debate on development policy, food security, green growth and rural development in a post Millennium Development Goal environment.

1.2 Objectives of the paper

The overall purpose of this paper is to support the mapping exercise by compiling available information on Sudan focusing on land degradation issues, institutional structures working on land degradation, identification of existing gaps in knowledge and the specific challenges to the implementation of sustainable land management approaches in Sudan.

[1] UNCCD, 1994.
[2] UNCCD, 1994.

The paper is also intended to inform and guide discussions at two (Federal and state level) consultative workshops.

1.3 Methodological consideration

Recognizing the multifaceted nature of land - as a place; culture; basis for livelihood; commodity; capital/asset; and human rights issue - the analysis is placed within a wide perspective that recognizes the interrelationships between nature, society, economics and politics in the causation of land degradation and its economics. The approaches also recognize the organic links between land degradation, violent conflicts, rural poverty and population instability in the country and the implications of the independence of the Republic of South Sudan on land and economics. To this end the mapping process was grounded in:

(i) A rigorous desk review exercise intended to contextualize the ELD initiative in Sudan focusing on country specific land degradation and sustainable land management issues while soliciting existing findings from previous studies concerning the economic valuation of natural resources, particularly land; in the process gaps in existing knowledge have been identified;

(ii) Consultation with relevant stakeholders and key resource persons engaged in environmental issues in Sudan;

(iii) Mapping of institutional structures related to land and natural resource management;

(iv) Mapping of national laws and policies pertaining to land management and natural resources governance and identification of gaps;

(v) Soliciting the particular challenges to the implementation of SLM approaches in Sudan will be rigorously solicited and assessed; and

(vi) The two consultation workshops, held at State level (North Kordofan State) and Federal level (Khartoum), which provided a valuable opportunity to inform and enrich the report; the key points of the discussion and recommended follow up from these two workshops have been highlighted in this paper.

2. SUDAN CONTEXT

Although 58 years have passed since independence, Sudan looks poorer, hungrier and more divided than ever before, with pronounced disparities in the level of development between regions. The UN categorizes Sudan as a low-income, poor and highly indebted country that ranks number 171 out of 187 countries and territories on the 2013 Human

Development Index. By comparison, the country ranked 147 out of 177 countries in 2008[3] reflecting a progressive trend towards deepening poverty in the country.

The population of Sudan is growing at a very rapid pace, from 7.8 million in 1955/56 to 30.9 million in 2008[4] resulting in an average annual growth rate of 5.7%, reflecting high demands for food, land and natural resources. The population of Sudan is also a very young population, with 47% of total population in 2008 being under the age of 16 years, indicating a very high level of dependency. In Darfur the figure reaches 52%, according to 2008 census data.

Population mobility made imperative by spatial variations in ecological conditions and gross disparities in economic development and opportunities is an intrinsic feature to the Sudanese population. Population mobility has however reached unprecedented rates since the last two decades of the 20th century, resulting in a rapid urbanization rate (around 40%) and conspicuous shifts in the population landscape map, with far reaching environmental, socioeconomic, and political repercussions. The scale and magnitude of displacement, estimated at 3.5 million internally displaced persons (IDPs) has introduced enormous pressures on the environment. Similar pressures are exerted by the large number of refugees (723,794 registered persons in 2007), especially in East Sudan.

In spite of long decades of modernization, Sudan remains rural in social, economic and cultural outlooks, with the majority of the population (around 60%) living in rural areas pursuing extractive livelihood systems based on traditional rain-fed crop farming and pastoralism as the two main economic systems and lifestyles. Land-based renewable natural resources are also the backbone of the other sectors of the economy, especially manufacturing, trade and transport.

Sudan entered the twenty-first century mired in several conflicts and enormous human security. Conflicts in Darfur, South Kordofan and Blue Nile continue to create more IDPs and enormous pressures on land and natural resources. Contested flash points and instability along the Sudan-South Sudan border, together with community-based battles over oil compensations, have been associated with enormous livelihood risks, especially for pastoralists.

The independence of the Republic of South Sudan on 9 January 2011 has created a new reality with far reaching economic, environmental, political and social implications for the country. The economic and financial losses related to the secession are substantial and have affected all sectors of the economy. The country has lost some three-quarters of its largest source of foreign exchange (oil), half of its fiscal revenues, and about two-thirds of its international payment capacity. Because of that, land has become a valuable commodity, as the base of livelihoods as well as the main source of revenue for government.

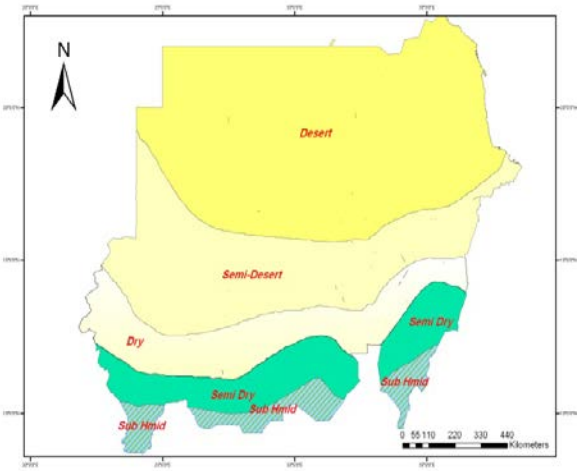
[3] UNDP, Human Development Reports, 2013 and 2008.

[4] Sudan First Population Census 1955/56 and Fifth Population Census 2008.

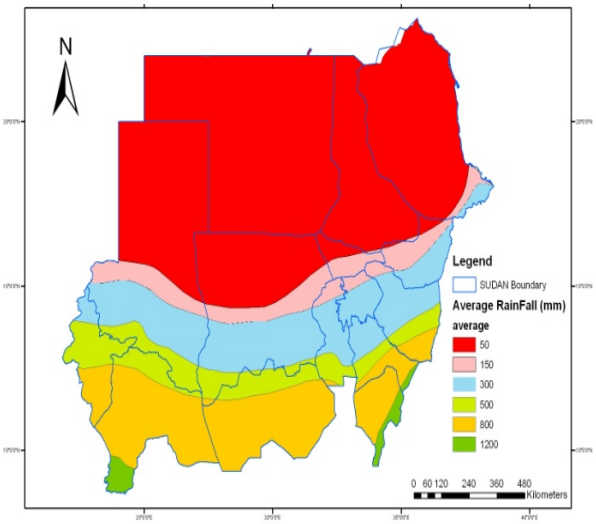
3. ENVIRONMENT AND NATURAL RESOURCES

3.1 Ecological zones and rainfall

The secession of South Sudan in January 2011 has left the whole of Sudan as a typical Sahelian dryland country. A recent study[5] shows that out of the country's total area (1.87 million km^2) 1.13 million km^2 (50.7%) is almost desert, 10% is semi desert (rainfall between 100 mm and 299 mm per year) and the remaining 0.687 km^2 (39.3%) is divided between low rainfall savannah (300-400 mm per year) and rich savannah (above 500 mm of rain per year) that extends extensively into South Sudan[6].



There are three distinguished three ecological zones in Sudan: (i) Desert Zone that receives an annual rainfall of zero to 75 mm and is only used for short periods by camels and sheep in good years of rainfall; (ii) Semi-Desert Zone where annual rainfall varies from 75-300 mm and where vegetation is valuable for grazing and its distribution is more related to soil types rather than rainfall, with the characteristic dominant woody species of Acacia while the dominant grass cover is mainly annual with few perennials and; (iii) Woodland Savanna that covers the southern parts of the latitudinal belt extending along the border with the Republic of South Sudan from the borders with Central African Republic in the west to the Blue Nile in the east along Sudan's borders with Ethiopia[7].



The diversity of environmental conditions, especially in relation to water availability, rainfall amount and soil type, has given rise to a wide variety of habitat, livelihood options and land tenure arrangements as well as affecting the distribution of human settlements and population movements. The data challenges the mindset of Sudan having an abundance of natural resources[8].

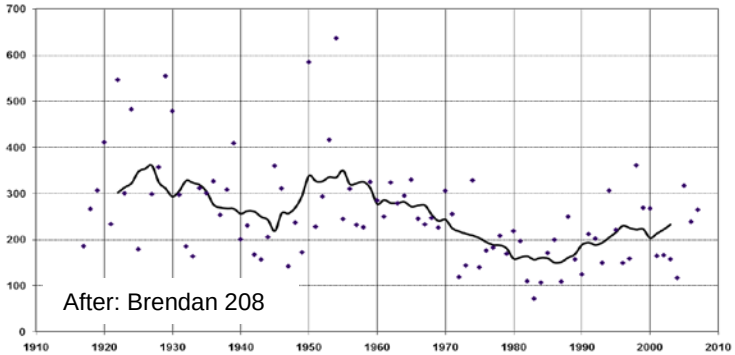
Pronounced spatial and temporal variations in the amount of rainfall and duration of the rainy season are evident. Drought is a recursive phenomenon and frequent drought cycles

[5] FAO and UNEP, 2008.
[6] FAO and UNEP (2011) Land cover in Sudan, FAO, Sudan.
[7] Harrison and Jackson, 1958.
[8] UNEP (2012) Environmental governance in Sudan, UNEP.

extending over 2-3 years are common. The table below provides a chronology of main drought years over the past three hundred years.

Recorded severe drought years in Sudan[9]

Year	Local name and damage	Location
1684	"The great famine" (Urn Lahm: meat)	Central Sudan
1835-38	"Years of famine"	Central Sudan
1836	Cholera spread through country	Central and Western Sudan
1885	Slight famine	Central and eastern Sudan
1888-89	Sanat Sitta: Complete failure of rains and Nile flood crop failure, locust attacks, and Mahadist wars.. Prices rose to US$60 for two sacks of dura (sorghum) and people sold their children as slaves to save their lives; an estimated 40% of the country's population died of famine and disease	Central, north, and E Sudan
1890	Locusts and mice consumed the products	The Nile area
1913	Poor rain, corn brought from India and issued free of charge in distressed areas and cheaply elsewhere	Central and Northern Sudan
1914	"The year of the flour" (flour brought from India because of poor rains)	Central Sudan
1940-41	Fouliya (named after Egyptian horse bean, foul Msasri, was distributed and crushed to be used instead of dura); years of poor rains and crop failure	East Sudan
1947-49	Sirar Hoyokia (named after the appearance of shooting star); three consecutive years of rain failure and lack of crops. Described as the worst famine during Condominium rule (1898-1955)	East Sudan
1958-60	American (after American relief distributed); failure of rains and crops	East Sudan
1970-72	Kiloiate (relief ration was distributed in kilogram's); years of bad rains and crop failure	East Sudan
1984-85	Years of severe drought and famine described as the worst Famine in Sudan during the 20th Century. Around 1.8 million Persons were displaced and 8.5 million receiving food aid.	Western, Central and East Sudan
1990	Undeclared famine caused by failure of rains	West/Centre/ESudan



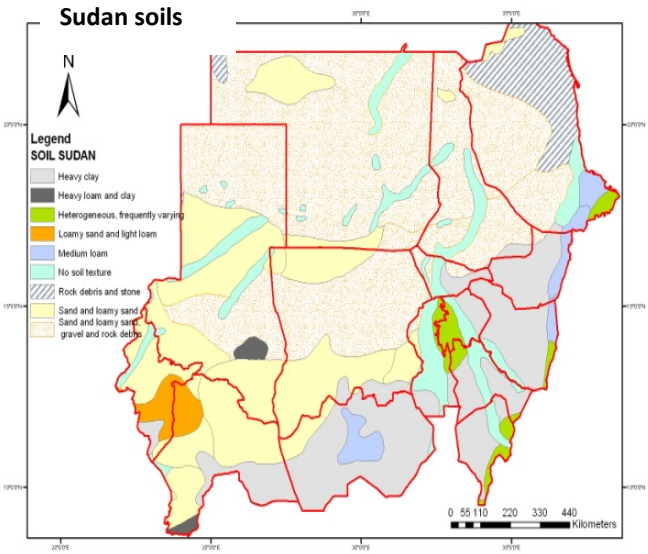
Impacts of climate change are also evident in Sudan. Rainfall records from El Fasher, North Darfur (Figure 1), show a marked drop beginning with drought in 1972. More significantly, droughts have become more frequent: 16 of the 20 driest years recorded have occurred since 1972. Climate change models (P. K. Thornton et al 2006) also predict a reduction in the length of the growing period of more

[9] Tesfaye Teklu, Joachim von Braun. Elsayed Zaki (1991) Drought and famine relationships in Sudan: Policy implications, International Food Policy Research Institute, Research Report 88.

than 20% between 2000 and 2020, with similar reductions across nearly all of Darfur by 2050[10].

3.2 Soils

Soil resources of the Sudan can be divided into seven broad regions as follows[11]: (i) Xerosol soils of the hyper-arid area (about 78 million ha) comprising part of the Sahara Desert composed of superficial deposits of sand with bare rock debris, shifting dunes and consolidated dunes. Recent alluvium provides a basis for productive agriculture in the narrow Nile valley north of Khartoum. Elsewhere soils are sandy with little agricultural potential. (ii) Arenosols (about 28 million ha) towards the south and are known locally as Goz and gardud soil. These are the typical soils of North Kordofan State. (iii) The 12 million ha of the more weathered Arenosols in the semi-arid climate of western and central Sudan. These soils are low in nutrients and organic matter and have a high sensitivity to erosion. The sands are free draining, with some clay or ferruginous clay as a bond near the surface, making them firm after the rains. Under high torrential rains their nutrients could be easily leached. (iv) Vertisols (about 70 million ha) have considerable agricultural potential in the semi-arid zone of the Sudan. They form the central clay plains extending southwards to the eastern part of the flood plains. Special management practices are required to secure sustained production of these soils. (v) Ferrasols (about 30 million ha) are the soils of the dry sub-humid areas. The low natural fertility and very low nutrient retention capacity are serious limitations of these soils. Their great depth, high permeability and stable microstructure make them less susceptible to erosion than many soils in the country, other than the Vertisols. (vi) The rocky soils of the Red Sea Hills and parts of Marra mountains, classified as Leptosols, constitute about 18 million ha. The Red Sea Hills soils are shallow and poor in nutrients and with high gravel content. The Marra mountain soils are relatively rich volcanic soils. Because of the limited soils depth and sloping terrain these soils are liable to erosion by water (vii) Cambisols is the smallest soil group (about 2 million ha) but could be among the most productive soils in the country. These soils lie along the undulating Ethiopian Highlands under dry and moist sub-humid conditions, and thus are prone to water erosion.



[10] Brendan, 2008.
[11] FAO, 1995.

3.3 Water Resources:

Sudan has a substantial fresh water resource base as almost half of the Nile Basin is found within the country and it also has substantial, but poorly developed groundwater reserves of which the largest is the globally renowned Nubian Sandstone Aquifer System. However there is a very wide disparity in water availability between regions, as well as wide fluctuations between and within years. These imbalances are a source of much hardship in the drier regions as well as a driving force for conflict in the country.

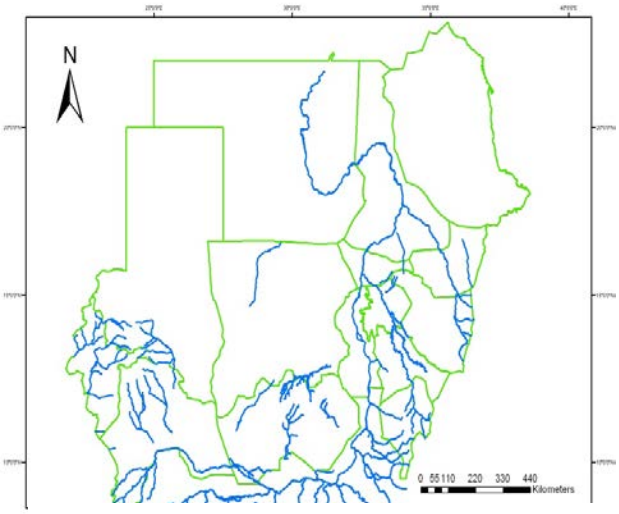


Figure ; Rivers and Wadis in Sudan

Sudan's total natural renewable water resources are estimated to be 89 km^3/yr including 20% from rainfall and the remaining 80% flowing over the borders from upstream countries. This reliance on externally generated surface waters is a key feature of Sudan's water resources and is of critical importance to economic development in the country as flows are both highly variable on an annual basis and subject to long term regional trends due to political, environmental and climatic changes.

Sudan is now utilizing about 14.6 md.c.m. of its 18.5 md.c.m share of the 1959 Nile Waters Agreement. The overwhelming part (96.7 %) is taken by agriculture. Withdrawals by the domestic and industrial sectors amounted to 2.6% and 0.7% respectively. Water consumption is mainly reliant on surface waters. Groundwater extraction is limited to certain areas but is rapidly expanding. It is mainly used for domestic purposes and small scale irrigation in the Nile flood plain and its upper terraces (small tube-wells called mataras) as well as in the wadis. Sudan has invested heavily in large dams which play an important role for irrigation schemes and electricity generation.

3.4 Forests and rangelands

Sudan is classified as a poorly forested country with an estimated 51.96 million acres (11.9%) of the country's area as forest and woodlands cover[12]. The Savanna zone (40% of Sudan area) is the richest in forest resources and is the most inhabited part of the Sudan. This is also the zone where more than 90% of agricultural schemes and projects are found.

Sudan forests domain is basically a natural structure contained in reserved forests (government and out-growers tenure) and natural non-reserved forests. The plantation area is not more than 3% of the reserved forests area. The total forest reserve area is estimated at 9,236,033 feddan[13] (Table 2) or 38792 km^2 representing 2.1% of the country's total area.

[12] Forests National Corporation, 2013

[13] Feddan = 0.42 hectare

Most of these reserves are found in West Darfur, South Darfur, Gedarif, Blue Nile and White Nile states.

Table 2: Forest Reserves in Sudan 2013, by State

State	No. of Forests	Area in Feddans
Khartoum	16	29768
River Nile	22	32044
Northern	8	32130
Gezira	65	270094
Sennar	197	350133
Blue Nile	271	961948
White Nile	78	848231
Kassala	43	89289
Gedaref	80	1 002 796
Red Sea	53	44 851
North Kordofan	107	701 655
South Kordofan	144	704 648
West Kordofan	174	173 332
North Darfur	9	16 993
South Darfur	49	3 513 938
West Darfur	32	464 193
Total		**9,236,033**

Forests distribution by mode of ownership show that most of the forests resources in the country (66.3%) are owned by the Government and managed and administered by Forests National Corporation. Forests owned by gum Arabic producers (groups and families) account for around 31%.

An Africover study[14] has revealed that over 70 per cent of the Sudanese people depend on forests to earn their livelihoods. FNC estimates that about 30% of the quantities of wood are consumed in Khartoum and Gezira states; 59% of wood consumed is obtained from the low rainfall savannah and 39% from the poor vegetation of the semi-desert region. The amount of wood removed annually exceeds the allowable limit by about 5 million cubic meters.

Rangelands occupy approximately around 30% of the country's area. They cover many ecological zones, namely, the desert, semi-desert, and low rainfall savannah. They produce an estimated 80% of animal feed requirements[15].

4. HUMAN ADAPTATION

The diversity of environmental conditions, especially in relation to water availability, rainfall amount and soil type has given rise to a wide variety of habitat, livelihood options and land

[14] Abdel HA Hamid etal, 2009, Situation Report Nature and extent of environmental crime in Sudan.

[15] Abde HA Hamid etal, 2009, Nature and extent of environmental crime in Sudan, Situation Report, Institute for Security Studies, South Africa.

tenure arrangements as well as being detrimental to large scale land acquisition. On the rain lands of the country, as in much of the African Sahel, where water is the main limiting factor, resource management and human adaptation were centred on traditional rain-fed cultivation and animal herding but with great variation due to local environmental conditions and technical and marketing constraints. Seasonal movements across zones, hunting and gathering and wage labor were supportive engagements. However, animal herding based on traditional pastoralism remains the most extensive land use system in terms of spatial coverage.

This type of adaptation processes has also affected cultural and political boundaries between groups. Adaptation movements have also helped in forging links between groups, violent ones as well as peaceful ones. Reciprocity, rendered imperative by ecological variations, was common. Close symbiotic relations, amounting to 'alliances', forged through negotiations between tribal leaders were also common. The emerging local markets and trading centres as important meeting places further helped to develop and expand relationships between communities.

Pastoral systems in the country vary along a north-south axis with camel pastoralism dominating the desert and semi desert areas north of latitude 16 degrees and cattle herding in the savannah belt towards the south[16]. Similar to other herding groups in the African Sahel, pastoralists adapt their livelihoods to fluctuations in pastoral resources through extensive mobility between wet season grazing towards the north and dry season grazing towards the south. This has created a historically dynamic relationship between drier environments in the north and the wetter environments towards the south. Such dynamism has been attained through numerous pastoral mobility routes linking dry season and wet season grazing areas while creating these areas as part of pastoral territorial domains.

Territorial mobility and ecological dynamism have brought most of Sudan pastoral groups into direct contact with sedentary farming communities, a situation that turned to be among the main causes of conflicts over land and natural resources. The above map of traditional agriculture in Sudan reflects the fact that the sector is restricted, almost exclusively, to the rangelands of the country away from the Nile in Darfur Kordofan, Red Sea, Kassala, Gedarif, Blue Nile, Sinnar and White Nile areas.

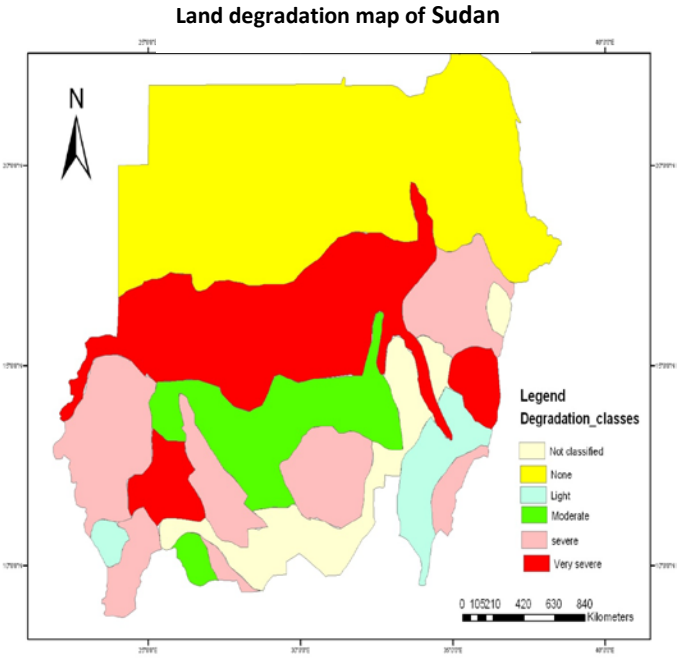
In spite of their profound differences, crop and livestock production share common characteristics in the sense that: (i) they both evolved as specific forms of adaptation to prevailing environmental condition; (ii) both systems were founded on common property customary land tenure arrangements; (iii) both are essentially rainfall-based activities; (iv) both systems are based on low level of technological input; and (v) low level of productivity and yields, particularly conspicuous in the farming sector.

5. LAND DEGRADATION: SCALE AND EXTENT

In spite of the absence of detailed and up-to-date studies, there is a general consensus among planners, decision makers and land users that land degradation is a serious

[16] Manger, 2002.

problem and one of the major challenges facing contemporary Sudan. However, several case studies on land degradation were carried out in Sudan during the two closing decades of the 20th century. Major among these were the assessments by UNEP (1977) [17] ; FAO/UNEP (1984) [18] ; UNEP/ISRIC (GLASOD) (1990)[19]; and Dregne 1991)[20]. According to Ayoub (1998) [21] of the agricultural land, pasture and forest and woodland (170 million ha in total), nearly 75 million ha (45%) have been degraded severely to very severely by human factors in recent history. GLASOD soil assessment shows that severe and very severe degradations totaled 58 million hectare, indicating that land degradation in the country is more linked to soil degradation than to vegetation degradation [22] . The GLASOD methodology of assessing human-induced soil degradation was considered a definite progress as compared to those used in other assessments[23].



About 64 million ha of soils are degraded in the Sudan[24]. 81 percent of the total degraded area is in the susceptible arid, semi-arid and dry sub-humid areas. Most of the degradation (74 % of the total degraded soils) is in the arid and semi-arid zones.

Since 1960s, Sudan has been experiencing severe problem land degradation, especially along the southern margins of the Sahara in Darfur and Kordofan besides the enormous threats to the main Nile. Vast tracts of land that were previously agricultural and pastoral

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[17] UNEP 1977. United Nations Conference on Desertification, 29 August-9 September 1977. World Map of Desertification at scale of 1: 25,000,000. A/CONF. 74/2.

[18] FAO/UNEP (1984). Map of Desertification Hazards: explanatory note. Nairobi, Kenya: United Nations Environment Programme.

[19] UNEP/ISRIC (GLASOD), 1990. World Map of the Status of Human-induced Soil Degradation, Nairobi: UNEP.

[20] Dregne, H.E. (1991). Desertification Costs: land damage and rehabilitation, International Centre for Arid and Semiarid Land Studies, Texas Tech. University.

[21] Ali Taha Ayoub, 1998, Extent, severity and causative factors of land degradation in the Sudan Journal of Arid Environments (1998) **38**: 397–409

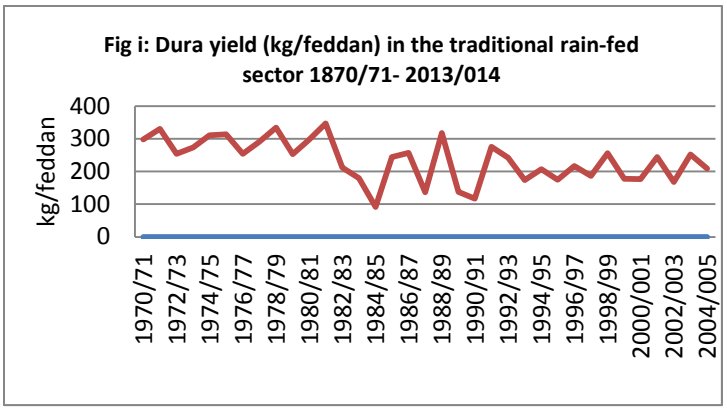
[22] Edinam K. Glover, 2005, Tropical dryland rehabilitation: Case study on participatory forest management in Gedaref, Sudan.

[23] Thomas, D. S. G. & Middleton, N. J. 1994. Desertification: Exploding the myth. John Wiley & Sons, Chichester, England. 194 p.

[24] Ayoub, 1998.

have been converted to desert. A particular problem in Sudan has been the conversion of semi desert habitat to desert[25].

Recent evidence[26] suggests a 50 to 200 km southward shift of the boundary between desert and semi desert has occurred since the 1935s. Empirical evidence from Darfur suggests that the conflict has resulted in an unprecedented destruction of environmental resources[27]. This situation has been further supported by Emelie Dahlberg and Daniel Slunge (2007)[28] who noted that most of the remaining semi-arid and low rainfall savannah, representing approximately 25% of Sudan's agricultural land, is at considerable risk of further degradation which is projected to continue to move southwards due to climate change and changing rainfall patterns causing an estimated 20% drop in food production.



Land degradation associated with reduced land capability and productivity remains a serious problem in the country. An SOS Sahel UK study from North Kordofan (2002)[29] maintained that average dura grain (sorghum) yield per feddan has declined from 630 kg in early 1970s to 270 kg in 2002. A very recent study[30] from Gedarif State of East Sudan shows that the average of dura yield per feddan has declined from 720 kg in 1960s to 180 kg in 2013. An immediate result of that is the dramatic expansion of cultivated land by farmers to compensate for their declining yield from land which further contributes to clearance of land cover, competition over land and eventually proliferation of conflicts. The enormous declining yield from land has been also documented by Government of Sudan study of the mechanized farming sector in the country in 2008[31].

Forest resources in the country have also been seriously depleted. The annual removal rate, which was estimated at 2.4%, is considered the highest rates of deforestation in

[25] UNEP, 2007.
[26] UNEP, 2007, Sudan Post conflict Environmental Assessment.
[27] UNEP, 2007, Sudan Post Conflict Environmental Assessment.
[28] Emelie Dahlberg and Daniel Slunge, 2007, Sudan Environmental Policy Brief, Department of Economics, Göteborg University, Sweden.
[29] Omer Egemi et al, 2003, Towards a local peace: SOS Sahel experience of conflict transformation between pastoralists and farmers in El Ain, North Kordofan, IIED.
[30] Omer Egemi, 2014, Livelihoods and food security strategies of pastoralists and small farmers in Gedarif State, East Sudan, Maan Organization and Oxfam Novib.
[31] Government of Sudan, 2008 Study of the Sustainable Development of the Semi Mechanized Farming Sector in Sudan, Ministry of Agriculture and Forests.

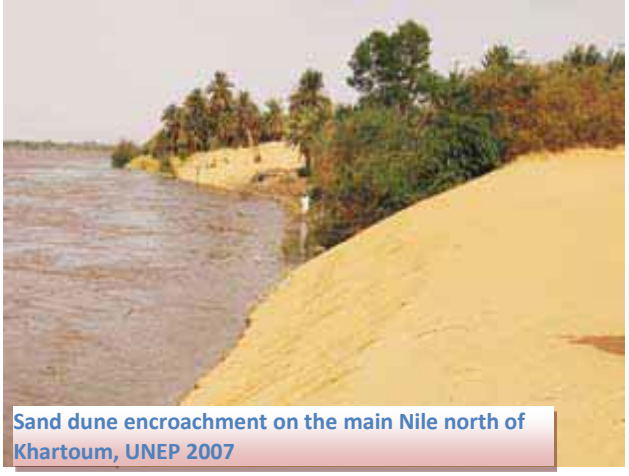
developing countries[32]. Rampant deforestation led to a loss of about 11% of Sudan's forest cover between 1990 and 2005[33]. Big regional differences exist: two-thirds of the forests in north, central and eastern Sudan disappeared between 1972 and 2001. In Darfur, a third of the forest cover was lost between 1973 and 2006. In Gedaref State the area described as grazing lands has declined from 28,250 km^2 (78.5% of the state's total area) in 1941 to 6,700 km^2 (18.6% of the State's area) in 2002[34]. In the Jebal Mara in Darfur the proportion of land covered with closed forest fell from 50.7% in early 1973 to 35.8% in late 2001. This is a loss of 29% of the forested area over 29 years, or 1.2% per year. The secession of South Sudan in 2011 has far reaching implications on the forest resources in the country (Table 3).

Table 3: Effect of South Sudan secession on forests in Sudan

Changes	From	To
Forest cover ratio	29.4%	11.6%
The annual removal rate. (90% of removal in the north)	0.74%	2.2%
Average annual rate of forests increase (million cubic meters)	11.0	8 million cubic meters
Green area per capita per feddan	5.89	1.68
Average tree density per feddans	400 - 700 (from north to south)	200 - 500 (from north to south)

The diversity of Sudan's ecological zones had historically supported a wide variety of wildlife species. However, because of the large scale destruction of the natural habitat, it is generally accepted that wildlife was more abundant in Sudan than it is today and that wildlife has been disappearing from several areas in Sudan. The removal of vegetation cover has also resulted in the severity of dust storms in the country. Middleton (1985, in Ayoub 1998)[35] reported that the number of dust storms (visibility less than 1000 m) per year in El Fashier, North Darfur state, had increased more than five-fold during 1970 to 1980.

Water resources in the country have suffered severe degradation. Groundwater is depleted and the main Nile is threatened by the combination of encroaching sands and riverbanks erosion. With the exception of the Jebel Aulia dam, all the reservoirs of the country's existing dams are severely degraded. It is estimated that 60% of



Sand dune encroachment on the main Nile north of Khartoum, UNEP 2007

[32] Forests National Corporation Report, 2013.

[33] Emelie Dahlberg and Daniel Slunge, 2007, ibid.

[34] Babikir, Mustafa, 2011, (2011) Mobile pastoralism and land grabbing in Sudan: Impact and responses, paper presented at the International Conference on the Future of Pastoralism, Feinstein International Centre, university of Tufts.

[35] Ali Taha Ayoub, 1998, Extent, severity and causative factors of land degradation in the Sudan Journal of Arid Environments (1998) **38**: 397–409.

Roseires's, 54% of Khashm El-Girba's, capacity has been lost to siltation. The hundreds of smaller wetter regions in Sudan's deserts (oasis and wadis) inspected by UNEP[36] were found to be moderately to severely degraded.

6. ECONOMICS OF LAND DEGRADATION

The economic and social costs of land degradation are not easy to quantify. However, these costs could be appreciated through consideration of its outcomes in relation to population instability, human poverty, declining incomes from degraded lands, conflict and political instability and the gender implications of land degradation.

6.1 Population instability

Population instability and massive dislocations are characteristic features of the Sudan population since the early 1980s, caused by the combined effects of land degradation, drought, disintegration of rural economy, but more importantly conflict on the rain lands of the country. This has resulted in a conspicuous shift in the population landscape map with far reaching socioeconomic, environmental, political and security repercussions. Because of that, urban growth has accelerated from 8.1% at time of independence in 1956 to approximately 45% in 2010[37] making Sudan one of the fastest urbanizing countries in the world[38].

Urban population in Sudan	
1955/56	8.1%
1985	22.4%
1995	31.4%
2010	45.0%

The 1984/85 disaster associated with large scale land degradation, drought, and famine and which displaced approximately 1.8 million persons, particularly along the edges of the Sahara in Darfur and Kordofan will remain a landmark in the social, economic and political history of Sudan during the 20th century. The failure to deal effectively with the disaster had set in motion many of the processes that Sudan and its partners are struggling with at present, especially in relation to poverty and proliferation of resource-based conflicts.

Displacement in 1984/85	
Darfur	500,000
Kordofan	425,000
Eastern	400,000
Central	420,000
Northern	55,000

Because of large-scale land degradation and decreasing resilience to climate change, especially in the semi-desert parts of North Darfur, North Kordofan and White Nile areas, Sudan is currently witnessing a remarkable shift in population and economies southwards towards the relatively wetter and richer savanna areas in South Kordofan and South Darfur, leading to intensified competition over resource and proliferation of local level conflicts, especially between pastoralists and farmers in areas already under extreme population pressures and high human security risks. The situation in these areas has further been complicated by the cessation of South Sudan and the wide range of human insecurity

[36] UNEP, 2007, Sudan post conflict environmental assessment.
[37] UN-HABITAT: Sudan http://ww2.unhabitat.org/habrdd/conditions/nafrica/sudan.htm .
[38] Asal, Manzoul Abdalla, 2008 Urbanization and the future of Sudan, http://www.ssrc.org/blog/category/darfur/ .

issues related to it, particularly in South Kordofan, Blue Nile State and the contested area of Abyie.

6.2 Poverty and food insecurity

Land degradation in the country is strongly linked to poverty in rural as well as urban areas. As much as 80% of reported diseases in the country are estimated to be waterborne and a key cause of child mortality. Land degradation and deforestation have large negative impacts on food security and incomes of the rural population. In many cases women are made disproportionately worse off by environmental degradation. Increasing scarcity of fuel wood and water adds to the workload of women and in conflict zones this has had grave effects on the personal security of women.

> *The land has degraded enormously. Last year (2013) I cultivated 15 feddans of dura and it produced 38 sacks of dura grains. After paying the zakat and repaying the sheil and other debts to the village merchant I remained with 6 sacks of dura that cannot cover more than 30%-40% of the annual grain requirements of my family. A farmer from Karsh El Fiel Village along Rahad River, Gedarif State*

Addressing land degradation in its various forms is crucial for the agricultural sector which constitutes around 40 % of GDP and 80-90 % of non-oil export earnings. For the over 80% of the population whose livelihoods depend on small scale crop production and/or livestock husbandry, land degradation often translates into lower incomes and food insecurity.

6.3 Conflict

Competition over natural resources, increasingly scarce due to land degradation and climate change is an important trigger of conflict in Sudan. UNEP identifies key links between four different natural resources and conflicts in Sudan: (i) oil and gas reserves; (ii) fresh water resources; (iii) hardwood timber; and (iv) rangeland and rain-fed agricultural land.

Continued severe land degradation in combination with climate change and increased demand for resources from a growing population and increased number of livestock are contributing to the conflict dynamics. A key cause for concern is the continued shrinkage and degradation of remaining rangelands in the semi desert areas contributing to increasing competition over resources between pastoralists groups and sedentary farmers. Due to the difficulties faced by pastoralist societies, an increase in southward migration of pastoralists had brought with it a wide range of risks and local conflicts over resources. A key challenge is to develop a stable system for rural land tenure which satisfies the interests of both sedentary farmers and pastoralists groups.

In Darfur, the areas of the Fur, Birgid, Berti and Daju tribes, have been the targets for waves of displaced groups from Northern Darfur, especially Zaghawa and various camel pastoralists whose livelihoods were severely ruptured and devastated by land degradation and desertification. The displaced people brought strong challenges and contestations to the prevailing customary land tenure arrangements founded on the Hakura system. The immediate result are the widespread conflicts that took an ethnic dimension where each group began to overplay its cultural and ethnic differences from the other to justify its rights

over land and to call for an autonomous administration, not on a geographical but on an ethnic basis. The recent creation of autonomous emirates for the migrant groups within the traditional homelands of indigenous tribal groups was held responsible for the escalation of the present war in Darfur[39]. The social, economic and political costs of conflicts in Sudan have been extremely high. These involve:

- loss of human lives: this could be exemplified by the conflict between Beni Hussein and Reziegat Mahameed over gold mining resources in North Darfur that claimed the lives of more than three hundred persons; conflict between Awlad Sirur and Awlad Hiban in West Kordofan over land that claimed the lives of more than a hundred persons; the conflict between Rizeigat and Maalia in 2013 which claimed the lives of more than 500 persons; and the conflict between Misseriyya Awlad Omran and Ziyod which resulted in the loss of tens of lives. This is in addition to many other conflicts such as that between Nuba and Misseriyya in Lagawa area, and between the Rezeigat and Massiriya along the border between South Kordofan and South Darfur.

- Population displacement, with an estimated three million displaced persons, one of the highest displacement levels in the world. This exceptionally high level of displacement is the outcome of conflict in Nuba Mountains, Blue Nile, East Sudan and, modty importantly, the conflict in Darfur which displaced approximately around 2 million persons living in 39 camps where human conditions, especially among women and children, are appalling and dehumanizing.

- Massive loss of economic resources. Official and other sources give an estimate of over US$2 billion loss to total military operations since 1983[40]; reduction of the country's investment ratio to less than one third of its potential ratio under normal conditions; and reduction of potential per capita GDP by a cumulative rate of 8%[41].

- The current Darfur crisis has resulted in a serious humanitarian crisis where more than 2.5 million people, mainly traditional farmers, have been displaced; hundreds of thousands have also been displaced in South Kordofan and Blue Nile since 2011.

Other developmental costs of conflicts are quite high but involve many complexities in computation. These involve widespread violence, especially against women and children; erosion of governance; decline of production; derailing of development interventions; destruction of physical, human and social capital; wide sense of social despair and apparent political instability.This is besides contributing to widening regional disparities that further perpetuates the persistence of conflicts.

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[39] Takana, Yousuf Suliman, 2010 Administrative boundary as a cause of conflict in Darfur, Paper to SECS.

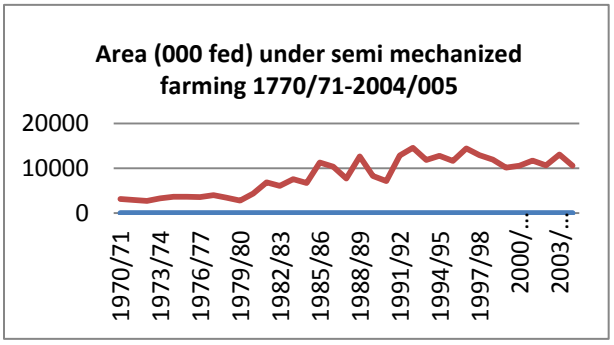
[40] Elbadawi, Ibrahim, 2005 “An MDG-based Strategy for Re-building the Post-conflict Sudanese Economy” a paper presented at the workshop on “Rebuilding Devastated Economies in the Middle East”, sponsored by the G.E. von Grunebaum Center for Near Eastern Studies, UCLA, February 3-5, 2005.

[41] Abdel Gadir, Ali and Wani, Paul, 2004 Opportunities and Challenges in the Post-Peace Era in Sudan, Background paper presented to UNDP, Sudan.

7. CAUSES OF LAND DEGRADATION

7.1 Land use transformation

Land use in Sudan has been significantly transformed over the past fifty years, setting in motion complicated processes of land degradation. Large scale acquisition of land for agriculture (in irrigated, semi mechanized and traditional sectors) and oil and gold mining has been associated with severe destruction of land cover while creating soil and water erosion as active processes of degradation. An estimated eleven million feddan has been appropriated and cleared for public and private investments (foreign and domestic) in the irrigated sector. The area under semi-mechanized farming, increased from 214,000 feddan [42] in 1954/55 to 2.0 million feddan in 1970/71 to around 14.5 million feddan in 2012[43]. Considering the fact that the semi-mechanized farmers do not usually cultivate more than 60-70% of the allocated land, the land leased for the sector is estimated to range between 30 million and 50 million feddan. More than 60% of the semi mechanized areas are found under the category labeled as "unauthorized or squatting schemes"[44]. Traditional rainfed cultivation has similarly expanded to cover an estimated 21 million feddan in 2012. In North Kordofan State it was found that the traditional farmer, in response to the declining yield from land, starts to expand the cultivable land from an average area of 3.0 ha in 1960 to 11.0 ha after 2000.



The study of the Sustainable Development of the Semi Mechanized Farming Sector in Sudan commissioned by Government of Sudan in 2008 established the semi-mechanized farming sector as a major cause of land degradation on the Central Clay Plains of Sudan. Kebbede (1997)[45] summarized the environmental and social destructive impacts of the semi mechanized sector as follows:

- Mechanized farming expanded by cutting down nearly all the natural vegetation in the area. In the past, tall grasses, flat-topped acacia trees, the drought-resistant trees, bushes and shrubs were dominant vegetation on the central clay soil plains that have now turned into large mechanized farms. In 1970s alone, an average of 8,750 square kilometers of forest were removed annually to make room for mechanized cultivation;
- Efforts to grow the same crop on the same field each year provided neither rest for the land nor opportunities for the land to regenerate its fertility. Once the land is

[42] Feddan = 0.42 hectre

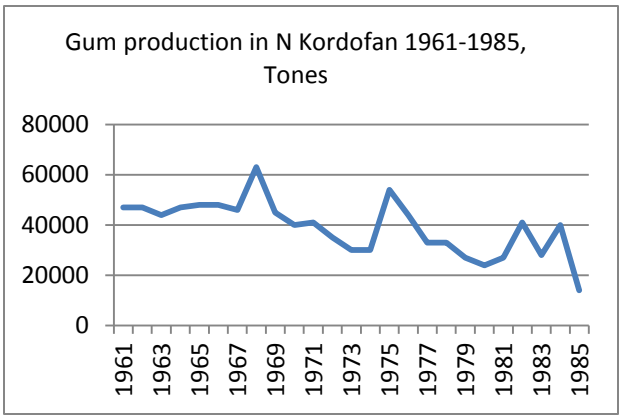
[43] Ministry of Agriculture and Irrigation, Agricultural series report, 2013.

[44] Omer Egemi, 2014, Livelihoods and food security strategies of pastoralists and small farmers in Gedarif State, East Sudan, Maan Organization and Oxfam Novib.

[45] Girma Kebbede, 1997, Losing ground: Land impoverishment in Sudan, Contributions in Black Studies 15 (1997):123-43.

exhausted and yields start to decline, abandonment of the land for new areas follows, destroying once again vegetation cover, and, in turn, leading to a rapid loss of topsoil by erosion. Soil erosion has also taken a toll, owing to widespread use of tractors and heavy machinery;

- The expansion involved heavy cuts in customary lands that were available for the traditional farmers and nomadic pastoralists;
- One of the most glaring incidents of wholesale clearing of vegetation, induced by the expansion of mechanized farming and state pricing policies, is the fast decline of the Acacia senegal, the tree that produces gum arabic, an important export crop of Sudan



- The loss of wood lands has also led to the almost total disappearance of wildlife in most parts of Sudan. Land clearance for rainfed mechanized farming and irrigation has expanded by virtually eliminating animal habitats.
- The continuing expansion of large-scale mechanized farming has also ruined the symbiotic relations that had existed for centuries between the farming population and the nomadic pastoralists
- Dislocation of considerable people out of land: even whole villages have been left landless with villagers forced to work in precarious employment as wage labourers on their own land or to migrate outside to urban centres[46].

Because of the expansion in semi-mechanized and traditional rainfed farming land use in Gedarif has been radically transformed (Table). More drastic change and transformation has taken place in Sinnar State, one of the States most seriously affected by land degradation.

Table: Transformation of land use in Gedaref State, 1941-2002

Type of use	Area 1941		Area 2002	
	Km2	%	Km2	%
Semi mechanized farming	3,150	8.7	26,000	72.2
Forest and rangeland	28,250	78.5	6,700	18.6
Hills and water courses	3,300	9.2	2,000	5.6
Wasteland (kerib)	1,300	3.6	1,300	3.6
Total	36,000	100.0	36,000	100.0

Source: Babikir, Mustafa (2011)

[46] Ijaimi, 2005.

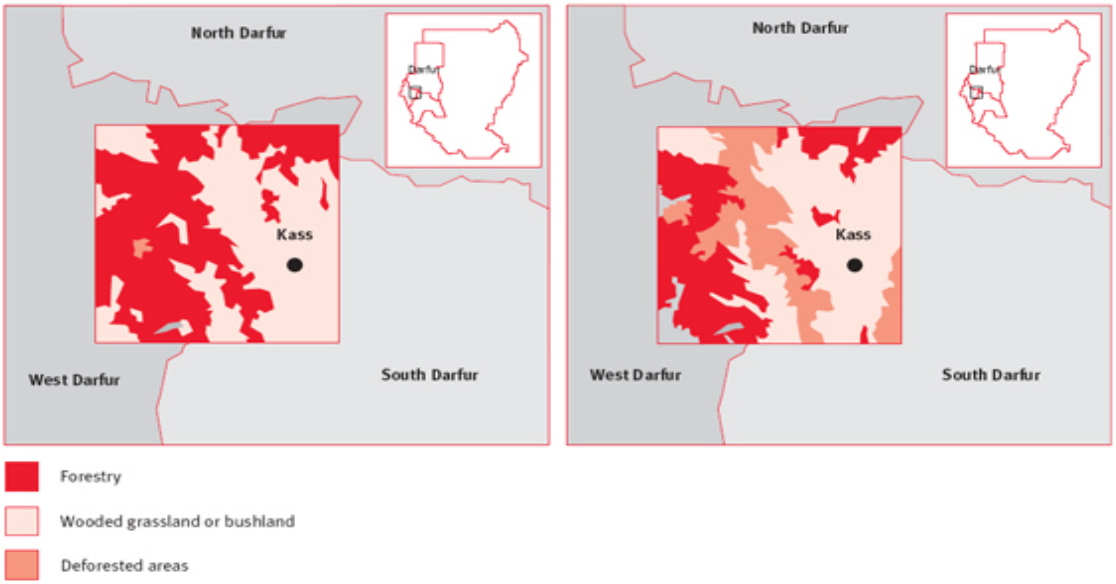
In Sinnar State, range lands and pastures dwindled to only 2.69% of the State's total area in 2009, reflecting radical land transformation and concomitant severe pressure on the traditional farming and pastoral sector in the State that supports 6.56 million head of animals. In South Darfur, the proportion of land use for rain-fed agriculture rises from 5.8 per cent in May 1973 to 15.4 per cent in November 2005. The combined percentages of forest and wooded grassland for the same dates are 70.9 per cent, to 49.4 per cent. The proportion of land covered by forest in Kass area of South Darfur has fallen from 51% in 1973 to 36% in 2006 as a result of land use transformation[47].

Land Use in sinnar State, 2009

Use system	Area 000 fed	%
State area	9,700	100.0
Rainfed agriculture	5,500	56.7
Irrigated agriculture	525.6	5.4
Dindir National Park	3,240	33.4
Forests	174.0	1.8
Pastures	261.0	2.7

Source: Strategic Plan, Sinnar State, 2009

Figure 2: Changing land use around Kass, 1973–2006



7.2 Oil and gold activities

The introduction of oil industry has been associated with marked shifts in customary land tenure arrangements and land use systems resulting in heavy dwindling in pastoral resources, both grazing and water. The Muglad Rift Basin, one of the two main oil fields and known reserves (the other is Melut Basin) is located in the heart of Misseriyya Humur homeland covering approximately 120,000 sq km with the largest concentrations being the Fula and Heglig fields. Available data (Pantuliano et al, 2009) revealed that the introduction of oil industry has created remarkable shifts in customary as scarce

Impact of oil on Misseriyya pastoral system and land tenure arrangement

- Loss of vast tracts of grazing lands to concessions to oil companies
- Severe contamination of water and pastures
- Changes in drainage system, flow of water and distribution of resources cause by earthworks Intensified competition and conflicts over land and natural resources
- Erosion of land tenure arrangements and relationships related to it
- Increased conflict with oil companies

Source: Pantuliano and Egemi et al 2009

[47] UNEP, 2007.

resource for both pastoralists and traditional farmers through appropriation of enormous grazing resources and agricultural lands while setting the scence for hightened competition and disputes over land.

Cash-strapped and dollar-starved, the Government of Sudan sees gold as its new oil. The country's annual gold production, over 40 tons, yielded around 2.2 billion U.S. dollars in 2012, accounting for almost 60% of the country's overall exports while making Sudan one of the main five gold producers in Africa[48]. Most of this gold is sourced from artisanal miners where more than 750,000 persons are prospecting for gold at more than 100 sites across the country. Encouraged by volume of production and export earnings, last year Russian and Chinese companies were granted permits to explore 769 km^2. Currently, 100 companies are licensed for exploration and development operations and most analysts expect that more land acreage will be portioned off to foreign companies as well as to domestic investors to expand gold production (Ismail et al 2013). Gold mining has institutionalized enormous processes of large-scale land degradation, environmental pollution and human security that have become issues of deep national concerns.

Earth works for gold mining in Subagh area, Butana, resulting in degraded land for farming and grazing

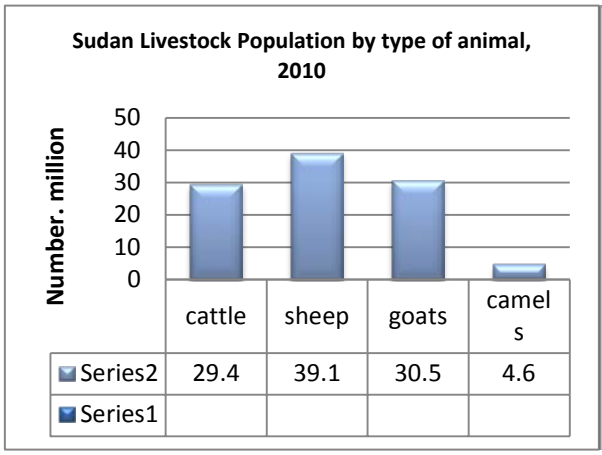
On the other side, gold mining has been associated with enormous environmental and social negative implications. Environmentally large tracts of land have been lost to farming and grazing uses. This is besides the wide range of environmental pollution and health problems generated. Socially, it contributed significantly to conflict and social polarization founded on claims to land rights. A typical example is provided by the conflict between Mahameed abbala and Beni Hussein in Jebel Amir area in 2012 and 2013 where hundreds of lives were lost and an estimated 150,000 persons were displaced leading to an internationally recognized humanitarian crisis.

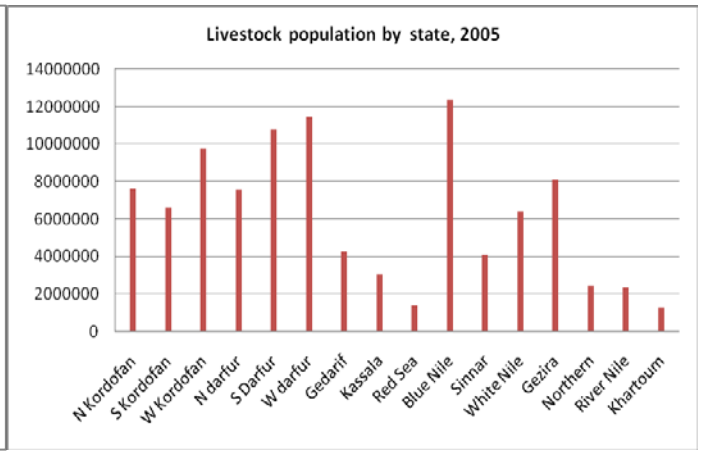
7.3 Population growth and related issues

The rapid growth in human and animal population exerts heavy pressures on land and natural resources contributing to degradation and environmental dissecation. Human population has increased from 7.8 million in 1955/56 to 30.9 million in 2008. Livestock

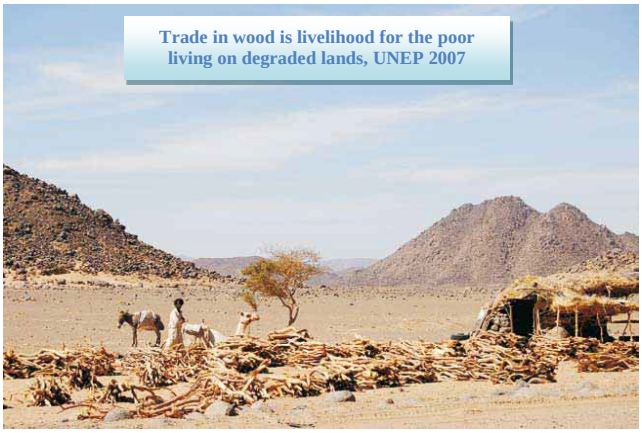
[48] Ismail et al, 2013.

population increased from around 30 million head in 1975 to over 100 million head in 2010[49]. Serious land degradation problems associated with over cultivation and over grazing have been widely reported and documented[50]. The nation's quest for domestic fuelwood is considered a major cause of desertification/land degradation. It is reported that the Sudan derives more than 75 % of its energy requirements from fuelwood, estimated at 22 million m³ per year. This is estimated to be equivalent to about 400 million acacia trees being cut annually[51].





7.4 Poverty



Human poverty is both an outcome as well as a cause of land degradation. Although concrete research is limited there are two uncontested facts about the nature of poverty in the country. The first is that it is largely rural in nature; the second is that it has a gender aspect, with women more seriously affected. However, Sudan Interim Poverty Reduction strategy paper[52] reported that 46.5% of the population are under the poverty line; the percentage increases to 66% in North Darfur. Poverty and declining incomes from the land have forced increasing numbers of the people to depend primarily for their livelihoods on the extraction and mining of the environment. Trade in wood and charcoal are described as flourishing businesses, especially in Darfur[53].

[49] Roy Behnke, Odessa Centre, 2013, the economics of pastoral livestock production and its contribution to the wider economy of Sudan, UNEP and Feinstein International Centre, Working Paper.
[50] Fuad Ibrahim, 1978, The problem of desertification in the Republic of Sudan with special reference to North Darfur Province, Development Studies and Research Centre, U. of K; Monograph Series No 8.
[51] Ayoub, 1998.
[52] "Sudan Interim Poverty reduction Strategy Paper", draft, June 2011.
[53] UNEP, 2008, The impact of conflict on the timber and wood fuel trade in Darfur.

7.5 Conflict and displacement

Conflict, especially in Darfur and the associated population displacement (1.7 million persons) have resulted in disastrous effects on the natural environment. These are as follows[54]:

- The context of conflict has allowed uncontrolled deforestation. Supplying and trading timber and woodfuel has now become a key part of the livelihood strategies of much greater numbers of people from all livelihood groups as other livelihood options falter and disappear.
- There are instances of extensive firing of fields by farmers to keep nomads away, or even by camel herders to keep cattle herders away. This firing destroys the seedbed and decreases the quality of the rangeland.
- The IDPs camps have created unprecedented concentrations of demand for natural resources.
- The demand for timber and woodfuel has increased substantially in all of Darfur's towns that have experienced population growth since the conflict began, partly because of the influx of the displaced from rural areas, partly because of the presence of the international community, and the construction boom that has taken place in many of Darfur's towns.
- The humanitarian effort is as dependent on natural resources as it is on external finance – for wood to cook food with, timber for construction, sticks and grasses for shelter and water.
- The vibrant relief economy in Darfur is fuelling a large market for bricks and charcoal.
- There are instances of very considerable destruction of protected forestry by IDPs camps established in or in the vicinity of forestry reserve, and the
- Pre-conflict land tenure systems have been undermined by the removal of significant features such as large trees and live boundaries, and the loss in value of degraded land.

Number of bricks produced and taxed by FNC in Nyala, South Darfur

Year	**number**
2004	2,359,000
2007	129,630,000

Source: UNEP, 2008

7.6 Planning of water points

During the period between1960 to 1991, over 5500 wells and boreholes were opened in central Sudan without adequate land use studies. The almost inevitable result was concentration of the population and their livestock around watering centres, thus disturbing the fragile ecological equilibrium. The degraded area around these watering points was estimated to be in the vicinity of 25 million ha, about 39% of the total degraded soils[55]. In parts of Sudan annual rainfall is low and erratic hydrological consequences include reduced

[54] Tearfund report , 2007.
[55] Ayoub, 1998, Ibid.

frequencies of wadi flows, major decline in shallow aquifers recharge, and earlier exhaustion in the dry season of shallow wells, surface pools and reservoirs[56].

7.7 Erosion of environmental governance

7.7.1 Legislative gaps

Existing legal frameworks to rural land are largely confused with the apparent dichotomy between the salutatory and customary rights, particularly on the rangelands of the country. Specifically, it is not clear at all whether statutory or customary rights that have legal status in terms of who owns, who controls and how access to land can be made, remade, legitimated and contested. Because of that, which law at present governs rural land is a very ambiguous and confused issue. Is it the customary law? Is it the 1925 Land Settlement and Registration Ordinance; the 1970 Unregistered Land Act, or the Civil Transaction Act? The dichotomy between the customary law and statutory law is apparent. In addition, existing laws are manifestly irrelevant. The tremendous changes in the social, political, economic and cultural circumstances of the country over the past decades render existing laws irrelevant and inadequate to keep pace with the changes. In addition, to date, there is no law or legislation that sanctions the rights and entitlement of traditional farmers and pastoralists to land and natural resources.

Recognizing the confused legal framework to land, the Sudan Interim Constitution 2005 included provisions that call for the harmonization of statutory and customary law. According to the Constitution, Article 186: "*All levels of government shall institute a process to progressively develop and amend the relevant laws to incorporate customary laws, practices, local heritage and international trends and practices"*.

The Constitution establishes a National Land Commission and a land commission for each of South Kordofan and Blue Nile. Establishment of land commissions for each of Darfur and Eastern Sudan was stipulated in Darfur Peace Agreement (in Abouja and Doha) and Eastern Sudan Peace Agreement. The National Commission is mandated to arbitrate between willing contending parties on land claims, enforce the application of law, assess appropriate land compensation and advise relevant levels of government regarding land reform policies, recommending land reform policies and incorporation of customary land rights. Due to political battles and vested interests of certain power structures the National Land Commission has not been realized yet.

A number of laws exist, either in ratified or draft form, to regulate use and access to natural resources. However, there is increasing recognition that lack of effective law enforcement is one of the root causes that sets in motion most of the problems associated with natural resource governance in the State at present. Lack of law enforcement has also created a powerful disincentive to mechanized farmers to conserve or protect the land; instead they have been encouraged to mine the land. Examples of the existing laws in the different States include: regulation of livestock routes; Crop Rotation Law, Prevention of agriculture north

[56] Walsh et al., 1988 in Ayoub, 1998.

latitude 14:45 Law; Tree Belt Law; development of Gum Arabic Belt; prohibition of use of tractors on sandy soils law; and organization of agriculture and grazing.

7.7.2 Inappropriate Institutional Arrangements

Institutional arrangements for land and natural resource management in the country are at a crossroads. The rapidly changing dynamics of land tenure make the existing institutional arrangements obsolete and manifestly incapable to keep pace with the progressively evolving national and local contexts of land administration management. The structure of land administration, at both the federal and state level, is characterized by a multiplicity of institutions and small units that are not closely linked or integrated. Key institutions are the Ministry of Environment, Forests and Physical Development and the Higher Council for Environment and Natural Resources. Other key institutions at the national level include: Ministry of Tourism and Wildlife, Forests National Corporation, Natural Resources Administration of the Ministry of Agriculture and Irrigation, Desertification Control and Coordination Unit of the Ministry of Agriculture and irrigation, and the Ministry of Electricity and Dams. At the State level a wide range of institutions exist including: the Walis (States governors), Ministries of Agriculture, Ministries of Animal Resources, Land Dispossession Committees at the Locality level and the Native Administration and Popular Committees at the local or village level.

> Sudan suffers the lack of recognizable and legitimate institution responsible for rural land management, administration and policy.

Although the Sudan Interim Constitution include provisions at the national and local levels designed to reform governance structures, existing institutions continue to suffer lack of coordination and systemic problems of capacities, accountability, and unclear or overlapping authorities. Years of underfunding have rendered these institutions manifestly incapable to deliver services and to perform their responsibilities. Added to this is the hesitant and partial process of decentralization of natural resource management which manifestly failed to proceed to a robust devolution of authority to the states and localities. The stipulation of land administration as concurrent competence in the Constitution has resulted in a continuous and a progressive encroachment of the Central government on States lands and power over it with the resultant distortion in the decision making processes between the various levels of governance that add to the deepening problem of land management and administration. The process has been facilitated by existing land laws that give government the right to appropriate land for the so-called “Public good” without defining what this concept of “Public good” means.

> Field research in the eastern Sahelian zone has emphasized that the spreading of desert-like conditions beyond the actual desert zone is principally the outcome of natural resources mismanagement. Recurring of drought events or dry periods must rather be seen as accelerators of the human induced effects of resources exploitation (Akhtar, 1998).

The situation has been complicated by the demise of the native administration and the subsequent absence of a recognizably credible institution capable of managing and administering land and natural resources at local level. Despite its reinstatement since the

mid-1980s, the Native Administration System has remained weak and ineffective in controlling illegal appropriation of land, protecting customary rights of communities, managing grazing resources and facilitating seasonal mobility. This could be attributed to the following:

- The dissolution of the institution in 1971 had severely impacted the economic power of the tribal leaders. When the institution was reinstated in 1986, its tribal leaders had already lost most of their power;
- Much of the roles historically played by customary institutions have been captured by modern governance structures;
- Being hereditary, the institution is accused of being non democratic and out of touch of contemporary universal value systems grounded in concepts of democratization and human rights;
- The power and legitimacy of tribal leaders is highly contested by the newly emerging political forces led by the youth and who accuse tribal leaders of being politicized and are accountable to politicians in urban centres rather than to their constituencies in the rural areas; and
- Establishment of many parallel institutions at local level (popular committees, security committees, village development committees) has stripped tribal leaders of many of their traditional powers.

7.7.3 Policy gaps

Sudan suffers the lacks of a clear and articulated policy to land administration and natural resource management. Existing policies are also biased, particularly against pastoralists. This bias was institutionalized since 1944, when the Soil Conservation Committee recommended that:

> "*where nomadic pastoralists were in direct competition for land with settled cultivators, it should be the policy that the rights of the cultivator be considered as paramount, because his crops yield a bigger return per unit area" (Galal El-Din El- Tayeb, 1985:35*[57]*).*

Existing policy frameworks reflect other policy gaps including:

- Land degradation issue is relegated secondary attention in national and state level development frameworks;
- Lack of clear and recognizably declared policy to combat land degradation;
- Absence of appropriate and coherent policies for sustained natural resource management;
- Lack of a nationally-driven and agreed upon long term vision to smallholder producers;
- Absence of policies to deal with climate change and its impacts;
- Lack of policy frames to address existing inequalities in access to land and natural resources;

[57] Galal El-Din El-Tayeb, 1985 The Gedarif study Area, Institute of Environmental Studies, Khartoum University, Khartoum.

- Lack of clarity over the semi mechanized farming sector: policy recommendations made by the study "Sustainable Development of the Semi Mechanized Farming Sector in Sudan" prepared for the government of Sudan and Sponsored by World Bank Multi Donors Trust Fund have not been implemented because of resistance from big landholders;
- Absence of appropriate and coherent policies for sustained natural resource management;
- Lack of clear and nationally owned policies to deal with climate change and its impacts; and
- Land degradation not on the priority agenda of government and international community.

7.7.4 Policy drivers

One of the defining features of Sudan's power structure and relations is the absence or very limited adherence to participatory decision making processes including policy formulation and development planning with conspicuous exclusion of civil society and community structures. Legislative councils, which exist at the various levels of governance (from the locality to the state and federal), are essentially political and dominated by one political party (National Congress Party NCP) that holds more than 90% of the seats in each council, which makes it extremely difficult for other voices to be heard or listened to. Although Sudanese civil society has expanded significantly over the past two decades and some aspects of capacity have been acquired over years, CSOs remain suffering a web of structural constraints including exclusion, banning, containment and persistent restrictions on civil and political rights. In fact, a wide gulf of mistrust defines the relationship between CSOs and government and which, by definition, determines that nature of policy formulation and decision making processes in the country. Because of that policy drivers are constituted principally by government senior officials and NCP affiliated structures.

8. CONCLUDING REMARKS

1. Present-day Sudan suffers a serious problem of land degradation. The scale and magnitude of the social, economic, environmental, political and security costs of the problem indicate that the problem of land degradation in the country is pervasive in nature, transcending issues of locality and environment to affect the very basis survival of the State and people alike.

2. Decreasing capability of land under conditions of increased population, rapid transition to market economy and global climate change have resulted in a heightened demand and competition for access to land, leading to decreased resilience to vicissitudes of nature, various forms of poverty, inequalities, violence and human insecurities while created an environment conducive to environmental mining and destruction, indicating a bleak trajectory for smallholder producers, both farmers and pastoralists, in the country.

3. The independence of South Sudan together with the changes in the global environment brought about by the globalization of economies and politics have combined to

create a new reality in Sudan where land becomes a scarce resource with rising stakes, especially in the border areas that accommodate the majority of Sudan's rural population and livestock. The new reality calls for a whole new approach to land and natural resource governance, particularly on issues related to land administration, institutions, policies and tenure structures. An important task for the future, then, is to address the injustices produced by earlier land use practices and to provide a secure tenure situation for rural communities, where land could be managed effectively and sustainably.

4. The existing legal, institutional and policy framework to deal with land has been rendered inadequate to deal with the tremendous social, economic and environmental challenges in the country. In particular, the multiple and parallel systems of natural resource management, the diffuse and ill-defined governance arrangements that exist, the ambiguous and confused land laws together with the distortions of power between the federal and state governments, have contributed to serious environmental degradation, characterized by extensive deforestation, as well as soil erosion, decline in biodiversity and increasing vulnerability to the effects of climate change. In addition, the ill-defined and weakly enforced governance regime has created a powerful disincentive, especially for investors in land and natural resources, to manage the land effectively or to invest in land-related capital.

5. A major challenge facing contemporary Sudan and its international partners is the construction of a social environment in which the issue of land could be dealt with productively and peacefully. This involves, in the first place, reforming the relationship between the state and society through changes in the national policies and legal frameworks to address power imbalances while mainstreaming land management and administration in national and state level development framework. A prerequisite for this is a constitutional structure that brings the local communities into the decision-making process and enhances their capacity to participate in issues that directly affect their livelihoods. In this respect there is an urgent need to engage people into dialogue and popular discussions to redefine the terms of debate over access and use of natural resources while identifying mechanisms for negotiating the diverse interests of the various social groups, including the State. Drawing out the historical and structural relationships between communities and the broader processes affecting society opens up the possibility of identifying fundamental problems and formulating alternative social discourse over land and natural resources governance.

6. In this regard, building of environmental governance constitutes the most important entry point. Realization of effective and transparent environmental governance emphasizes the need to go beyond narrow or rigidly sequential sectoral approaches to a holistic approach rooted in the link between governance, peace, security and development which places land and natural resource management concretely in the contextual realities of our time and the anticipated future trends of change, nationally, regionally and globally.

7. Fortunately, however, there is a growing recognition by majority of stakeholders, including politicians, planners and decision makers that: (a) land is no longer a limitless resource but on the contrary, is becoming a scarce resource that needs to be managed with care; and (b) that the current status quo is unsustainable, and that steps need to be taken

to strengthen the governance arrangements for natural resource management if the rural sector is to deliver improved livelihoods and social justice, sustainable environmental management, and promote economic and social development.

8. On the basis of the conclusions drawn and informed by the outcomes of the two Consultation Workshops, the following are top priority actions:

i. Mainstreaming of the land degradation issues in national and State-level development frameworks. This involves fostering of effective partnership between Government, international actors and civil society organizations. The advocacy for the mainstreaming process should be spearheaded by the Ministry of Agriculture and Irrigation, supported by its international partners. In this respect, the UNDP Drylands Development Centre is anticipated to play a catalyst role.

ii. Development of a national strategic framework, based on rigorous consultative processes, to deal with the problem of land degradation including aspects of climate change.

iii. Addressing the existing acute gaps in knowledge and information.

iv. Capacity development of relevant actors, especially targeting government institutions, in the fields of policy formulation and design, planning, implementation and monitoring of land use and management programmes.

v. Establishment of platforms for social dialogue as essential prerequisites to inform decision making and priority agenda for interventions.

vi. In order to focus popular attention on headline issues around the problem of land degradation, there is an urgent need to plan and conduct a targeted and focused media campaign to inform and arouse attention to the problem. This is the role of the Ministry of Agriculture and Irrigation with the support of its national and international partners.

vii. Realizing and appreciating the fact that land degradation is essentially a developmental problem, a more proactive role is anticipated to be played by the UNDP Sudan Country Office.

THE CONSULTATION PROCESS

ANNEX 1: NORTH KORDOFAN CONSULTATION WORKSHOP

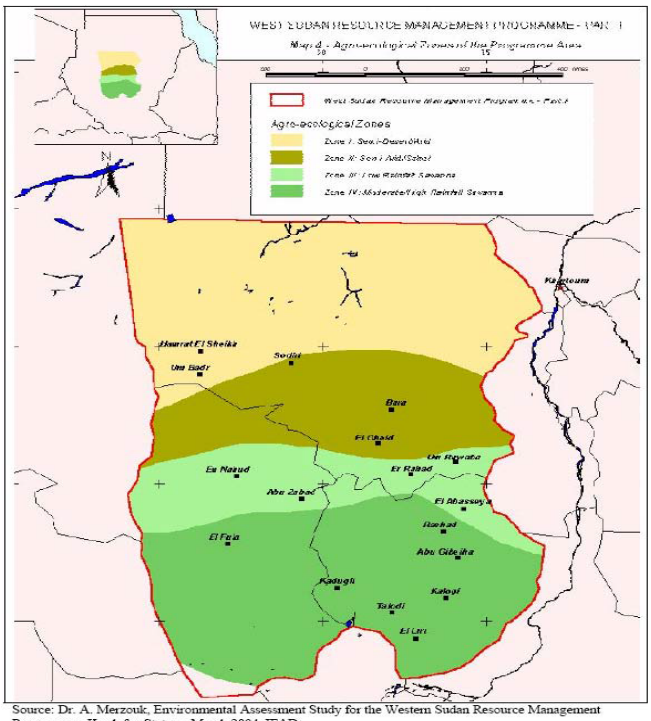
1. NORTH KORDOFAN STATE CONTEXT

1.1 Introduction

North Kordofan state occupies a *terra media* between West Kordofan state and the Nile Valley. To the north the Libyan Desert forms a natural border. The southern border is formed by South Kordofan state. The railway line from ElRahad to Nyala in south Darfur forms the approximate dividing line between the sandy steppes of the north and the hills and clay plains and valleys of the south. The total area of North Kordofan state is about 190,000km^2 and has a population of 2,920,992 persons in 2008 (Census) of whom 50.2% were classified as children under 17 years of age. Females account for 51.9% of total population. Nomadic pastoralists were estimated as 25% of the population. Administratively, the State is divided into nine localities with El Obied being the capital city of the State.

1.2 Ecology

To the north of latitude 14º 30´ N, the State is mostly desert and semi-desert, interspersed with occasional oases. Soils in this area are sandy, bereft of organic material and generally of low fertility and poor water-retention capacity. This part of the state has limited importance from the agricultural point of view except as a grazing area for camels, sheep and goats. The rainfall is light, but usually sufficient to support low scrub and some of the drought-resistant herbs and grasses. A large area in the extreme northwest known as Gizzu, provides in some years luxurious grazing from November to February and occasionally for longer. Camel grazing in that area does not require watering during the whole of this period and herders drink only camels' milk, as the area is without water supply.



Source: Dr. A. Merzouk, Environmental Assessment Study for the Western Sudan Resource Management Programme , Kordofan States – March 2004, IFAD

South of latitude 14º 30´ N and towards the centre of the region there is the capital, ElObied, and a gradual shift toward gently undulating *qoz* soil, which extends south to the railway line. These are sandy dunes stabilised by vegetation, and support extensive stands of acacia trees, among them the variety that exudes gum arabic,

hashab (*Acacia Senegal*) and crops of millet, sorghum, groundnuts and sesame. Uncultivated *qoz* generally supports a thin covering of grass and herbs, and a fair stand of light to medium bush, the commonest varieties of which are *hashab* (*Acacia Senegal)*, *higlig* (*Balanites aegyptyiaca)*, *seyal* (*Acacia raddiana)*, *sidir* (*Ziziphus sp.*), and *tebeldi* trees (*Adansonia digitata*) are fairly common, and in some areas their hollow trunk are used as cisterns for the storage of water. There is one comparatively small area in this belt, which is atypical. It is situated near Bara and is known as the Kheiran. It consists of a large depression with plenty of groundwater. Its interest lies in the fact that it produces considerable quantities of vegetables irrigated from shallow wells.

There is another small area in the southeastern corner of the state and south to the railway line, which enjoys heavier and more reliable rainfall than the rest of the state. In general it may be described as black clay plain. The clay soils in the plains are rich in organic matter, ideal for sorghum and cotton cultivation.

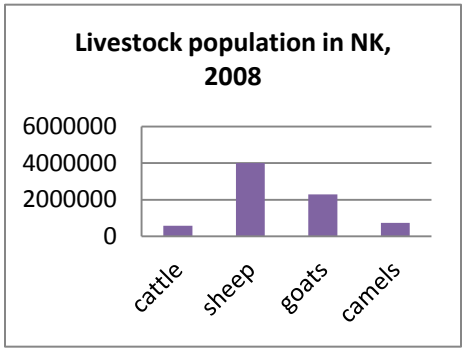
There are also large pockets of soils within the *qoz* locally called *gerdud*, as opposed to the sandy soils. They produce very fair crops, but are more liable to suffer from drought than the sandy soils, as they do not absorb rain quickly. They are difficult to work with hand tools and require more than average rainfall to produce good crops.

Ecological instability contributes to a precarious social environment. Rainfall throughout the State is low and highly variable in timing and space. There are no records of the rainfall for that part of the state lying to the north of latitude 14º 30´ N. July, August and September are the months of heaviest rainfall. With total rainfall averaging 300 mm per year in the area north of ElObied, and rising to approximately 400 mm in the southern parts, the economy is based on extensive cultivation of hardy crops such as millet, sorghum, groundnuts and sesame. A significant fraction of the population practices pastoral transhumance, moving with herds of cattle, camels or sheep according to the availability of water and pasture. Only small pockets of the region are suitable for year-round irrigated agriculture. In most parts of the region soil degradation is a serious barrier to intensification.

During the rains, surface supplies of water are plentiful over most of the state. These soon dry up in the north, and then supplies are limited in those areas to surface wells and deep boreholes, which are often very few and far between. The only river of any size draining to the north from the Nuba Mountains - Khor Abu Habil - is a very important source of water for this area. It fills a lake at Sherkeila, and significantly affects water supplies at ElRahad in years of heavy rain.

1.3 Livelihood systems

The inhabitants of North Kordofan can be divided roughly into nomadic camel pastoralists (Ar. Abbala), sedentary agro-pastoralists, and nomadic cattle pastoralists (Ar. Baggara). Most of the nomadic camel pastoralists inhabit the northern part of the state. They possess large herds of camels, sheep and goats with a few cattle. The most



important nomadic tribes are the Kababish, the Kawahla and the Hawawir. Another nomadic tribe of importance is the Shenabla, who inhabit the rolling *qoz* country in the Gawamaa administrative area centred around El Rahad Town, 43 kms to the east of El Obied. A total of 7.6 million head of animals were raised including cattle (0.6 million), sheep (4.0 million), goats (2.3 million) and camels (0.8 million)[58].

The most important agro-pastoral tribes are the Bedeiriya, Gawamaa and Dar Hamid, who inhabit the gum-producing *qoz* lands in the centre and southern parts of the state. Various tribes of West African origins, such as the Hausa, Berno, Bergo and Daju, have long settled among these groups. Households within these groups combine herding with rain-fed farming in different proportions. The main crops grown are millet, sorghum, groundnuts, sesame and watermelons. The chief animals herded are small stock (sheep and goats) with a few cattle. The animals provided needed product to the household, and acted as a form of insurance against crop failure.

The Baggara pastoral tribes consist of Hawazma, Meseiriya, Habbaniya and Awlad Hemeid. They inhabit the country, which lies south of the railway line, with some having their headquarters right into South Kordofan state. During the rains the Baggara tribes live and graze their animals in the southern half of North Kordofan state. After the rains, they move south as grazing and water becomes scarce in the north. The cessation of South Sudan has seriously affected the cattle herding groups as it denies them access to historically important dry season grazing grounds in the South Sudan. At the same time enormous pressures have been exerted on the progressively dwindling rangelands of Kordofan.

1.4 Farming Systems

After the railroad connection to ElObied was completed in 1912, a bush-fallow agricultural system developed that integrated acacia trees, mainly acacia senegal (gum arabic trees) on fallow lands to maintain soil productivity over time. Because of that, North Kordofan has gained the reputation of being the most important area for Gum Arabic production in the world and its capital city, El Obied as the main trading centre for Gum Arabic. Until early 1990s, Sudan held the

[58] Arab Centre for the Study of Arid Lands (ACSAD), 2008, Land use in East Sudan.

monopoly of Gum Arabic production, contributing more than 75% of its international trade. The system of customary land tenure also evolved to accommodate a bush-fallow system. The right to the continued control of land in fallow, and to any resulting gum trees, emerged as a result of the many land disputes, which followed a rush to claim control over acacia trees.

Bush-fallow agriculture involved a 10-15 year rotation cycle on each plot of land wherein crops were grown for 6-10 years, and then the land was left in fallow for 3-15 years. Each family would control two to four plots of land, which on average totaled about 30-40 acres. Changes in soil productivity, which improves during acacia fallow and declines during tillage, motivated the need for land-rotation cycle in the bush-fallow system. In this system, crops are grown on a plot of land for six years, after which the soil is exhausted and the land is left fallow during which acacia trees regenerate naturally.


Gum Arabic: one of the major riches of NK

Initial gum arabic harvest begins on four to five year old acacia trees. Gum harvest could continue on trees up to about 15 years old, at which time the land was returned to crop production. In addition to gum production, the trees also had many important local uses, such as fuel wood, building material for huts, wells, and fences, and animal browse.

product	Darfur and Kordofan Contribution to Sudan **%**
Millet	90%
Sorghum	17%
Sesame	52%
Groundnut	46%
Gum Arabic	90%
Hibiscus	85%
Sheep	37%
Cattle	45%
Goats	32%
Camels	65%

Kordofan, together with Darfur, contributes significantly to Sudan's economy and national food security. This involves production of 90% of the total production of millet. 52% of the sesame and 90%, 85%, 45% and 65% of Gum Arabic, hibiscus, cattle and camels, respectively.

1.5 Agricultural Intensification and Ecological Degradation

During the last three decades, the area devoted to crops has continued to increase. This expansion, which occurred predominantly in areas that intersected the gum belt, was due to increasing population pressure and attempts by farmers to maintain output in the presence of declining yields per unit area. The last three decades were also a period of consistently below-average rainfall in North Kordofan. While yields were surely related to rainfall, however, yields also declined during this period because the horizontal expansion of crop land and reduced fallow periods exposed larger tracts of land to erosion, which in turn reduced soil productivity for future years.

The animal and human population of North Kordofan has also greatly expanded over the same period. A large number of boreholes were also dug, which turned seasonal pasture into permanent grazing lands. As a result, overgrazing has occurred around water points and livestock routes.

Over the same period, when the rain-fed agricultural sector was most vulnerable due to declining productivity, increasing population, and deforestation (as a result of increasing pressure on the acacia stock for fuel-wood, charcoal production, and browse), two severe droughts hit the area in the 1970s and 1980s. In an attempt to maintain output, the area devoted to crops continued to increase. The introduction of the tractor and the associated land grabbing by private capital induced is another factor explaining the expansion in the traditional farming sector as farmers feared losing their land. This expansion in land allocated to crop production had to come at the expense of forests and pastures. It is also important to recognize, however, that environmental destruction is also the result of domestic pricing policies that determine how individuals will use – abuse - natural resources.

1.6 OUTCOMES OF THE CONSULTATION WORKSHOP

i. Scale and magnitude of the problem

North Kordofan State is severely affected by the problem of land degradation and there is evidence that the problem is intensifying. Apparent symptoms include severe degradation of rangelands; depletion of forest resources; deterioration of water sources; prevalence of invading plants and weeds; desert creep; destabilization of sand dunes; and spread of desertification where vast tracts of land that were once agricultural and grazing areas have been lost to desertification. However, in the northern parts of the State that had been severely affected and depopulated by the famine and drought disaster of the mid 1980s there is observable improvements in the land cover and regeneration of the environment.

ii. Root causes of land degradation in the State

Land degradation in North Kordofan is the result of a complex combination of physical and human factors. Although dry lands are usually described as resilient ecosystems, the prolonged period of Sahelian drought between the late 1960s and mid 1980s resulted in large-scale environmental hazards and degradation. The same period witnessed an explosive expansion of water sources as part of the Sudan Government water supply programme in response to the drought. Almost 300 wells (bore holes) were opened

during 1968-73, which is 51% of all the wells opened during the period 1919-1982 (581 wells)[59]. The availability and poor planning of water sources contributed significantly to land degradation, not only through overgrazing around these points but also through notable expansion of land clearance for agriculture.

Human factors involve a multiplicity of land and natural resources governance issues including: (i) uncontrolled use of inappropriate and environmentally destructive technology, especially use of tractors on the qoz (sandy) soils, and (ii) lack of law enforcement mechanisms, as there is a wide body of legislations pertaining to land and natural resource management that are not implemented. Examples include the law that prohibits use of tractors in sandy soils and the law that restricts cultivation to the north of latitude 14º N. There is a lack of political will to deal with the problem.

Existing land polices and interventions are also grounded in a sectoral approach that fails to address the interconnectedness between the various land uses and to address the dynamic nature of dry lands. Because of that, all interventions implemented over the past 30-40 years (i.e Desert Encroachment Control and Rehabilitation Project DECARP) have failed to achieve tangible results. Lack of complementarities in rainwater harvesting projects for agriculture and livestock is another typical example of the sectoral nature of the intervention projects.

Characteristics of land governance in N Kordofan

- Diffuse and ill-defined governance arrangements
- Confused land tenure arrangements
- Confused and poorly conceived land policies based on top-down approaches
- Sectoral nature of polices and interventions
- Multiplicity of actors and inappropriate institutional arrangements
- Lack of land use plans and strategies
- Land mining for generation of revenue for government institutions
- Ill-defined and weakly enforced governance regime
- Instability of policies and institutions

The confused land tenure arrangements between the customary and statutory laws and lack of clarity over who owns and who is responsible for land management has been associated with lack of security to land rights while creating a powerful disincentive among land users to care for the land or to invest in land capital. Land and natural resources have also remained a major source of revenue to government institutions that suffer underfunding as a result of decades of wars and conflicts in the country. Poor planning and strategizing capacities are characteristic defining features of government institutions.

iii. Economics of land degradation

Land degradation is one of the most critical problems facing North Kordofan State at present. The economic and social costs of the problem are enormous, involving: proliferation of conflicts over land and natural resources; endemic food insecurity situation; declining incomes from land–related economic activities; impediment of economic investment in land; widespread rural poverty; and population instability. The burden on

[59] Helldén, Ulf, 1988, Desertification Monitoring: Is the Desert Encroaching? Desertification Control Bulletin, p. 17.

women and children is particularly high. Women, who are primarily responsible for fetching water and collecting firewood, spend hours to do so. Large numbers of children, especially boys, drop out from the education system to help their poor families, which further contributes to the problem of child labor.

iv. Recommendations

a) Land degradation is a critical issue with far reaching economic, social and political repercussions. Therefore it should be taken seriously.
b) There are enormous gaps in scientific knowledge relating to land classification, land capabilities, soil types and the scale and magnitude of the problem and its economics. What is known presently is based essentially on observations and subjective judgments. Because of that, gaps in knowledge should be filled before any interventions take place.
c) Being essentially social issues, platforms for social dialogue are essential prerequisites to inform priority agenda for interventions.
d) Land degradation issues need to be carefully and concretely incorporated in the State's development frameworks, including budgetary allocations.
e) There is an urgent need for resolving the current confusion between customary and statutory law of land tenure.
f) Capacity building of government institutions and civil society organizations are essential inputs to deal with the problem of land degradation.
g) There should be a comprehensive approach for land management and administration instead of the existing sectoral approach.

There are, however, enormous challenges to be addressed including: the seeming lack of political commitment; fragmentation and poorly communicated/coordinated decision making processes associated with the presence of multiple actors; weak capacities of institutions and civil society organizations; lack of long-term vision to traditional farming and animal herding livelihood systems; and the threats of climate change.

In spite of these challenges, there are also important opportunities to capitalize on, including: the growing global concerns with the problem of land degradation and its social, economic and political repercussions, especially in post conflict situations; the enormous potential of dry lands to contribute to global food security; and the widespread conviction among all stakeholders at local, State, and national levels that the status quo situation is unsustainable and should change.

ANNEX 2. KHARTOUM CONSULTATION WORKSHOP

Outcomes of the consultation

i. Root causes of land degradation

The problem of land degradation in the Sudan was described as a serious and pervasive problem that threatens not only the wellbeing and security of the population but also the prospects of stability in the country. Root causes of the problem were described as being of both natural as well as man-made nature. Natural factors essentially involve aspects of drought and global climate change. Man-made factors were perceived and recognized as being particularly responsible for the problem and involve a complex web of interrelated factors. These factors were broadly categorized into: (i) interference of man with nature; (ii) cultural factors; and (iii) aspects of land and natural resources governance.

The first category is constituted by the dramatic increase in human and livestock population and the concomitant increasing demands for food; large scale deforestation; environmental destruction associated with polluting industries and artisanal gold mining; overgrazing and over cultivation; and the uncontrolled use of environmentally destructive agricultural technology and the resultant explosive expansion of agriculture, even beyond the agronomic boundary (Latitude 14º -45' N). Conflict, especially in Darfur, was considered an important contributor to land degradation through removal of forests and burning of range lands, two activities largely used as strategic elements in the war by both pastoralists and farmers, respectively. The large-scale population displacement associated with the conflict and the concentration of the poor and jobless IDPs in the camps contributed enormously to the problem of land degradation in Darfur. Widespread human poverty and reliance on trade in environmental products, namely firewood and charcoal, was described as an important factor of land degradation.

Cultural factors include housing style on the rain lands of the country, where forest products constitute the main building material. The low quality of house building and the need to renew it every 3-4 years is described as one important consumer of forest resources and eventually soil erosion. Recognizing that over 80% of rural population in the country depends almost entirely on the natural environment as the primary source of domestic fuel, the implications of that on land quality could be realized.

Governance aspects involve an array of issues. Major issues include the gross neglect of land issues in development frameworks at both the national and State levels. Even when land and natural resources are considered, they are usually relegated secondary importance only as sources of wealth and capital accumulation that further adds to the mining of environmental and misuse of natural resources.

Presence of multiple actors that suffer problems of confused and overlapping roles and mandates with minimal coordination and information sharing result in poorly harmonized and mostly conflicting decision making processes that negatively impact the management of land and natural resources. The actors in land management also suffer problems of prevalence of professional tribalism and acute capacity gaps to design, plan, implement and monitor land use and management programmes. Clear policies for land management and administration are lacking, with existing policies being ad hoc and usually grounded in

a top-down approach with minimal public consultation and participation inputs. Absence of a strategic framework for land and natural resource management, together with the lack of guiding land use maps and recognizable polices to deal with climate change, are characteristic features of the land governance frameworks. This is in addition to the conspicuous gaps in legislation, knowledge and information. Sudan's development policies based on the horizontal expansion of agriculture under conditions of weak law enforcement mechanisms, increased population pressure on land and rapid transition to market economy have been responsible for setting in motion various forms of land degradation.

The cessation of the South in 2011 has introduced new pressures on land in the country, especially in the transitional border areas. The prevailing insecurity situation along the border associated with the conflict over Abyie, demarcation of the border and the many contested flash points together with the restrictions on pastoral mobility into the South have resulted in remarkable pressures on land and natural resources.

ii. Challenges to improved land quality

Sudan faces enormous challenges to improve land quality and to harness the problem of land degradation. These challenges were categorized into socioeconomic challenges and governance challenges. Important among the socioeconomic challenges were: the very rapid increase in human and animal population; the widespread and appalling human poverty; issues of rural domestic energy; the unorganized/uncontrolled expansion of agriculture; and the impacts of conflict and displacement. Land governance challenges include: the acute gaps in legislations, policies and information; the inappropriate institutional arrangements; existing institutional capacities to deal with the problem; and the effectiveness to realize and deal with the repercussions of the cessation of the South.

iii. Opportunities to deal with land degradation

There exists enormous opportunities to address the problem of land degradation. These include: increased awareness, at all levels, of governance in the country, about the serious social, economic, political and environmental costs of land degradation; land issue has become part of the public agenda for poverty reduction, reduced conflict, social stability and peace building in the country; because of the loss of 70% of oil revenue to the Republic of South Sudan, there is growing recognition of the importance of land for the national economy; the increased global awareness about the role of land degradation in the causation of poverty, conflict and social instability**;** and the **i**ncreased global attention to the potentials of dry lands in promoting and strengthening global food security.

iv. Recommendations: priority actions:

i. Mainstreaming of land degradation issues in national and State-level development frameworks. This involves the fostering of effective partnership between Government, international actors and civil society organizations.
ii. Designing and implementing national strategic framework to deal with the problem of land degradation including aspects of climate change.
iii. Addressing existing gaps in knowledge and information.

iv. Capacity development of relevant actors, especially targeting government institutions, in the fields of policy formulation and design, planning, implementation and monitoring of land use and management programmes.

ANNEX 3:

National Consultation Workshop on "Contextualizing the Economics of land Degradation Initiative in Sudan"

Grand Holiday Villa (18 Sep, 2014)

A speech delivered by Ms. Yvonne Helle, the UNDP Country Director

You are aware, ladies and gentlemen, that **Land degradation** is a serious global issue, which has a significant impact on food security, and livelihoods losses. The proportion of land subject to desertification and land degradation is increasing year by year. There are a number of pressures driving this trend, including unsustainable land use as a result of demographic changes, unsustainable consumption and production patterns and growing pressure on water sources, exacerbated by climatic changes and drought.

We are aware, ladies and gentlemen that, the majority of Sudan's land lies in the scope of dry lands (it is more than 70%), and it stretches from the desert in the north, to the poor savannah in the south. The dryland in Sudan provides the livelihoods for a great majority of the Sudanese population, in particular, farmers and pastoralists.

However, we are all aware that environmental degradation in Sudan is widespread, severe and continuing at a linear rate. Sudan also suffers periodical drought spells since the 70's. The most sever was during the early 1980's which caused irrecoverable massive displacements.

Overall the natural environment in Sudan is fragile, with weak ecological balance and scarcity of natural resources. The deterioration and erosion of the natural environment in Sudan involves serious and significant threats and risks to production systems, people livelihoods and their coping mechanisms. Conflicts over natural resources and the impacts of climate change are further exacerbating the problem and contributing to the ecological systems fragility.

In order to address the problems of land degradation, there is a need for more coherent policies worldwide, and for measures in the affected countries to address the issue at an early stage. The ***Economics of Land Degradation Initiative***, - the theme of our today's consultation workshop, is an initiative for a global study on the economic benefits of land and land-based ecosystems.

The initiative highlights the value of sustainable land management and provides a global approach for the analysis of the economics of land degradation. It aims to increase the political and public awareness of the costs and benefits of land and land-based ecosystems and for setting the effective strategies to address the problem. The initiative also provides an opportunity for the private sector to set out clear incentives for investment in sustainable land management policies.

The UNDP Sudan Country Office is convening a national study and will prepare a report that will be an integral part of a regional report produced for Kenya and Tanzania to represent the Eastern Africa cluster. Our consultation meeting today will inform the appropriate preparation of the report.

I hope that this consultation will also generate concrete feedback and guidance on the practical application of the economics of land degradation approach on the ground hoping to make it an integral part of policy strategies and decision making by increasing the political and public awareness of the costs and benefits of land and land-based ecosystems.

Finally I would like to extend our thanks to the colleagues at the Federal Ministry of Agriculture and Irrigation; and to the State Ministry of Agriculture of North Kordofan State for owning the process and leading the consolations, which we hope will find a broad coalition of partners to give it the further impetus it requires and the impact that the issue deserves.

Finally, I wish you all successful discussions and deliberation.

Annex 4:

Closing remarks by the State Minister of Agriculture and Irrigation

On behalf of Government of Sudan and Minister of Agriculture and Irrigation in particular and who for some reasons failed to attend this very important Workshop I would like to thank UNDP Drylands Development Centre and UNDP office in Sudan for organizing this workshop. I would also like to commend the continued and fruitful partnership between Ministry of Agriculture and Irrigation and UNDP. Deep thanks also to everyone who participated in the two workshops in ElObied and here in Khartoum.

These workshops are very timely as they drawn our attention to one of the problems that continues to impact Sudan and the Sudanese negatively. Land degradation as we all know is a serious problem that should be addressed before turning into a disaster. For Sudan land degradation is a very critical issue as the country is highly dependent on agriculture and the livelihoods of the majority of the Sudanese is directly linked, in one way or another, to the use and utilization of land and natural resources. Because of that the Government of Sudan has initiated a comprehensive national programme for the revival of the agricultural sector, in both the rainfed and irrigated subsectors. Improving land productivity and dealing with the problem of land degradation is an integral component of these efforts. The undue attention the Government of Sudan is now giving to the institutionalization of rainwater harvesting technology for crop production and rehabilitation of rangelands is another important dimension in dealing with the problem of land degradation and ultimately maintaining national food security and reducing poverty.

Recognizing and appreciating the efforts of the Drylands Development Centre Initiative, the Government of Sudan is strongly committed to promote, facilitate and expand on this initiative. In this respect we also call regional and international actors to support and promote this imitative.

Finally, I would like to thank you all for devoting your time and efforts during these workshops which I think are not enough but just marked the beginning for more wider and broader consultative processes that are badly needed to inform policy formulation and decision making processes. In this connection I would like to assure you that the recommendations of these workshops will get the due concern of the Government of Sudan and the Ministry of Agriculture and Irrigation.

ANNEX 5:

Presentation held by the National Consultant at ElObied, 14 Sep 2014 and Khartoum 18th Sep 2014[60]

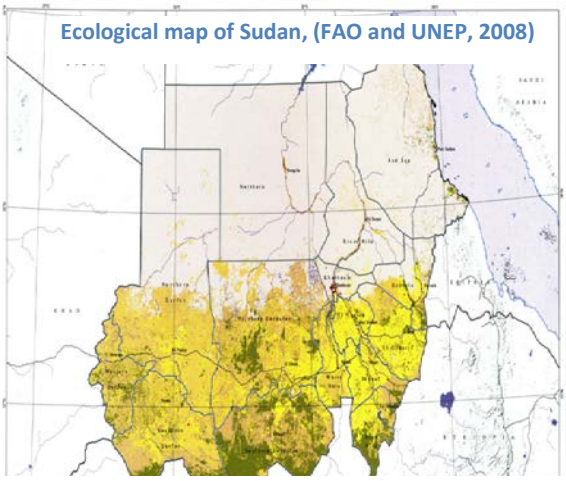
- Land degradation is a long-term decline in the capability of land and measured in terms of net primary productivity.
- Net degradation **=** (natural degrading processes + human interference) – (natural reproduction + restorative management)
- LD is one of the most critically important issues facing the contemporary world
- Dry lands are the most severely affected due to the fragility of their ecosystems
- In essence, LD is a societal and developmental problem owing to its social, economic, environmental, and political and security implications.
- By definition, LD is a human security issue.
- Empirical evidence from around the world shows that women, children and the elderly are the most severely affected by LD
- The relationship between land degradation and the power of the state has also been established.
- A taxonomy of failed States also tends to reflect a positive correlation between land degradation and State failure
- Issue of LD, social peace and political stability

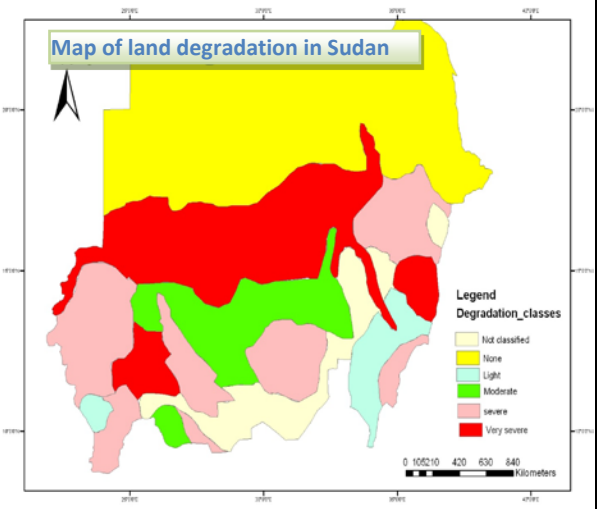
Why LD in Sudan Matters:

- Decades of modernization but the country remains rural in social, economic and cultural outlooks where land remains the main source of wealth and livelihoods
- Land is the main absorber of labour force (average of 60% and in some states up to 80%) who are mainly farmers and pastoralists
- Many other sectors of the economy (manufacturing, transport……) depend on land-related production
- With the loss of 70% of oil to the RSS land has become the backbone of the national economy. It is also the main source of revenue for local councils.
- Sustained land productivity is a major source of social stability and maintenance of the balance between rural and urban areas
- With the independence of the RSS the whole of Sudan has become a dry country (issues of fragility and high susceptibility to degradation). Out of country's total area (1.87 million km^2) 1.13 million km^2 (50.7%) is desert, 10% semi desert. The remaining 0.687 km^2 (39.3%) is divided between low rainfall savannah (300- 400 mm per year) and rich savannah (above 500 mm of rain per year) that extends extensively in South Sudan.

[60] Prepared by Dr. Omer Egemi, Faculty of Geography and Environmental Sciences, University of Khartoum

- The most rich lands are along the border with the RSS; these are mainly conflict areas (S Darfur, Blue Nile, South Kordofan, Abyie)
- Evidence shows that Sudan is one of the countries most severely affected by LD in Sub Saharan Africa.
- Vast tracts of once agricultural and grazing areas have been lost to LD. Hundreds of villages, especially in N Darfur, N Kordofan and N White Nile States have disappeared from the map of Sudan because of LD.
- Threats to the main Nile in N Sudan have been documented.
- According to UNEP a 50 to 200 km southward shift of the boundary between desert and semi desert has occurred since the 1935s.
- Degradation of forests, grazing lands, depletion of biodiversity and wildlife.
- In Sinnar State range lands and forests currently account for 2.7% and 1.8%, respectively
- Depletion of gum arabic and collapse of rural economies associated with it





Economics of LD

This could be looked at through the social, economic, political and security costs involved.

1- **Degrading capability of land**:

- Declining yield per feddan from an average of 720 kg in early 1970s to an average of 120 kg over the past 8 years. What is the value of economic loss to the farmers and how that affect their incomes? How many feddans the farmer needs to cultivate now to produce the same amount used to be produced from 5 feddans in the 1970s? What are the implications of that on range lands, livestock routes, forests and biodiversity and on the relationship with pastoralists and the social fabric as a whole? A web of interconnected social, economic and security issues
- Food security situation in the country and the implication on health and nutritional situation, particularly among women and children

2- Poverty

- Very high incidence in the country, the uncontested facts: (i) high level of incidence (average fluctuating around 46%); (ii) mainly rural in nature where dependence on land is the main source of livelihood; and (iii) women and children are most severely affected. Related issues include family disintegration, mushrooming urban growth and degradation;

drop from education system; child delinquency ……etc

3- Conflict

- Land degradation as a driver of **conflict** and a source of social and political insecurities. Could it be possible to quantify the economic costs of conflicts and insecurities in the country

4- National economy

- Overstretching of resources
- Derailing of development programmes and interventions
- Low yield and low productivity
- The potentially very heavy cost involved to deal with the problem
- Disruption of rural economy
- Depopulation of the rural areas
- Congestion of urban areas and management problems

Sudan's preparedness to deal with LD

Current preparedness does not amount to the scale of the problem and its implications:

- Lack of a clear and agreed upon national vision to the management of land and natural resources
- LD relegated secondary attention in national and state level development frameworks
- Lack of national strategy to deal with LD and development of the natural resource base
- The expanding use of environmentally destructive technology
- Erosion of environmental governance
- lack of recognizable and legitimate institution responsible for rural land management, administration and policy formulation
- Absence of the comprehensive approach to rural development
- Legislative gaps and poor law enforcement
- Weak/limited extension services (crop and livestock)
- Land degradation not on the priority agenda of gov and international community

Challenges

- Critical knowledge gaps (absence of basic research).
- New realities introduced by secession of the South
- Prevalence of dry lands that require a special approach to deal with
- Rapid population growth
- The current situation of national economy and the limited possibilities of reasonable investments to enhance land capability and the increasing possibility of land mining for short term profit maximization from land
- Threat of global climate change
- Appalling rural poverty
- Rapid transition to market economy and the concomitant increasing pressures on land
- Proliferation of land-related conflict and disputes

- Maintenance/promotion of environmental governance

Finally:

- Does LD issues deserve to be seriously considered by Sudan and the Sudanese and their international partners? If yes how it could be concretely and rigorously mainstreamed in national and state level development frameworks? What is (are) the entry points to do that?

ANNEX 6:

Workshop Programme
North Kordofan Consultation Workshop
Elobeid, Sunday, 14 Sep 2014

09:00-09:30	***Opening session:***
09:00-9:30	• Verses form Holy Quran • Speech: Representative form the Federal Ministry of Agriculture & Irrigation (Mr. Abdelmageed Eltayib) • Speech: Representative from UNDP Country Office (Hanan Mutwakil) • Speech: Representative from the NK State Ministry of Agriculture (Tigani Khalifa Mukhtar)
09:30-10:20	***Session 1: Introduction of the ELD initiative***
09:30-10:20	• Overview of workshop and outline of key objectives: *Mr. Abdelmageed Eltayib – (*10 min) • Participant Introductions: *Mr. Abdelmageed Eltayib (10 min)* • Presentation of the ELD initiative *(15 mins)* followed by (15 mins) of questions and discussion – *Mr. Adil Mohamed Ali*
10:20-11:30	***Session 2: Understanding the ELD initiative in the country context***
10:20-11:30	• Presenting the main findings of the Sudan's report on Economics of Land Degradation : *Dr. Omer Egemi*
11:30 -12:00	Lunch break
12:00 – 13:15	***Session 3: Applicability of the ELD approach in Sudan – challenges and opportunities***
12:00 – 13:15	• Group work –to reflect views from State level Sustainable Land management practitioners and stakeholders (40 minutes) • Verbal presentations on the Challenges and the Opportunities (10 mins each) • Discussion (15 minutes)
13:15-13:30	• Summary of key recommendations and action points: *Mr. Abdelmageed Eltayib*
13:13– 14:00	Tea and coffee break

ANNEX 7:

National Consultation Workshop
Khartoum, Thursday, 18 Sep 2014

09:00-09:30	***Opening session: Mr. Babiker Hag Hassan***
09:00-9:30	• Verses form Holy Quran • Speech: Ministry of Agriculture & Irrigation Mr. Babiker Haj Hassan • Speech: Ms. Yvonne Helle – UNDP Country Director
09:30-10:20	***Session 1: Introduction of the ELD initiative***
09:30-10:20	• Overview of workshop and outline of key objectives: *Mr. Babiker Hag Hassan – Director General, Administration for Planning and Agricultural Economics(*10 min) • Participant Introductions: *Mr. Babiker Hag Hassan (10 min)* • Presentation of the ELD initiative *(15 mins)* followed by (15 mins) of questions and discussion - *Stacey Noel (ELD Policy WG) and Anne Juepner UNDP-DDC.*
10:20-12:00	***Session 2: Understanding the ELD initiative in the country context***
10:20-12:00	• Findings/recommendations from the ELD discussions in North Kordofan State: *Dr. Omer Egemi – National Consultant (20 mins)* • Findings/recommendations from the main findings of Sudan's report on the Economics of Land Degradation : *Dr. Omer Egemi – National Consultant*
12:00 -12:50	Lunch break
13:00 - 14:00	***Session 3: Applicability of the ELD approach in Sudan – challenges and opportunities***
13:00 - 14:00	• Group work –to reflect views from country level Sustainable Land management practitioners and stakeholders (40 minutes) • Verbal presentations on the Challenges and the Opportunities (10 mins each) • Discussion (15 minutes)
14:00-14:30	• Summary of key recommendations and action points: *Mr. Babiker Hag Hassan*
	Tea and coffee break

ANNEX 8: Participants in the National Workshop, Khartoum

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