

State of the environment in Sudan

Asim I El Moghraby

ABSTRACT

Sudan is an example that projects the environmental plight of Africa, south of the Sahara – drought and desertification, floods, deforestation, loss of biodiversity, tribal and ethnic conflict and poverty are only too common. As a result, interest and commitment to environmental impact assessment practices have become mandatory by donors when executing new development projects. Older projects, however, continue to escape notice. New projects compile their own ‘EIA’ with no genuine efforts to legalize and institutionalize EIA.

INTRODUCTION

No doubt accumulating indigenous knowledge and cultures are influenced by natural resources and the intensity of their use. In this respect Sudan could be taken as an example of the whole Sudano-Sahelian Belt, across Africa south of the Sahara. Historically tribal communities were well organized in mitigating natural disasters like fire and the invasion by the desert locust. Managing natural resources became more institutionally efficient after the re-conquest of Sudan in 1898. The first environmental law enacted was the Forestry Act of 1901, followed by the Land Tenure Law of 1908. The early 30s witnessed several environmental initiatives. The 40s produced the ‘Stepping Report’ on desert encroachment in Sudan and neighbouring African Countries. The Forestry Law came into force in 1932, the Wildlife Act and the proclamation of several National Parks came in 1935. The Land Use Committee was also established in 1944. It was a good record! Management of resources, however, was focused on exporting raw materials to the benefit of colonial countries.

Many years ahead of its time was the establishment of the Jonglei Investigation Team to look into the probable impacts of the Equatorial Nile Project. The four-volume report, submitted in 1954, is perhaps the first Environmental Impact Assessment endeavour ever carried out prior to a development project in Africa. The project was subsequently abandoned due to its monumental environmental and social repercussions.

After independence in 1956 the National Governments took several initiatives to manage and rehabilitate natural resources. Several specialized departments and units were created to conserve soils and program water

See Topic 2

**UNEP EIA Training
Resource Manual**

*Law, policy and
institutional
arrangements*

etc. Massive projects were launched like the anti-thirst campaign of the 1960s, expansion in rain-fed and irrigated agriculture, building dams across the Nile and other rivers, overstocking livestock, deforestation etc. This resulted in large-scale population movements, environmental degradation, dam siltation etc. It must be stressed that the outlook had always been that natural resources are renewable and infinite. The value put on the soils, waters and natural vegetation covers for example was zero in the calculations of cost and benefit of new projects.

Professional and sectoral tribalism and population explosion as well as cyclic droughts increased synergetic pressures on the natural resources culminating in chronic poverty, repeated famines and near total collapse in life-supporting production systems. Sudan is at this point in time one of the poorest countries in the world; in spite of the fact that it is vastly rich in natural resources and highly qualified professionals. It is a typical situation of 'scarcity among the plenty'.

Firm political commitment and understanding of the environmental dimensions of resource management does not exist. Many examples could be cited. The new adoption of the federal laws divided the country into 26 states. The division of old administration areas into northern and southern states neglected the ecological need to draw management plans on regional bases.

BACKGROUND

With an area of around 2.5 million square km Sudan stretches between latitudes 4 and 22 North. It is mostly flat plains with a few mountain areas, the highest of which is Jebel Marra massive in the west. It is bounded by nine countries and a coastline around 650km on the east. Sudan has around 2000 million ha of surface water the most important of which is a 4000 km stretch of the Nile and tributaries. Rainfall ranges between almost nothing in the barren deserts of the north to about 1400mm in the southern sub-humid parts of the country. The climate is tropical and is one of the hottest in the world with vast daily and seasonal variations in temperature. According to the 1993 census Sudan is inhabited by almost 25 million people of whom 25% live in the capital, Khartoum. They belong to about 700 tribes speaking more than 300 dialects and languages. The rate of growth is around 2.9%. About 80% of the population depend on agriculture for their livelihood. Cotton, oil seeds, gum arabic and livestock are the main exports of the country.

Harrison and Jackson classified the ecological zones of Sudan in 1958 as:

- Deserts: cover almost 30% of the northern parts. Annual precipitation is less than 50 mm; soils are sandy. Sparse vegetation grows on seasonal 'waddis' and the banks of the Nile.
- Semi deserts: cover above 20% south of the desert belt. Rainfall

between 50 and 300 mm. It is speckled with few Acacia trees and thorny bushes and zerophytes.

- Low rainfall woodland Savannah: covers about 27% of the area of Sudan with rainfall less than 900 mm. A nine-month dry period. Annual grasses are dominant. Heavy clay soils lie on the east of the Nile and the west is sandy. Most of the 36 million feddans of rain-fed agriculture and the 4 million irrigated lands fall within this heavily populated belt.
- High rainfall woodland Savannah: 13% of the area with rainfall more than 900 mm and with broad-leafed trees in the Southern parts of Sudan
- Swamps: are probably the largest in the world and cover about 10% and fall in three main areas around the tributaries of the White Nile.
- Highlands: are less than 0.3% of the area of Sudan and are scattered along the Red Sea coast, the south and the west of the country.
- The Red Sea Cost-Marine ecosystem, mangrove swamps, coral reefs and associated fauna.

The ecological diversity is reflected in the richness of biodiversity; out of 13 mammalian orders in Africa, 12 occur in Sudan. Cave and Macdonald (1958) recorded 971 species of birds. Setzer (1956) reported 91 genera and 224 species and sub-species of mammals other than bats. The Nile is the home of 106 species of fish and the swamps are considered as a major gene reserve (Moghraby 1982). One water sample taken by Prowse in 1958 'contained 211 species and varieties of desmids of which no less than 21 were entirely new species and 48 are new varieties and formae' (Hammerton 1964). World Research Institution Annual Report 1995 recorded 3112 flowering plants in Sudan.

Biomass makes up more than 80% of the energy used, 12% are petroleum derivatives while hydropower is only 1%. Oil reserves have recently been discovered in the western and southern parts of the country. Sudan is currently suffering from a chronic energy crisis (Callaghan *et al* 1985).

THE STATE OF THE ENVIRONMENT

At the beginning of the 20th century the population of Sudan was only three millions and the economy was a subsistence one. Modernization of the economy and social progress started with education well before World War One. Massive agricultural schemes like the Gezira (2.5 million feddans) were launched after the War. This involved building dams and irrigation works (10 thousand km of canalization in the Gezira scheme).

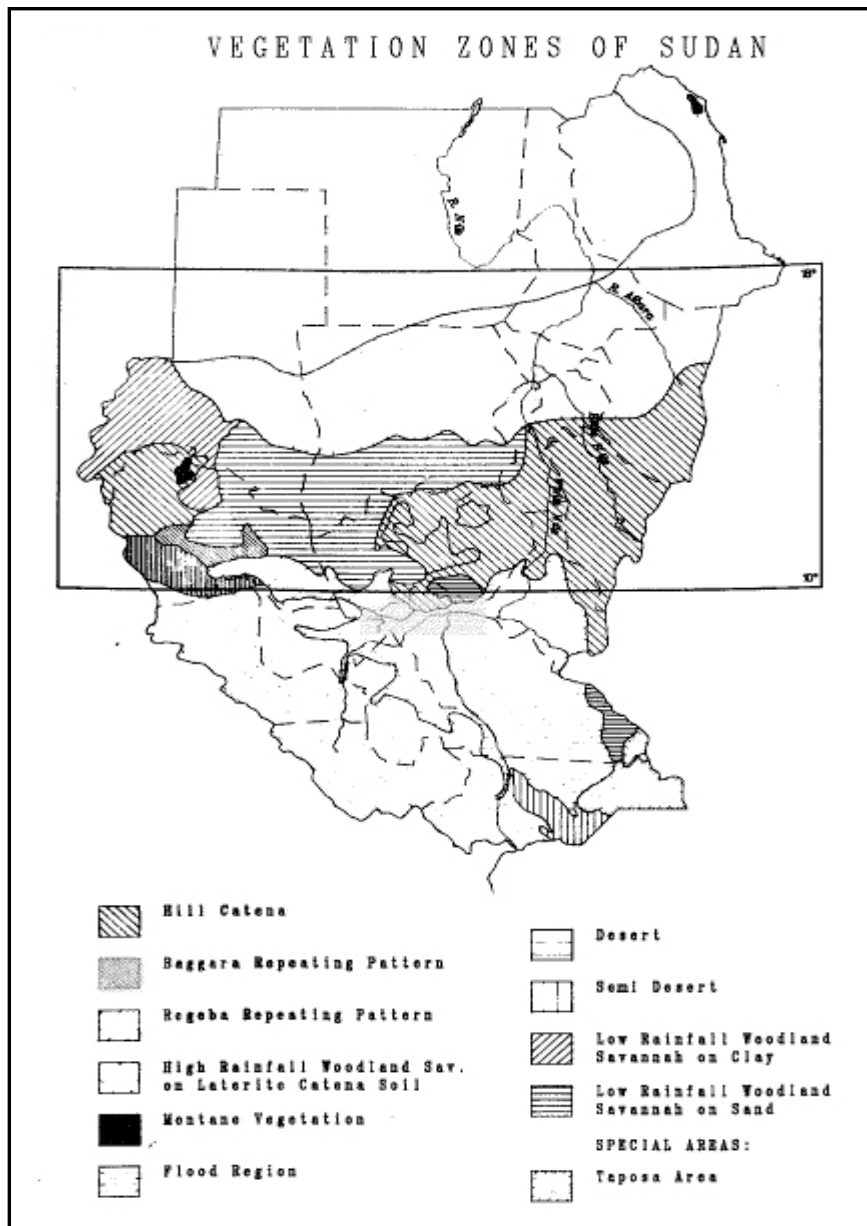


Figure 1: Vegetative zones of Sudan

Although pilot projects, to test production techniques, preceded the full scale launching of the project, environmental impacts, like deforestation, population movements, Stalinization and water related diseases, were not even considered. The goal of the scheme was the production of long-stable cotton for export. Economic progress followed in many directions, influenced by the colonial powers, trying to bridge the gulf between production growth and a stagnant economy.

At this time the general picture is as follows:

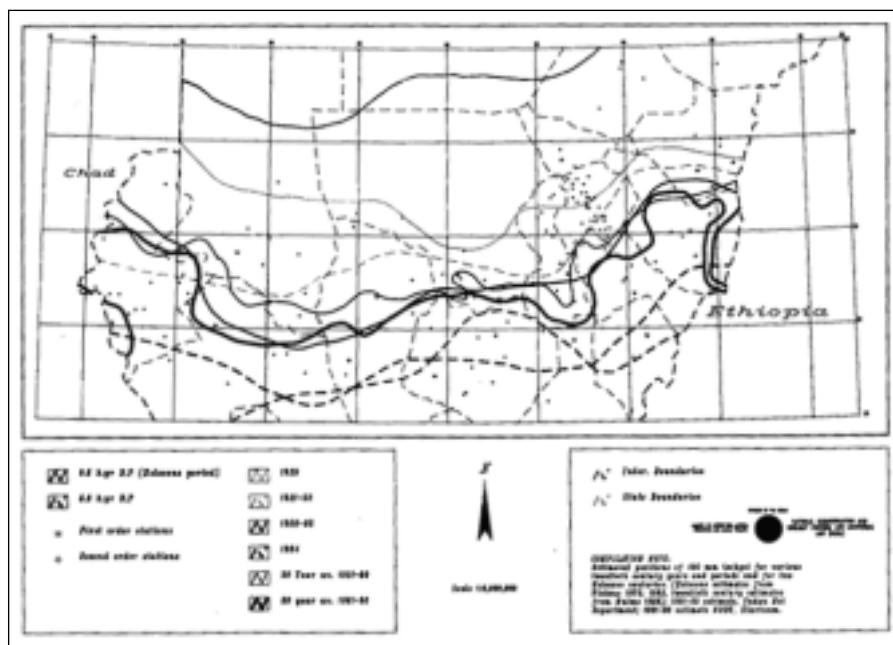


Figure 2: Estimated changes in the position of 400 mm isohyet

Soil degradation

This is interpreted as the inability of the resource to sustain production. This is due to receding isohytes towards the south of the country. Consequently the vegetation cover north of latitude 12 disappeared almost completely. This is also due to repeated use of fire deforestation, drought and the dearth of reforestation efforts. Compacting of soils and deforestation become very significant problems around water points especially after the 'anti-thirst campaign' of the 1960s. Sand dune movement accelerated rates of desertification.

Deterioration of water resources

Global Warming, drought and desertification accelerated rates of deterioration in water resources both qualitatively and quantitatively. The annual discharges of the Nile system have decreased during the past two decades. It is postulated that rainfall over the Ethiopian Highlands will decrease in the order of 15%, which would result in a 30% decrease in the discharge of the Ethiopian tributaries of the Niles.

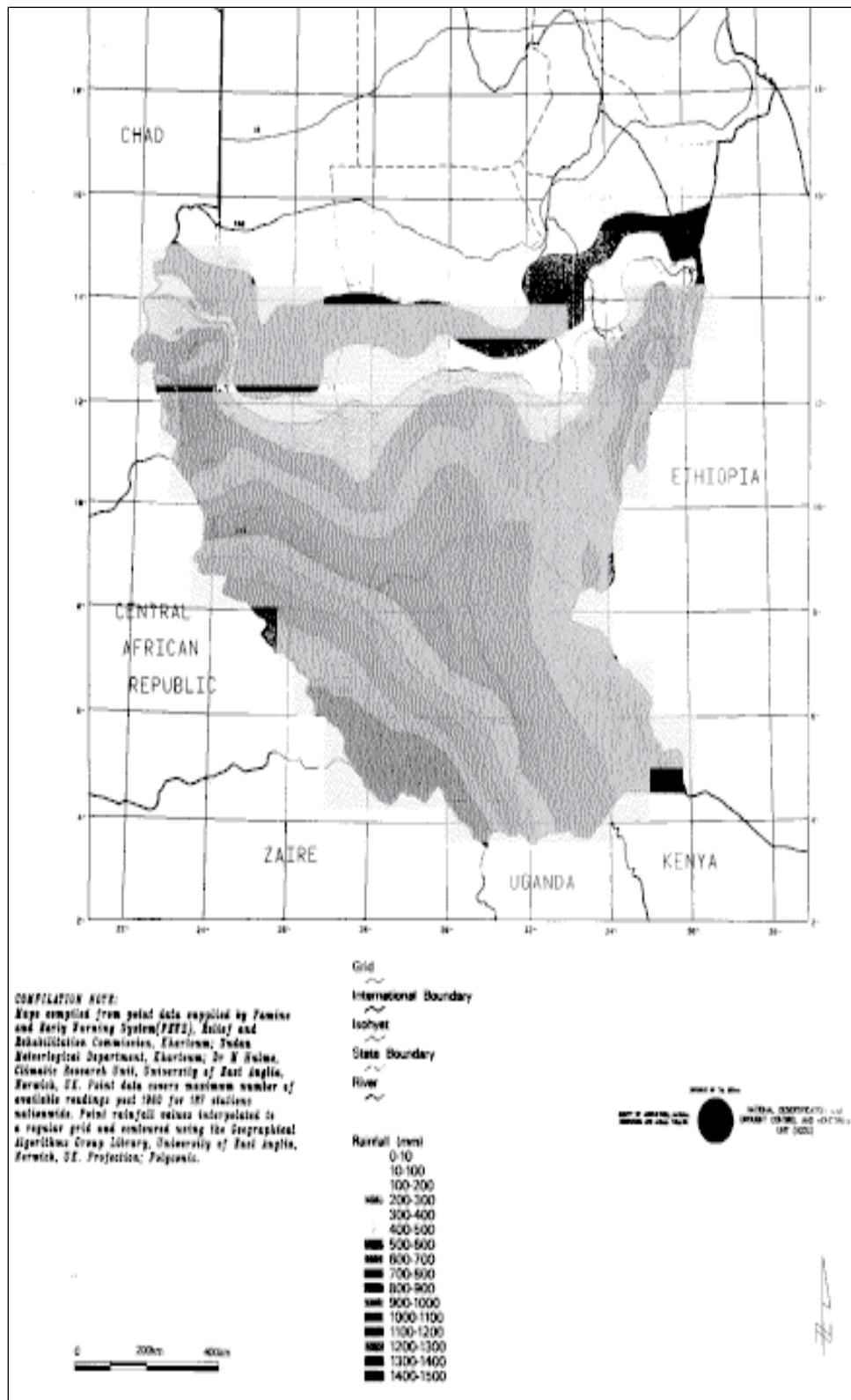


Figure 3: Rainfall 1961-1990

Dams across the Nile in Sudan have serious siltation problems. This is due to the high load transported down from the Ethiopian Plateau as well as from degraded watersheds. Lower water current velocities are a consequence of decreased volume of discharge. This makes Sudanese rivers vulnerable to invasion by weeds and water-related diseases. Perhaps the Nile is one of the least polluted rivers in the world. Sources of contamination include sugar estates, power plants and agricultural chemicals. The infrastructure of rainwater drainage systems has deteriorated of late. Incidences of malaria and enteric diseases are prevalent during the rainy season. The wide use of domestic water storage tanks has also made malaria a domestic disease.

DETERIORATION IN BIODIVERSITY

The annual rate of deforestation is close to 504 thousand hectares. Only 30,000 ha are reforested. We lost a number of wild life species in the last two decades; many more are endangered or vulnerable. This is mostly due to habitat destruction. Several grasses and herbs have disappeared due to overgrazing, repeated droughts and fires. Fires are responsible for the annual loss of 30% dry fodder otherwise available to wild life and the 103 million heads of livestock.

Awareness and sensitivity to environmental issues is weak among the public and the policy makers.

It must be stressed that the overwhelming limitations of land use in Sudan are the periodic droughts experienced in the Sahelian Belt. Population distribution is inversely proportional to vegetational cover in such a way that 78% of the Sudanese inhabit northern areas with only 33% of cover (which already decreased to 18%). The remaining 22% inhabit the southern parts with 67% of the forest area.

Most of the economic development was established in northern parts of the country. Horizontal expansion in large-scale rain-fed mechanized agriculture replaced the traditional subsistence one. The areas under plough are currently 36 million feddans for the rain-fed sector and 4 million for the irrigated sector. Productivity is very low notwithstanding the use of agricultural chemicals and hydrocarbon fuel. Farming marginal lands (with precipitation less than 300mm) is particularly disastrous. Farming and distorting flood plains seasonal watercourses have far reaching effects.

ENVIRONMENTAL PROBLEMS

Environmental problems of Sudan can be summarized as follows: Recurring droughts and desertification have led to an increase in environmental consciousness. The fact that environmental issues affect all aspects of life in the country is gaining acceptance.

The basic environmental problems of Sudan are related to the absence of an acceptable strategic master land use plan, the growing conflicts in land use policies, the depletion of natural resources and the unchecked population growth (due to lack of a coherent Population Policy).

These problems are made worse by the limited perception of the environmental issues as well as the total neglect for the impacts of agricultural policies. The adoption of 'modernization' in agriculture (which is actually not modernization but horizontal expansion in agricultural practices with very little vertical direction) has become an instrument of interference in the traditional sector and takes away from its resources the lands, forests, ranges, pastures and wildlife.

A listing of environmental problems include:

- horizontal expansion in rain-fed and irrigated agriculture ;
- the complete absence of the environmental dimensions in policies, strategies, plans and programs of management of resources;
- development is random and environmental evaluation does exist before or after execution of projects;)
- the economy and society, in spite of the century-long attempts at 'modernization' are still dominated by subsistence way of living;
- the economy is still affected seriously by the yearly, seasonal and geographical variability of rainfall for crop and livestock production;
- dependence on imported seeds and agricultural chemicals has increased cost of production;
- loss of land productivity and marketing policies decreased cash surplus;
- the civil war in the South has grave economic and social costs;
- population distribution and rural-urban migration due to desertification and civil strife has led to deterioration of natural resources, indigenous knowledge and loss of local culture and dignity;
- problems of poor sanitation, limited industrial pollution and food hygiene have become more complex;
- the energy crisis is aggravating desertification and affecting climate charge;
- vast water resources are badly managed;
- environmental education has only been recently incorporated in school curricula; and
- laws and legislation concerning the environment are not effective and law enforcement measures are not integrated.

CONCLUDING REMARKS

Colonial powers followed two main approaches to guiding development policies and investment. The first could be called the 'transformation approach' which meant the total restructuring of societies and ecosystems. The second is the 'improvement approach' where change was gradual. After independence many African countries fell into the grave trap and misconception of adopting the western model of development. Many were encouraged to choose capital-intensive, large-scale food production schemes as a way out. This has ultimately led to food scarcity. Sub-Saharan Africa is perhaps the only region in the world where food production has declined in the past 30 years. Per capita food consumption in 1980 for example was 15% below that at the start of the 1970s and almost 2% below that at the start of the 1960s.

Sudan is perhaps a classic example of a developing country trapped in the so called western model of development. After independence, the slogan was to 'catch up' and to achieve a revolutionary jump. We only attained a harvest of dust. What Africa needs is an alternative pattern of development.

It is no help that industrialized countries also depend on tropical resources, to a great extent, without a genuine involvement in conservation or payment of the environmental costs of overexploitation. Only recently have interest and commitment to Environmental Impact Assessment practices become mandatory by donors when executing new development projects. Of these is the development of a massive infrastructure to cope with the newly discovered oil wealth. Some of these efforts, I am afraid, are not taken very seriously.

Brain drain, poor infrastructure and attempts to rapidly modernize the economy have resulted in mismanagement of the vast resources and consequently in unsustainable social and economic development.

Gloomy as it seems, nevertheless, there is still light at the end of the tunnel! Recurring environmental disasters have made Sudanese both conscious and sensitive to environmental issues. Environmental curricula are now taught in schools. The Institute of Environmental Studies, of the University of Khartoum, is the proud father of more than 3000 Masters of Science, over a span of almost 20 years. Several Sudanese universities teach environmental curricula and management courses of natural resources. On the official level, a Higher Council of the Environment and Natural Resources has been established recently. Subsequently a Ministry of The Environment and Tourism was created.

Voluntary work is deeply rooted in the Sudanese culture. Thus the sprouting numbers of NGOs and CBOs came naturally after the Sahelian drought of the early 70s. Traditionally the 'Naffer' (during the harvest times and tasks like building homes) becomes a seasonal collective task of the

communities. The 'Fazza'(facing calamities or livestock theft or apprehending aggressors) is occasional.

A leading NGO is the Sudanese Environmental Conservation Society (SECS), established in 1975. It has more than 80 branches across the country with a membership of over 8,000. Following the INCD sessions a desertification network was established (RIOD). The Network connects national NGOs across the country, Africa and the Globe. The Sudan Women's Network is one of them.

LIST OF RELEVANT PUBLICATIONS AND OTHER SOURCE MATERIAL

Callaghan, T.V; Bacon, P.J; Lindley, D.K and Moghraby, A.I.el 1985, The Energy Crises in Sudan; alternative supplies of biomass, *Biomass* 8. 217-232.

Cave F.O and McDonald J.D 1958, *Birds of Sudan*. Oliver and Boyd, UK.

Hammerton, D 1964, *Hydrobiological Research in Sudan*. Sudan Phil. Soc. 12 th Annual Symposium. Khartoum.

Harrison, M.N. and Jackson,J.K 1958, Ecological Classification of Vegetation Of Sudan. *Bulletin No. 2*. 1-45 Forest Dept. Khartoum.

Moghraby,A.I.el 1982, The Jonglei Canal – A Needed Development or Potential ecodisaster? *Env.Cons.*9 (2) 141-148.

Mohammed,Y.A; Nimer, N.B; and Moghraby A.I.el 1996, Policy profiles Africa *Biodiversity Series- Sudan*, UNEP / ACI.

The author:

Asim I el Moghraby,
Emeritus Professor of Ecology
Sudanese Environmental Conservation Society
PO Box 1100
Khartoum
SUDAN.

Key words

Sudan
environmental
mismanagement

EIA awareness

developing
institutional
framework
procedures