

1995

December

vol. 37 no. 4

ISSN 0343-2521

CODEN GEOJDQ

An International Journal of Physical, Biological, Social, and Economic
Geography and Applications in Environmental Planning and Ecology

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Desertification: or perhaps not? White Nile, Sudan, 1980-92

Davies, H. R. J., University of Wales, Department of Geography, SA2 8PP, Swansea, UK;

✓ Alredaisy, S. M. A. H., Dr., University of Khartoum, Faculty of Education, Khartoum, Sudan

ABSTRACT. The White Nile area of the Sudan has undergone significant socio-economic change during the 1980s as demonstrated by surveys carried out near Ed Ducim in 1980 and 1992. At first sight these changes appear to be linked directly with the reduction in average annual rainfall. This paper demonstrates that, though important, this factor is not the sole, and may not even be the main factor involved. Government investment policy and associated population movements are shown to have great significance, and cast doubt on any belief that a return to higher rainfall levels would reverse the current socio-economic processes.

The White Nile area of Sudan, lying between Khartoum and Kosti, has seen some significant socio-economic changes during the period under review. Many of them suggest a run down of natural resources in the region. Furthermore, this area was classified by the UN Conference of 1977 (UN 1977) as being under "Very High Risk" of desertification (Fig 1). In Mainguet's view (1991), this would imply land degradation caused by man's activities but made manifest through environmental change or fluctuation. This paper examines changes that have occurred within this region by looking at the results of two surveys carried out in 1980 (Davies 1986), and in 1992 (Alredaisy 1993). The centre point of both studies was Ed Ducim on the west bank of the White Nile. It should be noted that the first survey took place before the severe droughts of 1983 and 1984. The rainlands have seen more radical changes than the irrigated riverain areas.

Physically, the area is bounded to the east by the White Nile whose waters are artificially raised for much of the year by the Jebel Aulia Dam. To the west of the seasonally flooded riverain land lie clay plains which interdigitate with sandy areas. Further than 15 km westwards from the river *qoz* sands dominate.

The Changes

Traditionally *dura* (sorghum) has been grown on the clay plains with *dukhn* (bulrush millet), a hardier, less demanding crop, on the sandy *qoz* areas. In 1980 most farmers with clayey rainlands grew *dura*; in the Arushkol area 95% did. By contrast on the sandy *qoz* some two-thirds

of cultivated rainland was under *dukhn* and a further quarter under sesame. Of these crops *dura* and sesame were significant sources of cash income to some rainland farmers. In 1992 *dura* and sesame production on rainlands had almost ceased with less than 2% of farmers interviewed claiming to be more than small growers for household needs. A year with good rains, such as in 1985, did lead to some attempt at catch cropping of *dura*, but *dukhn* now reigns supreme on the rainlands.

In 1980 there was good qualitative evidence to suggest that falling crop yields were being compensated for by an expansion of the area under cultivation. Figures from northern Kordofan (to the West of the White Nile area) supported this conclusion (Trilsbach 1986). By 1992 the reverse process seems to have taken over. Poor yields have now led to shortages of seed and a feeling that it was not worth trying to cultivate more than a limited area with the resulting decline in areas under rainland production. Some 20% of active farmers reported use of this strategy. This is a similar result to that reported by Ibrahim and Ibrahim (1995) in Tanzania.

In 1980, about the White Nile it was written, "Livestock of various types form an integral traditional part of the lives of all White Nile farmer's" (Trilsbach 1986). In theory this may still be true in 1992, but the reality is different. Qualitative evidence suggests a decline in livestock numbers by as much as 50% since 1980. In 1992 more than 60% of farmers no longer kept any animals with figures of over 75% recorded in some parts of the rainlands, where livestock in particular had formerly been an important part of social and economic life.

In 1980 a survey of some of the area's 70 cheese factories was undertaken (El-Tayeb 1986). The large numbers of animals at that time was in part attributed to the demand for cheese

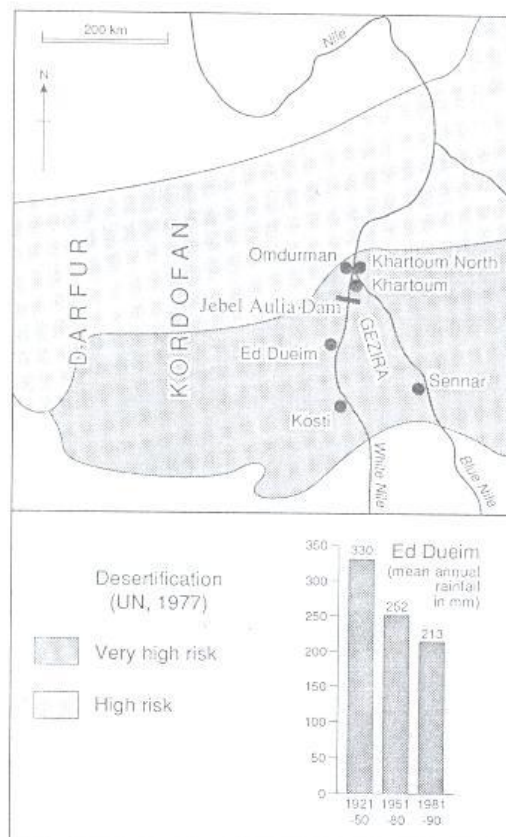


Fig. 1. White Nile.

from the Khartoum Capital Region. Between 1976 and 1981 the number of livestock units in the White Nile was estimated to have increased by 35% (Davies 1991a). There was also evidence that some semi-nomads were beginning to have poorer nutrition due to the attractive prices for milk from cheese factories (El-Tayeb 1986). In 1992 there were no cheese factories operating; all milk being used almost entirely for family nutrition.

In 1992 only about one-third of the farmers on the rainlands were growing any crops at all; they were depending upon other sources of income. Such was not the case in 1980. In 1992 there were distinct signs of food shortages, which had not been there in 1980.

The Causes of Change

At first sight it seems obvious that all these changes are the result of a decline in rainfall. Fig 1 shows that the

average annual rainfall at Ed Dueim in the 1980s was 15% lower than 1951-80 and 35% lower than for 1921-50. Such would appear to account for the move away from *durra* and sesame towards the drought resisting *dukhin* on rainlands, for the abandonment of farming, reduction in livestock numbers and the demise of cheese production. There was also good evidence for a continuing decline in biomass which had already been noted in 1980 (Alam & Din 1986).

There is, however, another side to this. A series of socio-economic changes have occurred within the region. First of all, there has been a redistribution of population in the Sudan. Between 1955 and 1983 the population of the country had increased by 100% whereas in the White Nile area the increase was 120%. This rapid rate of increase has continued since at over 3% per annum. Between 1955 and 1990 the population of the Khartoum Capital Region had increased from half a million in 1955 to 1.7 million in 1980 and to 3.6 million in 1990 (Davies 1991b), which, in turn, brought new demands upon the White Nile area. The movement towards the White Nile was mainly accounted for by migrants from the more westerly areas of Kordofan and Darfur, escaping from drought and rural malaise in those regions. These folk have simply piled up on the west bank of the White Nile attracted by possibilities of work on the greatly expanded areas under irrigation; pump schemes literally line the west bank of this river (Fig 2).

To accommodate the rising population in the White Nile and to enable rainland potentials to be more fully utilised, the 1960s and 1970s saw a rapid increase in the availability of rural water supply points. Mohammed (1986) has demonstrated very clearly some of the adverse effects of such a policy in neighbouring north Kordofan where considerable evidence of land degradation has been observed through heavy grazing and increased cultivation at intensities possible perhaps under higher rainfall levels, but now out of key with the contemporary situation. Such developments have broken the natural connection between water supply and biomass. It is significant that nomadic herdsmen in the White Nile in 1992 stated the shortage of grazing was now their problem whereas in the past water was their limitation.

The expansion of irrigation along the White Nile through heavy government and private investment has created an important alternative source of income through labouring on such schemes. The one-third of rainland farmers who no longer carried out cultivation in their home areas relied heavily on the new work opportunities created along the river.

Furthermore, the expansion of irrigation along the river and the irrigation farmers' antipathy towards nomad owned animals grazing on their crops has brought about a re-orientation of nomadic grazing patterns. Most no longer spend the dry season grazing along the White Nile but now practice a southerly movement during the dry season. Their increased presence in these areas is not well appreciated by local farmers. New opportunities of employment, decreased areas for dry season grazing, and years of poorer

rainfall and government neglect of the rainlands, apart from the sinking of bore holes with their ambivalent effects upon nomadic grazing, can be seen as the causes of declining livestock numbers and a collapse in the local cheese production industry.

The movement away from *dura* and sesame production on the clay plains is not merely a response to declining rainfall. *Dura* production on White Nile irrigation schemes produces higher and more secure yields for a given investment of time, money and energy than on the rainlands. Furthermore, the government has encouraged the expansion of mechanised *dura* production. In 1961 the area under mechanised agriculture in the Sudan was about 1 million feddans (1 feddan = 1.038 acres = 0.42 hectares). Since the mid 1980s it has on occasion topped 9 million feddans. By comparison the area under traditional agriculture in the Sudan peaked at about 10.5 million feddans in 1977. Since when it has been generally in decline. For the first time in 1985 the area under mechanised agriculture exceeded that under traditional agriculture. In 1989, 84% of the mechanised sector's cropped area was under *dura* and 10% under sesame (Davies 1991a). Sudan is now an exporter of both. It is no longer profitable to produce these crops, except perhaps for domestic consumption, on the White Nile rainlands.

There are also other factors working against agricultural production on the rainlands. Alternative sources of work elsewhere have led to migration from the area. In 1992 farmers on the rainlands were older than those on irrigated lands. In some irrigated areas more than 60% of farmers were under 35, whereas on parts of the rainlands the figure for this age group was only 15%. On some parts of the rainlands farming was being carried on mainly by the older men, women and children left behind while male family members worked elsewhere, thus limiting the potential for agriculture. On average just over two persons per family were working away from home and outside the White Nile area. 95% of these were working in the Capital Region or in the Gezira, and a further 3% were working in Saudi Arabia.

The Khartoum Capital Region offers apparently attractive possibilities for non-agricultural employment to White Nile farmers. How these attractions can work for traditional agricultural workers has been demonstrated clearly by Briggs (Briggs 1986), and found still to pertain in 1990 (Davies 1991c). Briggs examined farmers' choice of crops on the Gummuiya irrigation scheme situated on the west bank of the White Nile north of Jebel Aulia. This 10,000 feddan scheme was intended to produce fruit, vegetables and some milk for the capital but had become, instead, a large irrigated *dura* and berseem field. Such modest use enabled farmers to produce food for themselves and fodder for their animals with any surplus marketed in the capital. Such crops once planted required little attention and allowed farmers to be available for work in the nearby urban area. On a much smaller scale, the same phenomenon can be found operating around Ed Dueim. This town has developed an increasing role as an

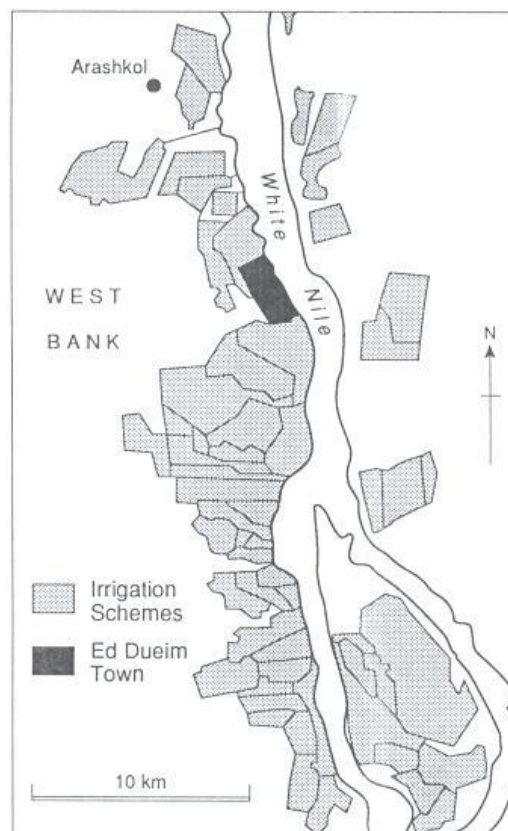


Fig. 2 Irrigation schemes of the White Nile (after Alredaisi 1993)

administrative, marketing and distributive centre during the 1980s, 17% of migrants from local rainlands interviewed in Ed Dueim gave "looking for work" as their main reason for migration and a further 68% gave "looking for work because of food shortages in their home area" as the reason.

The impact of the Capital Region has been enhanced by the improved access provided by the new tarred road from Kosti to Khartoum along the eastern bank of the White Nile, by Radio Omdurman, returning migrants and itinerant traders. All these have introduced new urban based ideas into the region. In times of food shortage it is from the Capital Region that relief supplies are distributed. Wheat bread is very popular in the Capital Region and in other urban areas of the Sudan, and relief supplies have often been of wheat flour. Accordingly, the Government has led a campaign for the expansion of wheat production on irrigated land in winter. Some of it is grown along the White Nile. Wheat cannot be grown on the rainlands. Such factors have led to subtle changes in food consumption

patterns with movement away from the less convenient *dura*.

The movement of peoples eastwards from western Sudan and West Africa has been a noted phenomenon since early in the 20th century. In the past it was connected with the pilgrimage to Mecca (*Haj*) with many West Africans attracted to the largely unoccupied rainlands of eastern Sudan. Many never completed the *Haj* or, if they did, preferred to remain in Sudan rather than return home. In more recent times work opportunities in the eastern Sudan, for western Sudanese, including folk from the White Nile, have come from the large irrigation schemes of Gezira with Manaqil Extension (c 2 million feddans), Rahad (c 300,000 feddans) and New Halfa (c 400,000 feddans). Opportunities have been enhanced in the Gezira by the emergence of what Arifi (1975) calls "landlordism" whereby tenancies in the Scheme are worked by hired labour whilst the real tenant works elsewhere, often in town or in the capital. This process has been brought about by the generally better educational provision in the Gezira, and a consequent aversion to hard work in the sun for small reward, when better opportunities can be found.

Conclusion

The West bank of the White Nile emerges as marginal to the main economic core of the Sudan which may be described as the Capital Region together with the triangle of land between the White and Blue Niles north of the Sennar/Kosti railway. The White Nile area has received some benefits through investment in irrigation and infrastructure making it attractive to people from western Sudan. On the other hand the region as a whole has suffered from its proximity to, rather than being an actual part of, the "economic core" of Sudan through migration of some of its more active and better educated citizens with their replacement by less qualified folk from further west.

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- Such increases in population as the area has received have co-incided with a period of decreased rainfall and have led to a decline in the total biomass in the area as evidenced by the decline in livestock numbers.
- Developments elsewhere in the Sudan have co-incided too with decreased rainfall and have led to the decline in *dura* and sesame production on the rainlands and a concentration of agricultural activity on lands under irrigation from the White Nile.
- The region is no longer as independent as it was. It is more tightly tied to development in the country as a whole with an increasing dependency for survival on food imports from other parts of the country and from food aid.
- Whilst the White Nile region as a whole can be described as peripheral to the Sudan's "economic core", the rainlands have become peripheral to the irrigated areas and ever more dependent upon them.
- Whether the area has suffered desertification in the sense of permanent land degradation remains to be proved. If rainfall was to return to 1921-50 levels then perhaps the period of restricted cultivation may have acted as a kind of fallowing. To prove this would probably require a lack of use for agricultural and stock purposes for 10 to 15 years, if recent work on semi-arid lands in northern Nigeria is applicable to Sudan (Abubakar 1995). Increased demands from the Capital Region for food and firewood would probably prevent the "experiment" being completed. A return to the situation in the 1970s is not going to take place. The challenge now is to devise a policy for management of the White Nile area under contemporary circumstances so that the sustainable potential of both irrigated areas and rainlands can be used to best advantage for all. This should not be impossible if the political will is there.

Disclaimer

The material assistance of Dr. Samir Alredaisy is gratefully acknowledged but the views expressed in this paper are those of H. R. J. Davies alone.

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