SETTLED PASTORALISM is often regarded as an economic activity that contributes to the destruction of the vegetation cover, and consequently to the degradation of soils. Although this may be true in many cases, there are some pastoral peoples who take great care to preserve the vegetation cover and soils of their region: the case of Al-Shaykh al-Siddiq region, and in particular the village of that name, is a good example to illustrate this point. The tree cover in Al-Shaykh al-Siddiq is good, for a semi-arid region, and there is almost no sign of soil degradation. This is due primarily to a human factor—a high regard for the dominant tree, Acacia senegal (loc. com.); tree felling is prohibited by tradition as well as by law.

The present paper examines the physical resources of the area, the culture and economy of the people of Al-Shaykh al-Siddiq, and the dominant forest vegetation, and concludes with a general discussion which contains recommendations for further developing the forest resources of the region and the possibility of making use of the experience of the village in other parts of the Sudan.
The region is quite marginal in its physical resources. The soils are shallow or sandy and the annual rainfall is scanty, while other sources of water present problems.

Geology and soils: The area from Jabal Alwiyah southwards as far as Chahar is underlain by the Nubian Sandstone Series. In many places this formation 'breaks up on the surface, or example, in the areas just south of Jabal Alwiyah near the white Miqin and in a number of residual hills. Elsewhere the Nubian Sandstone is covered by a mixture of superficial deposits. Fine sands cover large areas and stretch westwards until the true gabb (sand dunes and sand sheets) is met at about 25-35 kilometres. The fine sand is mixed with silt, clay, gravel and coarse sand in different proportions depending on depth. As a general rule, the percentage of fine sand is highest in the top 10 cm, where it amounts to about 80%, and decreases to about 45% at a depth of 100 cm, while the percentage of coarse sand, gravel and clay increase with depth. The percentage of coarse sand is 1-4 in the top 10 cm and 47.6 at a depth of 121 cm, while that of clay is 1.0 and 31.0 at depths of 10 and 120 cm respectively. There are, however, some pockets where the percentage of clay and silt is much higher near the top, mainly in some depressions and the beds of some watercourses, although some slightly elevated areas are also covered by a greater proportion of clay and silt. Where the Nubian Sandstone outcrops, the soil is either thin or totally lacking. As a general rule, the soil is not fertile, although it is easy to cultivate and produces reasonably good yields of dhura (Triticeae vulgare) and date palms (Phoenix dactylifera). If water is available and the soil is not exhausted by continuous cropping, the clayey-silty soils found in the small pockets are extraordinarily fertile and are easy to work if water is available.

Water resources: These are principally direct rainfall, the White Nile, intermittent watercourse and shallow wells.

Rainfall is seasonal 200 cm, which is not evenly distributed throughout the year. The total rainfall is subject to wide fluctuations from one year to another: in 1950 the rainfall was 417 cm, while in other years it was as low as 33 cm. In addition to this, the period of rainfall is erratic: although July and August generally receive the highest totals, rain may start as early as April and continue into September. Natural vegetation, except on either side which are inundated during the rainy season, is less than that of the remaining river, but it poses problems too. It is on both sides and is inundated when the river subsides with the opening of the Jabal Alwiyah. The settlements and the edge of the water become part of the river bank in the region of al-Sheikh al-Siddiq.
is high above the water level and so the lifting of water for irrigation is a problem.

A number of intermittent watercourses are found in the region: Idh al-Din, Idh al-Dahr, Idh al-Sayyid, Idh Walid. These watercourses are not reliable, but otherwise they are important to the people because they replenish the water table, and thus it is possible to obtain water throughout the year from wells dug in or near their beds.

Wells are the main source of domestic water for most of the year. The Nubian Sandstone is a good water-bearing formation, and the water table is usually recharged by water from direct rainfall, the White Nile and the intermittent watercourses. The depth of the wells varies from 60 to 80 feet (18 to 24 m).

Water supply is by far the most decisive factor in the economic activities of the Shaykh al-Siddiq region.

Vegetation: The natural hydrology, soils and the vegetation of the Shaykh al-Siddiq region vary according to the rainfall pattern. The general impression of the region is that the grasses and trees are ephemerals, reflecting the low and seasonal rainfall. The grasses and trees are closely linked with the natural pattern. The general impression of the region is that the grasses and trees are closely linked with the natural pattern. The general impression of the region is that the grasses and trees are closely linked with the natural pattern. The general impression of the region is that the grasses and trees are closely linked with the natural pattern.

The grasses in the region are the main species of Acacia tortilis (Ar. kusa), and A. mellifera and A. oryza (Ar. kite and la'ale), respectively. These are hardy species needing little water and able to withstand prolonged droughts.

Acacia tortilis is the extremely drought-resistant species of the region. It is found in the region, and there is almost no soil, is rather xerotic and at variance with the soil type. It is found in the region, and there is almost no soil, is rather xerotic and at variance with the soil type.
Table 1: Density of Turtles in Five Patches on Fine Sand and Nubian Sandstone Areas in al-Shaghl al-Sulayman Village

<table>
<thead>
<tr>
<th>Type of Area</th>
<th>Area (m²)</th>
<th>Young</th>
<th>Medium</th>
<th>Mature</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Nubian Sandstone</td>
<td>200</td>
<td>16</td>
<td>9</td>
<td>17</td>
<td>42</td>
</tr>
<tr>
<td>2 Nubian Sandstone</td>
<td>1000</td>
<td>17</td>
<td>12</td>
<td>17</td>
<td>46</td>
</tr>
<tr>
<td>3 Nubian Sandstone</td>
<td>75</td>
<td>5</td>
<td>12</td>
<td>41</td>
<td>68</td>
</tr>
<tr>
<td>4 Sand</td>
<td>700</td>
<td>11</td>
<td>8</td>
<td>21</td>
<td>40</td>
</tr>
<tr>
<td>6 Sand</td>
<td>300</td>
<td>23</td>
<td>6</td>
<td>7</td>
<td>36</td>
</tr>
</tbody>
</table>

A. Washkon covers small areas mainly where more water is available, as on the banks of some watercourses. La’it and Abi’ are found in restricted pockets in the clayey and silty beds of some watercourses, especially in Jid’ and Abi Allah and Al’ Aff. Here the density of the bushes is quite high, but no calculations were carried out. It was mentioned by some of the villagers that those clay areas had been cultivated until recently, but less land is now cultivated because of out-migration by many young people as well as because the population has become more interested in rearing livestock than in crop production. This had enhanced colonisation by these...
II. Population: Culture or Economic Activities

The main tribe in al-Shaykh al-Qidr region is the Husaynani, which together with the Kasabliya occupy the White Nile region from Bulleyn to north of the Atb Aba Olayes. The three tribes in the Sudan as the Kasabliya Arab Group, which are semi-nomadic in nature, and cultivate on seasonal migration. A landmark in the history of the region was the construction of the White Nile flood period, which lasted from July to April instead of from July to October. This had two effects: the loss of the White Nile plains, where they used to graze their livestock, and the establishment of the Kasabliya Scheme. It is here that many of the Husaynani settled, practicing agriculture based on the production of long-staple cotton. The establishment of this scheme created opportunities for the local people. Furthermore, the scheme gave rise to the concept of settlement. The village of al-Shaykh al-Qidr was originally a camp site. It started to develop into a village under the leadership of a religious leader. Gradually more people settled there, and the village has about 2000 inhabitants.

In general, it can be said that the vegetation of al-Shaykh al-Qidr is a climax vegetation.

Shaykh al-Qidr region is the Husaynani, which are semi-nomadic herders and cultivate on seasonal migration with the Kasabliya. A landmark in the history of the region was the construction of the White Nile flood period, which lasted from July to April instead of from July to October. This had two effects: the loss of the White Nile plains, where they used to graze their livestock, and the establishment of the Kasabliya Scheme. It is here that many of the Husaynani settled, practicing agriculture based on the production of long-staple cotton. The establishment of this scheme created opportunities for the local people. Furthermore, the scheme gave rise to the concept of settlement. The village of al-Shaykh al-Qidr was originally a camp site. It started to develop into a village under the leadership of a religious leader. Gradually more people settled there, and the village has about 2000 inhabitants.

In general, it can be said that the vegetation of al-Shaykh al-Qidr is a climax vegetation.
...the present economic main occupations, which are animal husbandry and in the whole region, depend which the people themselves practice both. However, different as the economic in addition to animal husbandry from other work, such as transport and a market, the having any such official or village, 29 (37.31) declare other than cultivation and respectively gave these as the number of those who combined cultivation or trading, was bureaucratic apparatus of the state, prefer to examine animal husbandry since cultivation is subject to a number of natural and man-made hazards.

Cultivation and animal husbandry in a number of widely separate pieces is practised on the qas, in and in the Abu Qara irrigation male members of households westwards to Qas Abu Bulq. FAU, members also cultivate the nearby 'Id Fakel, 'Abd Allal, and Aln Ham's villages, and more agricultural land is grown. All these crops are harvested in January. Cultivation on the White Nile Flats starts in April, when the flooding season begins and the river subsides; vegetables are grown here. Five of the 35 family members interviewed in Abu Qara, where cotton, wheat and groundnuts were cultivated.

In addition to their own cultivation, some of those interviewed went to as agricultural labourers, which is possible because cultivation on the site when cotton pickers are the season. Those who raise animals in many ecological zones, some of which are also zones of cultivation. Those who possess only a few animals in the year, those which were at the Irrigation Schemes, the major or subsidiary occupation graze their livestock. The livestock used the A. forest during the dry season, and may go as far as the Indian Ocean. As the gafat pasture dries up in October, the livestock are taken to the watercourses, which produce edible pods at this time.
The animals that are reared are mainly goats, sheep and some cattle. It is difficult to estimate the number of animals the people are very reluctant to declare the number their family possesses. However, Table 2 gives the number of animals which those who were interviewed stated that they possessed.

<table>
<thead>
<tr>
<th>Animals</th>
<th>Household No.</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>187</td>
<td>2.5</td>
</tr>
<tr>
<td>Sheep</td>
<td>613</td>
<td>5.0</td>
</tr>
<tr>
<td>Goats</td>
<td>756</td>
<td>10.5</td>
</tr>
</tbody>
</table>

On the basis of Table 2, whose figures are thought to be grossly understated, the total number of animals possessed by the people of al-Shaykh al-Siddiq region may be approximately as follows:

- Cattle: 6,750
- Sheep: 32,000
- Goats: 41,400

The calculation of these figures is based on the assumption that 75% of the families in the region are engaged in animal husbandry as a main or subsidiary occupation. The number of families is calculated on the assumption that the average family size is five persons, and therefore the population of 20,000 consists of some 4,000 families. Seventy-five per cent of this figure is considered as very rough, for neither the number of families nor the number of animals possessed by each family is known even approximately.

However, it should be borne in mind that al-Shaykh al-Siddiq region is an area where a large number of the Kababish of Darfur visit the region, and they do not have the custom of denying their animals the benefit of the acacia pods on the pasture of the White Nile flats. Nevertheless, relations between the tribes of northern Kordofan and the people of the al-Siddiq region are cordial since a large part of the soda lake is in Kordofan.

Traditionally, animal milk was the mainstay of the people and was a source of wealth. In the past two or three decades the value of milk has increased, and in addition to the milk used by the family it is now processed.
ANTI-DESERIFICATION TRADITIONS IN A SETTLED COMMUNITY

into white cheese, which finds a ready market in the urban centres of the central Sudan. There are three cheese-making plants in the village, one of which is owned by a co-operative society and produces between 15 and 35 10-kilogram tins of cheese a day, depending on the season. Near, especially during the dry season, also finds a ready market in the urban centres of the Sudan and is exported to Saudi Arabia. In the last ten years or so the price of rationed meat has increased almost tenfold. So more and more people have become interested in raising animals, and this has led to developing the commercial mentality of the people. Every lot of oilseed cake and fodder (abu ala’ al-‘abab) are brought from distant areas to feed the animals, especially during the dry period. It seems that this trend will continue to increase with the increase in demand for cheese and meat.

III Domestic Fuel

The source of domestic fuel in the rural areas of the Sudan is wood, which is used either directly as firewood or processed into charcoal. It has been observed that the increased demand for wood as fuel and as a building material has led to the increased demand for firewood and charcoal. The people of al-Shaykh al-Siddiq region use wood and charcoal for fuel, and sometimes also for building, but this is only for making doors (thin sheets of unpeeled bark made from bamboo). Because of their own traditions, they are more inclined to use the wood in the area where their needs are satisfied with the use of wood. People in the northeast use wood from Dar Rababish in northern Kordofan Province and from the area on the coast of the White Nile. It is difficult to estimate how much wood or charcoal each family uses per year, but calculations based on the interviews given by those who were interviewed show that on average a family uses about 24 donkey-loads of wood and charcoal equivalent to wood per month, each load being estimated to weigh about 37 kg. Thus, the total consumption of the village of al-Shaykh al-Siddiq would be about 102,000 kg a year, and the whole region would consume about 1,020,000 kg. If this need were to be satisfied from local sources, then the forests of the region would be rapidly depleted, as it is very difficult to regenerate. The abundance of wood used.

IV Dissemination and Recommendations

Deforestation and its consequences—soil degradation and desertification—are among the main environmental problems of the Sudan and of the world. Much work has been done in recent years on the expansion of irrigated and rain-fed cultivation, overgrazing, and the cutting of wood for domestic
energy and construction has been facilitated by
'sunay, as in many other situations, there is little
the regeneration of the

In some areas, the need for conserva-
tion and the development of economic value. Examples of such groups are the

The traditional cultivators of the dry
particular interest in the kusa (Anacardium occi-
tidal and pastoralists of the 'alifl

The village of Khoroush in the al-Shaykh al-Sajdiq

It can be seen there that the practice of preserving the tree cover

The village of Khoroush in the al-Shaykh al-Sajdiq

The area is rich in forest and wildlife, with

The cultivation of trees for

The people of the

al-Shaykh al-Sajdiq contribute to the deserti-

The qaf is used for the cultivation of an
ness in the area, which has a high price for

They may also sell the

This happens, then the forest of al-Shaykh

al-Sajdiq will not last long.
The questions that should be posed, therefore, are:
(a) how to maintain the pace and the traditions of conserving the trees;
(b) how to stop the people of the region from exporting deforestation and
its harmful consequence to other areas;
(c) whether or not it would be possible to make use of the experience of
al-Shaykh al-Middi region in other areas of the Sudan that suffer from
deforestation.

The answers to the first two questions are closely related and may be treated
together. Two suggestions are put forward here in this connection: first,
that more specialization in livestock-raising should be encouraged to the
exclusion of rain-fed cultivation in the whole region, including the oasis,
and second, that a programme of afforestation should be carried out in the
areas that have lost their tree cover.

The tendency to specialize in raising animals already exists in the
region. What is needed is to develop it further so that it becomes the
predominant economic activity and so that there is a return from it enable the
people to buy the clothes and goods that they need. The region has a number of
advantages in this respect, in addition to the existing knowledge of animal
husbandry, the people have acquired the skills of cheese-making. Further-
more, the region is near the urban market of Greater Khartoum, with over
1½ million consumers; it is here that animal products fetch high prices,
and it is also from here that the lucrative export trade in livestock
starts. In addition to this, al-Shaykh al-Middi is near sources of fodder
and other animal feeds; alfalfa is widely grown in Khartoum and al-Ruwai
regions. Finally, the existing oil factories in Greater Khartoum produce
large amounts of oil cake, groundnut shells and other substances that are
used for feeding animals. Hence the people of al-Shaykh al-Middi already
have these substances to supplement the animals' natural food.

Building on these existing advantages, two measures are suggested to
promote specialization in animal raising:
(a) to make supplementary feed easily and cheaply available by taking a
number of steps, two of which are to all and encourage farmers in al-
Middi region to grow fodder crops instead of cotton, and to improve
the road between al-Middi and Khartoum so that fodder and other foods
can flow more easily to al-Shaykh al-Middi region;
(b) to improve the veterinary services and animal stocks so as to obtain
better yields of milk and meat. At present, goats and cattle are raised
for milk while sheep are raised for meat, but the milk animals are not
the best types to give large quantities of milk; it is the native breed
of goats and the Kushein breed of cattle that are raised in the region,
while the Sudan breed of cattle, which are good milkers and have already
proved themselves, similar regions of the country, are not raised here.
The people may, in the long run and by trial and error, improve their
stock, but as a general rule, those who live on the verge of poverty
rarely take the risk of experimenting. It is important, therefore, that
One planners plan so make available appropriate scientific knowledge to the people of al-Shaykh al-Sjiddin.

In connection with this second main suggestion, to initiate a programme of reforestation, it may be noted that the areas that have good tree cover in the region are limited to the villages of al-Shaykh al-Sjiddin and 20% of the watercourses. The total area of the forested parts may not exceed 10% of the remaining area of the village. The absence of tree cover from the area, either by the slight elevation of the land or by its being a no-man's land in relation to its surroundings and along a section of the watercourses. The total area of the forested parts may not exceed 10% of the remaining area of the village. However, it is important to create in both high and low areas similar to those of al-Shaykh al-Sjiddin. The local courts must be established to control the cutting of trees. On several occasions local villagers expressed their willingness to co-operate in a programme of reforestation as a danger, however, usually remained for sale.

The programme of reforestation should be well planned and include a number of different aspects. The establishment of a tree nursery is one of the first measures to be taken, the traditional function of a nursery being the propagation of seeds and seedlings. The area that has proved itself in the region is Amanuel, but since this is a slow-growing tree may be a good idea to experiment with other species as well. Mosqueto (Aedes albopictus) is a possibility: it needs little water, possesses edible seeds, grows quickly, withstands heavy browsing and yields valuable firewood. It provides little shade (Kogali and Johnson 1982). There may be other useful species, and the possibility of trying them must be explored. The importance of forestation and crop production, since this is what makes people, in this as in other regions, interested in the preservation of the tree cover.

If the suggested reforestation programme succeeds, it will both increase the amount of feed for animals, allowing more specialization in animal raising, and create sources for firewood and charcoal. This, together with the reduction of cultivation on the fens (for the people would do entirely on animal husbandry), would mean that the people of al-Shaykh al-Sjiddin would stop exporting deforestation and soil degradation to other regions.

It was noted above that the people of al-Shaykh al-Sjiddin are not unique among the Sudanese in having traditions of tree preservation. However, it is observed that deforestation is the rule rather than the exception in the Sudan, which demonstrates that traditions similar to those of al-Shaykh
ANTI-DESECRSIFICATION: ON TRADITIONS IN A SETTLED COMMUNITY

In November 1983, the writer visited the village of Zarka in northeastern Kordofan. It used to have a good forest composed of Acacia tortilis and A. raddiana, but owing to overcultivation in a marginal area and the cutting of wood for energy and construction, the forest deteriorated and was replaced by a desertified landscape. On learning that the writer was interested in investigating aspects of desertification, Mouhamed al-Ma'add, the sheikh of Zarka, became enthusiastic and promised that if he was given technical aid (seedlings and knowhow), he and his people would devote land, time and energy to planting the seedlings and leading to its establishment. A similar promise was made to the MO of As-Samantar and M. Sulaym from Suleyman (now in the National Administration for Energy) the villages of Sharabok (north of Kordofan) and other areas (south of Kordofan) expressed similar enthusiasm. Information supplied by Mouhamed al-Ma'add.

Despite the small area of cultivable land, farmers in some of the peripheral areas of Kordofan Province accepted the offer of the Sudan Council of Churches to establish shelter belts to help reduce encroachment upon the cultivated land. At first, the farmers hesitated, but on seeing the results they became strong supporters of the program (information from Kemal Udeifah, assistant in the Northern Province). Information from Professor Hassan Awad).

In planning programs for stabilizing village forests, two points should be given careful consideration:

(a) The program should be aimed at present and especially at creating a source of firewood and to serve cultivars or pastoralists. Depending on the prevailing economic activities, we have strong agro-silvicultural components. Kordofan's cultivars, A. raddiana and A. tortilis and should be serving these needs in areas where they grow.

(b) The local population should be fully involved and participate in any project so that they feel that the forest belongs to them; the first step is to strengthen their awareness of the need for a forest.
and the second is to create leadership that will mobilize the people to do the work of reforesting the land and planting and maintaining the forest; the people themselves should also make regulations for the use and conservation of the forest, and the local courts should be in a position to enforce these the same way as in al-Shaykh al-Shiddiqi's village; the role of the planners should be confined to giving technical help and advice.

Conclusion

Many species of acacia, but mainly A. tortilis, A. ehli, and E. dura, have proved their value in desert conditions. Settled past these trees. The people of al-Shaykh al-Shiddiqi have already established tree cover in their region, which can be improved by pastoral people and are suited to semi-desert conditions. People from other pastures can take advantage of these trees for their sustenance and agriculture. The suggestion here is to encourage the people to increase their specialization in cattle husbandry to the whole region, so that the trees will be preserved. This problem requires the introduction of a program for tree cultivation on a whole. This program will improve the livelihood of animal breeders. In this process, people can participate fully in all aspects of the program. This limits the role of the planners to advising on the technical aspects.

Notes

1 The village is named 'Sheikh Bagi' on the topographical maps of the Sudan, but 'al-Shiddiqi' is used here because that is how the people refer to their village.

2 Information supplied by the Institute of Forestry, Soma.

3 There are three main Arab groups in the Sudan: (a) the Ja'aliyin, who are found mainly in Shendi region but also in Danafas and in Northern Sudan; (b) the Jubbulpars, who are scattered over large areas but especially in the western Sudan, the Baggara tribe constituting the bulk of the group; and (c) the Kassab group.

4 This is a type of dhura used as fodder rather than for the production of grain. It is usually produced under irrigation.
Cultivators felt it was necessary to protect the land for cultivation, and some of them remove the trees as soon as to get rid of the birds that live on the grain, before it is harvested or on the seeds at the beginning of the growing season. When the Giiru Scheme was established, an active movement for tree-felling developed, with the result that present the scenery is markedly barren.

Cotton is perceived by the farmers as an un rewarding crop; it needs substantial inputs in terms of labour, pesticides and fertilizers, while the rewards are usually low because prices are low. They grow cotton because they would otherwise be denied water for other crops.

This is a programme started in 1970 with financial support from a number of international donors to re-establish Acacia senegal in the areas which were previously covered by the species.

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THE CONTROVERSY OVER LAND-WATER CHARGES AND DECENTRALIZATION IN THE GIZIRA SCHEME

by

EL FATHI SHAABEEDIN

I Introduction

There has been an ongoing academic and political debate over the future of the Giza Scheme. The El Nilo system versus the sharecropping system on the one hand, and the issue of decentralization on the other. The MFO Report (1966), which came out strongly in favor of the decentralization of decision making in the Scheme. Others, such as AlJoh and Abdel-Malek (1979), have focused on the effects of the El Nilo System and have criticized the sharecropping arrangement. The main purpose of this paper is to bring into sharper focus the controversy over the role of the El Nilo system versus the sharecropping arrangement by examining the issues and implications for the future of the Scheme. The paper also focuses on the development of the Scheme (Section 2), the future of the Scheme (Section 3), the delivery and irrigation in the Giza Region (Section 4), and the new arrangement of the Giza Scheme (Section 5). The paper demonstrates the feasibility of a decentralized decision-making type of organization involving cooperatives in a dialogue form of interaction with a central planning unit.

2 The Development of the Scheme

Perhaps we should not be so surprised at the development of the Scheme, as it is the result of a historical process. The Scheme was established to serve the interests of the Egyptian government, to achieve its objectives, and to satisfy the needs of the people. However, it is worth noting the need to trace the evolution of the Scheme to understand the present situation. Through this process, we can identify the factors that have contributed to the development of the Scheme, and the factors that have hindered its development. Moreover, the association of the Scheme with the development of the country should be highlighted.

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