



Community natural resource management & farm forestry

Twenty-five years of experience in Kordofan and Darfur



(Cover photo credit: Sanjak el Amin Mohamed)



TABLE OF CONTENTS

1. INTRODUCTION	4
2.1. Introduction	8
2.2. Support of El Ain forest reserve	9
2.3. Establishment of community forests	11
2.4. Support for sustainable forest management	16
2.5. A broad package of support	23
2.6. The interests and the roles of women	24
2.7. Involvement of pastoralists in natural resource governance	26
3. FARM FORESTRY IN JEBEL MARRA	32
3.1. Introduction	32
3.2. Expansion of farm forestry in the 1990s	33
3.3. Sustainability under pressure during the Darfur crisis	36
3.4. Economics of farm forestry	37
3.5. Women as farm foresters	40
4. CONCLUSIONS AND RECOMMENDATIONS	41
4.1. El Ain community forest management	41
4.2. Jebel Marra farm forestry	49
5. REFERENCES	50

ACRONYMS

CF	community forest
FAO	Food and Agriculture Organization of the United Nations
FNC	Forest National Corporation
IDP	internally displaced person
IFAD	International Fund for Agricultural Development
JMRDP	Jebel Marra Rural Development Project
LPG	liquefied petroleum gas
NFMP	Natural Forest Management Project
REDD+	reduced emissions from forest degradation and deforestation and reforestation
SDG	Sudanese pound
SFM	sustainable forest management
UNEP	United Nations Environment Programme

The Authors:

Dr. El Amin Sanjak Mohamed, Dr. Sawsan Khair Elsied Abdel Rahim, Dr. Abuelgasim A. Adam, Dr. Mohamed Adam Khamis, Dr. Faiza Siddig Mohamed Ahmed and Paul Kerkhof.

El Ain Natural Forest Management Project, Staff:

Rashid, Abdelaziz, Abdeen Mohamed, Faiza Siddig Mohamed Ahmad, Sulieman Harun, Kaltu Ahmed, Fawzia Aldai, Lango Mangum, Bashir Mohamed, Gasim Abdelaziz, Hanan Mohamed, and Ahmed Elmustafa.

1. INTRODUCTION

The country of Sudan is a part of the Sahelian belt, which stretches from the Red Sea on the east to the Atlantic Ocean on the west. Due to its vicinity to the Sahara, Sudan experiences irregular rainfall and occasional periods of severe drought. While Sudan has been subject to these environmental conditions from time immemorial, the socio-economic conditions of the country have greatly changed over the last 50 years.

Sudan has experienced a dramatic increase in human population, with six- to eightfold growth since the 1950s in some regions. Urbanisation has significantly impacted—both positively and negatively—the people, the economy and the environment of Sudan. One of the negative changes, observed in the 1980s, was deforestation and land degradation, particularly in the vicinity of urban areas. In response, a major project—the FAO/Rawashda Fuelwood Project, whose aim was to develop productive and sustainable forest management strategies and practices—was implemented in the 1980s in Rawashda forest reserve, located in Gedaref State. At that time, fuelwood production was seen as the key issue in sustainable environmental management throughout Africa.

The Rawashda project involved a great deal of technical research to develop a forest management plan, and it strongly influenced forest reserve management approaches in Sudan at the time. Yet, by the end of the project in 1987, many observers found the plan far too complex for local communities to take on and maintain.

A key lesson learned from the Rawashda project is the importance of involving local communities throughout the design, implementation and duration of such projects. Local communities affected by the project felt they were only involved at the last moment, in an attempt to secure their participation, so that they would not obstruct forest management efforts. The project offered limited rights to local people at the end of the project, and it became clear that this was not very successful. One reason the project was not locally accepted is that the communities felt that the reserved forest was theirs and that it was taken from them when the forest reserve was gazetted.

The Rawashda project was a source of inspiration for the Natural Forest Management Project (NFMP) in El Ain, North Kordofan. The Forest National Corporation (FNC) and SOS Sahel UK implemented NFMP in 1989, by the time the Rawashda project was phased out. NFMP learned from weaknesses identified in the Rawashda approach. NFMP took into account, from the project's outset, the people and natural resources

in the 'buffer zone' around the El Ain gazetted forest. Although productive and sustainable management of the gazetted forest was the essential objective in the first phase, management of 'village forests' (also known as 'community forests', CFs) in the buffer zone was another early objective.

Three years later, in 1992, the NFMP concentrated on the community forests in the buffer zone. The results were the gazettelement of community forests and sustainable management by the communities, as defined in the 1986 Forests Act. By the time the project ended in 2001, the NFMP registered 14 community forests in El Ain; it had also diversified its approach and supported other aspects of natural resource management, such as livestock corridors, water points and conflict management between farmers and pastoralists.

Since 2001, many researchers have visited the communities supported by NFMP, and numerous reports have been written, although none have been widely published. Ministers and many other officials also have visited the El Ain communities. Awards offered to villages show that the project impact has been appreciated. The annual FNC national conferences repeatedly mention the need to draw on the experiences gained in El Ain for wide application in Sudan.

A different forest management project was implemented in the 1980s and 1990s in Darfur. The Jebel Marra Rural Development Project (JMRDP) supported government forest reserve management and community forest management. Project support to gazetted forests was eventually phased out for several reasons, such as recurrent fires, and community forest management transformed into farm forestry because farmers were interested in individual rather than communal forestry activities.

Although the El Ain experience is based upon community resource management and the Jebel Marra experience is based upon farmers managing their own forests, both cases involve local people asserting ownership rights over land and related natural resources, and managing those resources sustainably. In both cases, sustainable natural resource management has lasted more than 10 to 15 years after the projects were completed.

In 2014, the FNC, SOS Sahel and United Nations Environment Programme (UNEP) decided to publish a comprehensive document on lessons learned from the El Ain and Jebel Marra experiences. The starting point was project evaluation reports and other project documents. Six master's and doctoral theses were written based upon research performed in the El Ain area after the NFMP was terminated. While some theses focused on specific themes, such as micro-catchments or the role of pastoralists, others were

broadly oriented around natural resource management. In 2013, two consultants documented the SOS Sahel experience since 1989.

With respect to the El Ain experience, the present publication is largely based on 2014 field research conducted in six villages by a team of two researchers (one of who is female). Based on the results of this research, a second research team focused on outstanding research issues in three of those villages. The members of the second team had been involved in project implementation in the 1990s, so they could draw on memory. Photos taken in 1997 were still available, and photos were retaken in 2014 to draw comparisons.

In the case of the Jebel Marra experience, the UNEP scanning project recovered a large number of JMRDP reports from the 1980s and 1990s. The documents were scanned and made available to interested Sudanese institutions. Some Jebel Marra research documents, including theses, were also available. Due to the Darfur conflict, data post 2003 is limited.

FNC/SOS Sahel/UNEP sent two researchers to Zalingei and Nyrtete for data collection in accessible areas. In all, 34 farmers (including 7 women) with woodlots were interviewed, out of the 92 men and 45 women farm foresters traced during the research. One of the researchers was a woman; she was specifically responsible for interacting with female farm foresters.

Five field research documents are available for the present publication:

1. Dr. Elamin Sanjak. Lessons Learned Project NFMP. 2014.
2. Dr. Sawsan Khair Elsied Abdel Rahim. Gender dimension: NFMP lessons learned. 2014.
3. Dr. Adam Khamis. Sustainable forest management by local communities and farmers in Sudan: A review of experiences gained through JMRDP intervention since the 1980s. April 2014.
4. In a separate note: Women and private forests in Central Darfur. May 2014.
5. Dr. Faiza Siddig Mohamed Ahmed. Community based Natural Forests Management in Sudan: Lessons learnt from the El Ain Natural Forests Management Project (NFMP); Second Stage of the Field Research. May 2014.

The research has been constrained by deadlines, administrative bottlenecks and security regulations. It is evident that more resources and research are welcome to better understand the complex socio-economic and environmental issues, particularly in a conflict situation. In spite of the limitations, the team feels that a profound understanding has been acquired through literature review and research. Two workshops have

been held to scrutinize the conclusions and recommendations, both from the perspective of practitioners (in Kordofan and Darfur) and of researchers and decision makers (in Khartoum). This document is the outcome of the process and is available in Arabic and English.

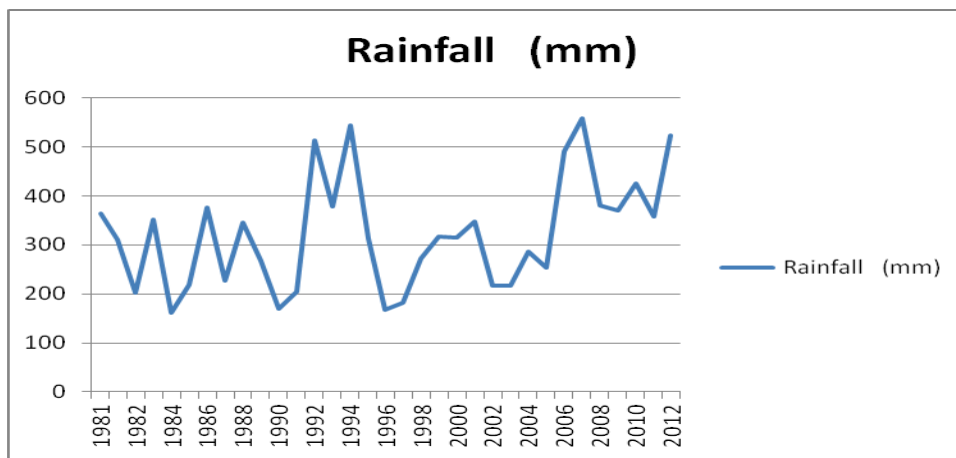
This report provides important lessons learned from community natural resource management and farm forestry in Sudan, and includes resources such as water and rangeland. It does not cover the experiences of gum Arabic production, community environmental action plans and management of buffer zones of national parks, such as Dinder National Park. The report is not a compendium of all Sudanese community forestry experiences, but it does provide an important contribution.

The conclusions and recommendations can be read as the report summary.

2. NATURAL FOREST MANAGEMENT PROJECT IN EL AIN

2.1. Introduction

North Kordofan State has an arid to semi-arid climate with high temperatures and rains less than 50 millimetres (mm)/year in the north to 400 mm/year in the south. Rainfall is highly variable, with occasional droughts, most recently occurring between 1983 and 1991, and again from 1995 to 1997. Since 2006, the rainfall average has been high. Graph 1 shows the variability of annual rainfall for El Obeid, capital of North Kordofan State and the study area.



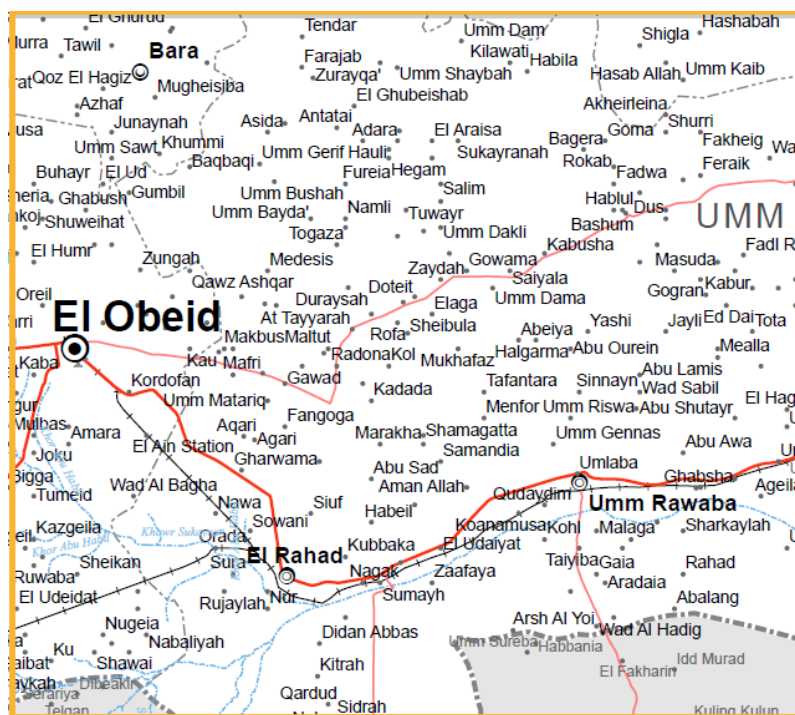
Graph 1. Average annual rainfall, El Obeid, showing periods of drought and good rainfall. The start of the National Forest Management Project (1989) was a time of drought, which explains the major effort made for tree planting in micro-catchments.

The total population of North Kordofan State was 1.94 million in 1993 (according to that year's census) and 2.42 million by 2007. The population of El Obeid has grown by 280 per cent, from 90,000 in 1973 to 345,000 in 2008. This growth impacts natural resources; in particular, a large amount of woodfuel is needed to satisfy demand in El Obeid. The El Ain forest reserve, east of the town, was gazetted in the 1950s with the aim to supply woodfuel to El Obeid. Population growth in El Ain rural areas has been variable, but in some villages the number of households has grown by 400 to 500 per cent since the 1960s. More recently, the conflict in South Kordofan State has increased population pressure to the north. Alrahad (southeast of the study area, see map 1) had a population of 28,000 in the 1990s, which has grown to almost 100,000 people by 2014, a number that includes internally displaced persons (IDPs). Most of the IDPs are herders of Arabic origin, who are in conflict with Nuba tribes.

Much of North Kordofan State falls in the semi-desert zone, where *A. tortillis* (Seyal), *A. mellifera* (Kitr) and *Maerua crassifolia* (Sarah) dominate. Southward, vegetation gives way to *Leptadinia pyrotechnica* (Marikh), *Acacia senegal* (Hashab) and others. Nomadic pastoralism in North Kordofan State is characterised by the Abbala camel and sheep herders and the Baggara cattle herders. Local culture and customary land rights determine land tenure; however, foreign investors have appropriated a significant amount of land.

2.2. Support of the El Ain forest reserve

The El Ain forest reserve covers about 19,000 hectares. The soils are mostly heavy Gardud and light Goz. In 1989, when NFMP began, the buffer zone around the forest reserve was thought to include approximately 24 villages, with a combined population of 7,000. Much of the land is in Sheikan Province, which is considered Bederia tribal land, but the settled population is from many different ethnic origins. Furthermore, pastoralists move through the forest reserve and the buffer zone during their annual north-south migration.



Map 1. El Ain area, North Kordofan State. The FNC forest reserve is between El Obeid and Er Rahad; the buffer zone, which includes 24 villages, is located on both sides of the highway leading to Khartoum.

(Map credit: UNOCHA)

NFMP started with a great deal of research into the forest ecology of the study area and with options for reforestation. The survival rates and growth of the existing natural forest was one of the project's areas of focus. Initial research showed that there was significant dieback in the Kitr vegetation, which is widespread in the forest reserve and buffer zones. Kitr had 20 to 25 per cent mortality rates in some plots, affecting both young and mature trees. The dieback was thought to be the consequence of the very low rainfall between 1989 and 1991. NFMP staff was not particularly concerned this would affect the future of the project: successive periods of poor rainfall followed by good rainfall had always occurred in the area. Kitr productivity had been little studied in Sudan or abroad; therefore, the research was considered useful.

The heavy Gardud soils typically have a high water runoff, up to 98 per cent of the rainfall, particularly on denuded slopes. Much work was therefore needed to improve the efficiency of different micro-catchment systems. Micro-catchments of various sizes were analysed, identifying the impact of catchment size on tree survival and growth, hay production and cost. The results favoured the larger catchments (ten by ten metres). Unsurprisingly, there were uncertainties, and more research was considered necessary.

In financial terms, Sunut forest in parts of the El Ain forest reserve is economically important, even though it covers a much smaller area. The NFMP supported the inventory of forest products and the preparation of a management plan for Sunut forest.

Villagers within the buffer zone primarily accessed the forest reserve for woodfuel and for grazing of livestock, particularly goats. Additionally, the State Water Corporation had a number of goats browsing illegally in the reserve. A set of rules was established in 1992 and discussed with the villages. All but four villages out of the 23 agreed. The rules also concerned pastoralism, but the rules were not discussed with the affected pastoralists at that time.



PHOTO 1: View of El Ain gazetted forest from a nearby hill. Initially, the project concentrated on the gazetted forest reserve.

(Photo Credit: Abdelmajied Mohamad Yahya)

While the NFMP contributed to better communication between the FNC and the numerous forest users, the FNC and villagers were not always in agreement. It was evident that natural resources outside the El Ain forest reserve had to be managed sustainably, for the sake of the reserve itself. From 1992 onwards, NFMP put special emphasis on natural forest management in the buffer zone surrounding the reserve.

2.3. Establishment of community forests

The idea of a buffer zone around the El Ain forest reserve proved to be vague. For example, where would the boundary limits of the buffer zone be drawn? It was felt by the project staff that the buffer zone is the area around the reserve where villagers draw on the reserve for their needs, such as woodfuel, fruit and grazing.

Yet, there was no clear buffer zone limit. Villagers far removed from the El Ain forest reserve did not rely on the forest for their daily needs because of the distance. However, they did rely on the forest in different ways. During the 1989–1991 droughts, rainfall was very low and rain-fed agriculture failed, particularly in the north. Impoverished villagers in the buffer zone relied on the El Ain forest for income generation in order to survive during the drought.

The idea of a buffer zone, therefore, required some flexibility: communities close to the forest relied on the resource on a regular basis, whereas more distant communities relied on it but only during certain years and for certain groups within those communities.

Registration procedure

Prior to the implementation of NFMP, not a single community forest in Sudan had ever been registered under the provision of the 1986 Forests Act. Nobody knew exactly what a registered community forest was and how to create such a forest, including FNC staff and State administration, let alone traditional leaders and community members. Therefore, the NFMP implemented an awareness-raising campaign to inform communities in the buffer zone about the opportunity for and potential advantages of community forest registration. With respect to the 1986 Forests Act, NFMP was a pilot project.

The awareness-raising campaign targeted local leaders and, in particular, the village Sheikhs. Sheikhs play a very important role not just as community leaders but also because of the responsibilities they hold in community land tenure. Given their authority to allocate public land in their domain (*hakura*) to community members for agriculture, Sheikhs play a decisive role in the community registration procedure. Registration courses for Sheikhs and other local leaders were therefore held.

Goodwill for NFMP and for community forest registration was created through a range of complementary activities. These activities included an improved stove programme, tree nursery support to communities and interested individuals, micro-catchment and tree planting support and improved water supply in certain cases. All involved trainings and some accompanied food-for-work programmes.

Communities and their leaders were encouraged to discuss the idea of registering their forest, or a part of their forest. It is hardly surprising that the first step in the procedure—the villagers agreeing to apply for community forest registration—was probably the most difficult one; nobody knew whether negative consequences would arise as a result of registration. The most important barriers to community consensus were the following:

- A number of villages were afraid their land would be taken from them, similar to the gazettelement of the El Ain forest reserve by the government.
- In other cases, communities had a limited claim to traditional ownership. Some communities had only arrived relatively recently, for instance, those who had arrived from West Africa. In other cases, two or more distinct ethnic groups living in the same village, or close to each other, may jointly own a forest and rangeland resource. These types of ownership claims complicated discussions and the decision-making process.

Nevertheless, an increasing number of communities made the decision, once any differences were settled, to contact the NFMP to start the gazettelement procedure. The steps followed for gazettelement in El Ain are outlined below.

Steps of the community forest gazettelement procedure followed in El Ain

1. Villagers' decision to request a community forest is communicated to the NFMP.
2. Additional training provided.
3. Choice of location, participatory rural appraisal mapping and boundary determination begins.
4. Visits to neighbouring villages take place to secure verbal agreements on boundaries.
5. Village authorities (Sheikh and Popular Committee) sign.
6. Omda and Emir sign agreement.
7. FNC surveyor measures forest boundaries.
8. Surveyor prepares map.
9. Rural locality officer signs.
10. Land Department Authority and Head of Muhafatha (Province/State) sign.
11. State-level FNC director forwards document to national FNC director in Khartoum.
12. Lands Registration Department approves registration (or refers decision back to State).
13. State-level FNC director receives notification of approval and collects certificate.
14. Certificate of community forest ownership is handed over to the community, specifically the community forest committee.

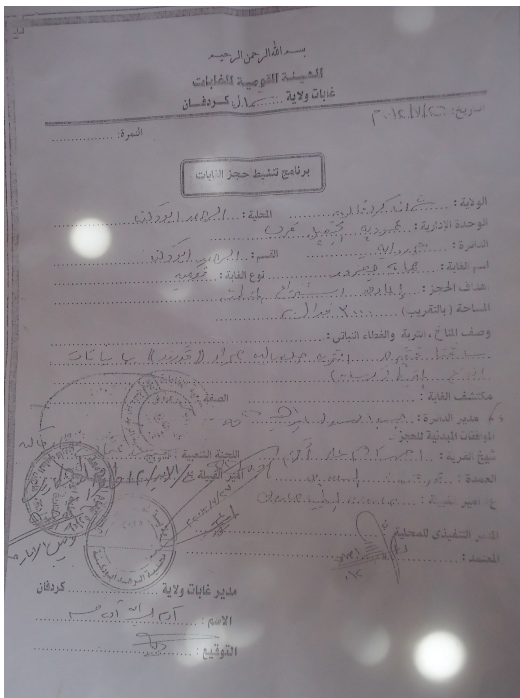


PHOTO 2: A signed and stamped certificate of ownership for a gazetted community forest in El Ain

(Photo Credit: Faiza Mohammed Ahmed)

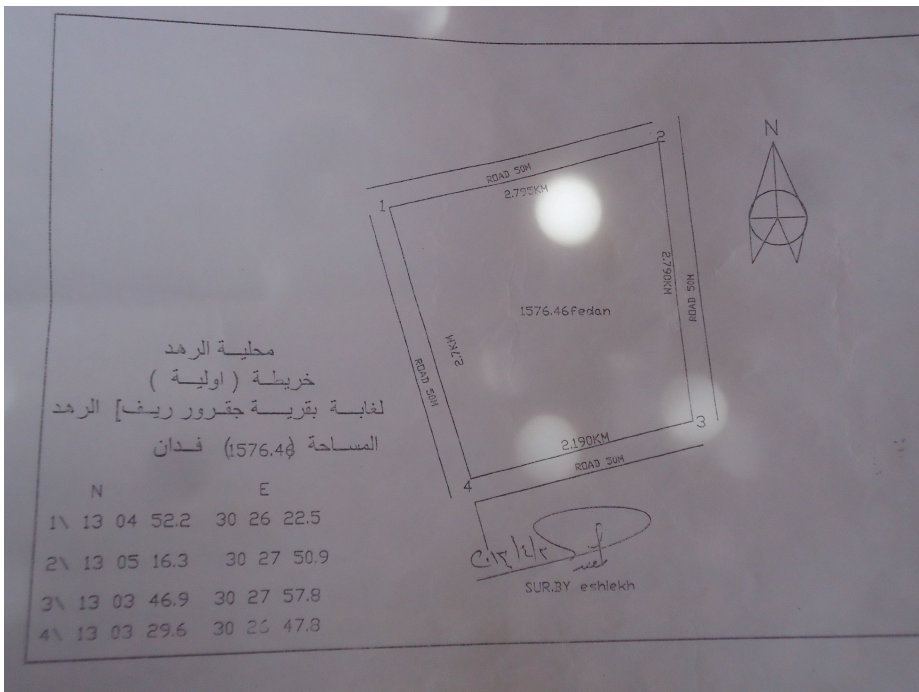


PHOTO 3: A signed map that accompanies the certificate of community forest ownership.

(Photo Credit: Faiza Mohamed Ahmed)

The procedure involved many steps, steps to be taken within the community and between communities, and at the local, state and federal levels. Some steps at the village level were time-consuming, such as the mapping of boundaries. Other steps required a great deal of awareness raising, convincing and negotiation between communities with overlapping rights, or the granting of permission by traditional authorities. In all, community forest gazettement took about four years, from the first step to the last step. This was the time it took even with the pressure and the means applied by NFMP staff members, who followed up when delays occurred.

Steps at the federal level took the greatest amount of time in the registration process. One particularly prolonged step involved the approval of the FNC and the Lands Registration Department in Khartoum; both had to be satisfied with the map provided by the state-level surveyor. In some cases, federal officials requested a further land survey. In 2005, the registration procedure was simplified, resulting in less involvement at the federal level (see box).

Procedures followed for community forests reservation and registration in Butana, in eastern Sudan, 2014

1. Community-level meetings are initiated to reach consensus.
2. The extent of the forest area is agreed upon.
3. The locality issues a letter stating that there is no conflict (announcement for 15 days). State Survey Department to draft.
4. The draft map is sent to State Forest National Corporation (FNC) to confirm that the land is not part of any reserved or proposed forest.
5. The State FNC sends back the draft map to the State Ministry of Agriculture and Forestry.
6. The State Ministry of Agriculture and Forestry sends all documents to the Federal FNC and makes recommendation to the Land Registration Committee at the Court Authority.
7. After the approval of the Court Authority, all documents are sent back to FNC for issuance of the Forest Ownership Certificate from the State Court Authority.

Several factors make it difficult to estimate the financial cost of registration: the lengthiness of the registration process, the variability of the Sudanese pound (SDG) exchange rate and the challenge to estimate the cost of work performed by local villagers, community leaders and NFMP staff.

The NFMP's influence in registering community forests was positive, with 14 community forests gazetted by 2001. All six villages visited in the 2014 research sample have a legal document to prove ownership, and the villagers interviewed are fully aware of the legal ownership of the forest by the community. Records at FNC headquarters, in Khartoum, show the existence of 26 gazetted community forests in North Kordofan State, revealing that another 12 community forests were established after NFMP terminated.

Safeguarding community forests is clearly a major achievement. The right of the FNC to grant concessions to a non-state body, such as an investment company, is provided for under the 1989 Act that defines FNC, but this right is confined to federal and state forests. The gazetted community forests are not subject to such concessions because the 1986 Forests Act assigns forest management to community-elected committees and not to the FNC. Major land allocation to international investors occurred in the 1990s in the El Ain area, but none of the gazetted community forests were affected. If a community forest is degazetted in the future, for the sake of overriding public interest, appropriate compensation to the

community will be due. Community forest registration has undoubtedly provided a level of tenure security that did not exist prior, and this level of security has remained in effect long after the NFMP concluded.

2.4. Support for sustainable forest management

Forest registration is a major achievement, but registration alone is not necessarily sufficient to guarantee sustainable forest management. Therefore, NFMP devoted a great deal of time to develop locally useful management tools. The project's outputs were a forest management plan for each community and the capacity to implement the plan. Similar to the forest gazettement procedure, there was no established framework to prepare such plans. NFMP tested a variety of simple management tools, some of which have been adopted.

The 1986 Forests Act required that village committees manage community forests. The communities were free to decide on the constitution and operational rules of the committee. The NFMP made only one imposition on the constitution of these committees: women were to be represented (e.g., a ten-member committee was to include three women). After the project was phased out, FNC issued cards to three members of each committee, especially those members charged with protecting the forest against offenders. The cards provide legal evidence of the role of the cardholder.

By 2014, all visited communities still had functional committees. In some communities, all villagers were expected to contribute to forest protection. In others, one guard was assigned to protect the forest, and he was compensated for his effort. One village decided to pay a guard from outside the community so that the guard would be unbiased when enforcing rules.

Forest protection is the most important forest management activity. In one example, from August 2013, a pastoralist engaged in illicit felling at Warshal Hafir. The committee decided on a penalty of SDG 2,800, which the offender refused to pay. The case went to court, and the judge refused to accept the committee decision, stating that the FNC should determine damages for forest offences. Villagers conferred with the FNC, and the FNC legal advisor wrote an official letter to the court explaining that the 1986 Forests Act gives the community the right of local regulation. The cost of forest protection through a court case can be high: by May 2014 (nine months later), the committee found it has spent already more than SDG 3,000 on the court case. If the sanctions imposed by the court are too low, the cost of bringing such cases to court becomes prohibitive to local communities. This should become a matter of policy debate and legal reform.

Apart from protection, forest management concerns a series of activities. NFMP assisted each community in developing activity plans adapted to each forest. Each forest management plan became a document that included, for the most part, the following:

Physical description of the forest: Description of geographic location, soil types and relevant social issues and dynamics.

Maps: Participatory rural appraisal maps and a land survey map.

Ownership: List of those included in ownership.

Responsibilities: Description of the responsibilities of the Sheikh and the village committee.

Regulations for forest product usage: Rules relating to forest exploitation, by whom and under what conditions.

Investment: Commitments by villagers to improve and maintain the forest, e.g., through microcatchment construction, tree planting or broadcasting of tree seeds.

Protection: Decisions regarding ways in which the forest will be protected, such as the use of individual guards or through villager groups; commitments to cut and maintain fire lines.

Accountability: Summary of records to be kept, e.g., for planting and revenue collection.

Transparency: Guidelines regarding how the committee is to record and present information to all other villagers.

٢٠٠٧/٩/١١

- فورم رقم 5 :-
- العقوبات

تاريخ الجريمة (المخالفة)	نوع الجريمة	المرتكب (اسمه و من أين)	من الذي ألقى القبض عليه	نوع العقوبة	إذا كانت غرامة هل تم دفعها و إذا لا فلما	تعلق
٢٠٠٧/٨/٣١	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		
	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		
٢٠٠٧/٨/٣١	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		
	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		
	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		
	قطع أشجار	عبد الله بن عبد الله	عبد الله بن عبد الله	حبس		

PHOTO 4: Forest offences have been recorded by this community; records include identification of offending parties, the date, a description of the offence and the penalties incurred. However, many communities are not interested in comprehensive documentation. Most forest management issues are well known by villagers, and the details are not documented in writing. This practice is found throughout the Sahel. (Photo Credit: Faisa Mohamed Ahmed)

Additional information that can also be included in a forest management plan is forest inventory data. In order to avoid complicated standard forest inventories and incomprehensible statistical methods, NFMP tested a simple method of counting forest products in transects. First, the villagers decided on the most valuable forest product (e.g., Kitr construction wood). A team of villagers, supported by NFMP staff,

counted the number of forest products found in the sample. Minimal statistical knowledge was necessary to calculate totals for the community forest.



PHOTO 5: Forest inventory. Counting tree products and natural regeneration has been performed by community members since 1997, and some communities still continue the practice. This could possibly become one of the tools of REDD+ (reduced emissions from forest degradation and deforestation and reforestation) in Sudan.

(Photo Credit: Paul Kerkhof)

The forest inventory supported by NFMP was expected to produce a baseline and a means to calculate sustainable harvest (i.e., to determine the allowable cut). It also provided important data on natural regeneration. The research on Kitr productivity in the forest reserve provided some indication of what may be harvested sustainably. However, rainfall significantly impacts Kitr productivity, so a realistic estimation of allowable cut was too difficult to determine.

The project also employed photography as an objective means to record the state of the forest. Well-known spots in the forest were selected as vantage points to take panoramic photos, photos that capture 360° of a vantage point. The villagers were responsible for photographing the forest and for assembling the panoramic photo series once the prints were available. Photography provided an objective and comprehensible tool to evaluate forest change.



PHOTO 6: Baduga villagers assembling panoramic photos of their forest, 1997. Unfortunately, 17 years later, the photos have since been spoiled. Digital photography was not an available technology in 1997. With current-day technology, photographs can be preserved at low cost by supporting agencies such as the FNC and nongovernmental organizations. Photography could become another of the REDD+ tools in Sudan.

(Photo Credit: Paul Kerkhof)

Documented management plans, forest inventories and photography, as used during the NFMP in El Ain, were innovative management tools at the time. Nowhere else in Sudan had communities developed clearly written plans and regulations governing how they will manage a forest resource, at least not in such detail.

The 2014 research—13 to 15 years after the management plans were produced—revealed that little remained of the original documents and photos. In many cases, the management documents are no longer available, or they have not been updated. Often, the inventory data are no longer available, except in a few villages. The panoramic photos no longer exist in any of the villages, but some were still held by consultants.

Towards the end of the project, the NFMP team was concerned that very few villagers were literate. The team believed this would impede widespread understanding of the management plans and the plans' sustainability. This concern proved to be the case during the 2104 evaluation. Various aspects of the written management plan were unsustainable, but even so, important forest management tasks are still carried out in many villages. This finding is hardly surprising in the context of Sudan, or the wider context of the Sahel: the Forest Sector Review found less than 1 per cent of all federal forest reserves have an up-to-date management plan (see box). In most cases, updated forest management plans are limited to those forests that are lucrative, such as the *A. nilotica* forests in the Blue Nile State. Forest reserves of lesser value rarely have an updated, approved management plan. Why would that be any different for the small community forests in El Ain, especially as there is no longer any project in place to support such efforts?

Forest management plans for communities in Mali and Niger

The registered community forests in these countries were expected to have detailed management plans, with forest inventories as the basis for determining the annual allowable cut. The system was first put in place in 1992 and was evaluated after 12 years. Villagers did not understand the complicated management plans. Most communities had never received a copy of the management plan. However, villagers were very well aware of how to manage their forest, how to address problems encountered, and how to do better.

It became evident that such management plans were mostly in the interest of the forestry experts who had written them and not the villagers, who fully understood how to manage their forest without having a detailed document.

More importantly, however, all villages involved in the 2014 field research have forest ownership documentation, and community forest guards possess the FNC-issued cards that prove ownership status. In all villages studied, the community forest committees exist and are functional. The forests are protected against various forms of forest offences, as demonstrated by local offence records (for those resolved locally) and the records kept by the court of justice in El Obeid.



PHOTO 7: Burning around the forest may serve to avoid forest fires. However, in many community forests, the risk of fire is modest. Firebreaks are rarely maintained because it requires much work, and also because the risk of forest fire damage is low.

(Photo Credit: Faisa Mohamed Ahmed)

In the various communities studied, forest management tasks are still being executed. For example, the villagers themselves have implemented tree planting schemes, long after the NFMP was phased out. Additionally, small micro-catchments have been constructed to improve the seedling survival rate; this work was done without external support, such as food-for-work programmes. In some villages, community nurseries existed at the time of the research, although mostly with small numbers of seedlings. In one sampled village, the forest product inventory was consistently carried out, the last one in 2013. For the villages of Gagrur and Warshal Hafir, communities established firebreaks occasionally between 2005 and 2009 (three times in Gagrur and twice in Warshal Hafir) but not since 2010.

In many communities, the implementation of the management plans ran into problems in the absence of the NFMP. The constraints are a matter of financial cost or risk to social peace. The financially costly

activities include maintenance of firebreaks, digging large micro-catchments, planting trees and forest protection, including legal pursuits in court. The risk to social peace mostly involves high pastoral livestock pressure and decisions regarding grazing. For the sake of social peace, little is done against overgrazing. In the current situation, overgrazing is so severe that there is almost no natural regeneration of valuable tree species in most forests. This has been going on for many years, so much so that the species composition of forests has changed. Appreciated species, such as *A. tortillis* and *A. mellifera*, have become rare (only old trees are found); they are displaced by less-valued but hardy species such as *A. nubica* (Laot), which resist grazing.



PHOTO 8: Rehabilitation of a community forest by using half-moon water-catchments. Catchments were constructed without support from food-for-work programmes. This is the only type of microcatchment system retained by communities post NFMP, in part, because of its low cost; it is considered sustainable. Nevertheless, not many communities establish these types of forest plantations without external assistance.

(Photo Credit: Abdelmajid Mohamed Yahya)

The conclusion that villages can independently and sustainably manage community forests is evidenced by the example of Abunaanaa village, which has a small but well stocked and productive community forest. The forest is widely recognised as being entirely man-made by the community. It is very close to the village and is well guarded, and the land surrounding the community forest is exclusively cropland.

PHOTO 9: Panoramic photos with denuded Abunaanaa community forest land in the background, 1997. Note arrows to identify and compare the same site 17 years later.



PHOTO 10: Panoramic photo with Abunaanaa community forest in the background, 2014.
(Yellow arrow indicates the same tree in 1997 (above) and 2014 (below))



PHOTO 11: Close-up of Abunaanaa community forest, 2014.

(Left: Red arrow indicates zoom-in of forest area in 2014.)



(Photo Credit:
 Photo 9 – Villagers of Abu Naana
 Photo 10 and 11 – Faisa Mahmoud
 Ahmed)

No pastoral herds pass through or reside in this community forest. Hay produced in the forest is a commodity that is harvested and sold to traders. There are no regeneration and succession issues in this forest. The Sheikh is highly motivated to support sustainable forest management, and the small community is ethnically homogeneous Fellata.

2.5. A broad package of support

Early on and throughout the program, NFMP supported villagers in the buffer zone with a range of activities, in addition to community forest registration. The most important projects included the following:

- inputs to improve gardening (locally known as *jubraka*);
- tree nurseries, including fruit trees;
- micro-catchment construction (supported by food-for-work programmes) and tree planting and grass reseeding schemes;
- water supply improvement, in some cases through repair and renovation of hafirs; and
- improved cooking stoves.

The popularity of micro-catchments is partly explained by the fact that it was linked to extensive food-for-work schemes. In the early 1990s, the very poor rains led to an influx of food aid in North Kordofan. Many agencies provided massive food assistance without any concern for environmental and socio-economic impacts. NFMP decided to use the inputs provided by food aid agencies and direct it at environmental recovery. Micro-catchments proved to be an effective tool for recovery of the vegetation, in spite of very low rainfall. Both trees and herbaceous cover were effectively re-established through ten-by-ten-metre or five-by-five-metre catchments.

Later in the 1990s, NFMP continued to use food-for-work programmes, even though the rains improved considerably. It was apparently difficult to wean villages off this type of aid. Accordingly, food-for-work programmes have often been the subject of contentious debate in the Sahel, a region subject to highly variable rainfall conditions.

The 2014 research found that villages have not maintained or constructed the large micro-catchments (ten-by-ten-metre or five-by-five-metre catchments) since the time the food-for-work programmes were phased out. Some communities, however, have been using the small half-circle micro-catchments—even after NFMP terminated—for tree planting, which are more practical and easier to construct.

2.6. The interests and the roles of women

The cultural differences put women in El Ain in a very different situation from the men. They rarely own land, and their roles in the local economy are distinct. For that reason, it was necessary for the NFMP to pay attention to the needs of women. NFMP had women as senior staff members, and SOS Sahel UK provided significant training opportunities with attention to gender issues.



PHOTO 12: Woman collecting fruits and pods in a community forest. Women have interests in specific forest products (e.g., woodfuel and fruit), which may be different from the interests of men (e.g., land tenure and livestock grazing)
(Photo Credit: Faiza Mahmoud Ahmed)

Women are in charge of the children and household affairs. Accordingly, female villagers must address—amongst other needs—the daily need for domestic energy for cooking. Women used to depend entirely on locally available trees and shrubs, but in most villages the source of wood was becoming ever more distant and the time required for firewood collection increased. Nevertheless, firewood was still available in the 1990s in most villages on village land outside the gazetted community forest. This area was also called a 'buffer zone.' In this sense, the term was used for uncultivated land, outside the registered community forest, that had remaining natural resources.

NFMP supported widespread use of improved woodstoves, stoves produced by the women villagers themselves. Liquefied petroleum gas (LPG) has been introduced as a substitute for firewood for those who have access to it.

As of 2014, the situation is very different for women in the sampled villages:

- Firewood that was available in the buffer zones in the 1990s has become scarce. Women now depend on the community forest for the collection of construction wood and firewood, if the buffer zone no longer supplies it. Women will first try to find products outside the community forest, but they will use the forest when there is nothing left elsewhere.
- Most women have improved stoves in addition to the traditional stove, and some use LPG stoves. The improved stoves produced at the time of the project are no longer in working order; women villagers replaced the stoves on their own initiative.
- LPG is available to a number of villages on account of the proximity of highways and major towns. Nevertheless, widespread use of LPG is rare, and in many villages it is hardly used at all, because of financial reasons and because the community forest (and possibly the buffer zone) provides for a suitable alternative. The community forest, therefore, yielded a positive NFMP impact on women's budget.
- Women in a comfortable financial situation may pay for LPG in spite of its high cost, or they may buy woodfuel. Poor women, on the other hand, often must rely on the community forest and buffer zone to collect and sell firewood to improve their meagre income.

In the 1990s, many women relied on the forest and the buffer zone for a range of products. These products included medicinal plants and herbs, dyes, fruits, nuts, edible leaves and various other non-wood forest products, mostly for home consumption but also for sale. The buffer zone was entirely deforested by 2014; therefore, such products may only be found within the community forests. The pressure on some community forests has been so high that certain products, as of 2014, have disappeared. Men primarily own livestock, but women also own some livestock and benefit from the range resources offered by the forest.



PHOTO 13: Fruits and other non-wood forest products collected by women are useful for home consumption and minor market opportunities, but only on a modest scale in this case.

(Photo Credit: Faisa Mahmoud Ahmed)

The community forest committees invariably have a number of women members. It was a requirement imposed by the NFMP, and in 2014, women are still among the committee members. It is less clear how active their participation is. Earlier research in El Ain indicated that membership of women was sometimes a pretence. In one village, for instance, the Sheikh was very talkative about the community forest and the committee, but he couldn't recall the names of the women on the committee.

Yet, the women in some of the sampled villages were active in forestry, much more so than the men. In one village, where no forest was left by 1990, the women organised themselves to reforest denuded land and turned it into a registered community forest (this was done with assistance of the Sheikh, himself an enthusiastic proponent). In another village, women were active in tree nursery production and planting. Quite recently, in Abunaanaa, the committee confiscated fuelwood collected by neighbouring El Mulbas villagers. A female member of the committee decided to allow those villagers to take the wood anyway (when they promised not to do it again). She found good neighbour relations important. This example shows that women can be active decision makers in forestry management.

2.7. Involvement of pastoralists in natural resource governance

The NFMP project experienced significant community involvement in comparison to the Rawashda project of the 1980s. From the beginning of the NFMP, local communities in the El Ain forest reserve buffer zone participated in the project and, as years passed, they became highly motivated about and engaged in the project. Nevertheless, local communities were understood to be the settled groups in the buffer zone and did not include stakeholders passing through the area, particularly nomadic pastoralists.



**PHOTO 14: Shanabla
pastoralist with livestock in a
community forest.**

(Photo Credit: Abdelmajid
Mohamed Yahya)

The area targeted by the project included large areas north and south of the El Obeid–Khartoum highway, land used by both Shanabla camel pastoralists and Baggara cattle herders. Despite NFMP staff knowing that pastoralists used the land, neither the Shanabla nor Baggara were involved in the community forest registration process. Indeed, the 1992 project review mentioned the need to properly involve the nomads. However, this recommendation was not followed during the process of community forest registration. The constraints that inhibited participation of pastoralists included the following:

- Pastoralists' physical absence from the El Ain area for a significant amount of time during the year. It is often felt that the Union of Pastoralists in El Obeid does not sufficiently represent the various nomadic groups.
- The legal status of pastoralism. The legal access of pastoralists is not defined in the 1986 Forests Act, and the traditional hakura rights do not clarify pastoral rights and obligations.
- Limited experience working with both farming and pastoral communities. In the 1980s, few organisations and experts supported joint land use management by farmers and pastoralists. This experience has since grown in Sudan and, more widely, in the Sahel. NFMP started interacting with pastoralists in 1999, near the end of the project.

The absence of pastoralists in the registration process led to various problems at later stages.

The example of Gagrur

Gagrur is a small farming village of the Gawamaa tribe. The village is located to the north of the El Obeid–Khartoum highway and was established circa 1900. The village has grown rapidly: from ten households in 1963 to 40 to 45 households 50 years later. The Sebeihat group of the Shanabla camel pastoralists (40 households in 2001) frequently use the range and forest resources in and around Gagrur. This population has long-lived in this part of Sudan.

Land use in Gagrur, and other areas, has changed dramatically since the 1960s, and not only because of increased population growth. Some of the more notable changes follow:

- The area cultivated per household has quadrupled due to technological advances such as the introduction of the tractor.
- Many people, besides pastoralists, have become interested in livestock keeping or investment—not only the farmers but also many town-based people.
- Highway construction and other innovations have changed the economy.
- Increased insecurity in other areas, such as in South Kordofan State, has pushed northward those livestock keepers who traditionally remain to the south of Gagrur. The closed borders with South Sudan are yet another reason for increased pressure in the north.

Gazettement of community forests in the El Ain area, with assistance of the NFMP, is also an innovation; Gagrur, with a registered forest of 100 feddan, was one the communities participating in the project. During the community forest registration process, the Sebeihat were not involved. Under traditional tenure, the Sebeihat are theoretically landless in Gagrur, but have customary rights to range resources.

After forest registration, conflict between the people of Gagrur and the Sebeihat increased. By 1999, NFMP began working with the Sebeihat through mediation and conflict management training of pastoralist leaders. NFMP assisted the two parties to better communicate, and to negotiate an agreement on natural resources jointly used and managed by the two groups. The negotiation involved leaders of both groups and local authorities. The agreement includes the following:

- how to use water in the hafir;
- how to resolve crop damage;
- where to settle and establish camp; and
- rules for the community forest and the livestock corridor.

In 2001, two years after the agreement was signed, it was evaluated. The evaluation found that many issues remained unresolved, according to the Sebeihat. Nevertheless, the people of Gagrur found the agreement very important. The 2001 evaluation found that although the agreement was considered fragile, both parties respected the agreement. The reasons for caution about the agreement included the following:

- The recent killing of a Gawamaa farmer (in another village), by someone suspected to be a Sebeihat, had made relations edgy between the two groups.
- A Gawamaa Amir gave a large land area (12,000 feddan) to a Shanabla Amir (not far from Gagrur), without local involvement of either Gagrur villagers or the Sebeihat.
- The Rural Council and the Range Department complained that they had not been involved in the agreement.

Recently, a Shanabla family has claimed ownership of an area inside the Gagrur community, stating that the land was where the great-grandparents lived until the 1950s. The family put up camp and refused to leave. The forest committee contacted the court in El Obeid to intercede. This example shows that seemingly old history can impact present-day environmental sustainability and social peace.

SOS Sahel has tried to develop a more comprehensive and lasting approach to conflict management, in part, through the implementation of IFAD’s Natural Resources Management Western Sudan Project. The project created three centres for conflict management: Alrahad centre, Um Keredem centre and Abu Haraz centre. One of the centres is presently helping the Gawamaa Nazir to solve the ongoing Gagrur-Shanabla dispute. It is expected that an area adjacent to the Gagrur community forest will be available for the family in question, so that the integrity of the forest will be safeguarded.

PHOTO 15: Old trees (Kitr and baobab) and natural regeneration of Laot in a community forest. When valuable tree species become old and die off, they are replaced by less valuable shrubs that resist heavy grazing pressure.
(Photo Credit: Faiza Mohamed Ahmed)



The Gagrur example demonstrates that nomadic groups should be involved immediately in natural resource management. Conflicts over land use have always existed, but the nature of conflicts is changing because of changes elsewhere in the environment. While agreements may be concerned with small land areas, agreements should consider what is happening beyond, in much larger areas. Historical events can be important, even if they happened long ago. Finally, although an agreement may be signed, some members of the group may be unhappy with the arrangement, and problems may re-emerge later.

The Gagrur community feels that it has been affected by a great deal of land grabbing by powerful outsiders. As a result, it is now in the process of registering 3,000 feddan to be added to the existing gazetted community forest. Community forest registration is a way communities can protect their lands against external land grabbing.

Livestock corridors and resting areas

It has become increasingly understood that forest management strategies are not enough to protect the environment. In the last 10 to 15 years, natural resource management has been an important objective that concerns the management of forests and rangelands but also the social relations between farmers and pastoralists. Clearly, without a more peaceful coexistence between these land use groups, conservation of forests and other natural resources cannot be achieved. Since 2001, SOS Sahel and other NGOs as well as the Range Department have worked with farmers and pastoralists to rehabilitate livestock corridors. This is a departure from the original aims of the NFMP, with its narrow technical focus on forests.

SOS Sahel and others, therefore, support the delineation of pastoral resources and, in particular, corridors, resting areas and other natural resources such as wet season grazing areas. Some of the work to establish these types of areas was done in El Ain. By 2013, one researcher evaluated this undertaking, about five years after efforts had been implemented. While the results are encouraging, the researcher found that some boundary markers had been destroyed, supposedly by some of the youth. One of the questions raised is whether the youth are interested in natural resource management and have respect for rules and agreements. Sustainable land use and peaceful coexistence will require further support.

Water governance: Joint management of water points

NFMP and other projects have invested in hafirs, which are a priority for local communities. In the example of the Warshal Hafir, a 2013 evaluation found that water is shared peacefully. Although there is a

management committee, there is no record keeping and there is almost no revenue. Local people do not pay for water consumption and expect that SOS Sahel will take care of infrastructure maintenance.

In 2009, the State Water Corporation declared itself the owner of the Warshal Hafir, and sent staff and police to collect fees. The local community asserted the hafir as their own, and some people were arrested and incarcerated over the matter. However, the Warshal Hafir was supported by FNC; documents proved project support and local ownership. The court finally ordered release of the detainees and confirmed hafir ownership by the Warshal community.

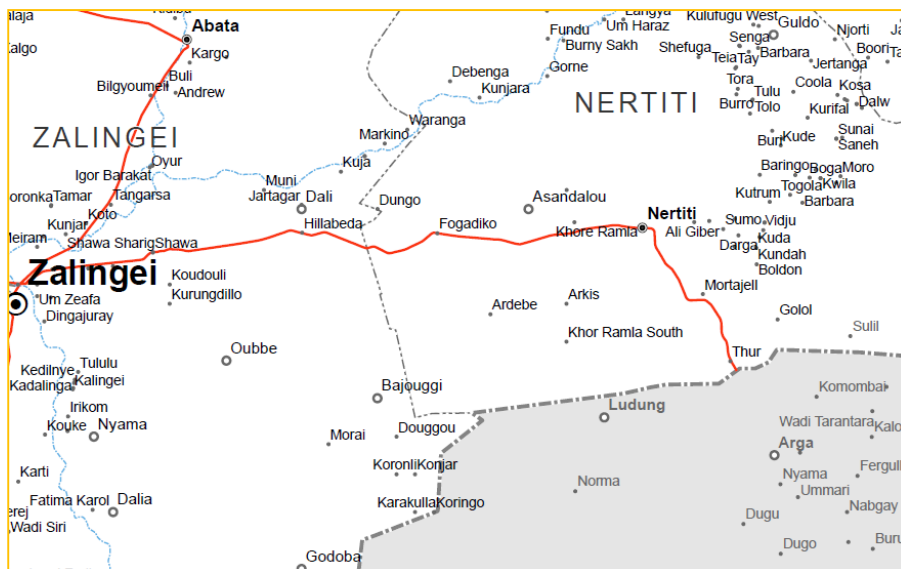
Water is a crucial natural resource, which requires good governance alongside other natural resources, such as forest, range and pastoral resources. The experience in El Ain over the last 25 years shows a way forward, even though questions of sustainable natural resource management and wider application in Sudan remain unanswered.

3. FARM FORESTRY IN JEBEL MARRA

3.1. Introduction

Jebel Marra mountain range is a volcanic chain that stretches 160 kilometers (km) west-southwest from North Darfur State to Central Darfur State. Central Darfur State—separated from West Darfur State in 2012—has a population of 1.12 million people,¹ excluding IDPs, and a surface area of 39,844 km². The areas of interest for farm forestry cover two localities: Zalingei (the capital of Central Darfur State) and Nyrtete (see map 2). The Jebel Marra mountain range receives quite higher rainfall than the surrounding plains. Nyrtete, close to the western foothills of Jebel Marra mountain range, has a much higher average rainfall than Zalingei, even though the two towns are only 60 km apart.

Plantation forestry was introduced on the slopes of Jebel Marra in 1957, mainly for *Cupressus* and *Pinus* species. While the initial plantations were highly successful, they experienced successive fire incidents, especially in Golol. The Jebel Marra Rural Development Project (JMRDP) supported establishment of 800 feddan of softwood plantations. However, the plantations established by 1982 were poorly managed, and the commodity chain for construction wood (e.g., saw mills) had not been put in place to foster development. Some plantations destroyed by fire in 1974 were again impacted by fire in 1984. The latter occurrence affected upward of 1,200 feddan. In 1990, GTZ funded replanting, but in 1994 large areas burned down again.



Map 2. Map of Zalingei and Nyrtete localities in Central Darfur State.
(Map Credit: UNOCHA)

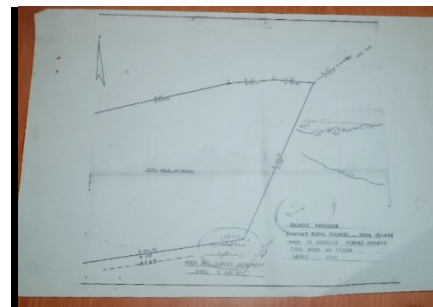
¹ Based upon data from 2008.

The forestry objective of the JMRDP was changed to put emphasis on community woodlots. The objectives and strategies focused on woodfuel production, the most common strategy throughout Africa at the time. Five villages were selected for the project; however, after some time, results showed the communal woodlots approach unsuccessful. The project’s other community-based initiatives—for example, cooperative societies and grain mills—also failed. The people of Jebel Marra preferred receiving support for individual or household initiatives.

JMRDP shifted its focus to extension services and the supplying of seedlings to individuals. It also supported the establishment of private nurseries. The farmers of Jebel Marra had embraced tree planting a long time ago in the form of citrus production, for which the area is famous. These communities had no problems adapting to farm forestry, i.e., the planting and tending of eucalyptus instead of citrus. Many villagers had been employed in government plantation forestry and therefore were familiar with plantation techniques.

3.2. Expansion of farm forestry in the 1990s

The farmers of Jebel Marra have either inherited land from their parents or purchased land. Land tenure is therefore private, belonging to a man or woman and land can be disposed of through commercial transactions. Most farmers surveyed during the current study have documents in the form of land purchase receipts with witness signatures, and certificates from the locality authority. In the case of a woodlot, a certificate can be obtained from the FNC that recognises the piece of land with trees as a farm forest, a woodlot or a private forest; or a no-dispute form can be stamped by the Ministry of Agriculture, the FNC, the native administration or Survey Department. Only a small portion of the land in the 2014 study had been inherited from ancestors.



Left: FNC certificate to Ismail Mohamed Abdalla, a private forest owner in Nyrtete. Right: A map of Abdalla Mohamed Abaker, a private forest owner in Nyrtete.

(Photo/Map Credit: Survey Department in 1992, Abuelgasim Adam)

Land tenure is secure during the main cropping season (July through December), but individual rights are weaker from January to June, when livestock is left to graze and browse freely on the unfarmed land. Only by fencing can farmers maintain their exclusive rights to use their land year round. Similar security is important during forest establishment (particularly in the first year). Once the forest is established, the trees are strong symbols of land ownership and are less vulnerable to being burnt or grazed.

The number of farmers engaged in farm forestry increased slowly in the late 1980s and steeply in the 1990s. There are different sources of information about the number of farm forests in Jebel Marra; the statistics are variable and generally outdated. The 2014 study attempted to estimate the number of farmers engaged in farm forestry through interviews in Zalingei and Nyrtete, the two most important localities where this activity is common. The results suggest that there are at least 92 farm forests owned by men, and 45 owned by women; there are a total of 137 owners.



PHOTO 16: Eucalyptus farm woodlot in Jebel Marra.
(Photo Credit: Abuelgasim Adam)



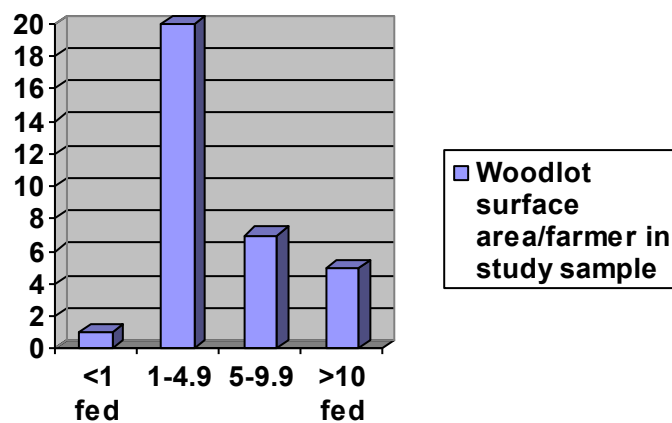
PHOTO 17: Many farmers sell a small amount of poles every year, although some sell a large quantity at once through clear felling. A farm woodlot can be considered a flexible 'savings bank account'; its owner can access its assets when the need arises.
(Photo Credit: Abuelgasim Adam)

In Zalingei, all the woodlots are established close to watercourses and are irrigated for at least the first year. In Nyrtete, which has much higher rainfall, proximity to a watercourse is not necessary. Accordingly, the large majority of farm forests are located in Nyrtete.

The 2014 study indicated that 64 per cent of the producers received seedlings free of charge either from JMRDP or FNC. The remainder are purchased from private nurseries. The majority of trees are eucalyptus, with emphasis on *E. citriodora* and *E. torelliana*, species which are fast growing, resistant to fire and less palatable for livestock. Eucalyptus also has high coppicing capacity; it can be harvested multiple times before the plants are exhausted. Most forest farmers own between 1 and 5 feddan of eucalyptus plantation (see graph 2).

Other species planted by farmers include *A. mellifera* and *Ziziphus spina christi*, which are used for fencing, and fruit trees such as *Citrus spp*, *Magnifera indica* and *Salvadora persica*.

Graph 2. Woodlot area per farmer in the study sample.



In 1990, the union of private woodlot owners was established in Nyrtete with objectives to organize the business and to look for services and government support that promote private tree planting. The union demanded recognition of private woodlots by the various authorities, and worked to obtain tax and royalty exemptions from the FNC. Before the Darfur crisis, the union had 120 members, and it had achieved a significant reduction in taxes on eucalyptus poles.

Photos: Various farm forests and their farmers in Zalingei Locality, 2014. (Photo Credit: Abuelgasim Adam)



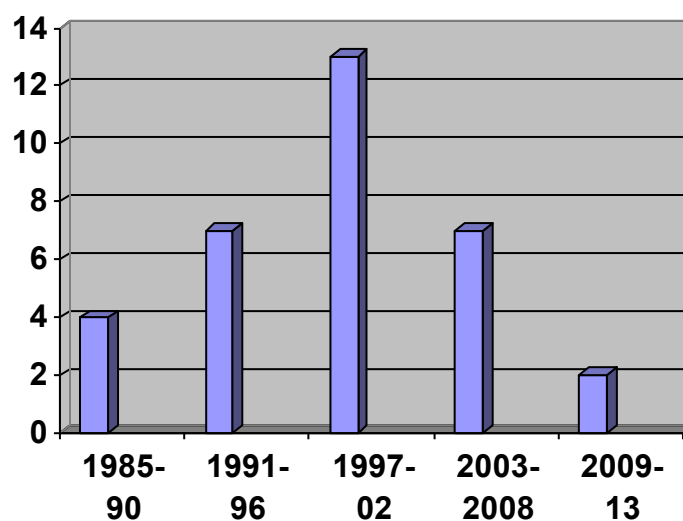
Most farmers surveyed responded that they harvest their first tree crops four to five years after planting, and then every three to four years thereafter, as eucalyptus regenerates through coppicing. Harvesting systems include selecting trees that have reached a marketable size (seven to ten centimetres in diameter) and annual or periodic cutting (every three to four years). The farmers use clear felling, selective felling or a combination. Four coppice rotations is roughly the average number of rotations before a woodlot is replanted.

3.3. Sustainability under pressure during the Darfur crisis

Due to the Darfur conflict, woodlots are under pressure. The conflict has caused major destruction of forest resources, including some of the private woodlots, in Jebel Marra. In some localities, farm forestry has been utterly destroyed, and in others it has expanded to fill the gap left by the destruction of government forest reserves.

Between 1985 and 1990, only a few forests were established by early adopters. After that, farm forestry grew rapidly and thrived for roughly a decade (see graph 3). In 2003, expansion of private forests declined due to the prevailing insecurity and conflict in the region. For instance, all 11 private forests in Mortagellow were completely destroyed, and the population displaced. The Union of Farm Foresters is no longer active since the conflict.

Graph 3: Number of new farm forests established between 1985 and 2013 in the study areas



3.4. Economics of farm forestry

Land is the most important investment required for farm forestry in Jebel Marra. It is priced between SDG 7,000 and SDG 20,000 per feddan (as of April 2014). Fencing is the next major expense; it accounts for more than half the remaining costs. Unsurprisingly, many farmers have attempted to plant live fences in response to the very high cost of fencing. The most successful live fences are made of *A. mellifera*. Fencing and seedlings together account for about three-quarters of the total cost of investment, apart from land.

PHOTO 18: A live fence of Kitr protects a farm woodlot. Live fencing is important because it is more cost effective than traditional fencing; fencing is the most costly input after the land purchase for a farmer wishing to establish a woodlot. The fencing protects the land from being accessed by pastoralists during the dry season. (Photo Credit: Abuelgasim Adam)



Fencing is a necessity to protect the land tenure of woodlots. Trespassing by armed pastoralists can hardly be pursued in court, and the rule of law does not apply. The exception is found in rebel-held areas, where farmers are protected against unlawful intrusion by armed pastoralists.

The quantity of eucalyptus poles harvested by farmers in the 2014 study varies from less than 1,000 poles to over 10,000 poles, depending upon when the respondents initiated farm forestry. The sales figures also depend on the year the activity started, spanning anywhere from 1985 to 2014. It also depends on the area under farm forestry, which varies from less than 1 feddan for some to over 10 feddan for the biggest producers. In terms of revenues earned, revenues in the 1980s or 1990s are incomparable to those earned in 2014 because of inflation and exchange rate fluctuations experienced over that time.

An alternative, more useful estimate of overall gross revenue is based upon the estimated number of poles sold at current prices (as of April 2014). The sales price per eucalyptus pole (i.e., the price received by the

farmer) is variable, between SDG 5 to more than SDG 25 per pole, depending on quality, quantity and other market conditions. The average price is close to SDG 10 per pole for the study sample. Given that the average number of poles sold per farmer in the study sample is estimated at 3,000 pieces, the total cumulative revenues earned from farm forestry can be estimated at SDG 30,000 at current prices (as of April 2014), on average, per forest farmer.

This amount is a significant contribution to household budgets. Some farmers, with large woodlots, confirmed the importance of their forest-based revenues as follows:

"By selling a small part of my woodlot, I managed to pay my holy journey to Mecca."

"Thanks to my woodlot, I managed to buy three residential plots in Zalingei."

"I was offered a Nissan truck in exchange for 3 feddan of eucalyptus poles in 2003, but I refused."

Most farmers, however, sell small quantities at regular intervals to meet recurring expenditures. Selling small quantities may lower the unit price to some extent. It is worth noting that traders have no difficulty filling their trucks in a single village through small-quantity sales organized by forest farmers.

Farm forestry allows farmers to diversify farm production and reduce risk. Under conditions of low water availability, eucalyptus production can be sustained when citrus production is interrupted. Under improved water governance, farmers convert eucalyptus woodlots to the more profitable citrus orchards. Food crops may fail due to drought, fire, livestock or temporary insecurity, whereas the woodlots may be more resistant to these pressures. On the other hand, woodlots are an investment that may be lost under extreme conditions of insecurity.



PHOTO 19: Citrus orchard on a terraced slope, Zalingei locality. Citrus orchards may replace eucalyptus plantations, if water availability becomes reliable. Conversely, eucalyptus may replace a citrus orchard, when security and water availability become problematic.

(Photo Credit: Abuelgasim Adam)

In the 1990s until the Darfur crisis, the Union of Farm Foresters managed to negotiate with the FNC a tax reduction on eucalyptus poles. The UNEP study on the timber trade in Darfur (in 2008) shows that there is a great deal of taxes levied on timber, including the following:

- FNC tax
- Locality tax
- Zakat
- Injured soldiers tax
- Security support
- SLA tax
- State tax (borsa)

The tax rate is variable, depending on the number and size of the poles. Nevertheless, the tax rate is likely to be very high if all taxes are counted.

Sudan has actively participated in REDD+ initiatives and processes. The principle of REDD+ is that communities and individuals who invest the time and resources in sustainable forestry will benefit financially through payments. Woodlots in Central Darfur State are a form of sustainable forestry, and the wood products harvested are sustainably produced. According to the principles of REDD+, these efforts should be financially rewarded. It is clear, however, that they are not rewarded but heavily charged by punitive taxes—the reverse of REDD+ expectations. Clearly, this contradiction needs to be addressed, and a new tax policy will need to be instituted in Sudan.

Examining experiences elsewhere in the Sahel regarding forestry tax reform may be useful (see box).

***Reduced taxes for sustainable forest management in West Africa:
An example from Niger, 1998***

In the West African Sahel, countries such as Niger and Mali have promoted community forests for sustainable woodfuel supplies to urban markets. There was no local LPG production; therefore, woodfuel was the major cooking fuel in many towns. Although hundreds of community forests (of the kind found in El Ain) were established, the competition from woodfuel produced on unmanaged forests on public land was fierce. Laws were adopted which ensured that woodfuel from sustainably managed community forests and sold in town were taxed much less than woodfuel produced from unmanaged sources. This is called a 'differential tax system': the taxes levied on wood from registered forests were approximately 35 per cent of those levied in all other cases.

3.5. Women as farm foresters

Out of 137 forest farmers surveyed by the study, 33 per cent are women forest farmers. Women own land through inheritance, through a dowry system, or through purchase. As with residential plots, women register their land in their names independently of their husband. And as with the citrus gardens and tomato fields in Jebel Marra, women have full rights over their land and the associated produce. Some women involve their husband or sons to bargain with timber traders on prices. In terms of gender equality, farm forestry in Jebel Marra can be said to rank high.

Furthermore, women are active in nursery activities, including seed collection, polybag filling, seed sowing, irrigation and other nursery practices. In the forest sector, it is generally felt that women are better at these activities than men. In terms of tree planting and woodlot establishment, the study noted that girls play a more important role than boys.

In terms of constraints experienced by women, insecurity is clearly the biggest issue, along with related livestock intrusion. Men are also encumbered by these challenges.

Farm forestry in East Africa

Farm forestry is very well developed in parts of East Africa, where rainfall is good and construction wood markets are sizable. West Kenyan farm forestry was studied in much detail in 1983. In one area, a study found 30 per cent of the land as eucalyptus farm woodlots. One in three farmers had a tiny tree nursery (45,000 nurseries in total), and almost all farmers had some form of farm forestry on their land. The proximity to large urban markets (such as Kisumu) was advantageous. It was also noted that no farm forestry assistance was provided by the forest service, and that there was no need for such support.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. El Ain community forest management

Protection offered by community forest registration

All villages researched in 2014 with a gazetted forest reserve have a legal document to support ownership. All interviewed villagers appear to be aware of the community's legal ownership of the forest. By 2001, 14 community forests had been gazetted with NFMP assistance; later and without NFMP support, another 12 forests had been gazetted.

FNC in El Obeid recognises and supports the status of gazetted community forests. Cards have been issued to three members of each committee, which provide legal support to deal with forest offences in court. FNC in the State has provided legal support to communities involved in court cases, cases not only concerning forest offences but also cases involving hafir ownership, such as a case against the State Water Corporation.

Nevertheless, not all FNC staff members are fully aware that the forest is gazetted as a community forest. Some staff members are under the impression that the forests are gazetted as FNC federal forests with benefits uniquely assigned to the villages mentioned on the ownership certificate. This type of misunderstanding requires further awareness raising.

In El Ain and elsewhere in Kordofan, outsiders may appropriate land that settled communities and pastoralists have long considered their traditional land. For example, in the area around El Ain, a concession of 25,000 feddan of federal forest and public land was leased to the Malaysian African Company. In another case, one Amir gave 12,000 feddan to another traditional leader.

It seems that these types of concessions did not affect the 26 gazetted community forests, which indicates the tenure security offered by forest registration. The safeguarding of community rights is clearly a major achievement. Once gazetted, the village committee has effective authority for the supervision and policing of its forest. The village committees are in a position to enforce the local rules adopted for the community forests.

This oversight and jurisdiction only works if offenders respect local decisions, including prescribed penalties. If offenders do not respect local rules and institutions, the committee engages in court proceedings. Such cases are presided over by a local magistrate. The process of taking an offender to court

is expensive for communities, given the time and money required and the modest fines imposed by the courts. This should be subject to policy discussion and review.

Replicability of the community forest registration model developed in El Ain

The capacity of community groups to reserve and register land as community forests is put at risk by high registration costs. Under NFMP, the project paid all costs for surveying and registration. This option is not open to communities not supported by a project.

The time required to register forests has been another issue. The average duration—from the moment a community submits an official request for a community forest to the time a certificate of ownership is issued—is four years, and this was only possible with considerable input from NFMP staff.

Since 2005, the government has adopted a simpler, decentralised registration procedure, which is completed at the state level. One village visited in 2014 was found to have extended a gazetted community forest of 100 feddan to 3,150 feddan using the state-level procedure. The modalities and impact of the new procedure should be studied, discussed and published.

Role of management plans

NFMP has played an important role by assisting villages in developing and implementing local forest management plans that govern the administration of each community forest. NFMP went to great lengths to prepare and support the villages in their quest to manage their forests. However, by 2014, none of the forest management plan documents existed. One constraint identified is that such plans are large and complex written documents, whereas most villagers are often illiterate.

It should be noted that the federal gazetted forest reserves often do not have updated, approved management plans. The Forest Sector Review noted that less than 1 per cent of all federal gazetted forests have a management plan.

Given that community forests are generally quite small, and forest products have little market value (unlike the large gazetted Sunut forests in the Blue Nile State), one can hardly expect that the communities would have prepared new plans without any outside assistance. The absence of updated plans, however, does not mean that the community forests are not sustainably managed. Proof of forest management observed in 2014, 13 years after the end of NFMP, includes the following:

- the existence of community forests, and their committees, in all visited villages;

- the sanction of local offences, with penalties or confiscation, and in other cases, a simple warning;
- the ongoing court cases in El Obeid, if local sanctions are not accepted;
- regular forest inventories (in some villages); and
- tree nurseries and recent tree planting activities, with or without micro-catchments.

The fact that formal, written plans do not exist is not a constraint. Examples throughout the Sahel show that formal plans are not necessary for effective local forest management. Proof and general acceptance of ownership are, however, essential. For wide-scale application, Sudan needs a national policy favouring community-based natural forest management.

Food for work

NFMP tapped into food aid through food-for-work programmes in order to regenerate community forests, which had suffered from years of drought. It helped villagers to improve their community forest and to learn new forestry techniques. The moment NFMP stopped providing food, villagers stopped making the large micro-catchments for reforestation. This demonstrates that food-for-work schemes can be used for short-term benefits but unless techniques used are locally appropriate, they are not sustainable.

Environmental impact: Forest regeneration and ecological succession

The project has been technically successful in forest plantations—even in years of low rainfall—due to the micro-catchment techniques employed. For long-term sustainability, it would be preferable to rely on natural regeneration without expensive micro-catchment and tree planting schemes, as long as protection against livestock overgrazing is provided. Natural regeneration was not possible during years of very low rainfall.



PHOTO 20: Old trees in a community forest without natural regeneration. This photo evidences the current conditions in most community forests in El Ain. A great deal of livestock has arrived from South Kordofan due to the conflict there, and villagers cannot keep pastoralists and their herds out of the community forests without the risk of more conflict. Accordingly, one can hardly expect the villagers to bear the cost of sustainable forest management whilst pastoralists reap key benefits without cost sharing.

(Photo Credit: Sanjak El Amin Mohamed)

The success of community forests can be evaluated by comparing what happened to other forests in the buffer zone that were not registered. It seems that almost all such unregistered forestland has disappeared. This is a measure of success of the registered community forests.

Over the last five to ten years, livestock pressure has been very high as a result of north-bound pastoralists fleeing conflict in the south. As such, neither FNC nor SOS Sahel has been able to tackle the problem of overstocking. As a result, in 2014, the rate of natural regeneration is very low in most community forests in spite of very good rainfall since 2006. In other words, the overstocking can be explained, to some extent, by political changes and conflict further south.

Valuable tree species (such as *A. tortillis*, *A. mellifera* and *A. senegalensis*) have almost disappeared in some forests and have been replaced by species more resistant to intensive livestock pressure, such as Laot. Many villagers note that large trees are now blown over during heavy winds, without any regeneration of the species. On the other hand, in some well-managed community forests, more valuable species dominate. Those forests are well protected against livestock overstocking.

It is interesting to note that the same phenomenon occurs in Rawashda forest. Even though Rawashda forest benefits from much higher rainfall and is an old FNC reserve, it is also under great livestock pressure. Old trees fall over, and there is hardly any regeneration of valued species. Laot takes over in many places. This appears to be a nationwide issue that requires debate at all levels. If it cannot be tackled, the future of REDD+ in Sudan is in doubt.



PHOTO 21: Rawashda gazetted forest, Gedaref State, December 2013. In this forest, the same forest degradation problems occur as in many El Ain community forests: very high livestock pressure and absence of natural regeneration, except for Laot.
(Photo Credit: Hussein Suleiman)

Socio-economic impact of the community forests

The initial cost of community forestry is attributed to registration, which used to be a very long process; however, the process is now simplified. If the forest is initially in poor condition, plantation forestry is necessary and can be a major cost item. The recurrent cost of community forest management is mostly that of protection, either local protection or through the court system.

In many community forests, wood production is limited to local consumption. Much of the wood serves as woodfuel, but construction wood is also harvested. More valuable wood may be auctioned in some villages. In a few villages, hay is harvested annually for sale to urban markets. Given that the community forest is a communal asset, any financial benefits derived tend to pay for community services: it benefits poor and rich alike.



PHOTO 22: Abu Hemera market with various forest products for sale. Most community forests produce for local consumption, not for the markets. Major economic development cannot be expected from the community forests; that has to be stimulated through other initiatives (such as microfinance for women).
(Photo Credit: Paul Kerkhof)

The forests also have an important function as a range resource for both local and pastoral livestock. In economic terms, this function likely holds the most significant value. The range resource benefits pastoral production, so it may not be perceived as a direct benefit to the settled community, even though it contributes to social relations. Non-wood products such as fruit, leaves and medicine, dyes, and materials for handicraft are important in variable proportions, depending on the species composition.

There is a concern about the attitude of the youth with respect to natural resource management. In some villages, it was found that elderly people appreciate their forests, while youth believe that the government, not the community, should take responsibility for forest management. Furthermore, young people took livestock corridor boundary markers to amuse themselves. It is noted that young pastoralists may not respect the traditional rules of environmental governance. It remains to be seen if the next generation shares the values necessary for community-based natural resource management; sharing the same values should not be taken for granted.

The interests of women

It is important to address the specific interests and cultural conditions of women, which can differ from those of men or local leaders. NFMP has helped empower women to participate in public events (such as major meetings), where, previously, women did not express themselves. Although the membership of women in the community forest committees can be pretence, the research found that women in El Ain participate effectively in decision making.

The 2014 research did not observe conflicting interests of major significance between men and women. Women appear to benefit from the availability of firewood and non-wood products, whereas men benefit predominantly from livestock production and tenure security.

The concerns of pastoralists and farmers

NFMP involved pastoralists belatedly, or not at all, in the community forest registration process. This led to problems at later stages. It is now clear that involvement of pastoralists in forest registration or hafir construction should be done at the outset, during the awareness-raising and negotiation phases.

Furthermore, pastoralists have specific needs, such as well-delineated corridors and resting places, which require land use–planning maps. This should be considered in any natural resource management strategy and programme. Acknowledging the concerns of both pastoralists and farmers is now a generally accepted practice throughout the Sahel, but adequately addressing the conflicting interest remains problematic.



PHOTO 23: Cattle concentration around water sources, Om Habila. Note the lack of natural regeneration. Such forest is important for livestock production and, in that way, for the local and national economy. However, overgrazing leads to ecological problems.

(Photo Credit: Abdelmajid Mohamed Yahya)

In the example from Gagrur village, a dispute between the farming community and the transhumant Shanabla was a case study for NFMP. An agreement was drawn up in 1999, but it was found later that many issues remained unresolved. A Shanabla family recently settled in the community forest, claiming it as their traditional land. Both the court and local arbitration procedures are ongoing, mostly through "conflict resolution centres," which have been set up in Kordofan.

Involving pastoralists in natural forest management from the outset is now generally accepted, but it is evident that it will not resolve all problems. The influx of pastoralists due to conflict in South Sudan is one issue, and the ever-increasing herd size is another. Unless pastoral pressure is managed, another crisis is in the making, especially when the variable rainfall cycle brings on the next drought.

How can the El Ain experience be useful elsewhere in Sudan?

El Ain offers over 25 years of experience in natural resource management, including management of water and pastoral resources. The experience shows that the forestry sector alone does not respond to all sustainable land use needs; therefore, forestry management should find synergies with other sectors. Collaboration and coordination between rural development institutions (water, agriculture, livestock, range and forestry) are thus essential.

The fragile nature of the pastoral sector has been exposed by conflicts further south. The kind of pressure brought to bear on forest resources is unsustainable, in spite of forest registration. Similar phenomena exist in east Sudan, notwithstanding the differences between east and west Sudan. A national dialogue to better balance the sustainability of natural resources and the needs of natural resource users is recommended, and the El Ain experience is a useful contribution to this needed discussion.

Registration of natural resources requires a great deal of negotiation. The extremely long and costly process of community forest registration has been shortened since registration was decentralised to the states. The constraints to local registration are not clear: there are no statistics of how widespread registration has become or how well natural resources are protected once registered. This should be studied and the findings widely published.

4.2. Jebel Marra farm forestry

The combination of water, markets and security

The success of farm forestry in Jebel Marra rests on a few key issues: a fair amount of rainfall (or alternative water sources), reasonable access to urban markets and a reasonable level of security. Where these factors combine, farm forestry thrives.

Construction wood fetches much better prices than firewood in Jebel Marra, as in Sudan and the rest of the world. Eucalyptus is suitable for construction and is resistant to local environmental challenges such as fire and grazing. Forest farmers in Jebel Marra have reasonable access to markets, and have benefited from reduced competition from government forest reserves. Finally, the security situation near Zalingei and Nyrtete is not good but just good enough for sustainable farm forestry. Where security is poor (e.g., in Mortagellow), farm forestry cannot sustain itself.

A fair degree of gender equality in farm forestry

At present, about one-third of all forest farmers in Jebel Marra are women, who own and manage their forests. The women are autonomous in all decision making related to farm forestry and are entitled to the profits made from their endeavours. Furthermore, women tend to be more apt than men in tree nursery activities, and girls are more active than boys in tree planting. In gender equality terms, the case of Jebel Marra farm forestry is more convincing than many other domains.

What government can do: Lower taxes on sustainable forestry

Sustainable forest management (SFM) should be financially rewarded to motivate those who manage the forests. This idea is the basis for the REDD+ international scheme of financial transfers for SFM. At present, sustainable farm forestry in Jebel Marra is not financially rewarded; instead, it is heavily taxed. Those taxes weigh greatly on the farm forestry enterprise. SFM should be a tax-exempt or low-tax venture.

FNC is a corporation and has been a financially autonomous body since 1989: it is expected to finance itself. This may appear an attractive idea, but it also means that FNC must extract taxes in order to finance the national forest service (i.e., to finance itself). While the objective of the FNC is to foster conservation and SFM by communities and individuals, the FNC is expected to survive financially from levying taxes on those it is trying to assist. The FNC model is contrary to all other national forest service models in the Sahel. A differential tax system, adopted in many Sahelian countries, may be challenging for the FNC if that means greatly reduced tax revenue, unless it receives additional support from the national budget. A more peaceful Darfur would, of course, enormously stimulate farm forestry.

5. REFERENCES

General:

Kerkhof, Paul. *Agroforestry in Africa: A review of project experience*. Edited by G. Foley and G. Barnard. London, UK: Panos Institute, 1990.

Siddig, El Nour Abdalla. *Sudan Forestry Sector Review FNC*. 2007.

United Nations Environment Programme. *Destitution, distortion and deforestation: The impact of the conflict and the timber and woodfuel trade in Darfur*. Khartoum, Sudan, 2008.

SOS Sahel Project documents:

Egemi, Omer, and Hanan Mutakwili. *Analysis of conflict resolution experience*. SOS Sahel UK, 2001.

Meadows, Nicholas A., et al. *Report of interim evaluation mission*. SOS Sahel UK, 1997.

Seif Eldin, Abul Gassim, Edwin Shanks, and Osman Omar. *El Ain Natural Forest Management Project: Phase I mid-term review*. SOS Sahel UK, 1992.

SOS Sahel UK. *Report of the final evaluation*. 2001.

Studies commissioned by the FNC/SOS Sahel/UNEP project in 2014:

Ahmed, Faiza Siddig Mohamed Ahmed. *Community based Natural Forests Management in Sudan: Lessons learnt from the El Ain Natural Forests Management Project*. 2014.

Khamis, Mohammed Adam and Adam, Abuelgasim Abdalla. *Sustainable forest management by local communities and farmers in Sudan: A review of experiences gained through JMRDP intervention since the 1980s*. 2014. In a separate note: *Women and private forests in Central Darfur* (May 2014)

Rahim, Sawsan Khair Elsieid Abdel. *Gender dimension: NFMP lessons learned*. 2014.

Sanjak, Elamin. *Lessons Learned Project NFMP*. 2014.

El Ain Natural Forest Management Project

Isam Hassan Elobied Rahama. *“Adoption of water micro-catchments for rehabilitation of vegetation cover.”* Thesis, University of Khartoum, Sudan, 2007.

Kerkhof, Paul. *Local forest management in the Sahel: Towards a new social contract*. Edited by G. Foley. London: SOS Sahel UK, 2000.

Mohamed Mergani Elobeid. *“The role of forests in poverty alleviation case of Shaikan Locality, North Kordofan State.”* Thesis, University of Khartoum, Sudan, 2007.

Sanjak, Elamin. *“Assessment of Community forestry activities in the desert prone zone of Sudan.”* Thesis, University of Khartoum, Sudan, 2000.

Tarig Tarig Eltigani Fadlalla Adam Algadall. 2006. "Impacts of modification of bush fallow system on the sustainable livelihood of local communities in Um Ruwaba Locality, Sudan." Thesis, University of Khartoum, Sudan, 2006.

Jebel Marra Rural Development Project

Ahmed, Abdalla Ahmed. "Land use history of Jebel Marra, Sudan, as related to the present distribution of woody vegetation." *GeoJournal* 6, no. 1 (1982): 5–14.

Awok, Samuel J., E. Sanjak Mohamed and Hisham M. M. Tahir. "Prospects of community forestry in Jebel Marra Area, Greater Darfur State, Sudan." *Journal of Natural Resources and Environmental Studies* 1.2 (2013): 19–24.

Hamid, Abdel Hamied Adam. "Social forestry in western Sudan. The experience of Jebel Marra Rural Development project" (1992): 1-16 unpublished.

Sanjak, Elamin. Assessment of community forestry activities in the desert prone zone of Sudan. Thesis, University of Khartoum, Sudan, 2000.

United Nations Environment Programme. Destitution, distortion and deforestation: The impact of conflict on the timber and woodfuel trade in Darfur. Khartoum, Sudan, 2008.

United Nations Environment Programme - Sudan
House No. 4, Block 9
Amarat East
Street 41, Khartoum

Web: <http://www.unep.org/sudan>

Facebook: <http://www.facebook.com/UNEPSudan>