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**COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS
AND NATURAL RESOURCE SYSTEMS ANALYSIS**

A PROPOSAL TO PREPARE A REGIONAL RESOURCE OVERVIEW
ON SETTLEMENT AND RESOURCE SYSTEMS ANALYSIS AND MANAGEMENT
INCLUDING LAND USE AND LAND POTENTIAL MAPS
FOR KORDOFAN REGION

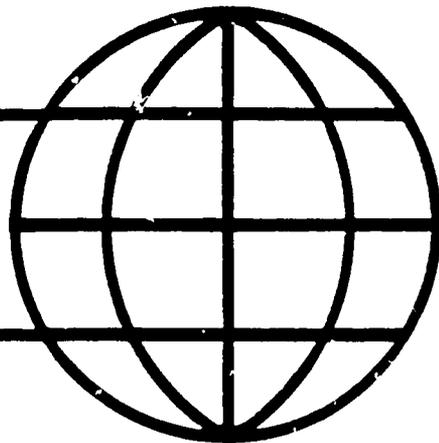
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Submitted by

The Regional Government of Kordofan

The Department of Geography, University of Khartoum

Clark University



Clark University

International Development Program
950 Main Street
Worcester, MA 01610

Institute for Development Anthropology

Suite 302, P.O. Box 818
99 Collier Street
Binghamton, NY 13902

PDAAR 860

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9 January 1984

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KORDOFAN REGION
Submitted by:
THE REGIONAL GOVERNMENT OF KORDOFAN
THE DEPARTMENT OF GEOGRAPHY, UNIVERSITY OF KHARTOUM
CLARK UNIVERSITY
on behalf of
THE COOPERATIVE AGREEMENT
IN SETTLEMENT AND RESOURCE SYSTEMS ANALYSIS

FIRST VERSION 9 August 83
SECOND VERSION 9 January 84

INTRODUCTION AND BACKGROUND

A number of activities have led to this proposal. These include:

1. Regionalization

Beginning in 1981, the Government of Sudan declared that development planning and implementation would be carried out primarily through the newly established regional governments. Regional governors, ministries, and councils were subsequently created to respond to this need. In Kordofan Region, after two years of preparatory work, the regional government now has an infrastructure in place which is ready to begin the task of project identification and implementation.

2. Resource Pressures

In much of Sudan, including Kordofan, pressures have been mounting on renewable resources, especially water, arable land, grazing lands, and woodlands. These pressures, often linked together under the label of desertification, are well documented in Sudan in general and Kordofan in particular. In the Kordofan Region, for example, gum arabic trees (Acacia Senegal) and other trees have been cut in substantial numbers, partly because of increasing needs for charcoal and fuelwood and also because of land clearing for agriculture; increased livestock pressures have denuded large numbers of former grazing lands, especially in the northern districts of Kordofan. Agricultural yields, for example, in dukhn and dura (basic food products) or groundnuts (an important commercial crop) have declined at alarming rates; installation of boreholes and other water sources has attracted livestock, thereby placing inordinate stress on grazing lands within 6 to 10 kilometers of the boreholes; large mechanized farming schemes, relying on rainfed water sources, have drained the soil of nutrients as well as disrupted traditional grazing patterns. The overall resource picture in Kordofan is one of renewable resources being drained at rates far in excess of their replacement; a southerly movement of pastoral groups due to desertification in northern districts; an expansion of rainfed agricultural activities in increasingly marginal lands; and an increasingly intense competition for the region's productive resources of water, arable land, grazing land, and wood supplies.

3. Project Activity Concerned with Resource Management and Monitoring

As these pressures have deepened, several preliminary steps have been taken to learn more about the precise nature of the problems and to begin taking measures to ease the pressures.

a. Environmental Training and Management in Africa (ETMA)

Staff from the Department of Geography and the Institute of Environmental Studies, University of Khartoum, have been monitoring resource trends in several parts of Kordofan (as well as other parts of Sudan) to determine the rate and intensity of environmental degradation. A seminar(s) with local officials and farmers is planned to share the results of the findings with users of the land as well as to identify small scale project activity which would counter resource degradation.

b. Baseline Survey and Monitoring Program for North Kordofan Rural Water Supply

A team from the University of Khartoum conducted an environmental impact assessment prior to implementation of a rural water project designed to rehabilitate local water supplies and drill new boreholes. Their recommendations changed a number of basic project design features.

c. Hunting Technical Surveys Resource Inventory of Three Districts in Kordofan

A British team spent two years in the field (1980-82) gathering resource data in the central and western portions of Southern Kordofan Province. Their inventory, though not yet adopted in formal project planning, has provided important resource data for three of the region's newly formed districts. Hunting has also carried out work in other parts of the region in earlier years (1950's) as has Doxiades Associates (1960's), all related to resource potentials in Kordofan.

d. Western Sudan Agricultural Research Project (WSARP)

Funded by US-AID and the World Bank, WSARP is developing research stations (Kadugli and El Obeid) in Kordofan. In particular, the research focuses on land management in semi-arid environments. Underway for two years, WSARP activities are now beginning to develop sets of recommended practices to be implemented in Kordofan Region.

e. Rural Finance and Planning for Kordofan Region

With support from US-AID, US planners are working with regional officers in economic and development planning (Ministry of Finance and Economics) to strengthen capabilities in planning, including data collection, analysis, and retrieval as well as in development of a regional plan.

f. Priorities of Regional Ministries

The Office of the Governor as well as the Ministries of both Agriculture and Planning have stated high priority for a region-wide land use policy and for preparation of a regional development plan as essential first steps in organizing interventions to combat desertification and to improve productivity. Critical to preparation of a sound land use policy is an informed body of planners and decision-makers in terms of the resource base and resource potentials.

Given rising resource pressures in the region and the series of preliminary steps already underway, the Regional Minister of Agriculture, with the backing of the Regional Minister of Finance and Economics, requested US-AID to investigate ways in which a resource inventory might be carried out. There were two components in the request:

- a. a broad-based and quick review of the resource situation in the region as a whole;
- b. a more detailed district-by-district inventory for the districts not covered by the recent Hunting Technical Services report. The district inventories would have provided data for a thorough regional development plan.

Based on results from the inventory, the regional ministries would then be in a better position to identify and locate development projects.

THE PROPOSAL

In response to this ministerial request, the US-AID mission in Khartoum made contact with the AID funded Cooperative Agreement in Settlement and Resource Systems Analysis and Management, through Clark University and the Institute of Development Anthropology. Clark University took the initiative and sent a team of two professors from Clark's International Development Program (B.L. Turner and R. Ford) and two professors from the University of Khartoum, Department of Geography (M. Khogali and I. alam el Din) to meet with regional officials in El Obeid, capital of the Kordofan Region. The names of individuals contacted on this preliminary visit (August, 1983) are attached as Appendix A.

Positive response to proposals circulated after the August visit led to a recommended follow-up visit from Clark. R. Ford arrived in January, 1984 and joined with a four member team for an overland field trip to Kordofan Region.

The group entered the Region via Kostî and Tendelti, making stops along the way between Umm Rwaba, Rahad and El Obeid. The journey took three days and led to the following conclusions:

1. Range pressures are becoming severe. Loose soil (goz), large stock herds, and spotty rains last year have led to severe stress in a number of areas. Rangelands near water points seemed especially stressed.
2. Acacia Senegal are becoming scarce. One member of the Geography Department (Dr. el Sammani) had grown up in Umm Rwaba and pointed out a number of areas where the gum arabic trees have virtually disappeared.
3. Substantial numbers of seasonal migrant workers are leaving Kordofan on their way to the Gezira cotton fields. Because economic livelihood systems in Kordofan are coming under heavy pressure, farmers have little choice but to seek external wage employment. As it is harvest time on the Gezira, the most significant labor outflow was headed there.

Any estimate at precise number is risky. Generally one would encounter oncoming "suk lorries" (literally market trucks) every 10 or 15 minutes. They tended to bunch up so there might be 2 or 3 in a group. Some were crowded and carried as many as 20 or 30 people. Others carried only freight. By another measure, one can count trucks parked at rest stops. Food stalls and tea shelters are positioned at roughly hourly intervals (15km to 25km).

At any given time (24 hours a day) there seemed to be from 4 to 10 trucks at a stop. One certainly had a sense of bustling activity.

Perhaps of equal interest is the effect of desertification along the roadway. The track generally parallels the railway. During the entire three days, we saw several hundred suk lorries (mostly British and Japanese built) some pick-up trucks, and 3 Land Rovers, two of which were ours. The Landrovers became stuck in the sand a few times and two of the three broke spring leaves. The higher suspended suk lorries seemed to plod along with generally little difficulty.

4. Not all of the range is in trouble. A number of dunes were well stabilized with shrubs and grasses well in place and surface soils well fixed. These dunes tended to be distant from human settlements. They demonstrate that stabilization of the land, given good management, is possible.
5. Not all of the trees are disappearing. A number of government sponsored reforestation efforts, some dating back to colonial times, have endured. In some cases, dense growths adjacent to villages have been well protected. In other cases, rain shadow and stream bed tree sites have prospered whereas the more exposed have not.

6. Mechanized, rainfed farming schemes were highly visible. Some of the crops -- mostly dura -- looked quite good, in spite of bad rains this past July-August. These schemes provide local employment and, if rains are adequate, a handsome return to the investor. Other large fields in rainfall deficit areas had already turned to a fragile brown and promised no return at all. We also spent some time with a farmer who harvested 200 bags of dura in 1982 but only 17 bags from the same fields in 1983 because of an infestation of stalk borers.
7. Overall, the situation of resource pressures, though not without hope, is one of growing concern. Significant interventions in land use management must emerge soon or there will be little vegetation and virtually no top soil in these goz areas.

The field visit concluded in El Obeid where the team met with regional officials (see Appendix B). We reviewed details for the resource assessment as well as discussed ways in which a seminar in Northern Kordofan could lead to small scale interventions to combat desertification. In both cases, reception was indeed positive to the ideas recommended.

These discussions resulted in agreement on the following strategies:

1. Goals

- ... to improve the information base on the region's resource base in order to increase the effectiveness of development planning;
- ... to review recent and current projects and examine documents related to Kordofan;
- ... to begin development of a documentation center for resource management planning in Kordofan;
- ... to identify major resource potentials as well as to provide caution about adverse resource trends;
- ... to develop an information base to guide planners and policy makers in project identification and site selection.

2. Components

- a. Initial Regional Resource Overview, including the production of several maps (to be initiated as soon as possible);
- b. District inventory and resource management plan for a district with predominantly clay soils (Rashad) in the Southern Kordofan Province (to be determined upon completion of the initial regional overview);
- c. District inventory and resource management plan for a district with predominantly sandy soil (Nahud) in Northern Kordofan (to be determined upon completion of the initial overview).

Upon completion of the first component, plans will be considered for the two district assessments (b. and c. above). When these three are complete, other districts may be considered. The main goal at this initial stage is to work out a quick and effective regional overview which will allow planners to get on with the work of devising a regional land use policy.

3. Institutional Arrangements

The team which visited Kordofan in August, 1983, was impressed with the capability of individuals in each of the region's ministries and departments. The January visit reinforced this finding. It is proposed that the regional staff become full and equal partners in the field work and data analysis proposed below. Further, because Clark University and the University of Khartoum, Department of Geography have both a long working relationship on matters of resource management and planning as well as a formally signed agreement of cooperation, it is proposed that staff from each institution provide technical expertise.

4. Staff Training

Although regional staff have considerable field experience in project design and implementation, they do not necessarily have skills of resource assessment. Prior to undertaking the field work to do the regional overview, a week-long training session will be held. The primary audience for the training will be the regional technical officers who will join in the field work.

Topics of the field training will include:

- ... field methodologies and techniques
- ... correlations of map information to field situations
- ... soil analysis
- ... vegetation analysis
- ... development of work plans and field schedules
- ... use of field equipment

The training will also present the rationale for preparing the regional overview as well as review the uses of maps and papers which will result from the resource assessment.

The University of Khartoum, Department of Geography will take primary initiative in organizing the brief training session.

5. Initial Regional Resource Overview

Activity will begin as quickly as possible, perhaps as early as March or April, 1984. It will consist of four inter-related pieces:

a. Data Review

Substantial information on Kordofan resources already exists, including reports, books, articles, maps, Landsat imagery, air photography, and research studies. Much information was drawn together by the earlier Hunting and Doxiades work; much is available at the University of Khartoum; the regional ministries have some information; libraries in North America house a surprisingly large number of articles and reports on Kordofan. It is proposed that a small data team be commissioned to undertake a two step process:

- ... to collect reports, papers, and documents relevant to resource issues in Kordofan and prepare a comprehensive listing of these documents.

- ... to select a sample of the more critical and prepare brief summaries, to be published in a small handbook for regional officers. The handbook would also serve as a guide to which departments have which information.

Work would be carried out simultaneously in the region (by regional staff so designated), Khartoum (by University of Khartoum staff and a research assistant), and in the US (by a Clark research associate).

The output from this exercise would be a comprehensive collection of the documents which will be housed in the region (photocopies where originals are out of print) as well as a possible computer-stored inventory (possibly to

be held at the University of Khartoum) which will be accessible by author, topic, district, sector, problem, etc. on resource information for Kordofan. Use of the computer to store documentary information also creates the possibility of developing a geographical/ecological information system, making use of a very small and inexpensive micro-computer which could be housed in the Geography Department, University of Khartoum.

b. Documentation Centre

The data and documents collected during the data review will be housed within the Planning Department, Ministry of Finance and Economics, Kordofan Region. A room has already been designated for the Centre; a librarian has been hired; a photocopy machine has been ordered so that users of the Centre will be able to reproduce relevant information for their own needs. It should be stressed that all officials in the region noted that such a centre would be very useful in their daily work in agriculture, water, grazing, energy, forestry, etc. Management of the Centre would be the responsibility of the project in Rural Finance and Planning and eventually be taken over by the Planning Department staff.

c. Project Review

Another component of information required for a resource inventory is the present state of project activity. The project review will have four purposes:

- ... to prepare a descriptive inventory (no more than one page per project) of activities underway as well as work recently completed;
- ... to select those projects which have had or are having especially positive or negative impacts and gather additional data on both practices to be duplicated as well as avoided;
- ... to locate each project on a base map of the region, possibly using a coding system noting the type of project activity;

to prepare a synthesis or review summary of the net impact of project activity on the region's resources. Special attention will be given to activities which may be having an adverse impact.

The project review will be carried out jointly by regional staff and staff from the University of Khartoum, with assistance as needed from US specialists.

The output will be a descriptive inventory (including a map) of all major development projects in the region plus an analysis of the resource impact of a selected number of projects. This resource impact analysis will be a considerable help in developing information for the next activity, land use classifications.

d. Land Use Zones and Mapping

Once the data have been gathered and the projects reviewed, staff will devise a system of predominant land use classifications, based on field work and then checked against information in Landsat satellite imagery. During the data analysis, it may be determined helpful to reproduce in limited numbers some of the base resource maps previously prepared by other organizations but for which multiple copies are simply unavailable. For example, the Department of Land Use and Soil Conservation, Regional Ministry of Agriculture, has prepared an excellent soils map, but only one copy is available; other maps of vegetation, rainfall, topography, etc. are in short supply if not totally unavailable to regional officers. Decisions on reproduction will be taken after project activity has begun and better perspectives are available on the precise nature of information needs.

The first new map to be prepared will be one of land use classifications. It will incorporate present land use systems, noting the location as well as distribution. Although it is too early to list these classifications in precise terms, they would probably fall along the following lines:

irrigated land
rainfed subsistence - traditional
rainfed commercial - large scale
rainfed small scale
mixed agriculture and livestock
forested and mixed agriculture and forestry
pastoral, seasonal dry season
pastoral, seasonal wet season
pastoral, year-round use
sparsely used land

Note that these ten classifications are included for illustrative purposes only. The actual categories will be determined on the basis of data analysis and interpretation.

Once the land use systems have been identified and located, a series of four sets of maps, as noted below, will be prepared. Simultaneously, an approximation of human population densities will be presented in map form. Each map will be accompanied by a brief explanatory guide.

The maps will present not only land use practices and potentials, but will also attempt to illustrate the type, distribution, and potential for the region's four primary resources: land, water, vegetation, and animals. As possible, in the case of animals and water, attempts will be made to project quantities. However, the exercise is not intended as a definitive animal census or water availability study so any efforts at quantities will be based on representative samples rather than thorough and comprehensive assessments.

The four sets of maps include:

condition:

a review of farming systems currently in use and the situation of the resource base as a result of current land use practices;

productivity:

this map would be presented in two parts. The first would indicate approximate productivity per unit of production. The goal would be to show productivity in each classification zone. The second would illustrate the variability per farming system. In both cases, the maps would indicate the

approximate levels of productivity now being achieved or to be expected under current land use methods.

utilization/potential:

this set would have up to six parts, depending on funds available. The goal would be to present a review of considerations and constraints as alternative land uses are considered. The sub-categories:

- (i) rainfall variability
- (ii) pests, livestock diseases, human diseases
- (iii) biomass and water condition, as a means to indicate livestock and grazing pressures. This map might also include location of bore-holes in the region.
- (iv) food and diet preferences
- (v) soil moisture, soil temperature*
- (vi) wind-induced soil erosion; water-induced soil erosion*

needs:

a review of needs will be prepared. For each of the categories, a map will illustrate whether each resource is in deficit, equilibrium, or surplus. It may also be possible to identify areas of extreme resource degradation or "hot spots" which land use planners should know about.

- (i) food
- (ii) fuel/energy
- (iii) water*

NOTE* indicates that the map is of lower priority and will be prepared only if sufficient interest and funds are available.

A variety of information sources will be called upon to produce these maps. Most will come from present maps and reports. However, field work will also be required in the amount of roughly ten days per land system. Close consultation with regional officers, researchers, central ministry officials, WSARP, project managers, and several departments at the University of Khartoum will be included. It should also be noted that the purpose of the initial review is to produce a quick and indicative set of data and maps rather than a definitive and comprehensive survey.

The two basic goals of this phase of the exercise are: (1) to provide base data to enable planners to devise a land use policy, and (2) to provide improved resource data to technical officers in the region in order to increase the effectiveness of development planning. These two goals can be achieved through this regional overview.

Should the initial regional overview prove effective, consideration will be given to preparation of more detailed district resource assessments, as mentioned on page 4 above.

6. Resources Required for the Initial Regional Resource Overview

Personnel, equipment, supplies, and transportation will be the main resources required to carry out this work. They are listed by component:

a. Data Review

region: one month each from four technical officers

U of K: four months each for two research associates
two months faculty time

US: four months research associate
two months faculty time

direct costs: materials, reproduction, communication, travel

b. Documentation Center

region: these costs are already contained in the budget of Kordofan Rural Finance and Planning Project and would be no additional cost to the proposed budget for the resource assessment;

c. Project Review

region: one month each from four technical officers

U of K: four months research associate
two months faculty time

US: one month faculty time

direct costs: reproduction, communication, travel

d. Land Use Classification

Staff time in the field will consist of approximately 100 days field visit (10 classification systems x 10 days per zone). This would total 300 field days, given a field team of 3 people each. Each team would consist of one faculty member, one field officer, and one research associate.

region: three months for field visits
three months for data analysis

U of K: two months for faculty field visits
four months for research associate field visits
two months faculty data analysis
two months research assistant data analysis

US: two months faculty field time
two months faculty data analysis

direct costs: cartography and map printing, materials, field
transport, travel

It is proposed that one four wheel drive vehicle be provided as well as field equipment as a cost of the project.

APPENDIX A

Individuals with whom discussions took place 6-15 August 1983, Kordofan and Khartoum.

Ministry of finance and Economics (El Obeid, Kordofan)

1. Dr. Fatih El Tigani, Minister
2. Saeed Abu Kambal, Director of Planning

Ministry of Agriculture (El Obeid, Kordofan)

1. Dr. Farouk Mohammed, Director General
2. Dr. Suleiman Hussein, Director of Natural Resources
3. Abu El Ghasim Ab Deek, Director of Land Use and Soil Conservation
4. Ahmed Obeid Alla, Director of Horticulture
5. Bakhit Mohammed Musa, Director of Mechanized Farming
6. Dr. Khalil Idrahim Khalil, Director of Financial Resources
7. Faisal Mukhtar, Soil Conservation
3. Mohamed Najel, Agricultural Extension

National Administration of Water (El Obeid)

1. Lutfi Wahdan, Director of Water Resources
2. Mohamed Abdalla Shirsheir, Geologist

Other individuals in El Obeid

1. Miles Todar, DAI
2. John Zins, UNICEF
3. James Stearns and Mohamed Magzub, CARE

Individuals with whom the Clark-University of Khartoum team carried on individual discussion.

1. Dr. El Tag, Regional Minister of Agriculture, Kordofan
2. Ali Jamaal, Minister of Nomadic Section, Kordofan
3. Dr. Dafalla, Director, WSRAP

Appendix A continued

4. Dr. James Riley, Senior Advisor, WSRAP
5. Eric Witt, Section Chief, USAID, Khartoum
6. Dr. Tom Eighmy, Project Officer, USAID, Khartoum

Department of Geography, University of Khartoum

1. Dr. Mustafa Khogali
2. Dr. Ibrahim alam el Din
3. Dr. Galal El Tayeb
4. Anne Lewandowski

APPENDIX B

An initial visit took place in Kordofan in August, 1983. This visit produced a draft proposal which was circulated to interested parties. Individuals with whom discussion took place on the first visit are listed in Appendix A.

In January, 1984, R. Ford, along with Dr. M. Khogali and Dr. M. O. Sammani (University of Khartoum, Department of Geography) returned to Kordofan to collect responses to the initial draft and to work out a version acceptable to all parties. During the course of the January visit, the U. of K/Clark team had discussions with the following:

Ministry of Finance and Economics

1. Saeed Abu Kambal, Director of Planning
2. Abdulla Adam Hamduk, Department of Planning
3. Miles Todar, Department of Planning

Ministry of Regional Affairs

1. Daldon el Khatiem, Minister
2. Ali Jammaal, Department of Nomadic Peoples and Settlements

Ministry of Agriculture

1. Dr. Bashir, Minister
2. Dr. Farouk Ahmed Abdel Guafear, Director General
3. Dr. Suleiman Hussein, Director of Natural Resources
4. Dr. Hassan Osman al Nour, IES
5. Mohamed Ali el Hadi, Department of Forestry
6. Ahmed A. Obeidaila, Acting Director, Horticulture

El Obeid Research Station

1. Hashim Khidir Mukhtar
2. El Hag Hassan Abuelgasim
3. Abdelrahman Khidir Osman

Kordofan People's Assembly

1. Ibrahim Ali el Tom, Chief

Office of the Governor

1. The Honorable Fadalla Hamad, Deputy Governor

APPENDIX C

Estimated Schedule

The work program will begin as soon as approvals are in place. The total time need for the project is from 9 to 12 months, depending on when work begins. The only major constraint is that field work is almost certainly impossible in June, July, and August because of the rainy season. Thus, a theoretical schedule is attached which would have to be revised, depending when work actually begins.

<u>Date</u>	<u>Activity</u>
Months 1 - 2 - 2	Literature and Project Review
Month 3	Field Preparations
Months 4 - 5	Field Work
Months 6 - 7	Data Analysis
Months 7 - 8	Map preparation and cartography
Months 8 - 9	Printing, writing and reproduction of handbook and brief report

APPENDIX D

BUDGETS

(Illustrative)

A. Regional Staff and Costs (in Sudanese Pounds)

<u>Activity</u>	<u>Person Months</u>	<u>Cost</u>
1. Data Review	4	(see note)
2. Documentation Center	0	0
3. Project Review	4	(see note)
4. Land Systems Studies		
a. Field Work	6	(see note)
b. Analysis	3	(see note)
Field Per Diem (150 x 26)		3,900.000
Total Sudanese Pounds for Field		(see note)

NOTE: Field costs for regional staff are not known at this time.
Upon approval of project, precise costs will have to be determined.

B. University of Khartoum (in Sudanese Pounds)

<u>Activity</u>	<u>Person Months</u>	<u>Cost</u>
1. Data Review	2 faculty (2 x 1500) 8 res. asst (8 x 500)	3,000.000 4,000.000
2. Documentation Center	0	0
3. Project Review	2 faculty 4 res. asst	3,000.000 2,000.000
4. Land Systems Study		
a. Field	2 fac 4 res. asst	3,000.000 2,000.000
b. Analysis	2 fac 2 res. asst 6 secretary (@ 400)	3,000.000 1,000.000 2,400.000
Total salaries		23,400.000

(continued)

Appendix D (page 2)

B. University of Khartoum (continued) (in Sudanese Pounds)

Other Expenses		
a. telex, communication, office supplies		2,500.000
b. field equipment		3,000.000
c. Lorry rental (with cook)		58,200.000
d. petrol		15,000.000
e. map preparation		
(i) cartography (8 maps)	10,400.000	
(ii) printing	12,800.000	
(iii) equipment & supplies	<u>7,000.000</u>	
	30,200.00	30,200.000
f. Field Per Diem (100 x 26)		<u>2,600.000</u>
	Total other	111,500.000

Salaries 23,400
 Other 111,500
 sub-total 134,900

U of K
 overhead 26,980 (20% costs)

Total 161,880

C. Clark and related equipment purchases (in US \$)

<u>Activity</u>	<u>Person Months</u>	<u>Cost</u>
1. Data Review	2 fac (2 x \$3,333)	6,666.00
	4 res. assoc (4 x 1,000)	4,000.00
2. Documentation Center	0	
3. Project Review	1	3,333.00
4. Land Systems Study		
a. Field	2	6,666.00
b. Analysis	2	<u>6,666.00</u>
	Total salary	27,331.00

Other Expenses

a. Fringe at 29.82% x 27,331 = 8,150	8,150.00
b. Off campus overhead at 35.8% x 27,331	9,784.00
c. communication and office supplies	2,500.00
d. field equipment	3,000.00

(continued)

Appendix D (page 3)

C. Clark (continued)

e. insurance and vehicle repairs	3,000.00
f. reducer/enlarger for U of K cartography	2,000.00
g. copy machine for U of K	1,500.00
h. Cartography	
(i) data compilation	3,000.00
(ii) drafting	7,000.00
(iii) printing	4,000.00
(production of final report, handbook, and related publications)	5,000.00
i. shipping	6,000.00
j. vehicle (Ford, FWD pick-up with extended cab)*	17,500.00
k. research materials	5,000.00
l. secretarial/clerical/administrative	7,000.00
m. micro-computer *	5,000.00
	<u>5,000.00</u>
Total Other	\$ 89,434.00

* to be retained by the Department of Geography, University of Khartoum and to be used on subsequent regional and district assessments.

Travel

a. domestic (300 x 3)	900.00
b. international tickets (2,500 x 2)	5,000.00
c. per diem	
short term (139 x 90 days)	12,510.00
longer term stay (2,500 x 4 months)	<u>10,000.00</u>
Total Travel	28,410.00

US total (including vehicle and equipment)

Salaries	\$27,331.00
Other	89,434.00
Travel	<u>28,410.00</u>
Total	\$ 145,175.00

Summary totals	Region	not yet available
	U of K	Sudanese Pounds 161,880
	US	US \$ 145,175

NB. This budget is illustrative only. Final figures will be subject to actual work times and situations.