

AGRICULTURAL RESEARCH CORPORATION  
WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT



WORK PLAN ,  
VOLUME II  
PROJECT HISTORY AND FUNCTIONAL STRUCTURE

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The Government of Sudan  
United States Agency for International Development  
The World Bank  
Consortium for International Development  
Washington State University

WORK PLAN  
VOLUME II  
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THE WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT

is supported by

The Government of Sudan

The Agricultural Research Corporation

US Agency for International Development

The World Bank

The USAID portion of the project is being implemented by

The Consortium for International Development  
Tucson, Arizona, USA

with

Washington State University, Pullman, Washington, USA

as the Lead University

Correct Citation:

WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT 1982

Work Plan, Volume II, Project History and Functional Structure.

October, 1982. WSARP Publication No. 14.

Khartoum, Sudan and Pullman, Washington, USA.

Volume II

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## WORK PLAN FOR THE WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT

### II. Background and Research Orientation

#### A. Introduction

##### 1. History of the Project

In 1975 the Ministry of Agriculture, Food and Natural Resources (MAFNR) requested the Ford Foundation to assist in a study of selected crop and discipline research capabilities in Sudan and to suggest ways and means of strengthening the Sudan's agricultural research and related services. This study was carried out by a number of consultants and Sudanese scientists and administrators. An integrated summary of the reports was prepared and discussed at an International Workshop on Agricultural Research and Development in the Sudan, November 20-22, 1975. It was later agreed by GOS and Ford Foundation that the reports should be integrated into a master plan for strengthening the agricultural research capabilities in Sudan, involving primarily the future development of the Agricultural Research Corporation (ARC). The International Agricultural Development Service (IADS) was invited to undertake the design of such a plan.

On the basis of preliminary observations and discussions in the Sudan in January - February, 1977, it was agreed that a further review would be enhanced by a Joint Team of IADS and Senior Sudanese Agricultural Research Specialists. The Team review was undertaken July 11 through August 14, 1977, but excluded the Western Regions of Darfur and Kordofan, which were being reviewed at The World Bank. The review resulted in 33 recommendations directed to various aspects of ARC staffing, functions, goals, priorities, etc.

The World Bank study of the research needs for Western Sudan referred to above, resulted in a plan to augment the Sudan's agricultural research capabilities in the West. It is stated in the World Bank Staff Appraisal Report #2005-SU, dated June 6, 1978, "In support of this overall framework, the project would develop the agricultural research capabilities of the West." In support of this plan, the Government of Sudan (GOS) requested IDA to develop and finance an agricultural research project for the rainfed arid and semi-arid areas of Western Sudan.

In July, 1978, the Government of Sudan and IDA signed a loan agreement for financing the project. Subsequently, because of the scope of the project and the inability of the IDA-GOS agreement to meet all of the emerging needs for carrying out the mandate of the project, USAID designed and approved a companion project that completely interfaced and interdigitated with the activities to be provided and supported by the IDA-GOS agreement. The combined project documentations define activities and responsibilities for the various participants in the total project. The IDA-GOS agreement finances the construction program and the purchase and operation

of an aircraft. The USAID components support technical assistance, training the purchase of commodities and equipment, and various research supplies and station operational costs, including 70 percent of the Sudanese salaries. As project implementation planning occurred, the need for additional financing became evident and was subsequently provided by USAID. Included in the additional AID component as approved by the PP Amendment was the provision of support for a part of the construction program.

Under the Title XII-Collaborative Mode, USAID in August, 1979, entered into a contract with the Consortium for International Development (CID) for implementation of the AID portion of the Western Sudan Agricultural Research Project (WSARP). Subsequently, Washington State University was designated the lead university in CID. Later, a number of planning activities took place to implement the project.

## 2. Purpose and Goals

The Sudan Agricultural Research Project Staff Appraisal Report dated June 6, 1978, by the World Bank (Report #2005-SU) indicated the purposes and goals of the project from the Bank perspective. It states, "This project would aim to develop improved production systems for livestock and crops, to conserve and rehabilitate natural resources and to improve the standard of living of the subsistence farmers and pastoralists in the arid and semi-arid areas of the West. The project would also strengthen the national agricultural research effort through the development of support services at the Agricultural Research Corporation (ARC) Headquarters to be moved to Khartoum."

The AID documents indicate that the program or sector goal for the project is "An improved standard of living for subsistence farmers and pastoralists in Western Sudan." The project purpose is, "To develop and institutionalize an effective system for agricultural research operations in Western Sudan." The GOS, through various representations including the ARC, Ministry of Agriculture, Ministry of Finance and Ministry of Planning has participated and agreed to project activities directed to these purposes and goals.

Thus, the purposes and goals of the World Bank, USAID, and the Government of Sudan are similar in improving the standard of living and productivity of farmers and pastoralists in Western Sudan through the planning, development and institutionalization of an agricultural research station network in the West as a part of the ARC. An integrated crop-livestock production system orientation for the research activities is repeatedly emphasized. The World Bank documentation in 1978, as mentioned above, further indicated strengthening of the ARC by the development of research support and planning activities at the ARC Headquarters, which was to be moved to Khartoum. It should be noted, however, that the move of the ARC Headquarters to Khartoum (Section 3.27 of the World Bank Staff Appraisal Report) is based upon the IADS report.

It has been recognized by the ARC and others involved in the assessment of Sudanese research capabilities and by those participating in

WSARP planning and implementation, that there would be considerable benefit to a move of ARC Headquarters to Khartoum. However, funds for construction of housing for staff as well as work facilities for a sizeable contingent of administrators, scientists and support staff were not provided. To be transferred from Wad Medani to Khartoum, according to the World Bank document, were administrative services (Director General, three deputies and research support services); the six heads of the research divisions; and the leaders of some research sections. ARC's research management capability was to be strengthened by improved Planning and Programming for research and by Technical Services responsible for research support activities. Included, also, was to be a liaison office for GOS and external agencies. As a result, the move of the total ARC Headquarters to Khartoum from Wad Medani is not under consideration. Instead, a liaison office is to be established in Khartoum to house the project support unit and ARC liaison activities. In addition, what was initially described as research planning positions and activities have been modified due to availability of funds so that the WSARP input into the ARC central administration is for the provision of a Senior Research Advisor to the Director General and for the establishment and functions of a Project Support Unit and Liaison Office in Khartoum.

### 3. USAID Logical Framework.

Figure 5 is a reproduction of the USAID logical framework for the WSARP. This is taken from the PP Amendment dated April, 1980, and indicates various parameters relating to project activities as per USAID.

### 4. Project Philosophy and Orientation

The Joint Team Report mentioned previously dated November, 1977, made recommendations for reorganizing and/or reorientating ARC research activities. The most relevant ones relating to the WSARP are embodied in Recommendations 1, 9, 10, 11, and 12.

Recommendation 1 indicates that the ARC should reorganize to give more effective national leadership to those research functions recently transferred to it and for integration of crop and livestock research. It further states that such could be facilitated by shifting from the traditional discipline orientation of research to commodity and factor problem research of national and regional interest. The report further indicates in Recommendation 9 that the organization of ARC should be restructured as rapidly as possible to the coordinated multi-disciplinary team approach from the commodity and non-commodity research. Further, Recommendation 10 indicates a decision should be taken on priority or phasing of the establishment and/or strengthening of multi-disciplinary research teams. Mechanisms for such are addressed further in the report. Recommendation 11 suggests that an agricultural scientist should be appointed with demonstrated experience and capability in coordinating the leadership of the proposed multi-disciplinary research.

In Recommendation 12, the report recommends the development of a national network of research stations that would give priority support

**WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT  
AID LOGICAL FRAMEWORK**

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>A1</p> <p>Improved standard of living for subsistence farmers and pastoralists in Western Sudan.</p>	<p>Measures of Goal Achievement:</p> <p>A2</p> <ol style="list-style-type: none"> <li>1. Increased ag. production.</li> <li>2. Sustained range productivity.</li> <li>3. Enhanced linkages between herder/farmer prod. systems.</li> </ol>	<p>A3</p> <ol style="list-style-type: none"> <li>1. Socio-economic studies</li> <li>2. Min. Ag. statistics</li> </ol>	<p>Assumptions for achieving goal targets:</p> <p>A4</p> <ol style="list-style-type: none"> <li>1. That improved ag. research is made available to herders and farmers, and they are receptive.</li> <li>2. That an improved transport/marketing system is developed.</li> <li>3. GOS will develop land use policies.</li> <li>4. That ag. research is an essential ingredient to improved ag. production.</li> <li>5. GOS will continue to support ag. research and provide recurrent costs.</li> </ol>
<p>Project Purposes:</p> <p>B1</p> <p>Develop and institutionalize an efficient system for agricultural research operations in W. Sudan.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>B2</p> <p>Adequately developed Sudanese staffed ag. research organization capable of carrying on effective research programs in W. Sudan selected from own priorities.</p>	<p>B3</p> <ol style="list-style-type: none"> <li>1. Contractors reports</li> <li>2. Project evaluation</li> </ol>	<p>Assumptions for achieving purpose:</p> <p>B4</p> <p>That GOS will induce qualified staff to accept assignments in W. Sudan</p>
<p>Outputs:</p> <p>C1</p> <ol style="list-style-type: none"> <li>1. Research projects in:             <ol style="list-style-type: none"> <li>a) Livestock/crop production</li> <li>b) water and land use management.</li> <li>c) range &amp; livestock production.</li> </ol> </li> <li>2. Physical infrastructure of research facilities</li> <li>3. Strengthened ARC management capability on ag. research in W. Sudan.</li> <li>4. Improved human resource base of Sudanese staff.</li> <li>5. Viable logistic/communication system for support of ag. research organizations in Sudan as well as international.</li> </ol>	<p>Magnitude of Outputs</p> <p>C2</p> <ol style="list-style-type: none"> <li>1. 5 research programs completed.</li> <li>2. 4 research stations completed.</li> <li>3. Office building in Khartoum for management.</li> <li>4. 30 Sudanese trained - external 80 Sudanese trained - OJT</li> <li>5. 5 radio base station established 4 mobile radio stations operating 1 aircraft operational.</li> <li>6. Planning evaluation committee formed.</li> <li>7. 5 conferences held.</li> </ol>	<p>C3</p> <ol style="list-style-type: none"> <li>1. Published reports</li> <li>2. Project evaluation site visits</li> <li>3. Site visits</li> <li>4. Contractors reports.</li> <li>5. PIO/Cs.</li> <li>6. Committee reports.</li> <li>7. Conference reports.</li> </ol>	<p>Assumptions for achieving outputs:</p> <p>C4</p> <ol style="list-style-type: none"> <li>1. Research is performed under rigorous scientific standards</li> <li>2. Construction materials available on timely basis.</li> <li>3. Counterparts available.</li> </ol>

(Continued)

WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT  
AID LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <p>D1</p> <ol style="list-style-type: none"><li>1. Technical Assistance:<ol style="list-style-type: none"><li>a) LT Researchers (AID)</li><li>b) LT management/planning (AID)</li><li>c) ST (AID)</li><li>d) A &amp; E (AID)</li></ol></li><li>2. Construction financing (IBRD/AID/GOS)</li><li>3. Training - external (AID) OJT (AID/GOS)</li><li>4. Commodities - general (AID) aircraft (IBRD)</li><li>5. Other costs (GOS/AID/IBRD) Operational costs, etc.</li></ol>	<p>Implementation Target (Type and Quantity)</p> <p>D2</p> <p>See BUDGET PP Table IV</p>	<p>D3</p> <ol style="list-style-type: none"><li>1. Controllers disbursement records</li><li>2. Contractors reports</li></ol>	<p>Assumptions for providing inputs:</p> <p>D4</p> <ol style="list-style-type: none"><li>1. Funds available from principle sources on timely basis.</li><li>2. TA recruitment performed on timely basis.</li></ol>

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in the six-year plan with special attention given to those areas of Sudan that did not have access to improved, adapted technology, including the Western Savannah and the Southern Region.

The World Bank documents (Sudan Agricultural Research Project Staff Appraisal Report) and the Implementation Volume of June 6, 1978), emphasize the necessity of an integrated range/livestock approach to research in the West. These reports indicate that Sudan's agricultural development strategy, as defined in the Six-Year Plan (SYP) (1977-83) emphasizes the need to fully utilize existing resources and at the same time to correct the wide variance in the productivity and income between the commercial, irrigated and mechanized rain-fed sector and the subsistence sector. As a part of this strategy, GOS, as stated in the Bank Documents, accorded high priority to launching development programs for subsistence cultivators and pastoralists in the West. This emphasis was embodied in the Western Savannah Project, the Nuba Mountain Project, and the Kordofan Regional Planning Project. The Bank Document Staff Appraisal Report section 2.11, indicates that the Savanna belt is the climatically most suitable area in the Sudan for the expansion of rain-fed agriculture and the plans should target for increased surpluses in sorghum, ground nuts, sesame and in better crop-livestock integration, all of which crucially depend upon the success of development projects in the West.

The Staff Appraisal Report (Section 4.04) defines the production systems and their research needs. The research needs will be addressed later in this presentation. The emphasis throughout the Bank and AID documents and also in the Joint Team Report is on the need for the establishment of an effective research network in the West to assist in removing production constraints and to utilize an integrated crop-livestock system approach to carrying out this research. These various sources of information point to the establishment of a project philosophy that is oriented to what is now known as "Farming Systems Research." For the purpose of this work plan, however, the term "Production Systems Research" will be utilized to include a strong livestock component and not strictly a crop component. Thus, the emphasis in the various documents is the necessity of establishing integrated crop-livestock production research activities at various project locations in the West and to utilize a production systems approach to it.

## B. Research Needs for Western Sudan

### 1. Synopsis of Agricultural Research Needs

#### a. Introduction

Various organizations have been involved over the last several decades in defining research priorities and needs for agriculture in the Sudan. These are given in a number of documents by both Sudanese and non-Sudanese organizations and have been expressed in the GOS six-year plans (SYP). The information provided below is not intended to be exhaustive, but to indicate some of the activities and research needs that have been defined by the various organizations.

b. Research Needs in Kordofan and Darfur as determined by the World Bank, USAID and GOS.

The "Joint Team" reviewed the GOS SYP regarding agricultural research needs for the Sudan. The team then developed a master plan which included seven elements or areas in which the research system should be improved. These are as follows:

(1) strengthen the organization and operations of the ARC; integrate crops and livestock research and development (as recently directed by the Minister, MAFNR); and be responsive to needs of the different farming systems and geographic areas of Sudan;

(2) replace the fragmented disciplinary research approach by a coordinated multi-disciplinary team approach along commodity and non-commodity problem area lines (factor or agro-ecological production systems);

(3) strengthen the national research station network in the subsistence areas of the West, and the tropical regions in the South, but maintain research services for the food-producing irrigated areas and the mechanized farming schemes;

(4) establish long-term manpower planning and training for professional and technical staff, and improve personnel management policies and procedures;

(5) strengthen research on production economics, marketing and human resources;

(6) strengthen capabilities for evaluation and application of new technology, including more effective linkages with extension; and

(7) strengthen linkages with external technical assistance organizations, including the international agricultural research centers.

The Joint Team proposals also included the recommendation for the further development of research and field stations of which one main station and six field stations would be included in the West. As a part of the report, the question of long-term research funding was addressed. It was suggested that the government introduce a strategy of financing agricultural research both by direct contributions of benefiting organizations and cooperations and possibly also by introduction of a levy on livestock and crop production as a means of taxing other beneficiaries.

The World Bank project papers further delineated the production systems and their research needs for the WSARP Project area. This is duplicated in the PP of AID and, thus, becomes an integral part of the proposed activities and needs for the project. These are outlined and

provided below as given in Section 4.04 of the Staff Appraisal Report into pastoral production systems of which two are purely pastoral and three integrated crop-livestock combinations. The systems are as follows:

- (1) arid livestock production at the desert fringe;
- (2) semi-arid livestock production in the south of the project area, interspersed with crop production;
- (3) integrated crop-livestock production on stabilized sands;
- (4) integrated crop-livestock production on non-cracking clays;
- (5) integrated crop-livestock production on cracking clay; and
- (6) Water and land use management research plan.

It was realized that there is considerable overlap among these systems as defined in the document.

A brief description of each of the above systems, the constraints on production, the proposed research program and needs are given in Sections 4.04 through 4.26 in the Staff Appraisal Report. These will not be detailed herein. In summary, however, the research needs that are defined address a wide range of food and cash crops, including sorghum, millet, ground nuts, etc., livestock in terms of production, utilization of by-products, marketing, reproductive efficiencies, etc., and the management and improvement of pasture and forage. Included are economic practices, cultural considerations and other details. In essence, the whole orientation is toward production systems as indicated in II., A, 4. above.

The AID-CDSS as well as the PP indicate that input from AID among others will be directed to rain-fed agriculture in the West and that the needs and goals are viewed as similar to those described in the Bank documents. Furthermore, the SYP of the GOS indicates that "Special attention will be given to research on unirrigated crop production by setting up a network of research stations in the Western provinces." In addition, the SYP also states, "The long-term integration of livestock into crop production should be a part of the activities of this research network."

#### c. Needs as Determined by Other Institutions

Other institutions have inbeen involved in various studies of the WSARP project region, including Hunting Technical Service, the World Bank, and others. Resulting from these various studies have been the design and implementation of projects indicated elsewhere in this document. Among these The Western Savannah Corporation funded by several donors was designed to address development in the West and to interface with the WSARP. This project is involved primarily in Southern Darfur. In addition,

the Hunting Technical Service study was designed to provide a development plan for Southern Kordofan. The final report of this study is not available at this writing, but should be forthcoming in the near future. Discussions by project staff with members of the Hunting Technical Services team, however, indicates that many of the priorities established in the study are quite similar to those determined by the WSARP project research staff.

In addition to the above, the German Technical Aid (GTZ) has determined a need for mechanized farming research and have initiated a project in Southern Kordofan. A French group (SARTEC) have initiated a program for the utilization of animal traction in Southern Kordofan.

d. Present Status of Research on Rain-fed Agriculture in Western Sudan.

(1) ARC and WSARP

The ARC has had research ongoing in Western Sudan for a number of years. This has included a research station at Kadugli which has been working on cotton, sorghum and other crops. Also, the ARC has maintained a Gum Arabic Research Station headquartered at El Obeid. This station has directed its efforts to investigating various aspects of the propagation of Acacia senegal and other Acacia species, as well as investigating various approaches for improving gum production. Intercropping of the trees with other crops has also been a consideration. In addition to the above, the ARC has carried out cooperative work with other organizations, including the International Agricultural Research Centers in variety trials and other matters relating to crop production in the West. A horticultural and forestry research station is operated at Jebel Marra in Darfur.

At the initiation of the WSARP, early planning activities addressed the initiation and location of early research. It was decided that initiation of research as early as possible would be beneficial, instead of waiting until approximately Year Three. After examination of existing facilities and potential time required for providing adequate research facilities, it was decided that it would be possible to rehabilitate existing facilities at Kadugli and build new facilities early, while planning and construction of the remaining stations took place. It was further decided that early initiation of research at Kadugli would accomplish:

- (a) define research needs and approaches,
- (b) define and establish station infrastructural needs and
- (c) Allow research to begin as early as possible.

Included in the early efforts have been various agronomic research activities, a range research program, a livestock production program and anthropological studies. Later economic studies were added. Both Sudanese and US scientists have been and are currently involved.

The results are given in the WSARP Annual Reports and the information provided for this evaluation.

## (2) Other Organizations

Other organizations have carried out research in the West. Animal disease diagnosis and research have been carried out by the Veterinary Laboratory at Soba, with field research in Southern Darfur. In addition, the Western Savanna Corporation funded by the World Bank and other donors established a project primarily in Southern Darfur directed to research and extension activities. Due to funding limitations, it became necessary for this project to be reduced in scope.

ICRISAT in cooperation with the ARC is carrying out sorghum and millet trials near El Obeid. INSORMIL, the sorghum and millet CRSP funded by USAID, is carrying out anthropological and now agronomic work in Northern Kordofan. These activities are working in close cooperation with WSARP.

The various units of the GOS Ministry of Agriculture, including the Range Department, Department of Animal Resources, and others are carrying out research in Kordofan and Darfur. One of these research stations which WSARP has now taken over, is at Ghazala Gawazat. In addition, the regional ministries of agriculture have or plan to initiate extension and other efforts supportive of the research programs.

## 2. Integrated Crop-Livestock Production Systems

The World Bank documents defining the WSARP emphasize production systems to a considerable degree are based upon the soil types (see Section III, A, 2 of this document). This is exemplified by the definition of five agro-pastoral productions systems in Section 4.04 of the Staff Appraisal Report. These are given above, but are exemplified by two systems given in the World Bank Document entitled, "Integrated Crop-livestock Production on Non-cracking clays and Integrated Crop-livestock on Cracking Clays."

This orientation to the production systems based upon the environmental circumstances is valid, but has been further refined by the WSARP as given in the attached description of the research activities.

After much discussion and planning by project staff and consultants, it was agreed that an integrated production systems approach is the most valid and is able to address the systems as defined in the Bank documents in a valid way. Various sources of information relative to production systems have been and continue to be used by the project staff. One of these (see references) is "Farming Systems Research and Development-Guidelines for Developing Countries," by W. W. Shaner, P. F. Philipp and W. R. Schmehl, Westwood Press, Boulder, Colorado, 1982. In addition, the WSARP staff that are involved in the project have a strong orientation toward the production systems approach. Also, an effort is being made to orient Sudanese colleagues

who are not familiar with this approach to research and development. Thus, the orientation of the research program of the WSARP is Integrated Production Systems, which in the Bank document has been called Integrated Crop-livestock Production Systems.

### iIII. WSARP Research Administrative and Planning Structure

#### A. Research Administrative Structure

##### 1. Administrative Structure

The research administrative structure for the WSARP is given in Figure 6. It can be seen in this figure that the researchers located at the stations form station research committees that address issues relevant to the activities of that station. This may mean involvement in more than one production system, depending upon the location and the activities. From the individual research station committees various administrative matters, including planning, budget, etc., go to a system/program committee, of which there is one project-wide for each of the systems under investigation. The present plan envisions at least three systems under investigation at the outset. These include the Transhumant System, the Nomadic System, and the Sedentary System.

After consideration in the system/program committees, recommendations and information proceeds to the project research committee, which is the central research committee for the project. Information then flows from this research committee of which the Project Director is Chair to the WSARP Advisory Committee, which is chaired by the Director General of the ARC. Information and recommendation from the WSARP Advisory Committee then goes to the Project Director, who is in turn responsible to and conveys the information to the Director General of the ARC. Thus, the research administrative structure flows from the researchers ultimately to the Director General of the ARC as per outline in Figure 6.

##### 2. Advisory Committee

The World Bank and AID documents indicate the establishment of an Advisory Committee. This committee is composed of representatives and scientists from various organizations within Sudan as well as from the international centers, etc. The committee is advisory in function and is chaired by the Director General of the ARC. It examines proposed activities by the Project Research Committee as well as having the prerogative of initiating input and recommendations to the Project Director.

##### 3. Integration into the ARC

Integration of the project in its totality into the ARC is central to the success of the project. Integration is proposed to take place at three levels. One of these is the participation of the WSARP Project Director as a member of the ARC Technical and Financial Committees (See

Figure 6. WSARP RESEARCH ADMINISTRATIVE STRUCTURE

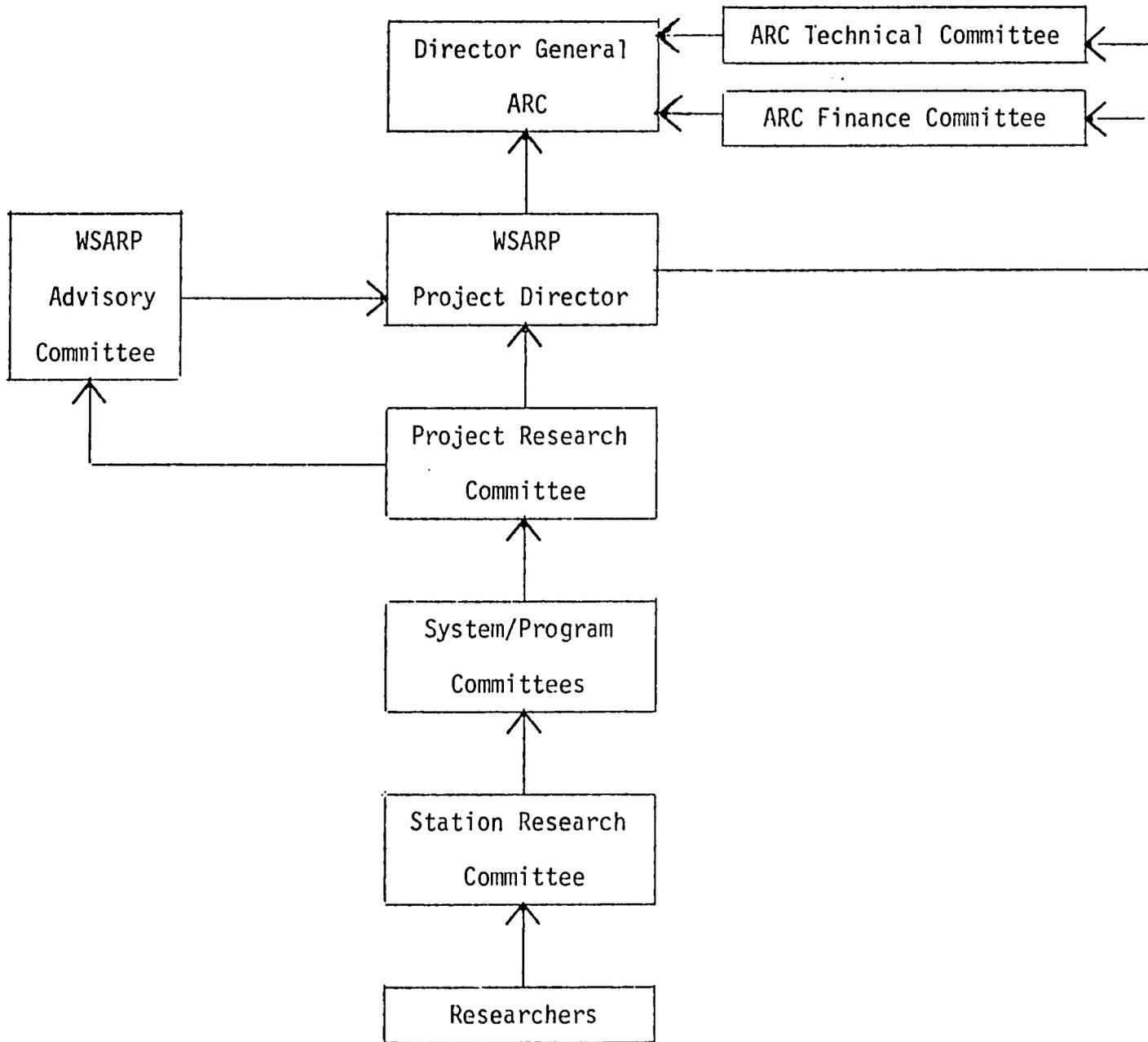


Figure 6. The latter two ARC committees consider various technical aspects and budgetary considerations of the total ARC effort, including that of the WSARP.

The second level is the project Director representing the WSARP to the ARC as do other section or station heads. The third level of integration is the inclusion of ARC scientists and coordinators on the Systems/Program Committees and the relevant national coordinators on the WSARP Project Committees as given in Figure 7.

#### B. WSARP Research Planning and Approval Structure

The WSARP research planning and approval structure is elaborated further in Figures 6 and 7. Figure 7 defines the research structure/organization/information source for input to be considered in the planning process. The purposes/activities and membership/composition of the research structure, are also given in Figure 7. This figure further indicates the activities and the responsibilities of the various individuals involved beginning with the farmers and pastoralists in the geographic areas and ultimately reaching the Director General of the ARC, who has overall responsibility for the ARC and the WSARP.

It can further be seen from this organizational chart that the researchers and collaborators at the various station sites work individually and collectively to make recommendations concerning potential research based upon their own observations and input from farmers and pastoralists (See also, Figure 8. These scientists at each station form a Research Station Committee which addresses not only programmatic questions, but also matters relating to station functions and operations. In this regard, there is a station research leader and a station superintendent. The latter has responsibilities for the station administration and support functions.

As indicated in Figure 7, there are project-wide systems/program committees for which there is one per system or program being addressed by the project. There is one individual designated the chairperson of the system/program committee. In addition, there are system/program leaders designated at different research stations. The purposes and activities for the system/program committees are given in Figure 7.

An overall Project Research Committee is composed of Project Director as the chair, the Deputy Project Director, one U.S. senior scientist and one Sudanese senior scientist, as well as the system/program leaders and relevant ARC national coordinators. The involvement of the latter is another mechanism for insuring input by the ARC into the project and vice-versa. This is the one committee on the project bringing together the various activities, recommendations, etc. from the stations and from system/program committees for incorporation into an overall plan of action for the project.

The Project Director is responsible, as seen in Figure 7, for the decisions in regard to various aspects of project management, with the Director General of the ARC having overall responsibility.

Figure 7: WSARP RESEARCH PLANNING STRUCTURE

<u>Research Structure/ Organization/Infor- mation Source</u>	<u>Purposes/Activities</u>	<u>Membership/Composition *</u>
Farmers/Pastoralists	Provide information and details concerning systems and needs; continual feed-back into project; constraints	Farmers/pastoralists (selected) in project areas
Researchers/ Collaborators	<ol style="list-style-type: none"> <li>1. Planning and conduct research activities</li> <li>2. Make recommendations to Station Research Committee- research proposals</li> <li>3. Interact with farmers/pastoralists</li> <li>4. Interact with colleagues</li> <li>5. Interact with other relevant organizations</li> </ol>	All researchers
Station Research Committee	<ol style="list-style-type: none"> <li>1. Define research needs and priorities for region or sub-region</li> <li>2. Make recommendations to Systems Committee</li> <li>3. Determine research support requirements</li> <li>4. Recommend research activities from local level</li> <li>5. Coordinate activities at station level</li> <li>6. Farm System/Program Subcommittees</li> </ol>	<ol style="list-style-type: none"> <li>1. Station Research Leader</li> <li>2. Station Superintendent</li> <li>3. Research Scientists</li> <li>4. Senior Maintenance and Operations Officer</li> </ol>
System/Program Committee	<ol style="list-style-type: none"> <li>1. Coordinate Systems/Programs project-wide</li> <li>2. Define System/Program research priorities</li> <li>3. Define System/Program Work-Plan and recommended to Project Research Committee</li> <li>4. Develop and make recommendations to Project Research Committee regarding budget for program activities</li> <li>5. Evaluate System/Program activities project-wide</li> <li>6. Interact with ARC</li> </ol>	<ol style="list-style-type: none"> <li>1. Chairperson(s)/System Programs</li> <li>2. System/Program Leaders at different stations</li> <li>3. All stations represented</li> <li>4. ARC representative(s)</li> <li>5. Others, as appropriate</li> </ol>

WSARP Research Administrative Structure  
Page Two

<u>Research Structure/ Organization/Infor- mation Source</u>	<u>Purposes/Activities</u>	<u>Membership/Composition *</u>
Project Research Committee	<ol style="list-style-type: none"><li>1. Define research priorities</li><li>2. Define research activities and work plans</li><li>3. Recommend budgets and activities to Project Director for final approval</li><li>4. Interact with ARC</li></ol>	<ol style="list-style-type: none"><li>1. Project Director, Chairman</li><li>2. Deputy Project Director</li><li>3. One US Senior Scientist</li><li>4. One Sudanese Senior Scientist</li><li>5. System/Program Leaders</li><li>6. Relevant ARC National Coordinators</li></ol>
Project Director	<ol style="list-style-type: none"><li>1. Responsible for project administration and activities</li><li>2. Makes final decisions on project activities and budgets</li></ol>	Project Director
Director General of ARC	Overall responsibility for ARC and project	Director General of ARC

\* Consultants both from within and outside Sudan, as appropriate, will be utilized.

Figure 8. WSARP RESEARCH ADMINISTRATIVE STRUCTURE

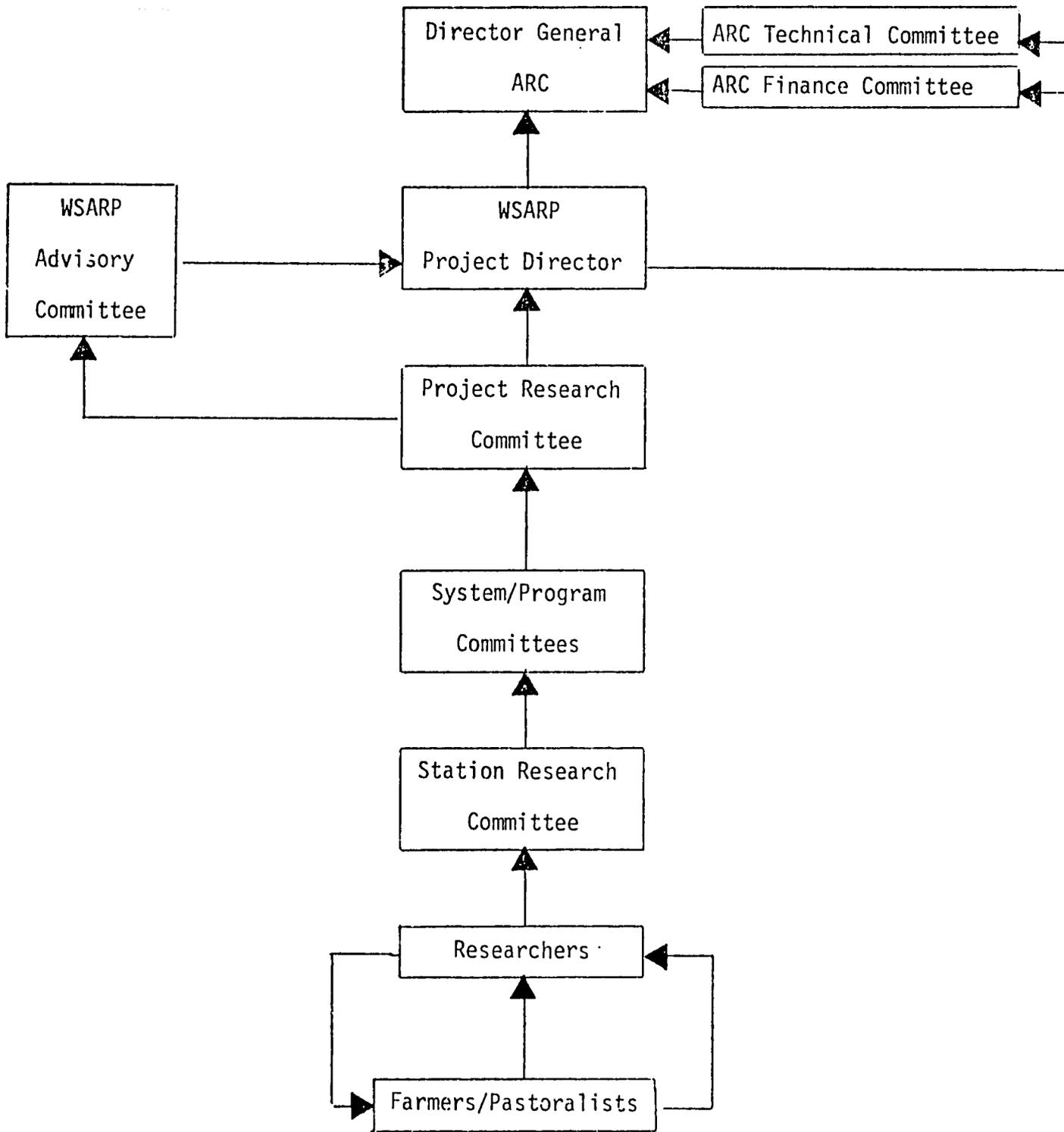


Figure 8 indicates the importance of a close relationship between the farmers and the pastoralists in the project area with the researchers.

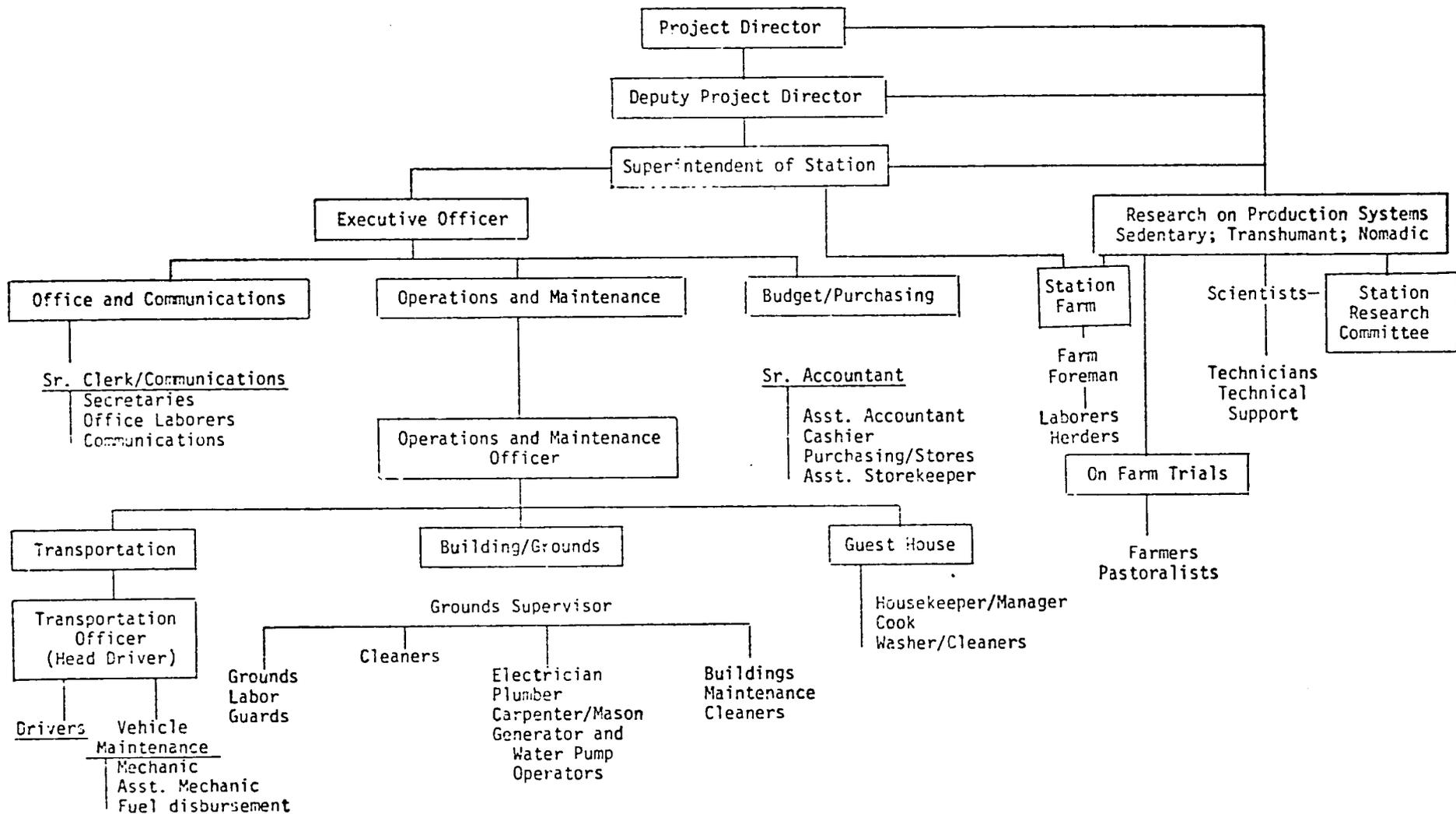
There must be a continual feedback from both the farmers and pastoralists to the researchers and vice-versa. This feedback will insure that needs will be fed into the project planning mechanism.

#### C. Research Station Administrative Structure

The research station structure is given in Figure 9 with Kadugli used as the example. The reader is also referred to Figures 6 and 7 that relate to research planning. Figure 9 shows the various responsibilities for activities associated not only with the research program per se but the research stations supportive infrastructure, including maintenance, operations, accounting and budget, etc.. A similar structure will function for each of the stations.

Figure 9:

RESEARCH STATION ADMINISTRATIVE STRUCTURE - KADUGLI



#### D. Khartoum Support

The early project documentation indicated the establishment of a project support and liaison unit, and a project planning and evaluation unit in Khartoum. This was based upon the concept that the ARC headquarters would move from Wad Medani to Khartoum. As discussed elsewhere in this presentation, however, the likelihood of ARC headquarters moving from Wad Medani to Khartoum is quite small, due to the unavailability of resources to provide the necessary facilities required for such a move. Under construction in Khartoum (Shambat), however, is a facility to house the Project Support Unit and the ARC liaison office.

##### 1. Project Support Unit (PSU)

The Project Support Unit, as defined in the original World Bank documents, was to provide (a) logistical support for project activities in the West, such as purchasing, clearing of commodities and equipment through customs, etc., (b) project liaison with GOS and (c) advise the DG of ARC on research policies and programs. Included were to be a senior research advisor to the DG, a project liaison officer and a project architect/planner. As planning for the project progressed, it became evident that a restructuring of the PSU was required to meet project needs. A senior administrative officer was required for overall responsibility, especially during the first six years of the project. Since the architectural and engineering aspects of the project were to be handled by a commercial firm with USAID funding, an architect/planner was not required, since such would be a part of the A&E contract. Furthermore, a project engineer was needed to be responsible for construction and renovation details not included in the construction contracts. As a result, a position for a project engineer was established.

At the present time, the Project Support Unit and WSARP headquarters are housed together in Khartoum and are indistinguishable. At the completion of the El Obeid headquarters facilities, however, the project headquarters staff will move to El Obeid as indicated elsewhere in this document.

Remaining at Khartoum will be a WSARP Sudanese administrator at the level of Assistant Project Director for Administration, who will be responsible for the Project Support Unit. A liaison officer is also to be included. The relationship between this unit and the ARC and the make-up and staffing of the ARC liaison activities remain to be defined. It has been suggested, however, that it would be appropriate for the ARC to locate one of its senior administrators and support staff at the liaison office. A requirement, however, is the provision of housing for such an administrator(s). The possibility of one or more houses being built at the Khartoum site needs to be explored.

Thus, the Project Support Unit will continue to provide logistical support for WSARP after the project headquarters moves to El Obeid. It will assume a greater, but yet to be completely defined role.

## 2. ARC Liaison Office

This has been discussed under (1) above.

## 3. Research Advisory Unit

The original Bank documentation envisioned the establishment of a Planning and Evaluation Unit (PEU) in Khartoum. This unit was to be headed by a Research Planning and Evaluation Advisor. Project specific and ARC activities for planning, monitoring, research plan preparation, and project completion report(s) were to be carried out.

The PEU has also been altered during the evolution of the project. The position that was retained in this unit is the Senior Research Advisor to the DG of the ARC. This position has been filled during the life of the project and remains located in Khartoum. The role of the Senior Advisor is given in Figure 10 under the Terms of Reference of Senior Research Advisor to the Director General of the ARC.

The senior research advisor works with the ARC administration and scientific staff in a variety of capacities. Chief among these has been interfacing with international centers and other organizations around the world to gain access to information, genetic material and other resources that have benefited the programs of the ARC. In addition, the senior advisor has participated in various planning and evaluation activities of WSARP. His role in the actual research planning of the ARC has been rather limited, due primarily to the distance between Wad Medani and Khartoum. Likewise, communication between the ARC headquarters and Khartoum and the stations remain a weak link in the system.

## IV. Staffing and Training

### A. Staffing

#### 1. Previous Staff Projections

The World Bank Document indicated a level of staffing for different categories, but further elaboration of the projected program indicated that this proposed staffing pattern was inadequate. A number of scientific disciplines not included and a number of support staff requirements were not addressed. As a result, considerable time was spent in discussions between WSARP, USAID and the World Bank representatives to define the projected staffing requirements. These revised and agreed positions are given in Appendix I. It can be seen from this Appendix addressed the scientific, technical and support staffing levels for all stations and the Project Support Unit. The station operational budgets for salaries reflects this projected staffing pattern.

#### 2. Current Staffing

WSARP staff are listed in Table 1. These are not current figures, so the list will have to be updated immediately prior to the evaluation.

TABLE 1  
LIST OF WSARP STAFF

Name	Location	Position	Discipline
<u>SCIENTISTS</u>			
A. Sudanese			
1. Dafalla Ahmed Dafalla		Project Director	Agronomist
2. Mukhtar Makki Kenani		Station Director	Agronomist
3. Zakaria Abdalla Said		Station Head	Forester
4. Babo Fadalla		Research Scientist	Animal Nutritionist
5. Ibrahim Mohd. Daw Madina		Asst. Scientist	Agronomist
6. Mohamed Azim Abu Sabah		Asst. Scientist	Social Scientist
7. Farouk Mohd. El Hadi		Asst. Scientist	Forester
8. Mekki Abdelatif Omer		Asst. Scientist	Agr. Engineer
9. Tigani Mirghani El Amin		Asst. Scientist	Agr. Engineer
10. Osman Adam Osman		Research Scientist	Horticulturist
11. Babiker Abdalla Ibrahim		Asst. Scientist	Soils
12. Mohamed Ahmed Elfiel		Asst. Scientist	Economics/Extension
13. Mahmud Awad Mekki		Asst. Scientist	Social Scientist
14. Hassan Osman Ahmed El Awad		Asst. Scientist	Agronomy
15. Gadel Karem Mahmoud Madibo		Asst. Scientist	Soils
16. Moustafa Ahmed Rahman		Asst. Scientist	Range/Livestock
17. Sidqiq El Tayeb Muneer		Asst. Scientist	Economics
18. Ahmed S. El Wakeel		Asst. Scientist	Range Management
19. El Tayeb Ali Babiker		Research Scientist	Entomology/Pest Mgmt
20. Abdel Rahman El Khidir		Research Scientist	Agro-Breeder
21. El Hag El Gasim		Research Scientist	Agro-Breeder
B. U.S. in Sudan (including Administrative staff)			
1. Gerald P. Owens		Deputy Proj. Director	Ag. Economics
2. Lee B. Stenquist		Chief Adm. Officer	Administration
3. James J. Riley		Sr. Research Adv. to DG	Research Planning
4. Shirley A. Higgins		Administrative Asst.	Accounts
5. David T. Higgins		Project Engineer	Engin/Construction
6. Richard H. Cook		Livestock Specialist	Livestock Production

Name	Location	Position	Discipline
7. Trent Bunderson		Range Scientist	Range
8. Joel M. Teitelbaum		Social Scientist	Sociology/Anthrop
9. Neil A. Patrick		Ag. Economist	Econ/Prod./Mktg.
10. Joe R. Gingrich		Agronomist	Agronomy/Soils
11. Antonio E. Cenidoza		Maintenance Officer	Eqpt/Vehicle Main
12. Barbara Michael		Research Associate	Anthropology
C. In U.S.			
1. J. B. Henson		Coordinator	Project Coordinat
2. J. C. Noel		Deputy Coordinator	Project Coordinat
3. J. Reuss		CID Deputy Director	CID
4. J. Kearns		CID Fellow	CID

## II. TECHNICIANS

1. Mohamed Ahmed Adam Abu Lissig	El Obeid
2. Abdel Aziz A. Ibrahim	El Obeid
3. Abdel Moenim Hamid	El Obeid
4. Osman Hassan Mohd.	El Obeid
5. Mohd. Ahmed Abulazig	El Obeid
6. El Dirdiry El Tom El Tahir	El Obeid
7. Abdalla Abu Anour	El Obeid
8. Abdalla Mohd. El Sheikh	El Obeid
9. Hamza Ali Kheir	El Obeid
10. Ali Mana Modir	Kadugli
11. Berima Babiker	Kadugli
12. Kuku Tiya El Ezeri	Kadugli
13. Khamis Ahmed Ali	Kadugli
14. Jabir Abdalla Kuku	Kadugli
15. Ibrahim Ahmed Said	Kadugli
16. Ahmed Kheir El Sid	Kadugli
17. Mubarak Arbab Gibriel	Kadugli

Name	Location	Position	Discipline
8. Hilal Tirab El Fadl	Kadugli		
9. Ahmed Ismail A'lrahim	Kadugli		
10. Ezzeldin Kuku Tiya	kadugli		

.SECRETARIES, CLERKS AND STOREKEEPERS

1. Adam Aburas Modu	Khartoum	Head Clerk
2. Valery Alex.Onyalla	Khartoum	Clerk
3. Mohd. Farid Taha	Khartoum	Purchasing Officer
4. Musa Abdel Gafar Musa	Khartoum	Storekeeper
5. Mahasin Suliman Ahmed	Khartoum	Secretary
6. Um El Hassan Ali Modu	El Obeid	Typist
7. Ahmed Musa Idris	Kadugli	Storekeeper
8. El Masea El Dim El Dimawi	Khartoum	Typist
9. Perlita P. Sulit	Khartoum	Senior Secretary
10. Omer Ali El Awad	El Obeid	Clerk
11. Abdul Majid	Khartoum	Transport Officer

ADMINISTRATION STAFF

1. Osman Abdalla Mohd.	Khartoum	Assistant Director/Admin.
2. Khalid El Amin Ahmer	Khartoum	Assistant Director/Finance
3. Ahmed Khalid Abubaker	El Obeid	Inspector H.Q.

ACCOUNTING STAFF

1. El Amin Ahmed Al Awad	Khartoum	Inspector of Accounts
2. Osman Mohd.Farah	Khartoum	Head Accountant
3. Ebeid El Awad El Ebeid	Khartoum	Accountant
4. Rajab Abdelrahman Kuku	Kadugli	Accountant
5. Ahmed Abdel S.Ibrahim	El Obeid	Accountant
6. Maria El Sherif	El Obeid	Accountant

GENERAL LABOURERS AND WORKERS

Kadugli 83 Labourers

El Obeid 113 Labourers

Khartoum 12 Labourers



### 3. Problems and Needs

Examination of the staffing over the last few months associated with the more definitive description of the research programs has indicated inadequacies. There are several disciplines that are either not represented or are inadequately represented and are required for optimal project effectiveness. These include the following and are also given in Table 2.

a. Extension Specialists: It is essential that the project have an adequate cadre of extension specialists in order to be able to interact effectively with the farmers and pastoralists in the research areas. These individuals can also interact with regional government extension activities as well as those on the national level. It is imperative that the project contain sufficient numbers of such extension staff to insure that project results can be extended to the farmers and herders in the project areas. A total of twelve positions with the necessary vehicles, equipment and resources are required (See Table 2.).

b. Plant Pathology: No plant pathologists were included in the original staff descriptions or the revised staffing pattern as given in Appendix I. One or more such specialists will be required because of the importance of pests and disease as constraints to crop production in Western Sudan.

c. Weed Specialist: At least one scientist in this discipline is required in order to address the important issues of weeds as a constraint to production.

d. Most recent examination of the staffing has indicated that the number of scientists related to range and livestock may be excessive as compared to the needs for additional staff in the plant sciences. Thus, it is proposed that one or more of the livestock and/or range specialists be eliminated and replaced with the above scientists (Table 2).

e. Technical and Support Staff: The identification, hiring and retention of qualified technicians and support staff in the West is a problem. Such staff are generally not available in the West and must be hired elsewhere and moved to the West. In-service training represents one approach for improving qualifications, but will not meet all the needs of the project.

f. Incentives: Incentives for hiring and retention of scientists and other staff remain an important constraint for the project. An effective incentive system must be implemented or the project will suffer. This is a topic that has been under discussion. The latest decisions in this regard will be elaborated at the time of the evaluation.

#### B. Training

Training activities by WSARP are to involve Ph.D.-degree training (6), M.Sc.-degree training (5), and non-degree training (17). In addition,

Discipline	Location	Sudanese Scientists	U.S. Scientist
<u>Livestock/Range</u>			
Livestock Production Specialist	Kadugli	Ajeeb	
Range/Forage Specialist	Kadugli		
Livestock Production Specialist	El Obeid		
Forage/Range Specialist	El Obeid	Wakeel	
Animal Production Specialist	Ghazala Gawazat		
Animal Health Specialist	Ghazala Gawazat		
Range Scientist	Ghazala Gawazat	Mustafa	
Animal Production Specialist	El Fasher		Bunderson Cook (Temporary at Kadugli)
Animal Production/Nutrition Specialist	El Fasher	Babo	
Animal Health Coop. with Vet. Dept.	El Fasher		
Range Management Specialist	El Fasher		
* Initially at Kadugli			
<u>Extension/Liaison</u>			
Research/Extension Liaison Specialist	Kadugli		
Research/Training/Liaison Officer	El Obeid		
Asst. Training Officer - Mid-level	El Obeid		
Liaison/Extension - Mid-level	Ghazala Gawazat		
Extension/Liaison (12)	Various locations		
<u>Crop Production/Post Management/Plant Pathology</u>			
Crop Protection Specialist	Kadugli	El Tayeb	
Weed Specialist	Kadugli	M. Yassin	
Plant Pathologist	El Obeid		
<u>Gum Arabic</u>			
Gum Arabic Specialist #1	El Obeid	Zakaria	
Gum Arabic Specialist #2	El Obeid	Faroug	

## PROJECTED SCIENTISTS BY DISCIPLINES AND LOCATION \*

Discipline	Location	Sudanese Scientists	U.S. Scientists
<u>Agronomy/Horticulture</u>			
Production Systems Agronomist	Kadugli	Mukhtar	
Agro-Breeder	Kadugli	Ibrahim	
Production Systems Agronomist	El Obeid		Gingrich
Systems Agronomist	El Obeid		
Agro-Breeder	El Obeid		
Horticulturist	El Obeid	Osman A. Osman	
Production Systems Agronomist	Ghazala Gawazat	Hassan	
Groundnut Breeder	Ghazala Gawazat		
<u>Soil/Water/Land Use/Agro-Climatologists</u>			
Soil/Water Use & Management Specialist	Kadugli		
Agricultural Engineer	Kadugli	Mekki	
Water/Land Use Systems Analyst	El Obeid		
Systems Deputy Program Leader	El Obeid	Madibo	
Soil Physicist	El Obeid	Babiker	
Agricultural Chemist	El Obeid		
Agricultural Engineer (Soil/Water Cons.)	El Obeid		
Agro-Climatologist	El Obeid		Consultant
Agro-Climatologist	El Obeid		
<u>Economist</u>			
Farm Management Economist	Kadugli	Tighani	Patrick
Agricultural Economist	El Fasher	Sediig	
Economist/Biometrician	El Obeid		
Farm Management Economist	El Obeid		
Agricultural Economist	Ghazala Gawazat		
<u>Social Scientist</u>			
Social Scientist	El Obeid	Abu Sabah	Teitelbaum/ Michael (Initially at Kadugli)
Social Scientist	Ghazala Gawazat		
Social Scientist	El Fasher		

\* Modified somewhat from previously agreed and is preliminary.

TABLE 3

SUMMARY OF PRESENT AND PROJECTED TRAINING ACTIVITIES

<u>Type of Training</u>	<u>Discipline</u>	<u>Name</u>
A. Ph.D.	1. Agronomy	Hassan Osman Ahmed El Awad*
	2. Ag. Engineering	Mekki Abdelatif Omer
	3. Forestry (Gum Arabic)	Farouk Mohamed El Hadi
	4. Soils/Soil Fertility	Gadel Kareem Mohamed Madiba**
	5. Range/Livestock	Moustafa Ahmed Rahman***
	6. Ag. Economics	Tighani Mirghani El Amin
	7. Range Management	Ahmed S. El Wakeel
	8. Anthropology	Mohamed Azin Abu Sabah
*Supported by ARC		
**Supported by ARC until July 1, 1983, then by Project		
***Previously supported by ARC; in Sudan conducting research		
B. MSc	1. Extension	Mohamed Ahmed Elfiel
	2. Soils	Babiker Abdalle Ibrahim
	3. Economics	Siddiq El Tayeb Muvir
	4. Agronomy/Breeding	Ibrahim Mohd. Daw El Madina
	5. Animal Production	Abdel Gadir Ajeeb
	6. Social Science	Mohmud Ayed Mekki
C. Non-Degree Training	1. Project Administration	Osman Khalifa
	2. Animal Nutrition/Prod.	Babo Fadalla
	3. Farming System	Mukhtar Makki Kanani
	4. Gum Arabic	Zacharia Abdalla Said
	5. Project Administration	Osman Obdalla Mohd.
	6. Budget Administration and Plannint	Khaled Amin El Ahmer
	7. Others to be determined	
D. Short Courses/Workshops	1. Research Project Planning, Management Monitoring and Evaluation	
	2. Agricultural Extension Procedures and Approaches for Irtegrated Crop- Livestock Production (Production Systems)	
	3. Production Systems Research - Approaches and Rationale	
	4. Scientific Equipment Maintenance	
	5. Integrated Range - Livestock Production	
	6. Vehicle Maintenance and Repair	
	7. Soil Conservation and Management	
	8. Water Conservation and Management	
	9. Others as may be appropriate	

the project is to carry out short courses and work shops on relevant topics. These are summarized in Table 3.

WSARP scientific staff projections require many more scientists than are to be trained by the project per se. A number of these are currently or have completed training supported by the ARC (See Table 3). Additional will have to be identified to fill project needs before the research stations become operational. The source, availability and retention of such staff is of paramount importance to the project. Another key element is the incentive system. These topics will be discussed with the team in Sudan.

#### V. Cooperation and coordination within the ARC

The WSARP is a part of the ARC and must be effectively incorporated into the overall planning and implementation activities of the parent organization. The orientation of the research, however, is different from the usual research by ARC which has a commodity and/or discipline orientation, while the WSARP is oriented toward production systems. It is imperative that these two approaches be amalgamated in an effective way within the total ARC scheme. In this regard, they are mutually supportive and do not detract from each other. Thus, the commodity specialists in the ARC should interact and be a part of the planning and the research activities of the WSARP in order for WSARP efforts to utilize the capabilities in the expertise of such individuals and organizations within ARC. In this regard, initial efforts have been made to structure the incorporation of these individuals into the WSARP research planning and implementation structure. These detailed more below.

##### A. Administrative Coordination and Support

Relationships between the WSARP and the ARC central administration are given in Figure 6. The Project Director answers directly to the Director General of the ARC. In addition, the Director General of the ARC serves as the chair of the Advisory Committee to the Project Director. The Project Director also serves on the finance and program committees of the ARC.

##### B. Research Coordination

The question of research coordination has been addressed in III, A and B. Effective research coordination and cooperation are viewed as being extremely important with the necessity of utilizing the expertise and ongoing support capabilities of the ARC in the support of WSARP. The central problem may be the integration of a production systems approach with that of a discipline and/or commodity one. In the view of the WSARP, however, these are not mutually exclusive and in fact are mutually supportive. The WSARP in terms of its activities should draw upon the expertise and ongoing activities of the ARC in plant genetics, pest management and other disciplines with the project serving as a mechanism for feeding needs into the ARC system. In turn, the ARC scientists can test and carry out other

relevant activities at WSARP sites in support of the information or materials that accrue from the ARC activities. Such coordination to a considerable degree depends upon interactions between scientists, which must be fostered as the WSARP evolves.

### C. Long-term ARC and GOS Support

This subject is addressed in the GOS-World Bank agreement which indicates that potential long-term support by the ARC and the government should be examined. This topic is of utmost importance for the long-term impact of the WSARP in the West. Given the financial circumstances under which the ARC and the Government is functioning, innovative and new approaches may have to be attempted to insure support. This is a subject that will have to be discussed in detail with the ARC and Government representatives.

## VI. Cooperation and Coordination with Other Institutions

### A. Sudanese Institutions

A number of Sudanese institutions are carrying out research activities that are related to the programs of the WSARP. Examples are the University of Khartoum faculties of agriculture, veterinary medicine, and social sciences. The Ministry of Agriculture, likewise, has a number of organizations that are carrying out related activities. Examples of this are the Range Department, the Division of Animal Resources, the Veterinary Research Laboratory at Soba, the Western Savannah Corporation, the Livestock Production Corporation, regional government ministries and organizations, and others.

The WSARP is of the opinion that as close a working relationship as appropriate for mutual benefit should be established with these organizations. In this regard, discussions and cooperative work are ongoing with these and other Sudanese organizations that have similar interests and relevance to those of the ARC and WSARP. Some potential interrelationships with other organizations are given in Table 4.

### B. International Agricultural Research Centers

The ARC and the WSARP already have ongoing cooperative work with several of the international agricultural research centers. These include ICARDA and ICRISAT. Others with whom cooperation will be sought include ILCA, ILRAD, CIMMYT, and IITA. As indicated previously, contacts and discussions have already been made with all of these centers for training, library and resource utilization, field research and other activities.

### C. Bilateral Donors

Cooperative work is already ongoing with other organizations or activities supported by external donors. Examples are the USAID CRSP projects, including INTSORMIL for sorghum and millet and the peanut (groundnut) CRSP. Potential activities with the Small Ruminant and Bean (cowpea) CRSP are also possibilities.

Table 4

SUMMARY OF POTENTIAL WSARP INTER-RELATIONSHIPS  
WITH OTHER ORGANIZATIONS

Activity	Unit(s)	Purpose(s)
1. Plant Breeding, genetics cultivar development, agronomic practices;	ARC; Faculty of Agriculture; CRSPS; ICRISAT; ICARDA; other international centers;	Provide genetic materials; provide experience and data for planning and implementation; coordination and joint efforts; reference material availability;
2. Soil and H <sub>2</sub> O planning, conservation and use;	ARC, ICRISAT; ICARDA; ILCA;	Information and data; coordination; joint efforts;
3. Livestock Production	Division Animal Resources of Min. of Ag.; Livestock Production Corporation; ILCA; CID; ILRAD; ICARDA; ARC;	Coordinator and cooperation of efforts; joint staffing; provision of reference materials; definition of needs;
4. Veterinary Medicine	Veterinary Research Labs-Soba; Division of Animal Resources; Faculty of Veterinary Medicine; ILRAD;	Joint staffing and efforts; coordination of activities; cooperative activities;
5. Range	Range Department; ARC; ILCA; CID;	Coordination and cooperative efforts; provision of reference materials; data and information exchange;
6. Research; Training; Extension; Others;	Regional Governments; ARC; CID; National extension service;	Definition of needs; Coordination; cooperative efforts; training;
7. Economics; Social Sciences; etc.;	Faculty of Agriculture; U.S. Institutions-CID; CRSPs; University of Khartoum; ARC <i>National Academy of Sciences</i>	Coordination; Training; Consultation; Data and information collection and exchange;
8. Government Policies; Long-term support;	Ministry of Agriculture; other GOS ministries; ARC	Coordination; continued presence of project within government; knowledge of government policies and priorities;
9. Donors	World Bank; AID; GOS Ministries;	Coordination with other projects; information transmittal;

It is anticipated that cooperative work will continue with the SATEC group in Southern Kordofan working on animal traction for which SATEC and WSARP have already signed a cooperative agreement. The SATEC group will be provided land for livestock and for the training of farmers in the use of animal traction on the WSARP farm at Kadugli. Also, continued cooperation will be carried out with the GTZ group now active in Southern Kordofan.

Cooperative endeavors with the Western Savannah Project will also be carried out. To this point, these have been more administrative and support sorts of activities rather than research or extension per se.

#### VII. Equipment and Commodities

Various items of equipment and commodities have been ordered and are projected to be ordered. These include laboratory equipment, farm equipment, vehicles, vehicle spares, etc. A number of these have been ordered and are in place in Sudan, are being shipped at the present time, or are awaiting final definition.

Problems have been encountered in the transport of equipment from the US in a timely manner, its clearance through Port Sudan, transport to Khartoum, and to the stations. There have been unduly long delays which the project is attempting to rectify. Some of these have arisen from lack of agreement between the GOS and USAID concerning a customs waiver agreement. Others related to clearing, etc.

One of the prime concerns for equipment for the project is the vehicles. This matter has been discussed at various times in considerable detail and is further elaborated in Table 5. Approval for the hiring of a maintenance officer will undoubtedly assist in maintenance problems.

#### VIII. Time-frame

A time-frame for proposed project activities for the last three years of the project is included in Table 6. This time-frame also includes some activities from previous years. The facilities at sites other than Kadugli. Until that time, major activities will be continued in Southern Kordofan headquartered at Kadugli with outreach efforts being carried out at the other locations as possible and appropriate.

Table 5.

SUMMARY OF SENIOR STAFF, VEHICLES AND VEHICLE REQUIREMENTS BY STATION

PROJECT YEARS 3 - 4

PROJECT YEARS 5 - 6

<u>LOCATION/VEHICLE TYPE</u>	<u>#Senior Staff*</u>	<u>Vehicles</u>		<u>vehicle requirements</u>	<u>Deficit/Surplus</u>	<u>#Senior Staff*</u>	<u>Vehicle requirements</u>
		<u>on hand** operational</u>	<u>non. op.</u>				
<b>Khartoum</b>	<b>7</b>						
Truck		6		3		3	
Van		1		1	+3		1
Station Wagon		1	1	2			1
Sedan		2	1	3			1
Pickup		4	2	3	+3		1
<b>Kadugli</b>	<b>13</b>						
Truck		1***		2	-2	7	
Van		1		1			1
Pickup		3	1	12	-8		10
Bus				1	-1		1
Land Rover		2***	1***				
Land Cruiser			1***				
Tractor		1***		1	-1		1
<b>El Obeid</b>	<b>2</b>						
Truck						22	
Van			2***	1			2
Sedan							1
Station Wagon							2
Pickup		3	1	2	+2		1
Bus							24
Land Rover		1***					1
Tractor							1
<b>Ghazala</b>	<b>1</b>						
Gawazet						8	
Truck							1
Bus							1
Pickup				1	+1		6
Tractor							?
<b>El Fasher</b>	<b>2</b>						
Truck						5	
Van							1
Pickup				1	-1		1
Land Cruiser		1***					6
Tractor							1

\*Projected

\*\*As of April 1982

\*\*\*Old ARC vehicles - not expected to last

Dafalla, Henson, Noel  
April 1982

Table 6

TIME FRAME FOR PREVIOUS AND PROJECTED ACTIVITIES\*

CID Contract Signed

A. Administration

- 1. Headquarters (Khartoum)
- 2. Headquarters (El Obeid)
- 3. PSU

B. Construction

1. Kadugli

- a. Planning, Tenders and Supervision
- b. Facilities
- c. Farm

2. Other Sites

- a. A/E Activities (Planning, Tenders, Supervision)
- b. El Obeid

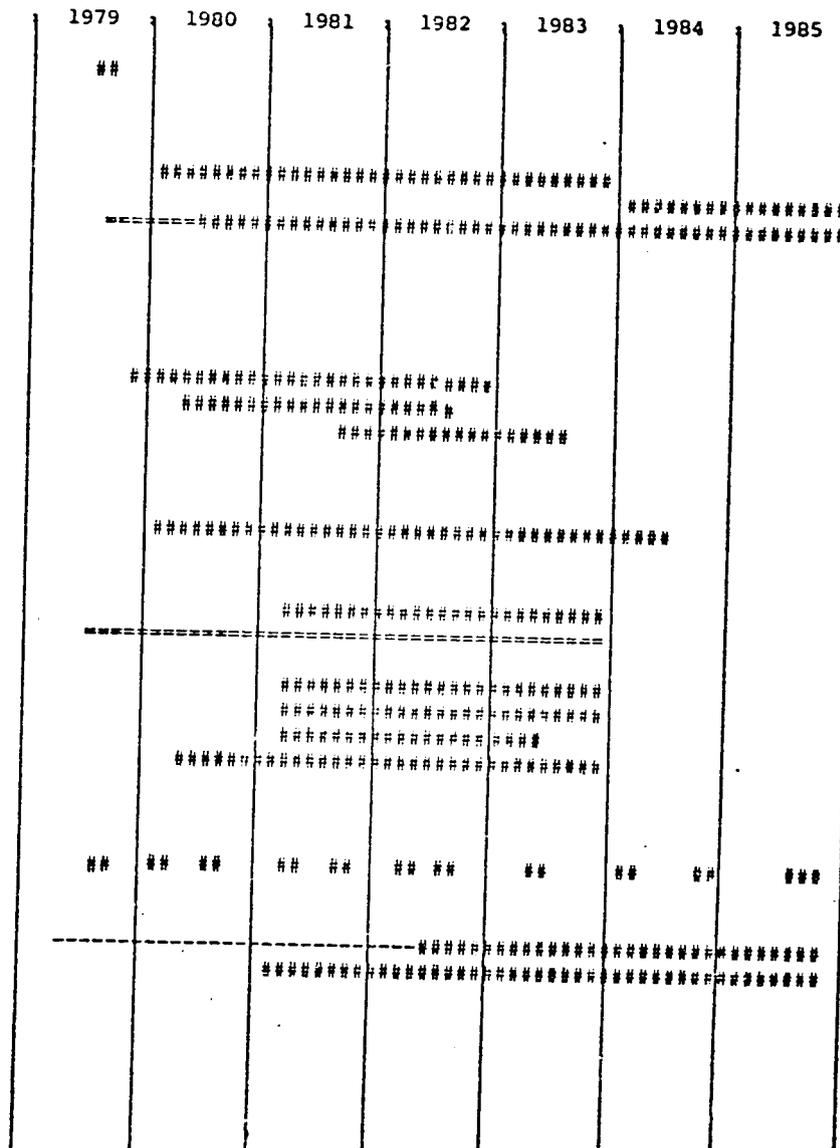
- (1) Facilities
- (2) Farm

- c. El Fasher
- d. Gazala Gawazat
- e. Liaison Office - Khartoum
- f. Force Account

C. Research Programs

- 1. Planning/Monitoring
- 2. Kadugli

- a. Agronomic
- b. Other



- 3. El Obeid
  - a. Gum Arabic
  - b. Other
- 4. El Fasher
- 5. Gazala Gawazat
- 6. Central Research Support Activities at Headquarters

D. Staffing

- 1. Khartoum (Liaison Office)
  - a. Administration
  - b. Support
- 2. Kadugli
  - a. Administration
  - b. Scientists
  - c. Technicians
  - d. Support Staff
- 3. El Obeid
  - a. Administration
  - b. Scientists
  - c. Technicians
  - d. Support
- 4. El Fasher
  - a. Administration
  - b. Scientists
  - c. Technicians
  - d. Support

	1979	1980	1981	1982	1983	1984	1985
3. El Obeid	#####	#####	#####	#####	#####	#####	#####
a. Gum Arabic					=====	=====	=====
b. Other					=====	=====	=====
4. El Fasher					=====	=====	=====
5. Gazala Gawazat					=====	=====	=====
6. Central Research Support Activities at Headquarters					=====	=====	=====
D. Staffing							
1. Khartoum (Liaison Office)							
a. Administration					=====	=====	=====
b. Support					=====	=====	=====
2. Kadugli							
a. Administration					=====	=====	=====
b. Scientists					=====	=====	=====
c. Technicians					=====	=====	=====
d. Support Staff					=====	=====	=====
3. El Obeid							
a. Administration					=====	=====	=====
b. Scientists					=====	=====	=====
c. Technicians					=====	=====	=====
d. Support					=====	=====	=====
4. El Fasher							
a. Administration						=====	=====
b. Scientists						=====	=====
c. Technicians						=====	=====
d. Support						=====	=====

- 5. Ghazala Gawazat
  - a. Administration
  - b. Scientists
  - c. Technicians
  - d. Support

E. Training

- 1. Long-term
- 2. Short-term
- 3. Short-courses/Workshops

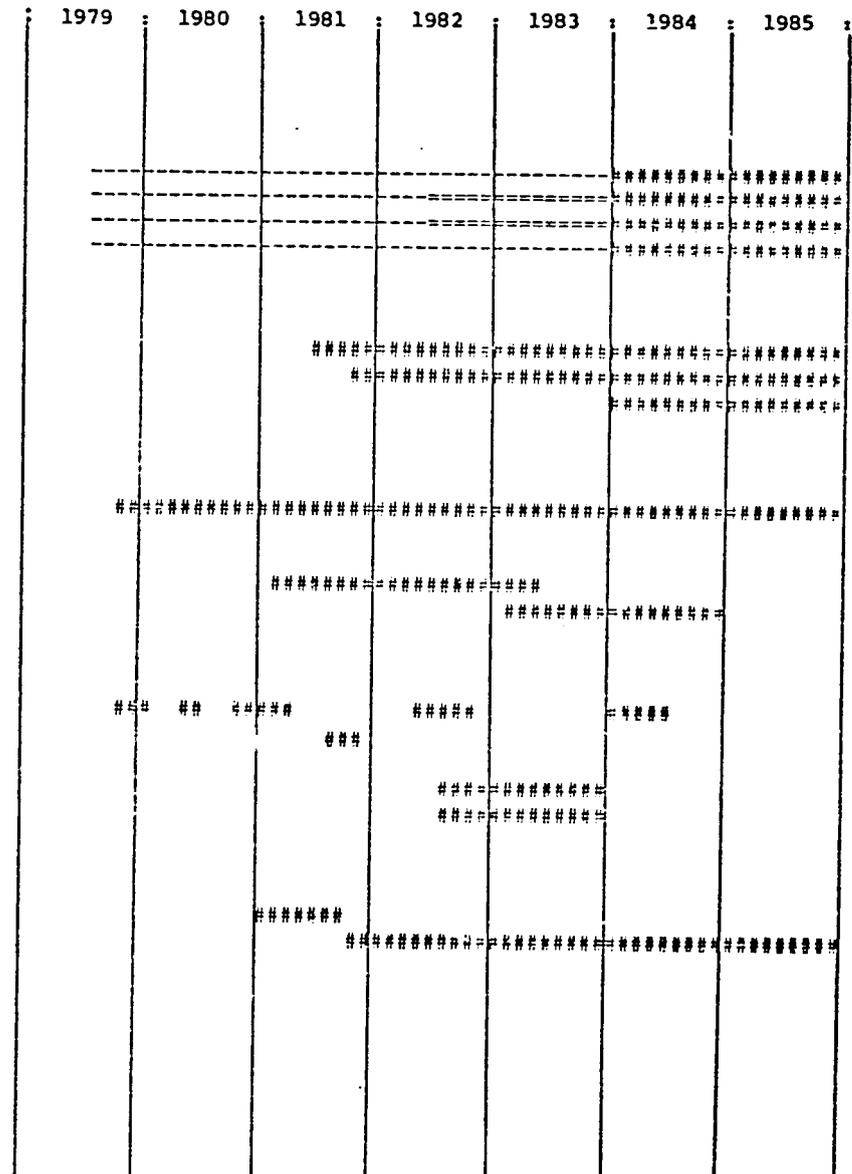
F. Commodities and Equipment

- 1. Supplies
- 2. Research Equipment
  - a. Kadugli
  - b. Other stations
- 3. Vehicles
  - a. Pick-ups/Vans/etc.
  - b. Lorries
- 4. Tractors and Attachments
- 5. Maintenance/Shop Equipment

G. Aircraft

- 1. Purchase
- 2. Operations

[-----] Represents activities being carried out prior to project initiation  
 [=====] Represents moderate project inputs and  
 [#####] Represents completely functional under project auspices



## Appendix 1

Staffing patterns for WSARP senior scientist, technicians, and support staff. These patterns represent projected staffing as agreed on March 6, 1980. They are given by location, discipline, and number of years.

SENIOR SCIENTIFIC STAFF

by

LOCATION AND YEAR

FINAL AGREEMENT: 6/ 3/80 -- Osman Khalifa, World Bank, J. B. Hanson, R. F. Harwood

<u>KHARTOUM</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>TOTAL</u>
PROJECT SUPPORT UNIT:							
Project Director	1	1	1	(El Obeid Yrs 4-6)			3
Deputy Project Director (U.S.)	1	(Kadugli Yrs. 2-3 and El Obeid Yrs. 4-6)					1
Construction Engineer (U.S.)		1	1	1	1	1	5
Advisor to Director General ARC (U.S.)	1/4	1	1	1	1	1	5 1/4
Chief Administrative Officer (U.S.)	1	1	1	1	1	1	6
Liaison Officer	1/2	1	1	1	1	1	5 1/2
<b>KHARTOUM SUBTOTALS</b>	<b>3 3/4</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>25 3/4</b>
<u>KADUGLI</u>							
INTEGRATED LIVESTOCK/CROPS OR CRACKING CLAYS:							
Production Agronomist (Sub-program leader)(US) 1		1	1	1	1	1	6
Farm Management Economist (U.S.)		1	1	1	1	1	5
Agricultural Engineer (Mechanical) (U.S.)			1	1	1	1	4
Agro-Breeder			1	1	1	1	4
Livestock Production Specialist			1	1	1	1	4
Economist			Tr	1	1	1	4
Research/Extension Liaison Officer				1	Tr	1	3
Water/Land Use Specialist					Tr	1	3

Training Designation (Tr) are speculative only at this time. All individuals so designated will undergo training, but the number of years and at what time such training will occur are not necessarily determined.

SENIOR SCIENTIFIC STAFF

-2-

	YEAR						TOTAL
	1	2	3	4	5	6	
Crop Protection Specialist		1	1	Tr	Tr	1	5
Agricultural Eng. (Trainee)		Tr	Tr	Tr	Tr	1	5
Deputy Project Director (U.S.) (Khartoum Yr 1)		1	1	(El Obeid Yrs. 4-6)			2
Agro-climatologist Consultant (U.S.)		1/4	1/4	(El Obeid Yrs. 4-6)			1/2
Sociologist (U.S.)		1	1	(El Obeid Yrs. 4-6)			2
Range Specialist (U.S.)		1	1	(S. Darfur Yrs. 4-6)*			2
Animal Production Specialist (U.S.)		1	1	(El Fasher Yrs. 4-6)*			2
	1	8 1/4	12 1/4	10	10	10	51.5
	(0 Tr)	(incl 1 Tr)	(incl 2 Tr)	(incl 2 Tr)	(4 Tr)	(0 Tr)	(5 Tr for 9 Tr yrs)

\* See page 4 for note on locations of U.S. Range and Animal Production Specialists in Years 4-6.

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SENIOR SCIENTIFIC STAFF

-3-

EL OREID	YEAR						TOTAL
	1	2	3	4	5	6	
<u>ADMINISTRATIVE HEADQUARTERS:</u>							
Project Director	(Khartoum yrs 1-3)			1	1	1	3
Deputy Project Director	(Khartoum Yr 1 and Kadugli Yrs 2-3)			1	1	1	3
(Station Superintendent - See "Non-Scientific Support Staff)				(1)	(1)	(1)	(3)
(Sr. Accountant/Controller - See "Non-Scientific Support Staff)				(1)	(1)	(1)	(3)
<u>LAND AND WATER USE PROGRAM:</u>							
Water and Land Use Systems Analyst (Program Leader)				1	1	Tr	3
Deputy Program Leader (Systems)	Tr		Tr	1	1	1	5
Soil Physicist			Tr	Tr	1	1	4
Agricultural Chemist			Tr	Tr	1	1	4
Agro-Climatologist	Tr		Tr	Tr	1	1	5
*Agricultural Engineer - Water oriented			Tr	Tr	1	1	4
Agro-Climatologist Consultant (U.S.)		(Kadugli Yrs. 2-3)		1/3	1/3	1/3	1
<u>RESEARCH SUPPORT SERVICES:</u>							
Production Systems Agronomist (Program Leader) (U.S.) (Kadugli yrs. 2-3)				1	1	1	3
Sociologist (U.S.)		(Kadugli Yr 2-3)		1	1	1	3
Economist/Biometrician			Tr	Tr	1	1	4
<u>TRAINING AND EXTENSION UNIT:</u>							
Research/Training/Liaison Officer		Tr	Tr	Tr	Tr	1	5
(Asst. Training Officer - Mid-level)				(Tr)	(1)	(1)	(3)
<u>CROP/LIVESTOCK OR NON-CRACKING CLAYS PROGRAM:</u>							
Systems Agronomist			Tr	1	1	1	4
Gum Arabic Specialist #1	1	1	Tr	1	1	1	6
Gum Arabic Specialist #2		Tr	Tr	Tr	Tr	1	5
*open position							

SENIOR SCIENTIFIC STAFF

-4-

	1	2	3	4	5	6	TOTAL
Farm Management Economist		Tr	Tr	Tr	Tr	1	5
Agro-Breeder				1	Tr	1	3
Livestock Specialist		Tr	Tr	1	1	1	5
Forage/Range Specialist				Tr	1	1	3
Horticulturist				1	1	Tr	3
EL OBEID SUBTOTALS	1 (0 Tr)	7 (6 Tr)	12 (12 Tr)	20 1/3 (9 Tr)	20 1/3 (4 Tr)	20 1/3 (2 Tr)	81 (16 Tr) 33 Tr yr

EL FASHER

LIVESTOCK PRODUCTION AT DESERT

FRIDGE:

*Animal Production Specialist (U.S.) (Kadugli Yrs 2-3)				1	1	1	3
Animal Production/Nutrition Specialist			Tr	1	1	1	4
Sociologist		Tr	Tr	1	1	1	5
Range Management Specialist		Tr	Tr	1	1	1	5
Forage/Gum Arabic Specialist (Animal Health - Cooperative with Vet. Dept.)				1	Tr	1	3
	0 (0 Tr)	2 (2 Tr)	3 (3 Tr)	5 (0 Tr)	5 (1 Tr)	5 (0 Tr)	20 (1 Tr) 6 Tr yr

S. DARFUR - GHAZALA GAMAZAT

INTEGRATED CROP/LIVESTOCK ON STABILIZED SANDS:

Production Systems Agronomist				1	1	Tr	3
Ground Nut Breeder			Tr	1	1	1	4
Economist			Tr	1	1	1	4
Sociologist			Tr	1	1	1	4

SEMI-ARID LIVESTOCK PRODUCTION

SUDANIAN & SAUDI ARABIAN:

*Range Specialist (U.S.) (Kadugli Yrs 2-3)				1	1	1	3
Livestock/Range Specialist			Tr	1	1	1	4
Animal Health Specialist			Tr	1	1	1	4

Locations of Animal Production Specialist and Range Specialist (expatriates) not yet finalized. World Bank feels U.S. Range person should be at El Fasher and U.S. Animal Production Specialist at G.G.

SENIOR SCIENTIFIC STAFF

-5-

	1	2	3	4	5	6	TOTAL
Animal Production Specialist			1	1	Tr	1	4
(Liaison/Extension Specialist - Mid-level)			(Tr)	(1)	(1)	(1)	(4)
HAZALA GAWAZAT SUBTOTALS	0 (0Tr)	0 (0 Tr)	6 (5 Tr)	8 (0 Tr)	8 (1 Tr)	8 (1 Tr)	30 (7 Tr for 7 Tr Yrs.)
TOTALS ALL STATIONS	5 3/4 (0 Tr)	22 1/4 (9 Tr)	38 1/4 (22 Tr)	47 1/3 (11 Tr)	47 1/3 (10 Tr)	47 1/3 (3 Tr)	208 1/4 (32 Tr for Total of 55 Tr Yrs)

NOTE: Positions in parentheses are either shown on additional staffing summaries (Controller, Station Superintendent, See "Non-Scientific Support Staff") or are now considered mid-level positions. These are not included in the total figures listed here.

WESTERN SUDAN AGRICULTURAL RESEARCH PROJECT

April 1981

Staff Projections: Technicians (Sudanese)  
by Location and Year

Based upon scientific positions by years, the technical positions are budgeted to coincide with the scientific staff m/y. One-half are senior and one-half are junior technicians.

EL OBEID	YEAR						TOTAL
	1	2	3	4	5	6	
1. Water/Land Use Res.							
Resource Analyst				2	2	2	6
Rep. Prog. Leader				2	2	2	6
Soil Physicist					2	2	4
Ag. Chemist					2	2	4
Ag. Climatologist						2	2
Water Engineer							
Ag. Climatologist (consultant)		1	1	1	1	1	5
2. Res. Support Services							
Prodn. Systems Sp.				2	2	2	6
Sociologist							
Economist/Biometrician					1	1	2
3. Training/Extension Unit							
Research/Training Liaison Office					2	2	4
4. Crop/Livestock Res. on Non-Cracking Clays							
Systems Agronomists				2	2	2	6
Gum Arabic Sp.	2	2	2	2	2	2	12
Gum Arabic Sp.	2	2	2	2	2	2	12
Farm Mgt. Economist						2	2
Agro-Breeder				2	2	2	6
Livestock Sp.				2	2	2	6
Forage/Range Sp.					2	2	4
Horticulturist				2	2	2	6
5. Maintenance							
Office and Scientific Equipment				2	2	2	6
	<u>4</u>	<u>5</u>	<u>5</u>	<u>21</u>	<u>30</u>	<u>34</u>	<u>99</u>



TECHNICIANS (SUDANESE)

-3-

<u>KADUGLI, cont.</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>TOTAL</u>
Range/Livestock Sp.		2	2				4
Range Mgt. Sp.		2	2				4
	<u>2</u>	<u>12</u>	<u>16</u>	<u>15</u>	<u>17</u>	<u>19</u>	<u>81</u>
 <u>KHARTOUM</u>							
1. Maintenance							
Office and Scientific Equipment		2	2				4
 <u>GRAND TOTALS</u>	<u>6</u>	<u>19</u>	<u>25</u>	<u>58</u>	<u>69</u>	<u>77</u>	<u>254</u>

NON-SCIENTIFIC SUPPORT STAFF

BY

LOCATION AND YEAR

Finalized by O. Khalifa, J. Yee1, J.B. Henson - March 1980

KHARTOUM	YEAR						TOTAL
	1	2	3	4	5	6	
Liaison Officer	(See Sr. Scientific Staff)						
Sr. Accountant/ Controller	1/2	1	1	(El Obeid Yrs. 4-6)			2 1/2
Sr. Clerk/ Communications	1/2	1	1	1	1	1	5 1/2
Sr. Secretary	1/2	1	1	1	1	1	5 1/2
*Secretaries	2 @ 1/2	2	2	2	2	2	11
Purchasing/Stores	1/2	1	1	1	1	1	5 1/2
Sr. Driver	1/2	1	1	1	1	1	5 1/2
**Drivers	3 @ 1/2	3	3	3	3	3	16 1/2
Office laborers	2 @ 1/2	4	4	4	4	4	21
Grounds Laborer	1/2	1	1	1	1	1	5 1/2
Guest House Cook	1/2	1	1	1	1	1	5 1/2
Guest Housekeeper	--	1	1	1	1	1	5
Guest House Cleaner/ Washer	2 @ 1/2	1	1	1	1	1	6
Guest House Guards	2 @ 1/2	2	2	2	2	2	11
Office Guards	3 @ 1/2	3	3	3	3	3	16 1/2
	10.5	23	23	**22	**22	**22	122.5

\*The number of secretaries in years 4-6 may decrease with transfer of one or both to El Obeid.

\*\*The number of drivers given is a maximum number; may be fewer drivers. Also, some of the positions may be transferred to El Obeid in years 4-6.

NON-SCIENTIFIC SUPPORT STAFF

-2-

<u>KADUGLI</u>	1	2	3	4	5	6	TOTAL
Executive (Admin) Office	2/3	1	1	1	1	1	5 2/3
(Sr.) Accountant	2/3	1	1	1	1	1	5 2/3
Asst. Accountant (Bookkeeper)	2/3	1	1	1	1	1	5 2/3
Sr. Clerk/ Communications	2/3	1	1	1	1	1	5 2/3
Cashier	2/3	1	1	1	1	1	5 2/3
Secretaries	2 @ 2/3	2	3	3	3	3	15 1/3
Purchasing/Stores	2/3	1	1	1	1	1	5 2/3
Asst. Storekeeper	2/3	1	1	1	1	1	5 2/3
Transp. Officer (Head Driver)	2/3	1	1	1	1	1	5 2/3
Drivers	9 @ 2/3	18	18	18	18	18	96
Office Labor	2 @ 2/3	4	4	4	4	4	21 1/3
<u>Skilled Workers:</u>							
Electrician		1	1	1	1	1	5
Plumber		1	1	1	1	1	5
Carpenter/Mason		1	1	1	1	1	5
Generator Operators		3	3	3	3	3	15
Mechanic		1	1	1	1	1	5
Assistant Mechanic		1	1	1	1	1	5
Farm Manager	2/3	1	1	1	1	1	5 2/3
Farm and Grounds Labor/ Cleaners	68 @ 2/3	66	66	66	66	66	375 1/3
Farm Supervisor (Head Laborer)	2/3	1	1	1	1	1	5 2/3
Grounds Supervisor (Head Laborer)	2/3	1	1	1	1	1	5 2/3
Head Guard	2/3	1	1	1	1	1	5 2/3
Guards	6 @ 2/3	6	10	10	10	10	50
Guesthouse Cook		1	1	1	1	1	5
Housekeeper		1	1	1	1	1	5
Guest House Washer/ Cleaners		2	2	2	2	2	10
	60	120	125	125	125	125	686

\*Driver numbers are maximums--may be fewer

NON-SCIENTIFIC SUPPORT STAFF

-3-

<u>EL OBEID</u>	1	2	3	4	5	6	TOTAL
Station Superintendent	-	-	-	1	1	1	3
Executive (Admin) Officer	2/3	1	1	1	1	1	5 2/3
Sr. Accountant/ Controller	(Khartoum Yrs. 1-3)			1	1	1	3
(Sr.) Accountant	2/3	1	1	1	1	1	5 2/3
Asst. Accountant/ (Bookkeeper)	2/3	1	1	1	1	1	5 2/3
Sr. Clerk/ Communications	2/3	1	1	1	1	1	5 2/3
Cashier	2/3	1	1	1	1	1	5 2/3
Secretaries	2/3	1	1	8	8	8	26 2/3
Purchasing/Stores	2/3	1	1	1	1	1	5 2/3
Asst. Storekeeper	2/3	1	1	1	1	1	5 2/3
Transp. Officer (Head Driver)	2/3	1	1	1	1	1	5 2/3
*Drivers	4 @ 2/3	4	4	25	25	25	85 2/3
Office Labor	2 @ 2/3	2	2	6	6	6	23 1/3
<u>Skilled Workers:</u>							
Electrician	-	-	-	1	1	1	3
Plumber	-	-	-	1	1	1	3
Carpenter/Mason	-	-	-	1	1	1	3
Generator Operators	-	-	-	3	3	3	9
Mechanic	-	-	-	1	1	1	3
Assistant Mechanic	-	-	-	1	1	1	3
Farm Manager	2/3	1	1	1	1	1	5 2/3
Farm Labor (32)	28 @ 2/3	28	28	46	46	46	212 2/3
Grounds Labor (6)							
Cleaners (8)							
Grounds Supervisor	2/3	1	1	1	1	1	5 2/3
Head Guard	-	-	1	1	1	1	4
Guards	6 @ 1/2	6	10	16	16	16	67
Guesthouse Cook	1/2	1	1	1	1	1	5 1/2
Housekeeper	-	1	1	1	1	1	5
Guest House Washers/ Cleaners	1/2	1	1	2	2	2	8 1/2
	34	54	59	126	126	126	525

\* Maximum--May be fewer

NON-SCIENTIFIC SUPPORT STAFF

-4-

<u>SOUTHERN DARFUR/ GAZALA, GARZAT</u>	1	2	3	4	5	6	TOTAL
Executive (Admin) Officer	-	-	-	1	1	1	3
(Sr.) Accountant	-	-	-	1	1	1	3
Sr. Clerk/Communications	-	-	-	1	1	1	3
Cashier	-	-	-	1	1	1	3
Secretaries	-	-	-	3	3	3	9
Purchasing/Stores	-	-	-	1	1	1	3
Asst. Storekeeper	-	-	-	1	1	1	3
Sr. Driver	-	-	-	1	1	1	3
*Drivers	-	-	-	10	10	10	30
Office Laborers	-	-	-	2	2	2	6
<u>Skilled Workmen:</u>							
Electrician	-	-	-	1	1	1	3
Carpenter/Mason	-	-	-	1	1	1	3
Generator Operators	-	-	-	2	2	2	6
Mechanic	-	-	-	1	1	1	3
Asst. Mechanic	-	-	-	1	1	1	3
Farm Manager	-	-	-	1	1	1	3
Farm Laborers/Herders	-	-	-	20	20	20	60
Grounds Superintendent (Head Laborer)	-	-	-	1	1	1	3
Grounds Labor/Cleaners	-	-	-	6	6	6	18
Head Guard	-	-	-	1	1	1	3
Guards	-	-	-	10	10	10	30
Guesthouse Cook	-	-	-	1	1	1	3
Housekeeper	-	-	-	1	1	1	3
Guesthouse Cleaner/ Washers	-	-	-	2	2	2	6
	0	0	0	71	71	71	213

\*Maximums -- May be fewer

NON-SCIENTIFIC SUPPORT STAFF

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<u>EL. FASHER</u>	1	2	3	4	5	6	TOTAL
Executive (Admin.) Officer	-	-	-	1	1	1	3
(Sr.) Accountant	-	-	-	1	1	1	3
Sr. Clerk/Communications	-	-	-	1	1	1	3
Cashier	-	-	-	1	1	1	3
Secretaries	-	-	-	3	3	3	9
Purchasing/Stores	-	-	-	1	1	1	3
Head Driver	-	-	-	1	1	1	3
*Drivers	-	-	-	5	5	5	15
<u>Skilled Workmen:</u> (2-generator operators 1 all-around maint.)	-	-	-	3	3	3	9
Head Laborer	-	-	-	1	1	1	3
Grounds Labor/Cleaners	-	-	-	2	2	2	6
Farm Labor/Herders	-	-	-	11	11	11	33
Head Guard	-	-	-	1	1	1	3
Guards	-	-	-	4	4	4	12
Guest House Cook/ Housekeeper	-	-	-	1	1	1	3
Guest House Cleaner/ Washer	-	-	-	1	1	1	3
	0	0	0	39	39	39	117

\*Maximums - May be fewer