New Partnership for
Africa's Development (NEPAD)

Comprehensive Africa Agriculture
Development Programme (CAADP)

Food and Agriculture Organization
of the United Nations

Investment Centre Division

GOVERNMENT OF THE REPUBLIC OF THE SUDAN

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

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Volume III of V

BANKABLE INVESTMENT PROJECT PROFILE

Integrated Traditional Farming & Pastoralism

January 2005

SUDAN: Support to NEPAD–CAADP Implementation

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NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Sudan

Sector of Activities: Agriculture–Pastoralism

Proposed Project Name: **Integrated Farming and Pastoralism Project**

Project Area: South Darfur State and Northern Bahr El Ghazal

Duration of Project: 5 years

Estimated Cost:
Foreign Exchange ..... US$47.0 million
Local Cost ..... US$15.7 million
Total .....US$62.7 million

Suggested Financing:

Source	***US$ million***	***% of total***
Government	9.4	15
Financing institution(s)	47.0	75
Beneficiaries	6.3	10
Total	***62.7***	***100***

SUDAN:

NEPAD–CAADP Bankable Investment Project Profile

"South Darfur and North Bahr El Ghazal Integrated Farming and Pastoralism Project"

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Abbreviations

ABS	Agricultural Bank of Sudan
ADB	African Development Bank
ARB	Animal Resources Bank
ARC	Agricultural Research Corporation
ARRC	Animal Resources Research Corporation
BOD	Board of Directors
CAADP	Comprehensive Africa Agriculture Development Programme
CDC	Community Development Committee
CDO	Community Development Officer
DPC	Deputy Project Coordinator
FAM	Finance and Administration Manager
FAO	Food and Agriculture Organization of the United Nations
FB	Farmers' Bank
GDP	Gross Domestic Product
GOS	Government of Sudan
IDPs	Internally displaced persons
IFAD	International Fund for Agricultural Development
LRIRS	Livestock and Range Improvement Research Station
M&EO	Monitoring and Evaluation Officer
MoAF	[Federal] Ministry of Agriculture and Forestry
MoST	[Federal] Ministry of Science and Technology
NARS	Nyala Agricultural Research Station
NEPAD	New Partnership for Africa's Development
NGO	Non–governmental Organization
NMTIP	National Medium–Term Investment Programme
NPRS	National Poverty Reduction Strategy
PC	Project Coordinator
PCU	Project Coordination Unit
PMA	Planning and Management Advisor
RVRL	Regional Veterinary Research Laboratory
SPLM	Sudan People's Liberation Movement
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VEA	Village Extension Agent
WAN	Wide Area Network
WB	World Bank
WFP	World Food Programme
WIDO	Women in Development Officer
WSP	Western Savannah Project

I. PROJECT BACKGROUND

A. Project Origin

I.1. The idea of this project originated as a response from the *Ministry of Agriculture and Forestry* (MoAF) to the resolution adopted by African ministers of agriculture, at the 22nd FAO Regional Conference for Africa, held on 8 February 2002 in Cairo, which set up steps to be taken in relation to agriculture in the framework of the *New Partnership for Africa's Development* (NEPAD) and the NEPAD *Comprehensive Africa Agriculture Development Programme* (CAADP) which aims to restore agricultural growth, rural development and food security in Africa

I.2. The CAADP intends to implement key recommendations on food security, poverty reduction and sustainable use of natural resources, approved at recent global conferences, including Johannesburg, Monterrey, Doha and Kyoto. It presents an integrated framework of development priorities comprised of five pillars namely: (i) Expansion of area under sustainable land management and reliable water control systems. (ii) Improvement of rural infrastructure and trade–related capacities for improved market access. (iii) Enhancement of food supply and reduction of hunger. (iv) Development of agricultural research, technological dissemination and adoption to sustain long–term productivity growth. (v) Sustainable development of livestock, fisheries and forestry resources. The project described below would be consistent with the objectives of the strategic vision of the current *"25–year Strategic Quarter Centennial Plan"* and is in line with the goals of the CAADP *National Medium–Term Investment Programme* (NMTIP).

B. General Information

I.3. Sudan, the largest country in Africa with a total area of 2.5 million km^2, shows high ecological diversity and can be divided into seven ecological zones, ranging from desert in the northern border with Egypt to high rainfall savannah in the south near the borders with Uganda and the Democratic Republic of Congo. The population is currently estimated at 34 million, growing at about 2.6 percent per year. This includes about 4 million of internally displaced persons (IDPs) who have escaped from conflict areas over the past two decades. Some 60 percent of the population is rural. The country is thinly populated (average of 14 persons per km^2) with main concentration of people along the Nile and in big urban centres. Away from the Nile shifting cultivation and pastoralism are dominating. Large population movements occurred due to the long civil strife in the south and drought and environmental degradation in the north.

I.4. Sudan's agricultural sector accounts for close to 40 percent of GDP and accordingly its performance affects the rest of the economy. About 60 percent of the population depends on agriculture for their living and the agricultural sector employs some 60 percent of the labour force. It also produces most of the country's food, more than 90 percent of non–oil exports and supplies almost about 60 percent of the raw materials for the industrial sector.

I.5. Land suitable for arable agriculture is estimated at 86 million ha of which only 17–20 million ha is currently under cultivation (20 percent). The cultivable land is mostly under rainfed agriculture (15.0–18.0 million ha) while only about 2.0 million ha is under irrigation. ***Four main farming systems*** prevail, namely:

- ***Irrigated agriculture:*** Practised on the Nile Basin and depends mainly on gravity irrigation from the Blue Nile and the Atbara River and to a less degree on diesel powered pump irrigation from the White Nile and the River Nile north of Khartoum. The irrigated

area is about 2.0 million ha or 12 percent of cropped area (less than 1 percent of total area of the country). It generates about 29 percent of agricultural production.

- ***Semi–mechanized rainfed agriculture*** covers approximately 6 million ha. It is concentrated in the States of Gedarif, Blue Nile, Upper Nile, White Nile, Sennar and South Kordofan. Farm size is typically 420 ha or larger and the land is leased to entrepreneurs by the government. Sorghum and sesame are the two main crops grown.

- ***Traditional rainfed agriculture*** occupies an area of about 9.9 million ha under crops. It is dominated mainly by subsistence crop farming and is found all over the country. Livestock are raised but they are second to plant crops in this mainly sedentary mode of life. The main crops are sorghum and sesame on clay soils and millet, groundnuts, water melon and Roselle on sandy soils. Gum Arabic is also an important export tree crop.

- ***Livestock:*** Dominated pastoral and agro–pastoral production systems are practised by nomadic and transhumant groups who move with their animals from north to south and from lowlands near the Nile to higher lands away from the Nile. The pastoral or nomadic groups are mainly camel and sheep raisers, who practise little, if any, crop farming. Their seasonal movement is not necessary related to specific homelands (*dars*) but rather dictated by availability of grazing and water. The transhumant groups raise cattle as the dominant animal species together with some sheep and goats. They also grow plant crops though these are relatively less important. They are usually associated with homelands where they grow crops.

I.6. A number of institutions are entrusted with agricultural development in Sudan. The Federal Government is in charge of the large scale irrigation projects. The state governments are responsible for agricultural development apart from these projects. The *Agricultural Research Corporation* (ARC) is the key research institution entrusted with research on crops, pastures and forestry. The *Animal Resources Research Corporation* (ARRC) is charged with livestock research, including wildlife and fisheries. Both ARC and ARRC are affiliated to the *Ministry of Science and Technology* (MoST). The *Technology Transfer and Extension Administration* is affiliated to the MoAF and is responsible for extension services. Plans are underway to establish parallel administrations at the state level within the state ministry in charge of agriculture.

I.7. The private sector plays a key role in marketing of most agricultural commodities, including livestock. Gum Arabic is an exception being marketed by the state–owned *Gum Arabic Company*. The main sources of formal agricultural credit are the state–owned *Agricultural Bank of Sudan* (ABS), *Farmers' Bank* (FB), and *Animal Resources Bank* (ARB). Other commercial banks are involved to a lesser extent. Almost all the formal credit goes to irrigated agriculture, semi–mechanised farmers and large–scale livestock traders. Traditional small–scale farming receives hardly any formal credit and is left to the traditional sources of lending.

II. PROJECT AREA

II.1. The proposed project area covers Southern Darfur and the northern parts of Bahr El Ghazal State. Southern Darfur extends from 23°15′ to 27°45′ longitude East and from 9°30′ to 13°0′ latitude North and covers a total area of 135,000 km^2. It has a population of 2.3 millions (1998 estimates) distributed over the 7 localities (*mahalias*) of Nyala, Ed Dein, Idd El Fursan, Buram, Reheid El Birdi, Shairiya and Adila. About 81 percent of the population lives in rural areas. The 1993 census indicated that nomads form some 11 percent of the population. Population growth is relatively high, 4–5 percent

per annum, mainly as a result of inward migration due to ecological degradation resulting from drought in northern Darfur and Chad and to conflict which led to waves of internally displaced peoples.

II.2. Rainfall ranges from less than 400 mm in the northern parts of the project area to over 800mm in the southern parts. Soils fall into three main contrasting land systems: the Baggara and Regaba alluvium (clay soils); the Habbaniya, Dango, Ma'aliya and Rizegat Qoz (sandy soils); and the Basement (quartzitic sandy and skeletal soils). Principal water sources are seasonal streams (*wadis*), and natural lakes and ponds supplemented by shallow wells. A network of over 330 deep boreholes within about 223 water yards equipped with pumps, diesel engines, elevated water tanks and a distribution system is the most important source of water in the *qoz*[1] land as the presence of shallow wells is rare here.

II.3. Traditional rainfed agriculture is the main source of livelihood for the population. An average area of about 1.3 million ha is cultivated annually mainly to millet and sorghum. Data available for 1996/97 showed that total millet and sorghum production was 2.33 million tonnes and total consumption was 4.09 million tonnes. The deficit of 1.76 million tonnes was partly corrected from a stored amount from 1996 season; the rest was met from other parts of the country or from imports.

II.4. Three production systems prevail in the project area. The dominant one is the sedentary village–based, crop–dominated system. Millet is the main staple food crop on sandy soils, followed by groundnuts as a cash crop. Sesame, gum Arabic and roselle (*Hibiscus sabdariffa)* are also grown. On the alluvial and clayey soils, sorghum dominates. Livestock is an integral part of this system though their contribution to the household budget is less than that of crops. Some sedentary communities grow horticultural crops on alluvial soils irrigated from shallow wells dug in wadi beds or banks. These have high potential to contribute to improving the standard of living in the villages of South Darfur. They are characterized by secured land tenure and a reliable source of water from wells and the system lends itself to modernization as lending institutions found it less risky to finance than traditional rain fed agriculture.

II.5. The second important system is the transhumant or agro–pastoral system which is practised by the transhumant Baggara tribes. The main source of earnings comes from livestock; crops play a relatively less important role. The key animal is cattle, followed by sheep and goats. These groups adopt a seasonal migration to Bahr El Arab and further into Bahr El Ghazal and Central Africa during the dry season. During the rainy season they trek into North Darfur.

II.6. The third system is the pastoral or nomadic system which is characterized by emphasis on camel and/or sheep rearing. It is mainly practised by tribes coming from North Darfur who spend the dry season in South Darfur.

II.7. Livestock rearing is very important in South Darfur and Bahr El Ghazal and for many groups it is the major profession. About 9.6 million animals are kept in South Darfur State. Of these some 3.6 million are cattle, 3.3 million are sheep, 2.6 million are goats and 0.07 million are camels.

II.8. Constraints to agricultural production in the area are low and erratic rainfall, traditional shifting agriculture, reduced soil fertility, pests and diseases, poor marketing infrastructure, the subsistence nature of production and weak agricultural services. The main constraints to animal production include insufficient nutrition owing to range degradation, animal diseases, low producing

[1] Stabilized sand dunes.

breeds, poor livestock management, inadequate drinking water, unsatisfactory market infrastructure and limited production enhancing technological packages. Inadequate land tenure arrangements are a constraint cutting across both crops and livestock enterprises

II.9. Agricultural, grazing and forestry land is communally owned all over the State. Within the village land, each family owns a farm or more which is acknowledged by the community and the village. This land comes from tribal lands (*dars*) embracing all above categories of land use down to the village land and the individual family holdings. The control of tribal land is achieved through historical ownership with conflicts resolved by tribal chiefs and village sheikhs through mediation and other means. Land allotment for various purposes such as farming and gum Arabic (*hashab*) plantations become more defined at the village level where individual ownership applies. Because of the shifting cultivation system, a household owns more than the land they can cultivate at any one year. Surplus land to the village use is left under the disposal of the sheikh who can allot it to the needy from the village or an outsider. An annual amount equivalent to one tenth of the produce is paid to the land owner or sheikh in recognition of land right. Horticultural and hashab gardens have fixed rights due to the high investment incurred on the land

II.10. The *State Ministry of Agriculture, Animal Resources and Irrigation* is responsible for agricultural development in project area. Other institutions operating in the area are the *Regional Veterinary Research Laboratory* (RVRL), the *Nyala Agricultural Research Station* (NARS), and the *Livestock and Range Improvement Research Station* (LRIRS) in Gazala Gawazat all affiliated to the MoST. The RVRL has vaccine production and diagnostic capabilities. The present staffing set up does not maximize use of the facilities available.

III. PROJECT RATIONALE

III.1. The proposed area has relatively high potential compared with the northern parts of Darfur. It therefore became a refuge for internally displaced people from Northern Darfur, from the conflict ridden Southern Sudan and even for people from neighbouring countries as a result of drought and instability. The increase in population and the growing demand for food coupled with a decrease in land productivity due to reduced rainfall, necessitated a horizontal expansion of cropped land. The expansion occurred mainly at the expense of pastoral lands, leading to shrinkage of traditional grazing lands and frequent blockage of migratory livestock routes, thus triggering conflict between settled and pastoralist groups. The project would contribute to mitigating these conflicts by rationalizing the expansion of agriculture and bringing currently inaccessible land due to lack of water into production, thus reducing frictions and conflicts between pastoralists and sedentary farmers.

III.2. The proposed area is a major contributor to food security in Greater Darfur. During good rainy seasons, it assists substantially in mitigating the impact of food shortages in North Darfur State thus playing a role in the government strategy of food security and CAADP pillar 3 on enhancing food supply and reduction of hunger. The planned project would introduce environmentally friendly production increasing technologies which would enhance the contribution of the area to food security and poverty alleviation at large.

III.3. The search for and the introduction of sustainable models of settlement which exploit land currently underutilized would be in line with CAADP pillar 1. It involves increasing the cultivable area under improved land management and reliable water control systems. It also involves the development of agricultural research, technology generation and adoption to sustain long–term productivity growth. To achieve this, greater, emphasis would be given to alluvial lands which lend

themselves to irrigation from shallow wells and to introduction of water harvesting technologies (CAADP pillar1). Settlements would also be established on qoz lands currently underutilized because of lack of water by drilling deep bore holes. The agricultural research station, the veterinary research laboratory in Nyala and the animal and range management station in Gazala Gawazat and other departments will have to be strengthened to enhance the generation of production increasing technologies for both crops and livestock.

IV. PROJECT OBJECTIVES

IV.1. The project would contribute to mitigating the conflict between settled and migratory groups through addressing the issue of land tenure in the area and advocating a land use plan that permits expansion in currently underutilized lands by opening water sources along livestock routes and other places.

IV.2. The ***specific objectives*** of the different components of the programme are:

- *To increase food production* in a sustainable manner through: (i) Development and adoption of food production enhancing technologies such as improved seeds, cultural practices, water management techniques and rural lending; (ii) Increasing awareness of farmers by promoting a viable and effective agricultural extension programme; and (iii) Bringing more land under cultivation by use of appropriate tillage techniques and water management practices.

- *To raise household incomes* by enhancing marketing efficiency through introduction of a reliable current market information system that assists in curbing prevailing lending irregularities. The creation of off–farm job opportunities especially for women is another contributing factor to enhancing household income.

- *To augment livestock productivity* through improved health, management, nutrition, and breeds.

- *To integrate crops and livestock* so as to benefit from the synergies between them.

- *To reduce environmental degradation* through range development and conservation, afforestation and use of alternative energy sources and building materials.

- *To test environmentally friendly new models of settlement* for introduction into new settlements. Moreover, ways would be developed to restore soil fertility, plant cover and range quality in existing villages that suffer resource degradation as a result of long and continual injudicious use.

- *To mitigate conflicts between settled and migratory groups* through development of new water sources away from cultivated areas especially along livestock routes, support programmes that promote the synergies between the two communities for their mutual interests, and supporting traditional and other conflict resolution mechanisms to play a more positive role in reconciliation.

V. PROJECT DESCRIPTION

Component 1: Traditional Farming Systems Enhancement

V.1. ***Agricultural Extension and Smallholder Services.*** This component would cover villages in all localities in the two states. The extension services would be the vehicle to improve and modernize farmer practices in order to increase productivity and income without jeopardising the resource base. Available up–to–date knowledge on improved production enhancing technologies from various sources would be acquired and transferred to farmers. Credit services would be made available to facilitate the acquisition and adoption of recommended inputs and practices. A participatory approach would be adopted.

V.2. The project would work with the State Extension Department providing training, vehicles, audiovisual aids and other extension materials. It would also advocate increasing the present number of *village extension agents* (VEAs) by 250 during the five–year project period. Trained VEAs would be furnished with necessary supplies and equipment. Each VEA would be provided with a suitable means of transport (donkey/motor bike). Assuming an average of 200 households per village and that the extension agent can train 50 percent of those then the project would be expected to train about 25,000 farmers through farmers' field schools and other extension methods. The number benefiting could be more when taking into consideration spill over effects. This component would cover all localities within the state.

V.3. ***Support to Technology Generation Institutions.*** Three research institutions currently operate in the project area namely the NARS, the RVRL and the LRIRS. No research station is found in Bahr El Ghazal. The NARS is actively involved in the development and/or adaptation of technologies aiming at alleviating constraints to agriculture in South Darfur. In addition to their involvement in efforts directed towards a more accurate characterization of the farming systems of the area and the definition of their limitations, the NARS scientists are executing research to enhance food production from both field and horticultural crops (CAADP pillar 3). This would be achieved through improving cultural and water management practices (CAADP pillar 1); adapting superior crop varieties to enhance food production and reduce hunger (CAADP pillar 3); and developing cheap animal–drawn implements for cultivation, weeding, water lifting, threshing and oilseed pressing.

V.4. The overall research outcome would be an increase in area cultivated; added value to oil and other crops; saving labour and effort; increasing incomes and reducing poverty. However, the present condition of the station and the available facilities are not adequate to achieve the set objectives. Currently, the station has about 8 scientists who are all former employees of the IFAD–funded *Western Savannah Project* (WSP). All have higher degrees in agriculture obtained from local training institutions. There is need for further targeted short training courses in relevant international training institutions. The station itself needs to be rehabilitated with necessary office, laboratory and field equipment and supplies, as well as with vehicles.

V.5. The RVRL is entrusted with animal disease surveillance and diagnosis. It plays a vital role in immediately responding to reports on disease outbreak before spreading and getting out of control. Prior to the establishment of this laboratory, diagnosis of diseases had to be done at the *Central Veterinary Research Laboratory* in Soba near Khartoum. By the time a response is obtained from Soba, the disease may get out of control. The RVRL is also involved in vaccine production. This activity is essential especially for the vaccines of short shelf life. The RVRL is reasonably equipped. However it needs renewal of some of its supplies and equipment in addition to acquisition of new items and vehicles. It also needs to be furnished with at least 5 qualified scientists.

V.6. The LRIRS is entrusted with research aiming at improving the local breeds of cattle as well as developing range management, conservation and improvement strategies. This station has always shown problems regarding staffing due to its isolated location. There are now two scientists posted at the station. This number is inadequate and the ARRC should post more scientists. If this proved to be impossible then livestock research could be conducted from Nyala with some outstation facilities or from the NARS through transfer of scientists from the ARRC or through recruitment from within the project area. There is need to support these research institutions to enable them produce and/or adapt technologies targeting problems of smallholder farmers in the area. Specific requirements should be determined later on. However, there is need for vehicles, training and laboratory, office and field equipment and supplies.

V.7. ***Development of Models for Sustainable Farming.*** The current system of shifting cultivation needs to be improved through developing new and more sustainable models of land use. The WSP attempted a model of settlement that recognized land ownership for farmers through registration. Six such settlements were established. In each a 40 ha piece of land was allotted on a long term lease basis for each household. Basic services such as water, schools, health and a grazing area at the outer peripheries were provided. Efforts were underway to empower farmers through extension and introduction of production enhancing technologies that are environmentally benign. These include rotations, planting of fallow land with legumes, use of animal–drawn implements and others. Ten new settlements would be established under the project with some modifications to the previous generation of settlements based on lessons learned. The existing settlements would be rehabilitated. The perfection and multiplication of this model should gradually lead to the abolishment of the shifting cultivation system characterizing the project area.

V.8. Intervention within existing settlements/villages that developed spontaneously over the years and are practicing a type of shifting cultivation that resulted in land degradation and decline in productivity, should aim at halting degradation of the resource base and then reversing it. This requires afforestation, deferred grazing and judicial land and water management to bring about the desired changes. The project would select 20 villages of this category for rehabilitation of natural resources.

V.9. ***Wadi Farming.*** The project area is traversed by a large number of wadis. Water may be obtained from shallow wells dug on the banks or in the beds of these water courses. The soils lying on both banks of wadis and extending to a short distance away (100–500 metres) are fertile due to the deposition of silt during the fast flow of water. Many horticultural farms were already established and irrigated from shallow wells. The lands are registered and stand a good chance of acquiring credit from lending institutions. The intervention in Wadi farming would be in line with CAADP pillar 1 of the expansion of the area under sustainable land management and reliable water control systems. It would also be in line with CAADP pillar 3 of enhancing food supply and reduction of hunger. Moreover, it addresses the diet quality through planting fruits and vegetables. The project would provide 500 diesel engines and pumps for lifting water, 500 sprayers for crop protection, cold storage processing facilities, improved varieties and extension. These inputs would be provided through suitable lending mechanisms. A consultant would be contracted to advise on appropriate cooling and processing facilities.

<u>Component 2:</u> Livestock Production and Range Development

V.10. This component deals with CADAP pillar 5 namely *'sustainable development of livestock, fisheries and forestry resources'*. The outcome of this intervention would be increased and diversified sources of household income, improved child and other disadvantaged groups nutrition, reduced

frictions between settled and migratory communities, and more efficient utilization of the resource base. There would be five sub–components.

V.11. ***Animal Health.*** The prevalence of diseases in the project area negatively impacted on livestock production. The project, under this sub–component, would provide support to the veterinary services department and to the private sector to enable them respond promptly to disease hazards. The services that would be provided at full cost plus a profit margin include diagnosis, treatment and/or vaccination against epidemic and endemic diseases. The veterinary offices in the localities would be equipped with 6 mobile clinics (to operate in both States) each consisting of a vehicle, a generator, a solar refrigerator and freezer for storing medicines and vaccines (these may alternatively go to private veterinary officers on credit basis). The project would also provide the veterinary administration of the Ministries of Agriculture, Animal Wealth and Irrigation in each State with two vehicles to facilitate the supervision of various field activities. Moreover, an initial supply of essential veterinary drugs would be purchased to be used as a revolving fund. In addition 12 crushes would be constructed to facilitate the vaccination programme. Village/ camp animal production extension agents or Para–vets would be trained to handle animal problems at the village /camp level. Veterinary clinics that were destroyed during the civil strife would be rehabilitated and provided with equipment and drugs. Staff would be allocated.

V.12. ***Animal Nutrition and Feed Resources.*** Natural rangelands are the main source of animal feed in the project area. These are undergoing degradation, both in amount and quality. The project would support a programme for conservation, improvement and development of rangelands as under:

- About 2,000 ha of land in each of 20 villages showing severe signs of range degradation would be fenced off with local materials by communities for use as improved deferred grazing. The land surface would be cleared and seeds of desirable indigenous and exotic plants would be broadcasted. Seedlings of desirable browse tress and shrubs would also be transplanted. This improved range would be grazed later on in the dry season when grazing elsewhere is depleted which also coincides with a time when plants are least affected by grazing as they have already shed their seeds for the next growing season. Villages, in which range degradation is noticeable as a result of overgrazing and fire, would be selected. The number of grazing animals would be matching the carrying capacity of the range.

- Range conservation would be undertaken by constructing about 2,000 km of fire lines with assistance from local communities in the form of labour and other contributions. The project would provide 4–6 tractors with blade and trailer specifically to implement this activity which must be finished in a very short time between grass maturity and fire outbreaks. The tractors can be assigned other tasks when the fire line construction is complete.

- Range rehabilitation would be done through collection of seeds from desirable plants to be stored in the seed store already constructed by WSP Phase II. Seed collection would be contracted to some village farmers and livestock raisers who show interest in that activity at an agreed fee. Collected seeds would be broadcasted on the range especially in denuded areas. Ten tonnes of seeds are expected to be collected annually.

- Forage, inaccessible or in surplus of animals' requirements, may be preserved as hay through certain methods. The economics of enhancing the nutritive value of this hay could be explored. Likewise, attempts would be directed to improve the efficiency of use of crop residues and crop by–products such as sorghum and millet straw and groundnuts

and sesame hulls. The feed industry would be encouraged using oilseed cakes rather than exporting them.

V.13. ***Improving Animal Production.*** It is understandable that animal production under extensive systems uses minimum inputs. However improvements in productivity can be effected by manipulating the system through better management of animals. Trained livestock extension agents, equipped with the necessary knowledge and skills, can contribute a lot to this end. Issues that should be addressed include controlling the breeding season in sheep to have lambing coinciding with periods of feed availability, advocating strategic feeding to ensure higher conception and parturition rates and higher mothering ability, reducing the distance walked in search of feed and back to water, selecting the more productive animals from within these adapted breeds, culling less productive and old animals and those with vices, processing surplus milk into cheese and improving the efficiency of current methods of ghee production. About 200 livestock extension agents would be trained by the project in both states. They would be supplied with essential drugs and equipment. Each would have a donkey, camel or bike. All will be under the overall supervision of the veterinary authorities. They would provide their services at actual cost plus a small margin.

V.14. ***Restocking of Smallholder Farmers.*** The desert sheep is in high demand for export so its price is continuously rising. Females are relatively cheaper to buy than males and they can produce 1–2 lambs every year. The project would provide poor farmer heads of households, especially women, with ewe lambs on credit basis. About 20 farmers would be selected from each of 250 villages to make a total of 5,000 farmers. Each farmer would be given a loan to buy 10 ewe lambs making a total of 50,000 ewe lambs. Farmers from the same village would share 8 breeding rams to make a total of 2,000 breeding rams. Assuming a ewe lamb costs US$48 and a breeding ram costs US$60, a total of US$2,520,000 would be required to lend to farmers. To recover the loan a farmer should pay annually the equivalent of 2 male animals thus repaying the loan in 5 years. In Bahr El Ghazal loans to buy goats may make a better choice for poor households.

V.15. ***Provision of Livestock Water Facilities.*** The scarcity and uneven distribution of water sources in the project area, and especially along livestock routes, is a major factor contributing to conflict between migratory and sedentary groups in Darfur and other parts of Sudan. It is also contributory to the low productivity of livestock in the project area through the prevalence of hardy low producing breeds resulting from natural selection over the years and to the huge cost of energy lost to walking between water and grazing areas. South Darfur and particularly the qoz areas are suffering from acute shortage of water. The project would enhance the availability of water and grazing for livestock and would improve potable water availability for human consumption by developing new water sources in the form of *hafirs*,[2] water yards and by desilting of some locations in the bed of Bahr Al Arab. Special attention would be given to providing water along stock routes to Bahr Al Arab and further south into Bahr Al Ghazal State. The latter are more suitable to hafir construction.

<u>Component 3:</u> Community Support Services

V.16. The provision of community support services as part of agricultural projects attains more importance when an area witnesses civil strife which destroys infrastructure essential for rural life. The sub–components mentioned below, therefore, would form an integral part of rural development projects whether they are agricultural or otherwise simply because they are a prerequisite to the presence of people in any rural area. In fact they form top ranking community priorities. These

[2] Excavated earth tanks for seasonal water storage.

services would be supported only partially as the community would contribute may be up to 25 percent of the cost.

V.17. ***Water for Household Use.*** In areas like the basement and locations where water is available at shallow depths the need is for clean water. The project would install hand pumps and improve shallow wells in addition to the water program above to advance sanitary standards of existing water facilities.

V.18. ***Health.*** The project would improve the community health status by rehabilitating the health facilities that went into disrepair due to lack of maintenance and those destroyed during the conflict. Personnel would be recruited by government. Training and essential equipment and supplies would be acquired by the project. Some 150 clinics would be rehabilitated and furnished with refrigerators and medical equipment and supplies. About 250 midwifes would be trained over 5 years. About 4,000 traditional toilets would be improved.

V.19. ***Education.*** The project would support community initiatives to rehabilitate or build new schools or other activities provided they contribute 20 percent of the cost.

V.20. ***Feeder Roads.*** Poor feeder roads condition, especially during the rainy season, is a major constraint to development. It seriously impedes the transport of necessary agricultural inputs and marketable products resulting in elevated cost of production. A component of rural feeder roads improvement is therefore crucial. The project would assist the localities to acquire essential road plant sets to be used for improvement of 350 km of feeder roads and for annual maintenance. The actual work and equipment needed would be determined by a consultant.

V.21. ***Rural Financial Services.*** The adoption of improved technologies by poor rural heads of households, both women and men, is constrained by meagre financial resources. There are also many off–farm activities that can add substantially to the household income but cannot be pursued due to lack of capital. The project would provide formal and informal credit lines to enable rural people to purchase inputs, restock their livestock herds, and perform harvesting operations without resort to selling their produce at low price during harvest time and to furnish women with needed materials to start a handicraft small business. The project would initially provide credit and loans for 19,500 households at a total amount of US$3.9 million. This would cover 15,000 women and men heads of households receiving a loan of US$200 each for agricultural operations and 4,500 women head of households to start a small–scale business of handicraft works.

V.22. ***Institutional Strengthening.*** This component intends to strengthen the departments delivering services to communities, and to empower local communities to manage their own affairs for mutual benefit. *Community Development Committees* (CDC) would be formed through suitable measures that assure equitable representation. They would be registered and empowered to spearhead the efforts aiming at improving the quality of life for community members. The committees would work closely with project and locality personnel to ensure that community priorities are properly addressed. The CDC would form sub–committees to attend to certain important services such as water, health, education and loan administration and to serve the interests of certain sub–groups such as women and youth. The project would train the government department personnel, CDC and locality representatives in order to appropriately perform their respective duties. Communities would be animated to set and implement their priorities. A sizeable sum of funds would be allocated for institution support.

Component 4: Crop and Livestock Information System

V.23. The project will establish an information system for crops and livestock through collection, compilation, analysis, storage and dissemination of information. Assistance would be enlisted from suitable technical entities to develop this information system which would contribute to promoting marketing opportunities and enhancing capabilities of project management, locality authorities and farmers to better plan, manage and control, monitor and evaluate the various activities.

V.24. Acquisition of computers, internet services and training of project personnel and other stakeholders is crucial. The project management HQ at the state capitals and the units in the main town of each locality would be supplied with computers and servers which would be linked through a WAN with HQ and with each other. Appropriate personnel would be recruited and trained. A training facility at HQ would be established. About 60 computers would be supplied and distributed as follows: 20 for the training unit, 2 for each locality and 6 for personnel at HQ. Moreover, generators or alternatively solar units, would be provided to cater for a continuous power supply. This whole arrangement will be part of project monitoring and evaluation units which would be staffed with competent officers and provided with a vehicle in each state.

VI. INDICATIVE COSTS

VI.1. As indicated in the table below, project costs have been estimated at a total of US $ 62.7 million.

Component/Sub–component	GOS	Beneficiaries	Donors	Total
1. Traditional Agriculture Enhancement				
1.1. Agric. Extension & smallholder services	1.38	0.92	6.90	9.20
1.2. Support to technology generation	0.15	0.10	0.75	1.00
1.3. Models for sustainable farming	0.23	0.15	1.13	1.51
1.4. Wadi farming	0.77	0.51	3.83	5.11
Sub–total Component 1	2.53	1.68	12.61	16.82
2. Livestock Production & Range Development				
2.1. Animal health	0.38	0.25	1.88	2.51
2.2. Animal nutrition & feed resources	0.53	0.35	2.63	3.51
2.3. Improving animal production	0.08	0.05	0.38	0.51
2.4. Restocking of smallholder farmers	0.38	0.25	1.88	2.51
2.5. Provision of livestock water facilities	1.20	0.80	6.00	8.00
Sub–total Component 2	2.57	1.70	12.77	17.04
3. Community Support Services				
3.1. Water for household	0.68	0.45	3.38	4.51
3.2. Health	0.23	0.15	1.13	1.51
3.3. Education	0.23	0.15	1.13	1.51
3.4. Feeder roads	1.28	0.85	6.38	8.51
3.5. Rural financial services	0.59	0.39	2.93	3.91
3.6. Institutional strengthening	0.41	0.27	2.03	2.71
Sub–total Component 3	3.42	2.26	16.98	22.66
4. Crop & Livestock Information System	0.08	0.05	0.38	0.50
Total Base Costs	8.60	5.69	42.74	57.02
Contingency (10%)	0.86	0.57	4.27	5.70
Total Project Cost	9.46	6.26	47.01	62.72

VII. PROPOSED SOURCES OF FINANCING

VII.1. The project costs would be borne jointly by the Government of Sudan (15 percent), interested foreign financing institutions/donor countries (75 percent) and the target communities (10 percent). Government contribution would be in the form of personnel seconded and office and other building facilities allotted and taxes forgone. Community contribution could be in cash, in kind or in the form of labour. The credit program would form a revolving fund from which an increasing number of farmers would borrow. In Sudan the private sector has not shown interest in the past to invest in rainfed agriculture. Even in irrigated agriculture it tends to invest only in short term operations and avoids medium or long term investment. It is therefore suggested that donor funding be directed to suitable lending institutions such as ABS or to *sanduq*[3] which will then release loans to farmers.

VIII. PROJECT BENEFITS

VIII.1. The main benefits anticipated from the project would be:

- Reductions in the number of poor households as a result of restocking of poor farmers, with sheep and goats and provision of loans to enable farmers undertake timely agricultural operations and sell their produce when prices are high. Poor women in particular would benefit from the loans offered to enhance income generating activities as in the case of handicrafts.
- An improvement in the food security status in the project area owing to increased productivity of land resulting from the generation, transfer and adoption of improved agricultural technologies.
- The testing and adoption of an alternative farming system which increases crop productivity and is more environmentally benign.
- An improved access to markets, resulting from the enhancement in the condition of feeder roads and availability of agricultural information.
- An improvement in the productivity of livestock because of better health care, husbandry practices, breeds, and nutrition due to easier access to more grazing through improved availability of water.
- An enhancement of community welfare resulting from improved health, water and education services.
- A reduction in conflict between settled farmers and pastoralists' groups as the latter will find good grazing far away from cropped fields.

VIII.2. The main beneficiaries would be poor women and men farmers, people returning from displacement and transhumant groups seeking conflict free refuge. Other Darfur States would also benefit by sale of surplus food from a nearby area instead of from central Sudan with all associated transport costs.

[3] Village community fund.

IX. IMPLEMENTATION ARRANGEMENTS

IX.1. The lead project agency would be the MoAF which lays overall policy directions. The project would be implemented by a *project coordination unit* (PCU) that would have an enabling role to the key implementing agencies that would carry the day to day activities pertinent to people's livelihoods. The PCU would be answerable to a *Board of Directors* (BOD) composed of federal and state institutions and other stakeholders involved in the project implementation. Farmers and women organizations would have ample representation.

IX.2. The BOD would develop strategies and approve annual work plans and budgets and would have full responsibility to ensure that project activities are performed according to approved annual work plan and budget.

IX.3. The PCU would be located at the state capital, Nyala. It would have a core staff composed of a *project coordinator* (PC), a *deputy project coordinator* (DPC), a *financial and administration manager* (FAM), a *community development officer* (CDO), *women in development officer* (WIDO), a *monitoring and evaluation officer* (M&EO) and a *planning and management advisor* (PMA), preferably expatriate, and basic support personnel. The PCU would have full discretion to involve other parties, including NGOs and private sector as contractors.

X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. At this stage of project preparation, the need for technical assistance is felt for a planning and management advisor who should preferably be an agricultural economist with long experience in planning, implementation, monitoring and evaluation of development projects. He/she should be recruited for 3 years. The project may also need short and medium term technical assistance based on the outcome of the full fledged project preparation. For example consultants may be needed to advise on road construction and appropriate machinery, evaluation of existing land tenure patterns and preparation of a natural resource management strategy. A short term consultant would also be hired to advise on processing and storage of horticultural crops.

XI. ISSUES AND PROPOSED ACTIONS

XI.1. An increase in livestock numbers without a corresponding increase in off–take rates would further degrade the environment through overgrazing of the range resources. Serious efforts are therefore to be exerted to encourage off take.

- Off take can be enhanced by increasing awareness among pastoralists, providing market information, opening new markets, controlling diseases, setting disincentives to keeping large numbers of unproductive animals and installing differential prices for young and old animals in the markets.
- The project needs to attract and retain qualified and experienced personnel. This can be achieved through offering competitive salaries and executing an ambitious training programme.
- The issue of secure land tenure has long been recognized as a pre–requisite by farmers for long term investment in land. The current recognition of pastoral land as government land has created confusion over use. The former system which recognizes tribal lands allows

the judicial allotment and use of the land under the supervision of tribal chiefs. This prevents blockage of livestock routes by agricultural projects sand spontaneous settlement.

- The current reluctance of banks to finance smallholder farmers practising rainfed agriculture should be mitigated by the introduction of alternative lending modalities such as *sanduq* and through insurance of crops.
- The timely flow of counterpart funds on the part of the government of Sudan was a problem in the implementation of projects in the past. This issue needs to be resolved during project negotiations.
- Government taxes on agricultural produce have created a disincentive to production. This is especially true when the taxes are collected on the road or while livestock are grazing on the range, sometimes even in the absence of the owner. The powers of tax collectors should be regulated to put them under the national laws.
- The *National Water Corporation* and sometimes the state governments have in the past always insisted to have control over revenues collected from various water sources. These are often spent to solve problems not related to water development projects. When need arises for the money to maintain water facilities it will be discovered that it had already been spent for another activity not necessarily a life saving one like water provision. It is essential that water yards, hafirs and other water sources be the responsibility of communities and under their full control without undue leakage of funds to the *National Water Corporation* or the state government or any other entity.
- The peace agreement with SPLM endorsed more powers to Southern Sudan and to Nuba Mountains and Blue Nile areas to manage their own local affairs. The GOS has already promised that this will be applied to other parts of the country and especially the turbulent Darfur region. This will give communities greater control over issues affecting their livelihoods.
- The willingness of participating parties especially farmers to contribute to project activities in terms of meeting their agreed obligations in cash or in kind is crucial to project success.
- The five–year project period may not be adequate to bring some project components to their conclusion. This is specifically true with components addressing the issues of the environment and natural resources. A second project phase may be considered after a thorough evaluation to cater for this.

XII. POSSIBLE RISKS

XII.1. The risks that may threat the project include:

- The ***uncertain security status*** with concomitant displacement of communities and restriction of freedom to cultivate and graze in remote areas.
- ***Delays in implementation*** which may occur as a result of the remoteness of the project area. This may be manifested in delays in the delivery of procured goods and failure of

project to attract qualified and experienced personnel to execute its activities in the absence of attractive salaries.

- The benefits from the expected increase in agricultural production may be defeated by ***unavailability of markets***. This will be more pronounced when food aid is provided by NGO's and other relief organizations working in the area in excess of the real need and for free or in the form of unregulated food for work programmes.

- Government of Sudan has failed to meet its financing obligations for some projects in the past because of a shift in priorities and shortfalls in anticipated revenue levels. ***Changes in financing priorities*** have always been influenced by the war in the South and more recently by the conflict in Darfur. It is expected that after the signing of the final peace agreement in Naivasha, Kenya, and a settlement to the civil strife in Darfur, increased emphasis will be given to development.

Appendix: Map of Sudan Showing the Project Area