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ANNEX 8: INFRASTRUCTURE

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EASTERN NILE IRRIGATION AND DRAINAGE STUDY/FEASIBILITY STUDY
WAD MESKIN IRRIGATION PROJECT

ANNEX 8: INFRASTRUCTURE

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1. INTRODUCTION

1.1 GENERAL

It is the strategy of the Government of Sudan to develop the most remote areas in the country. Good services like roads, water supply, health services and education are also of importance to the government strategy. For Wad Meskin irrigation and drainage project, services like roads, health, education, and water supply are needed to serve people in the project area.

1.2 DEVELOPMENT IN SUDAN

The National strategy of the Sudan aimed to develop all economical and social aspects, it aims to raise the GNP and develop the agricultural, mining and industrial resource in Sudan. Many development projects are being planned and implemented all around the country. Health facilities were spread out to raise the health standards and to localize the health and medical services, many new equipment are brought and installed in most states and medical staff was trained to operate and maintain them.

Educational facilities like schools institutes and universities were built in all the states, town and villages to make education as near as possible to all citizens. Roads to link the country states were built to facilitate products transport inland and for export beside to make land transport and travel easy within the country large area. Water resources were studied to provide clean drinking water for both the human beings and the animal resources available and programme of water harvest is developed and many water harvest projects were built.

In the field of communication, Sudan has a modern network of communication facilities; there are four working providers of communication facilities, internet and other communication media. It is the policy of the Government of Sudan that development to integrated in all its aspects, beside the agricultural, industrial and roads being developed the society is to benefit from all these projects by upgrading the health and educational facilities, it a pre-requisite that development project shall pay social cost to the society of the area. These social services shall consider the needs of the society, shall be studied and evaluated in the environmental and Social Impact Assessment (ESIA).

1.3 NEED FOR INFRASTRUCTURE IN THE PROJECT AREA

The project area which lies south of Hawata City and North of Wad Miskin Village is a rural area with limited infrastructure and the economy depends on the agriculture at the Rahad River bank and some rain fed agriculture.

Gadarif State where the project lies is located at the Eastern Sudan and surrounded by Kassala State at the North, Gazira and Sennar States at the West and Ethiopia at the East. The state is characterized by the rain fed agriculture economy.

Population is composed of the nomadic that grow cattle, camels and sheep and they are non- residents in one place they travel from North to South and East to the River Bank in summer season and from South to North in the Rain season. Such movement needs health and education infrastructure to be available in the project area to attract them to be educated to get a reasonable medical and health services. The other group is those who practice agriculture at the Riverbanks, they mostly reside near the bank in small village with few facilities, and in most cases they depend on the services in the nearby Hawata City.

2. Water Services

2.1 GENERAL

Although the villages in the project area have, hand pumps water wells as a source of water but in most cases, they use water directly from the river for the human use and animals. These water resources are limited in quality and quantity, the river water is raw water, which changes quality in the rainy season due to the flood and is not that hygienic since it is not treated. The livestock is also using these resources especially in the summer time where water is rare uplands and all move to the riverbank.

2.2 EXISTING WATER SERVICES

It is important that villages within the project area be within easily reach of water sources whether surface or ground. According to the ground water aquifers in the area. The existing water supply system is a set of hand pump wells and the River water. The hand pumps are used due to the non-existence of power and cost of the diesel engine, which can be used instead as a driving source.

In the upland areas, small hafirs are located and they are mainly used by the rain fed agriculture work force for drinking and used by animal growers but they small and dry in a short time after the rain stops.

2.3 PROPOSED WATER SERVICES

It is recommended that artesian wells can be a good water supply sources for the people in these villages. The water supply system is a water yard, which constitutes a well (borehole) dug to the required depth so that the well is productive. Water will be pumped to an elevated tank using a submersible pump. The elevated tank is about 24 m³ capacity and 6 m high. The pump is operated by a diesel engine and can be managed by the village local organization.

To cover the project area in a reasonable manner three (3) water yards are enough to cover the requirements of the people in the villages and those around.

3. Health and Medical Facilities

3.1 GENERAL

The existence of an agricultural project with water canals and plantation will generate water related diseases that affect inhabitants and their animals. There are many water diseases, which can prevail in the project area due to the existence of the irrigation and drainage system. Diseases like malaria, belharzia, diahrehia, gardia and others are expected to prevail in the area.

3.2 EXISTING MEDICAL AND HEALTH FACILITIES

The health services available at the project area are poor and located at Hawata City where there is a central hospital, small clinics and private clinics are there. In the hospital, there are inpatient and outpatient services with specialist doctor's clinics to serve the population. Major cases are referred to Gadarif City the State Capital, to Wad Medani Gazira State capital, or directly to Khartoum. In villages there are small clinics that are operated by a senior nurse.

3.3 PROPOSED MEDICAL AND FACILITIES

Health services are needed for people in the project area in the villages and the surroundings. Health care in the project area is a requirement. Health centres are needed to take care of the people in the project area. For reasonable health coverage, two health centres are needed. The required and necessary equipment for each health centre include casualty and words, laboratory, delivery room, pharmacy, furniture etc.

4. Educational facilities

4.1 GENERAL

Education needs are of great importance to the people young generations in the project area. The project area although has some educational services but it is located in Hawata city mainly specially the secondary school level, it is recommended that educational services being extended to a wide area other than Hawata village.

4.2 EXISTING EDUCATIONAL FACILITIES

The existing educational services are composed of pre-education schools (Khalwa) which are created and managed by the Sheikh who is a religion leader; these pre-schools are meant to teach basic Arabic, basic mathematics and Quran sciences. These institutions are financed many by donations and village sharing and they are not considered within the formal school setup. Basic school education exists in major villages that students travel daily to attend it. Secondary school education is available only at Hawata City both for girls and boys education.

4.3 PROPOSED FACILITIES

Pre-schools, basic schools and secondary schools shall be made available for the kids to carry on with their education to get better chances for university and higher education in the future. Two preschools each with 40-student capacity are needed with all necessary equipments, furniture, toys, playgrounds etc. to cover the area in a reasonable manner.

Four foundations schools two for boys and two for girls are needed to accommodate required number of students. The foundation school will be supplied with all necessary equipments, furniture and other small laboratory equipments.

Each foundation school shall accommodate 240 pupils. Two secondary schools one for boy and one for girls are needed to accommodate the available students. Each secondary school is well equipped with all necessary equipments, furniture, laboratory needs etc. The laboratory needs include chemical, biology and physics equipments and necessary chemicals. Above schools shall be utilized for both girls and boys education.

5. Roads

5.1 GENERAL

In agricultural projects, road networks are needed for the product transport as well as the transport and inter project transportation. Usually simple and un costly roads are built within the project area. People travel between villages and local markets by small trucks and busses to go back and forth Hawata city and other villages; in the rainy season mainly tractors are the main transport facility even in emergency cases.

5.2 EXISTING ROADS

The existing road network covers the area around the project area with a main focus to Hawata city, there are field roads that spread out in the area and changes route frequently due to the result of the rainy season and mainly generated by the rain fed agriculture since it is used to transport products. The inter villages roads follow the riverbank to link villages which are located at the bank. Riverbank plantations which are mainly vegetables are transported through roads. In most cases animals in the summer season travel from the uplands to the river bank through a defined corridors to water their animals.

5.3 PROPOSED ROADS

A road network within the project area is of importance. The average annual rainfall in the project is about 450 mm. accordingly the movement of the people during the rainy season is rather difficult. In most of the irrigation projects, raised roads (sub base) along main and major canals are constructed to overcome the slippery muds of clay everywhere.

Raised roads will make easy movement of farmers so that they can reach their farms during cultivation and harvest periods.

The construction material of the raised roads are borrowed either from canal excavations or from nearby areas using dozer machine. This will very much reduce the cost of construction of these roads. A length of 20 kilometres of these raised roads will be enough for the road network.

It is considered in the design of the irrigation and drainage system to build crossings and corridors to enable animals to pass to the riverbank for watering and these crossings and corridors are considered as a part of the irrigation and drainage design and cost.

6. Cost of Services

The infrastructures proposed in the project study constitutes part of the social cost to be included in the project cost and to mitigate the social negative impacts resulted from the construction of the project in health, education and other social aspects. These services are essential to the population in the area to upgrade their health conditions and educational level which are very essential to improve and raise productivity of the project. The following table shows the estimated bill of quantities and costs for the services needed for Wad Meskin Irrigation Project. The cost of social services to be provided at the project area can be summarized in Table 6.1 below.

Table 6.1: Bill of Quantities

Ref	Description	Unit	Qty	Rate USD	Amount USD
1	Supply and erect water yards components which include, borehole, submersible pump, elevated tank, fence etc.	No.	3	80,000	240,000
2	Supply material, build and supply equipment and furniture for the health centres.	No.	2	80,000	160,000
3	Supply material and build, and supply equipments and furniture for high schools.	No.	2	62,500	125,000
4	Supply material, build, and supply equipments, and furniture for foundation schools.	No.	4	110,000	440,000
5	Supply material, build, and supply equipments, and furniture for pre-schools.	No.	2	42,000	84,000
6	Construct raised roads (20 km length) adjacent to main and major canals) with 5 m width and 0.7 m depth.	m3	70,000	2.5	175,000
	Total in USD				1,224,000