Environment Development Studies

(EDS)

West Omdurman

Proposed

Canal Project

Submitted

to

The State Ministry of Agriculture, Irrigation and

Animal resources,

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دراسة إقتصادية إجتماعية بيئية لمشروع ترعة غرب أم درمان

ملخص تنفيذي :-

منطقة الدراسة والتي تشمل ترعة غرب أم درمان المقترحة تبدأ من مضرب القناء علي النيل الأبيض حوالي 3-7 كيلو متر جنوب خزانات جبل اولياء . وتمتد شمال غرب بطول مسافة تقدر بحوالي 76 كيلو متر . تقع بمنطقة المشروع العديد من القري المتناثرة والتي تزيد عن 35 قرية بجانب موقع المطار الجديد المقترح وكذلك كبري النيل الأبيض الجديد.

طبوغرافيا المنطقة مستوية والإنحدار العام يميل من الجنوب للشمال وتخترق منطقة الترعة عدة أودية، منطقة الترعة المقترحة تقدر بحوالي 7 أودية إلي جانب بعض الجبال المتناثرة والتلال المنعزلة والكثبان الرملية الطولية .

فيزوجغرافياً تقع المنطقة في نطاق الحزام الجاف ذو الأراضي الطينية االخفيفة إلي الرملية التي تجرفها الرياح كلما إتجهنا نحو الشمال الغربي مع وجود تربات ملحية ببعض الجيوب حول النيل الأبيض .

الغطاء النباتي خفيف قوامة أشجار (سلم ، السرح ، السيال ، السمر ، الشعطوط) بجانب غطاء حشائش يتكون من بعض الحوليات والنباتات المعمرة مثل التمام والسنمكة .....الخ ، ويعاني الغطاء النباتي عموماً من مظاهر التدهور بفعل الرعي الجائر والتحطيب وأعمال الإنشاءات (طرق مطارات توسع عمراني) مما أدي إلي نشاط زحف الرمال .

لقد كانت الحياة البرية غنية حتي حقبة الستينات من القرن الماضي حيث كانت تشمل الغزلان والحبار وجداد الوادي والقطا والقمري والسمبر والرهو والقرنوق والزواحف من ثعابين وورل وغيرها . ولقرب المنطقة من الخرطوم تعرضت الحياة البرية فيها للصيد الجائر.ومع إنحسار الغطاء النباتي والجفاف إختفت الكثير من أنواع الحيوانات ومع ذلك تري الدراسة ضرورة الإهتمام بنثر بذور الغابات والمراعي وحمايتها لكي تتطور كمحمية طبيعية خاصة في المنطقة الجنوبية الغربية عند بدايات وادي المقدم .

هنالك أودية موسمية تخترق المنطقة في إتجاة غربي / شرقي وشمالي / شرقي ، تحتاج لمزيد من الدراسة لتشملها خطة تنمية المشروع . سكان المنطقة الأصليون هم الجموعية وهؤلاء يدعون بأنهم أصحاب الدار مما يعطيهم حق السكن وتملك الأراضي والسلطة لإدارة أراضي المنطقة . وهم أساساً رعاة إبل بجانب إمتلاكهم للضأن والماعز فقد كانوا يتحركون بحيواناتهم محلياً علي إمتداد النيل الأبيض شمالاً وجنوباً . أما حراكهم الواسع فكان يصل حتي دار الكبابيش حيث كانوا يمارسون زراعة تقليدية محدودة علي بطون الأودية الموسمية وحولها ، غير أن هذا الأمر تغير حالياً نتيجة لإرتباطهم بالإقتصاد الحضري بالعاصمة القومية مما أضعف إقتصادهم الرعوي التقليدي .

هنالك أيضاً قبائل الكواهلة والهواوير والقريات إلي جانب النازحين الذين تأثروا بموجات الجفاف التي توالت منذ عقد الثمانينيات من القرن الماضي ، وهؤلاء من قبائل الكبابيش والحسانية يضاف إليهم بعض المجموعات التي تفد للمنطقة طلباً للعمالة بالعاصمة وهؤلاء خليط من كيانات بشرية وخليط من الإقتصاد الممارس ، جذبهم بريق المدينة وسهولة الحصول علي العمل الهامشي والسكن العشوائي بأطراف المدن . ولعل في هذا أيضاً تبرير لموجة الإستثمارات والمضاربات في الأراضي السكنية والنشاطات الحضرية الأخري

المرتبطة بها من شراء وإستحواذ خصوصاً للأراضي الواقعة علي شارع الاسفلت المتجة للدويم مما يشير لعمل مستقبلي أخر . أن هذا الإنتشار السكني وأوجة العمالة المختلفة يمكن توضيحها بالملامح التالية :-

- سيادة الإقتصاد الرعوي التقليدي المرتكز علي حيوانات من سلالات محلية (ماعز ، ضأن ، جمال ، أبقار) .
- حيوانات بأعداد قليلة مصاحبة للمجموعات الوافدة من أصول رعوية (ضأن ، ماعز ، أبقار) .
- قطعان تجارية عابرة من من الولايات الغربية (ضأن ، أبقار مع إنحسار في أعداد الضأن في السنين الأخيرة بسبب النقل بالشاحنات) لوقوع المنطقة علي طرق الماشية فهي تمثل نقطة تجميع وإسترخاء وإستراحة للقطعان وتقصي لمستوي الأسعار بالسوق.
- عمال بالعاصمة القومية مع سكن مع الأسر بالمنطقة كمكان إقامة .
- نشاطات تجارية وخدمية داخل المنطقة متصلة بالعاصمة .

أما بالنسبة للإحصاءات السكانية فقد تمت الإستعانة بإحصاء 2003م القومي وتقديرات محليتي أم درمان وأم بدة بجانب ذلك قام فريق الدراسة برفع أكثر من 30 قرية علي طريق نظام تحديد المواقع الجغرافية (GPS) .

يبلغ تعداد سكان منطقة الدراسة حوالي 117 الف نسمة ويتراوح حجم الأسرة مابين 6-8 شخص حسب المسح الميداني الذي تم بواسطة فريق الدراسة .

تجدر الإشارة إلي أن معظم القري بمنطقة المشروع تبعد عن مواقع الزراعات المقترحة بحوالي 15 – 8 كيلو متر مما يوحي بصعوبة ممارسة مستحقي الأراضي لنشاطهم الزراعي نتيجة لبعد المزارع عن موضع سكناهم .

وعلية لابد من التفكير في إمكانية تحويل القري إلي مواقع قريبة من المشروع حتي لا يكون المزارع غائباً .

مهما يكن من أمر فأن السكان يتركزون في حوالي 15 % فقط من المساحة الكلية بمنطقة المشروع وبالذات بالمناطق الجنوبية في قري مبعثرة لا يتعدي سكان الواحدة منها الـــ250 أسرة فقط . أما الأجزاء الشمالية الغربية فتكاد تكون خالية من الإستقرار البشري وذلك لإنتشار الجبال والكثبان الرملية وتعرض المنطقة للزحف الصحراوي .

تبلغ نسبة الأمية 85 % بين كبار السن من الجنسين وتتناقص هذه النسبة بالنسبة للأجيال الجديدة (12 – 35 سنة) وذلك لإنتشار التعليم وتوفر الفرص وقرب المنطقة من أم درمان وإستفادة سكانها من خدمات العاصمة . لذلك نجد أن حوالي 60 % من البنين والبنات يجدون فرص التعليم بالمدارس والتي تكاد أن تغطي كل قري المنطقة . غير أن هنالك تسرب بين البنات وخصوصاً الفصول العليا وذلك نتيجة للزواج المبكر .

بالنسبة لهوية الأرض وأسلوب حيازتها فكما هو معلوم فأن الأراضي هذا قبلية والملكية جماعية مشاعة بين قبيلة الجموعية رغم رغم عدم وجود تسجيل للملكية الحرة حيث أن هذا الامر عرفياً فليس لأفراد القبائل الأخري حق التملك للأراضي والتي يتوارثها السكان الأصليون أب عن جد . وليس هنالك حدود واضحة للملكية والتي تحدد عادة بالحجر البعر (روث الحيوانات) كرمز لوضع اليد لفترة طويلة مما يبرر الملكية عرفية بالنسبة لهم . وموضوع حيازة الأرض من المواضيع التي قد تمثل عقبة كبيرة عند توزيع أراضي المشروع حيث أن السكان المحليون ينظرون لأفراد القبائل الأخري كوافدين ليس لهم حق الحيازة رغم سكنهم لفترة طويلة مع الجموعية .

أوجة إستخدامات الأرض بمنطقة الدراسة تتمثل في الزراعة التقليدية المطرية علي الوديان خلال فصل الخريف في حيازات صغيرة والإنتاج هنا لايكفي الحاجة المحلية . وهنالك أيضاً زراعة الجروف بعيداً عن المنطقة المقترحة للترعة وحول النيل الأبيض وكذلك هنالك مشروع الجموعية والذي تعثر كثيراً في الأونة الأخيرة غير أن العقبة الكبري في إستخدامات الأراضي تمثل في إنتشار المحاجر التي تنقل منها الرمال والحصي للإنشاءات بالعاصمة القومية مما يعرض تربة المنطقة للإنجراف والتعرية مما يجعلها عرضة لزحف الرمال .

أما النشاط الإقتصادي فيتمثل في تربية الحيوانات حيث أن هذه المنطقة بحكم وقوعها علي طريق الماشية القادم من غرب السودان ومتاخمتها لسوق أم درمان أصبحت مهمة بالنسبة لتجار المواشي حيث أنها أضحت محطة توقف تنطلق منها الماشية للسوق بعد أن تأخذ قسطاً من الراحة ويتم تسمينها وإنتظار إستقرار الأسعار بأم درمان . أما بالنسبة للحيوانات المملوكة للمواطنيين المحليين فهي محدودة غير أنه في الأونة الأخيرة إتجة بعض السكان الموسورين من إقتناء أبقار محسنة من سلالات جيدة ومدرة للألبان بجانب سلالات لاحمة توطئة لتغطية إحتياجات العاصمة وهذا الإتجاة يسير بصورة حسنة .

الخدمات الإجتماعية القائمة بالمنطقة تتمثل في خدمات المياه حيث تنتشر محطات المياه بالمناطق البعيدة عن النيل وتكاد أن تغطي معظم القري . إضافة إلي خدمات التعليم حيث تنتشر مدارس الأساس للبنين والبنات والتي تستوعب أكثر من 60 % من الأطفال في سن التعليم أما المدارس الثانوية فهي تتمركز في مدينة جبل أولياء والعاصمة القومية . أما الخدمات الصحية فهي فقيرة جداً وحتي القائم منها يفتقد أبسط المعينات من الخدمات من

أدوية وأمصال ومعامل ومختبرات طبية ، بجانب إنعدام خدمات الأمن وصحة البيئة والخدمات الزراعية والخدمات ذات الطابع الحضري .

عمدت الدراسة لتقييم المردود البيئي المتوقع لإنشاء مشروع ترعة غرب أم درمان فقد وضعت مؤشرات تتمثل في البيئة الطبيعية والبيئة الحيوية والكيميائية بجانب البيئة الإقتصادية الإجتماعية وقد أتضح لفريق الدراسة بأن هنالك مشكلات بيئية ستظهر مع قيام المشروع أهمها أن تكون تلوث التربة والمياه والتلوث الهوائي بجانب الضجيج نتيجة للعمليات الإنشائية إذ لابد من إتخاذ بعض الإجراءات والتحوطات البيئية اللازمة والتي أشرنا لها في صلب الدراسة ، ليس هذا وحسب بل أن هنالك كوارث صحية تتمثل في إنتشار الملاريا والبلهارسيا نتيجة لإنتشار مياه الري إذا لم يتم معالجتها . هنالك أيضاً خطر بيئي يتمثل في إزالة الغطاء النباتي نتيجة لنظافة الأرض وطؤطتاً لشق الترعة الرئيسية وفروعها مما يتطلب من إزالة للغطاء الشجري والعشبي في مساحات كبيرة بجانب الحرث العميق لبعض الترب الخفيفة مما يعرضها للإنجراف . فكل هذه المشاكل يمكن تلافيها بما أشير إليه من إجراءات كذلك لابد من الحد من عمليات المحاجر .

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West Omdurman Proposed Canal Project

Project Profile

Project background:

The west Omdurman area is a potential agricultural area that has practiced traditional crop and livestock raising for decades. This area was over stocked by migrating internally displaced people form western Sudan, namely the Kababish and Hawaweer tribes and others from North Kordofan who took refuge together with their livestock for more than 20 years.

The area began to experience urbanization and a new international airport is under construction in the southern part of the area. This, together with commercial livestock activities taking place since themed eighties triggered an awareness among the people of the area about land and livestock value of the area. The State Ministry of Agriculture and Irrigation, in line to the current enthusiasm for revival and mobilization of agriculture managed to secure a loan of US$150 million from the Chinese protocol to invest it in the development of the West Omdurman Canal project. This is expected to tap unutilized land and livestock resources of the area for the benefit of the inhabitants of the area and citizens of Sudan.

Project location and description:

The project is located on the western bank of the River White Nile south of Omdurman city and west of Gummuiya irrigated scheme, and about 3 kilometers south of the Jebel Awlia Dam. It will extend over 70 kilometers northwards. The project will be composed of an irrigation canal irrigating an

estimated are of around 100 thousand feddans for crop and animal production.

The Infrastructure and the people of the project area:

The project is connected to Khartoum and Omdurman cities by a number of asphalt and gravel roads and lies on the Omdurman-Dueim asphalt road and the Omdurman-Dongla asphalt road. The new international air port is already under construction and will provide a plausible avenue for exports of vegetables and red meat products. The area received electricity services in the big villages and residential areas and has telephone communications in addition to the wide use of the cell-phone system in the area.

The population of the area was estimated at about 117 thousand with almost 50 percent living in the southern part of the project area. The population of the rest of the area is sparsely distributed with relatively poor access to social services. The area is estimated to have more than 50 percent of its population under poverty situation, who are forced to go to the city and get engaged in petty trade and marginal jobs.

Project components:

The project components are composed of:

1. **Construction of the canal:** this has to take into consideration the availability of water supply throughout the year and to cater for dry periods-shortage of water in the White Nile River during summer. The canal also will be constructed by crossing wadies and needs to take this into consideration to avoid drainage problems and to benefit from seasonal wadies floods to expand the area under production particularly for the grazing of livestock coming from north Kordofan.
2. **Irrigation networking:** this entails the design of a proper irrigation networking that will supply and deliver water irrigation requirements

of individual-farmers and livestock owners whenever and wherever they need.

3. **Establishment of experimental farms:** this has to be established in different parts of the project area to ensure coverage of the different climatic and edaphic (soil characteristics) factors existing in the project area. The experimental farms are expected to grow the potential crops in the area and establish their agronomical requirements. Furthermore, these farms can play a leading role in extending information to farmers in the area and train them for adoption of new technological innovations. The experimental farms are also expected to introduce improved husbandry practices and veterinary training services for healthy livestock raising in the area. The experimental farms are expected to introduce new types of commercial forestry wood into the area and maintain the original ones from extinct by severe deforestation wave already taking place in the area.
4. **Land distribution:** this has to take into consideration the sensitive issue of land distribution among beneficiaries in the area. Land tenancy can act as a collateral foe loan- security and access to commercial credit and trade services. It may also encourage lad speculation and turn the land from agricultural purposes to urban construction purposes.
5. **Supply of credit and marketing services:** this has to take into consideration the importance of supplying adequate credit on time to allow for useful tapping of production and marketing resources ad opportunities. Establishment of productive and marketing associations together with encouragement of private sector involvement would

enhance the effective inherent investment opportunities of the project area.

6. **Environmental rehabilitation and mitigation:** this entails the recovery of the depleted forestry resources through community and commercial forestry nurseries and activities. It also entails the adoption of effective mitigation measures that would reduce the expected negative environmental repercussions arising from construction of the canal and from heavy trafficking in the area as a result of the expected growing socio-economic development of the area.
7. **Establishment of social services:** This particularly important in the area of drinking safe water, supply of health and sanitary services and establishment of accessible schools for boys and girls in the project area.

Project benefits: the benefits will accrue in form of increasing the income position of the stakeholders in the project area and the improvement of the welfare of the citizens of Sudan from increased fresh/raw and processed crop/livestock/forestry output for domestic ad export markets.

West Omdurman Proposed Canal Project

The Study Document

1. Introduction and Method of the Study:

This document is based on field surveys conducted in West Omdurman area (Um Badda and Omdurman localities) during the period from 25th June up to 3rd July, 2008. The objective of the study was to prepare a socio-economic study in consultation with the grass roots in the area and with the official authorities, local leaders, and communities in the area. The consultation focused on the socio-economic and environmental aspects of the proposed project.

Ultimately, the study suggested a set of alternative options for possible interventions that would contribute to the successful implementation of the envisaged project. The study also catered for the protection of the natural resources and for their sustained optimum utilization. The study also considered the livelihood of the people in the project area, particularly the women and the significance of enhancing the capacity of the local community institutions.

According to instructions of the State Ministry of Agriculture, Irrigation and Animal Resource (MAIAR) the study benefited from the feasibility study prepared by the Horticulture Cooperatives in 1996 and updated potential information and suggestions recommended by the Feasibility Study.

The study adopted the participatory approach using the rapid appraisal method for collection and validation of data and information by holding group meetings with key informants, community leaders, locality authorities, official staff of the State MAIAR, and women in the area. The study also

benefited from satellite imagery by identifying coordinates of villages, wadies and the proposed main canal route. It produced a more detailed map for the proposed project. The study also benefited from field observation in enriching the findings, analysis and recommendations of the project. The output of the study is a set of interventions that require further in-depth studies and preparation of a detailed updated technical, socio-economic and environmental feasibility study.

2. The Location of the Project Area:

The project lies between Latitude 15◦ 36'and 15◦ 12' and longitude 32◦ 25' and 31◦33' on the north and 32◦ 21' on the south. It is located on the western bank of the River White Nile south of Omdurman city and west of Gummuiya irrigated scheme. The irrigation proposed pumping head station will be established about 3-5 kilometers south of Jebel Awlia Dam with an irrigation canal that will extend north-west towards Fetasha and then northwards to Kilo 71, the northern boundaries of the proposed project. The mean width of the project is estimated about 7 kilometers on the southern part and about double of that on the northern part. The project is designed to run along the borders between Khartoum State, White Nile State and North Kordofan State. The canal will surround a number of hills series and the Khartoum New International Airport (KNIA) near within its boundaries enroute. The project area is connected with Omdurman and with the new International Airport by an asphalt road, with a paved asphalt road that runs into the White Nile State. It is also connected on the northern fringes by the Omdurman Dongola asphalt road, and by the new White Nile Kalakla-Damasin Bridge with Khartoum-El Kalakla-El Shagara area.

3. The Climate of the Project Area:

The project lies within the semi-desert climatic condition with an average summer rainfall of about 160 mm per year. The area experiences two distinct climatic seasons: (i) the dry-warm winter season starting from October and extending into April, which is dominated by the hot-north winds arising from the desert area creating wind erosion in the project site; and (ii) The summer rainy season starting from May and extending onto September. This season is dominated by the south and south-western winds, and is burdened with dust storms during May and June months. Most of the rains fall during July-August, and consequently floods the wadies with running waters for a short period of time.

The annual evaporation rate in the project area is high to the extent that it would require sustained irrigation water supply to compensate for deficit in the soil moisture condition, particularly in the drier areas of the northern part of the project. The daily temperature reaches over 40°C during April-June and goes down to around 30°C during December-February.

4. The Geology-Geomorphology of the Project Area:

The geology of the area is composed of a series of hills of Nubian sand stone origin, and of dissected ridges (Qalas) and wadies, and of alluvial outwash fans and interfluves. The Nubian sand stone forms the solid rock or weathered source of soil formation, and the alluvial deposits form the outwash fans and the small wadies, while the active Aeolin deposits form the sand sheets and dunes from eroded materials. The area is traversed by many deep and shallow wide and narrow wadies crossing the project area from the west to the east terminating in the River White Nile basin. The main wide wadies comprise Abu Hamra, El Mansorab, El Rawakeep and El Khairan wadies. The interfluves lie between the wadies and form the base of relatively more fertile soils in the project area.

5. The Topography of the Project Area:

In general, the topography of the project area is flat with a gentle slope from the southern to the northern part of the area. Uneven micro topographies occur in the wadies, the ridges and around the hilly areas.

6. The Vegetation of the Project Area:

The project area is characterized by the semi-desert zone sparse natural vegetation, which is generally concentrated in the seasonal streams. Most of the grasses and shrubs were lost during the heavy droughts except for the dry-areas trees such as the Acacia species. The whole project area is dominated by thorny acacia which is adapted to such climatic regions. The wadies trees, shrubs and grasses species are as follows:

Acacia melifera, Acacia nilotica, Balanites aegptiaca and zizphus spina, Christi acacia radiana, Acacia ehrenbengiana, Acala nubica, Capparis decidua, Maerua crossifolia, Co mmiphora africana and Salvadora persica.

The dominant grass species are: Panicum turgidum, Aristida spp., Laisrus hirstas, Cymbopogon proxies, Echino choloa colonum, Cyprus spp., Dactylactorxium aegyptium, Cenchrus biflorus, other herbs include Solanum dobian, Ocinam americanum (undesirable), Cassia senna, Tribulus terrestris, Pomea spp., and Colosythus vulgaris.

7. The Wildlife of the Project Area:

During the forties, Khartoum State was rich with wild life and game animals including gazelles, ostriches, foxes and wolves. Today, the number of wild life animals increased in numbers and had expanded activities in crop production, wood-cutting and game hunting. Accordingly, those game

animals became rare and only a small number of wild deer roam around within the project area. These game animals got extinct due to illegal/poaching hunting despite the present regulations and laws that control hunting through approved licenses.

The project area also falls within the international wild birds' sanctuary site on the two sides of the River White Nile banks. This natural good habitat for a variety of birds could be risked by the introduction of intensive agricultural activities and the heavy traffic that would be crated by the establishment of the new Kalakla/Damasin Bridge presently under construction. All these new interventions may generate an adverse environment to the wild bird sanctuary in the project area.

8. The Infrastructure of the project area:

There is a number of asphalt and gravel roads that connect the area with the cities of Khartoum and Omdurman, and that connect the different parts of the project passing along side of some major villages and the main paved roads. The project area also has two interstate paved roads, the Omdurman-Dueim asphalt road and the Omdurman-Dongola asphalt road. The area has the KNIA and the Islamic University within its surroundings, whereas it lies along the River White Nile with the Jebel Awlia Dam on its southern boundaries. The area received electricity services in the big villages and residential areas and has telephone communications in addition to the wide use of the cell-phone system in the area.

9. Population of the Area:

The Project area is sparsely populated compared to the other parts of Khartoum State. Based on the national census of 2003, the population of the area was estimated at about 117 thousand (table 1). The population density varies widely across the project area from large relatively/virtually

unpopulated areas in the extreme north-west parts of the area to the densely populated areas adjacent to Omdurman, with approximately half of the population living in just 15 percent of the land in the southern parts of the project area.

Table (1): Official estimates of the population of the project area

Locality	Households	Total population	Males	Females
Omdurman	13119	77075	39255	37817
Um Badda	10050	50250	26110	24140
Total	23169	117325	65365	61977

- Total numbers of residential houses in Omdurman locality portion of the project area approximated 13118 in 2003.

Source: localities of Omdurman and Um Badda, July 2008.

The settlement areas are composed of core areas and constellation of peripheries areas of dispersed households. The core areas are made up of old villages inhabited by the original tribes of the Gummuiya people, while the constellations are inhabited by the drought-driven internally displaced people (IDPs) from north Kordofan State. Those IDPs include the Hawaweer, the Kababish, the Grayat, Ahamda and the Kawahla nomadic tribes. The total estimated population of the area approximates 113 thousand persons, composed of extended families, each having and average of about 8 persons per household. Large extended families go up to 10 to 15 persons per household, while the small families go down to 3 persons per household. Most of marriages are of monogamy type though very few hexagomy exist. The estimate of the total population has been derived from different sources including key informants in different places of the project area, and from

estimates given villagers and from the localities (Mahaliat) of Um Badda and Omdurman.

The majority of the immigrants were originally engaged in agriculture and agro-pastoral livelihoods/activities having sufficient access to land and livestock that sustained them for self-sufficiency. With migration, they were deprived of all their assets and since their rural skills rarely provide them with access to adequate income in their new settings. For those settled around Omdurman, selling their labor as seasonal and low paid wages. Generally, the majority of the immigrants and especially women are economically and socially marginalized and politically underpowered.

The present feature of the project area is composed of the White Nile, The Jebel Awlia Dam, the KNIA and the location of the main settlements. These features depict the following observations:

1) The population estimates have been reached by working out interviews with local leaders, locality personnel. The size of the settlement ranges from 250 families to 600 families, with an average number of six to eight persons per household on average (tables 2 and 3). The general characteristic of the population in this area is that it is a quick growing population largely instigated by the rapid rate of immigration into this area.
2) The Gummuiya society is a sex segregated and the males dominate the society. Men constitute the household heads and the decision makers, and this need to be taken into consideration when implementing the project. Some lands are currently allocated and new allocations of lands would be allocated to the household heads and eventually women may not be involved in the initial distribution of land tenancy of the project.

3) Illiteracy is high especially among the female group, approaching 85 percent of the total population in the project area. However, and due to its proximity to Omdurman, the project area has a number of basic schools established as early as the 1960s. These schools enroll more than 60 percent of the boys and girls of the project area. Eventually, there are a large number of a variety of educated people from the living tribes of the area assuming senior positions in the government services, the private sector and the universities, and are consequently expected to play a positive role in the development of the project.

Table (2): Village population of the Project Area under Um Badda Locality

Name of the village	Number of households
El Maharig	500
El Kouu	350
El Ratag	350
Um Sarha	250
El Amra	400
Hilat El Sheikh	450
Qoz Dahloub	250
El Malkha	150
Umm Marisa	400
El Gamrab	250
Fatasha	500
El Rawakeep	450
Gadeer	350

Source: field survey, July 2008.

Table (3): population of the project area in Omdurman locality

Name of the village	Number of households
Kammonab	320
Mahmiya	125
Awlad Danas	110
Sheikh El Bashir	250
El Hagab	230
El Sandogab	300
El Samblab	210
El Mugdab	500
El Galaa	420
Hafir Doka	310
Iidd El Hadd	115
Birka	210
ElGalie	125
El Garaza	320
El Samra	410
Keddei	420
Qoz Ibrahim	180
El Gabrab	117
El Gumarab	215
Um Hegleig	215
El Wadi	155
El Salha	650

Source: field survey, July 2008.

4) The settlements are comprised of a core and constellation of dispersed households. The core area is usually made up of old villages that historically sparked the are while the periphery settlements are those established in times of drought as a result of the cyclical in migration from north Kordofan in search for refuge, grazing land and employment opportunities in Omdurman and Khartoum towns of the Capital State.
5) Ethnically, the population of the project area can be classified into the following:
    a. The Gummuiya who makes the major tribe in the area and acclaim ownership of the land. They form the consolidated settlements. They form the largest groups in the project area both in terms of number and of political power. They assume the administrative leadership and provide care and permission to the nomadic IDPs to settle and use the vicinity land under their auspices and jurisdiction.
    b. The Farageen, Hassaniya, Kababish, Gereyat, and the Hawaweer nomadic tribes, who make the rest of the population in the area. They came from north Kordofan during the drought periods of the early to mid eighties. Since this is not a full survey, the sizes of these different tribes are difficult to be given in exact numbers. These tribes form the scattered settlements spread over large facilitated areas for their livelihood, they are mainly found in the northern parts of the project area with a few living in-between the Gummuiya villages in the southern part of the project area. Despite their stay in the project area for more than twenty years, these

nomadic tribes still continue their original traditional ways of livelihood. Though, some of these nomads managed to force their way into modern life and lead urban-oriented style with some of them becoming large commercial traders in livestock and other merchandise/trading activities.

10. The Land Use in the Project Area:

The general land use pattern of the project area is based on communal property traditions and is geared towards livestock grazing, limited crop production under rainfall and irrigated Geruf livelihood. The rainfall crop production system is practiced on the Qoz soils and along the wadies, whereas the pump-irrigated crop production system is practiced in the western bank of the River White Nile. In addition, the area also accommodates large pockets of gravels and sand material supplied for construction works in the Capital towns and cities of Khartoum State. This has resulted in environmental degradation in the area with concomitant potential reservoirs for collecting rain water and development of swamps that hosts mosquitoes and malaria infection.

The present land use in the project area is characterized by uncontrolled use of the land due to the animal overgrazing practices on limited natural pastures and traditional farming in marginalized areas. Given the poverty situation, especially during drought, the forest area was subjected to severe deforestation for supply of fuel wood for home consumption and for the market. Consequently, vast areas encountered serious land degradation with desert encroachment on the northern part of the project area.

In Sum, at present, the land use pattern is dominated by grazing along the wadies and interfluves, growing crops under irrigation in El Gummuiya scheme, on the flood areas along the bank of the River White Nile and on

the traditional rain-fed agriculture in the Qoz lands and in the outwash-fans near El Garaza village. Some quarries exist in the area for gravel and sand supply for building material for the cities and towns. Most of the villages are concentrated on the eastern part of the proposed project area and to the west of El Gummuiya agricultural scheme. The area also accommodates a variety of agricultural and livestock schemes (table 4). With the anticipation of new changes taking place in the project area initiated by the construction of the International Airport and New Kalakla Bridge, an active wave of land speculation aroused in the area, and many inhabitants began to sell settlement lands to outsiders and to hedge large areas for remunerative potential sales.

Table 4: Distribution of agricultural schemes by type in the rural area of the southern part of the project area in the locality of Omdurman in 2003

Schemes by type of agricultural activities	Number of schemes
Fruits	6
Vegetables	8
Livestock	7
Fodder	23
Field crop	1
Others	11
Total	28

Source: the locality of Omdurman, 2008.

11. The Soils of the Project Area:

The soils are generally yellow-reddish with low nitrogen and phosphorous content. The soils are rich in ferrous due to the Nubian sandstone parent material origin. The soils are leached off salt material, and are deficient in sodium and calcium carbonates. They are slightly alkaline in reaction, which ensure availability of soil nutrients to the crop plants. According to the Feasibility Study the soils of the project area were classified into nine mapping units and two miscellaneous land types (table 5).

12. The Land Suitability of the Project Area for Crop Production:

The potential land area for agricultural production is estimated at about 119.5 thousand feddans of which almost 85% is suitable, in one way or another, for crop production. These lands are distributed as follows:

- Moderately suitable land denoted by S2 = 56% of the total area,
- Marginally suitable land denoted by S3 = 30% of the total area,
- Unsuitable land denote by N1, but can be reclaimed = 10% of the total area,
- Permanently unsuitable land denoted by N2 = 4% of the total area. This area can be proposed for establishment of fish ponds and other activities.

The main limiting factors affecting crop production are related to the seasonal floods, wind erosion, moisture deficiency and the low fertility situation due to the low availability of nitrogen, phosphorous and potassium (NPK). Based on the soil analysis carried out by the Feasibility Study team, the optimal crops for production in the project are grouped as follows:

1) Vegetables: potatoes, egg-plant, beans (fasulia), okra, green peppers, tomatoes and onion,
2) Fruits: mangoes, grape-fruit, limes, dates, bananas and cantaloupe,
3) Fodders: Alfa Alfa, Abu 70, clitoria and Phillip Sara.

Table 5: Topography, surface features, soil description and class by area, soil limitation and treatment of the West Omdurman Project area (derive from the Horticultural Services cooperative study, July, 1996).

Unit	topography	Surface feature	Soil description	Area (000 feddans)	Soil class	Limitation	treatment
Wash fans	Nearly leveled	Sand sheets & dunes	Deep, drained, loamy sand	12.582	S2	Moisture deficiency, wind erosion and low fertility	Add manure, shelter belt and urea and super-phosphate
Wash fans	Nearly leveled	Sand dunes	Moderately deep, drained, loamy sand on gravel	9.963	N1	Depth, moisture deficiency, wind erosion and low fertility	Add manure, shelter belt and urea and super-phosphate
Large wadies	Slightly concave	Sand sheets & few dunes	Deep, drained, sandy-clay-loam soil	29.362	S3	Flood, hard consistency	Earth embankment and deep ploughing
Small wadies	Concave	Sand dunes	Moderately deep, drained, sandy clay loam on gravel	4.795	S3	Depth, moisture deficiency, floods	Manure and earth embankment and deep ploughing
Interfluves	Nearly leveled	Few gravel	Deep, moderately drained, heavy clay loam on clay	2.443	S2		Shelterbelts and fertilizers
Interfluves	Nearly leveled	Sand sheet	Sandy clay	18.568	S2		Shelterbelts and fertilizers and manure
Interfluves	Nearly leveled	Sand sheet	Excessively drained, sand loam on gravel	3.650	S2		Shelterbelts and fertilizers and manure
Erisonol pediplane	Slightly concave	Desert pavement of ferrus	Deep, drained, sand loam on weathered sand stone	30.684	S3	Depth, moisture deficiency, wind erosion and low fertility	Manure, shelter belts and fertilizers
Erisonol pediplane	Gently sloping	Desert pavement of gravel	Shallow, excessively drained, sand loam on gravel and stone	2.166	N1	Depth, topography, low fertility	No treatment
Dissected ridges (Qala)	Gently sloping	Stone & gravel	Very shallow soils	5.164	N2		No treatment
Hills	Steep sloping	Rocks	No soils for crop production	0.123	N2		No treatment

The table (6) below gives the proposed varieties of the suggested crops:

Crop	Variety
Limes	Banzahir
Grape fruit	Red blush and March seedless
Mangoes	Alphonse, Shendi, Totopari, Taymour, Mabruka
Dates	Mishrigi and Medina
Bananas	Dwarf Cavendish
Potatoes	Alpha, Spunk, and Drage
Cantaloupe	Galia

Source: Horticulture Services Cooperative Study, 1996

The table (7) below gives the vegetables crop production calendar:

Crop	Planning period	Transplanting period	Harvest period	Yield (ton/feddans)
Potatoes	November-December	---	February-March	8
Onion	August-September	October-November	April-May	10
Sweet pepper	September-October	October-November	November-January	4
Beans	October-November	-----	December-January	4
Tomatoes	September-October	November	December-February	10
Cantaloupe	October-January	-----	January-March	10

---- Seeds instead of transplanting.

Source: Horticulture Services Cooperative Study, 1996

13. The Socio-Economic Activities in the Project Area:

The main economic activity in the study area is livestock grazing, which supports almost 100 percent of the area population. They raise sheep and goats on large scale and cattle and camels on small scale. Rain-fed crop production is carried out in the wadies and on the Qoz lands, while limited irrigated Guruf crop production is carried out on the bank of the River White Nile.

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13.1. Livestock raising in the Project Area:

The main livestock activities found in the project area include raising of sheep, goats and camels. Foreign cattle breeds, especially Friesian hybrids introduced 15 years ago, are also raised in the area for commercial milk business.

Livestock raising has traditionally been practiced and still the principal mean of livelihood and a source of social prestige in the project area. This area was hard hit by the 1980s drought destroying the livestock make up and the pastures of the Gummuiya tribe.

The total estimated numbers of animals owned by the Gummuiya tribe in the project area are difficult to estimate. Based on the field survey several numbers were given and accordingly the table below is prepared. It may be possible that there are large numbers of sheep and goats approaching 200 thousand heads each that graze in the project area during the whole year. However, the present estimated number of sheep may go up to 120 thousand heads and that of goats may go up to 150 thousand heads. Similarly the area receives about 800 thousand heads of cattle during the year with about 200 thousand heads grazing at one time. About 600 heads of camels out of a total estimated numbers of 600 thousand heads also graze in the area during the whole year. Table (8) gives the estimated number of animals available in the project area.

The project area constitutes a resort area for livestock keeping for animals coming from western Sudan before reaching the main livestock market in Omdurman. This area is a corridor of the livestock route coming from North Darfur and North Kordofan. Livestock usually makes a stop and camps around pastures and water resources drilled mainly for the stock-route. Thus the area became the site of cattle decks for commercial beef business coming

from Darfur and Kordofan States. During this rest-period, the animal is fattened during its stay in those holding grounds until moved by traders who had already tested the meat markets prices in Khartoum State. Limited numbers of animals, especially sheep, are raised by settled villagers and are often transported by trucks when market prices are high.

Table (8): Livestock population in the West Omdurman Project Area

Livestock	Number in (000 heads)	Kept in the project area all year round
Sheep	600	120 thousand
Goats	150	150 thousand
Cattle	800	200 thousand
Camels	60	600 camels
Total	1610	

Source: field survey.

Kabbashi and Hamary types of sheep are raised for mutton and fetch high prices ranging between SDG 200 to SDG 300 per head. Goats of milking types yielding 1 to 2 lbs per day also fetch similar high prices. Cattle fetch SDG 1500 to SDG 2500 per head while camels fetch SDG 1500 to SDG 2000 per head. Camels are raised for export to Egypt for meat while cattle are raised for beef for local markets. Sheep on the other hand is raised for both local in Khartoum State and for export markets in Saudi Arabia.

The size of livestock ownership varies in the project area according to location. Based on the results of the field survey, a well off person in the Gummuiya society would own more than 100 genetically crossed cows between Butana, Kenana and Ferrisian breeds for commercial milk production. He would own about 100 to 200 heads of sheep, 50 to 100 heads

of goats, and 5 to 10 camels. In the Kammonab village in the southern part of the project area, for example, one person would own up to 200 heads of camels, 200-300 heads of sheep and goats, and has 4 to 5 holding grounds for cattle fattening. Each holding ground accommodates about 50 to 70 heads of bulls.

Usually, the resident households keep an average of 5 goats, 5 sheep, sometimes 1 to 2 cows, while the rest of the animals are left to graze freely in the wadies. In the Kedei village in the central part of the project area for example, one household would own about 30 to 50 heads of sheep and goats, 100 heads of cattle, while in the northern parts of the project area the number owned by households drop to a range of 10 to 20 heads of sheep, 3 to 5 heads of goats and no cattle at all.

The main livestock diseases are Hila affecting camels and sheep, numbness (Khadar) and small-pox (Jadari) affecting sheep.

13.2. Rainfall cultivation:

The traditional cultivation on the Qoz lands and in the wadies is often of low production level that can not cover the local demand of the households in the project area. Erratic, low rainfall is the main responsible factor for the fluctuations and low output of field staple and other crops grown under this system in this area. To cope with these risks and uncertainty, producers use indigenous knowledge including rainfall expectations-calendar system, drought resistant local varieties and species of animals, use of terrace cultivation and shifting cultivation systems. Thus to meet specific crop husbandry practices, farmers grow millet in the Qoz lands and sorghum is grown in the wadies.

Each household cultivates a plot of land either as owned, temporarily donated or as rented (sometimes without money value). Each plot is

demarcated by stones and becomes a property of the user. The Qoz plots range from 1 to 3 mukhamas (one mukhamas equals 5 feddans). Usually one feddans produces 2 to 3 bags of sorghum, and this output will not be enough to cover the needs of a household over the year even with good rainfall, unless he grows the whole 5 feddans with the sorghum.

The Rain-fed Crop Production Performance:

Farmers in the southern part of the project area indicated that the crops grown in the Qoz area under rains include millet, sorghum, cucumber and okra. Sesame was also produced though abandoned because of high cost of harvesting. The area under millet ranges between 4 and 15 mukhamas depending on the rainfall intensity and distribution, and the financial capacity of the producers. The cost of weeding in millet crop production exceeds SDG1000 per 7 mukhamas, yielding about 12 sacks. Okra grown under rains yield up to 200-300 sacks per household area, and fetches a revenue of about SDG 600-SDG 900 per household. Gummuiya producers value one sack of okra as 4 sacks of sorghum.

The cost of land preparation using light ploughs is about SDG 10 per feddan. This applies to a mix of crops including sorghum, millet, cucumber and okra.

Farmers in Kedei village, in the centre of the project area, indicated crops grown to include sorghum, Abu 70, cucumber, okra, luba, and chick peas, water melon and cantaloupe on the river bank by pump-irrigation. Contrary to what has been mentioned in the southern part of the project area, Barseem production is claimed to grow successfully in this area. The estimated yields of crops grown in this area are given below:

Rainfed Cultivation in the Central parts of the Project Area:

Feterita sorghum	7-8 sacks per rope
Safra sorghum	7-8 sacks per rope
Cucumber	12 sacks per rope
Millet	60-70 sacks per rope

13.3. Guruf Cultivation:

This system is practiced on small scale on the River bank. Crops grown include pigeon pea, cow pea, chick peas, onion and tomatoes. One feddans of tomatoes gives 400 tins over 3 months, while one rope (habil) of pigeon peas produces about 5.5 sacks per season, and one rope (habil) of beans produces 9 sacks (one habil is about 100 meters long extending from the river shore up to the western boundaries of the village lands.

Guruf Crop Production Performance:

Though the Guruf land is outside the proposed project area domain, yet information about crop production performance in this area may shed light on expected crops that can be grown in the project area. The area cropped under Guruf system ranged between 0.5 to 3 ropes with 4 arm size width. These Guruf lands had been reduced in allotted land sizes due to continued fragmentation process of the Islamic inheritance system among the members of the household. Hence, hardly any one had land allotment that exceeds one rope in the Guruf cultivation system in the Gummuiya area. However, these lands are sometimes pooled among families and cultivated under the management of one person of the household institution.

The crops grown by farmers in the southern part of the project area include:

1) Legume crops: chick-peas, luba Adasi, broad beans, pulses,
2) Cereals: yellow sorghum, sorghum Wad Akar, sorghum Feterita, millet, wheat,

3) Vegetables: cucumber, okra, tomatoes, egg-plant, water melon though subjected to warm infestation,
4) Fruits: citruses, mangoes, dates,
5) Fodder: clitoria, Abu 70, barseem (did not perform well in many places),
6) Forest trees: introduction of Ban trees.

This system of crop production gives the following returns per household:

Luba: SDG 5-6 thousand per year per unit area,

Okra: 5-6 tins every two days giving more than SDG 70 per week,

Cucumber: 3 sacks giving SDG 5-10 per rope.

The cost of production is about SDG 1000 for meeting land preparation, seeds, labor, harvesting and renting of extra land when needed, and transportation cost. Water is supplied by small size irrigation pumps drawing water from a depth of 5 meters. Abu 70 was introduced 15 years ago into the Guruf cultivation system and gives an annual average return of about SDG 1000 to SDG 2000 per feddan.

Guruf Cultivation in the central parts of the Project Area;

Chick peas (kabkabaih)	
Broad beans	5.5 sacks per rope
Peas	9.0 sacks per rope
Beans (fasulia)	9.0 sacks per rope
Luba adasi	7.0 sacks per rope
Wheat	12 sacks per feddan
Hot and green pepper	-
Onion	125 sacks per feddan
Tomatoes	400 tins per feddan per week over a harvesting period of 2 months.

14. Forestry in the Project Area:

The forestry situation in the project area is poor. Only the southern part of the project area is endowed with relatively rich cover of Acacia trees and grasses. The deforestation of the area started in the mid eighties with the advent of the drought years of 1983-1985, associated by the heavy immigration of pastoralists from north Kordofan into the project area. Efforts to restore the area were not successful and despite the slow progress in introducing gas burners into the area, the recent increase in prices of gas from SDG 15 per tube to SDG 20 per tube resulted in resort of a large number of households in the project area to wood cutting of forest resources again for fuel consumption. The present types of trees and natural pastures included Samar and Sayal in the southern parts, and Sarh in the northern parts of the project area. Tumam grass is also widespread in the area.

The feasibility study suggested allocation of 10 thousand feddans for forestry rehabilitation and production. The proposed forestry activities encompass:

1) Shelter belts and wind breaks in 6000 feddans,
2) Agro-forestry production in 1000 feddans,
3) Wood lots in 2000 feddans,
4) Roads and canal side plantation in 1000 feddans.
5) Establishment of nurseries producing 200 thousand seedlings annually.

However, it has to be stressed that environmental protection for natural forestry resources is imperative. Forestation measures outside the project area, especially to the west of the proposed main canal are needed.

15. Social services:

There are drinking water, basic education, primary health care and security services. Professional services that link directly with their livelihoods such as agricultural extension, veterinary, inputs supply services are scarce and difficult to access. The social services coverage in the different villages is reasonable to some extent varying in degree from one place to another depending on the number of households, their date of settlement, and their distances from each other. Services are provided almost at points ranging between 6 to 12 kilometers apart primarily because of the scattered nature and nomadic spirit and characteristics of the people in the area.

The responsibilities of providing the social services in the area depend on the two localities (Omdurman and Um Badda) low allocated expenditure budget after being shifted from the federal institution to the locality councils. Hence, with the weak economic structure of the area, social services have deteriorated considerably associated with inadequate planning, poor management, and limited financial capacity.

Shortage of performance is represented by the poor maintenance of schools, health facilities and poor working environment. However, an emerging strong community awareness and leadership in the area especially after the introduction of the KNIA and the announcement of the establishment of the West Omdurman Canal project gives positive indicators of the latent potentials among the human factor and the natural resources factor inherent in the project area. Community leadership participated effectively in the conceptualization of the Canal project and in extending awareness to the society on the positive aspects of the Airport and the expected attitude of resident in treating the Airport surrounding grounds and environment.

15.1. Education level and Services:

Most of the medium to old age people have low access to primary education, however the new generations have better opportunity as there is one basic school for boys and girls in almost each village in the project area. It is worth-noting that a village is composed of scattered houses over a large area, and that a number of villages comprise one kinship. Therefore schools are built in villages or in the constellation of a kinship create difficulties to school boys and girls who live at distances that require a half of an hour walk. Some of the children find difficulty in going to school and prefer to stay at home with no schooling.

With regard to the education situation in the project area table (9) gives the number of children enrolled in the different schools as estimated in 2003 the last available census.

It was estimated from the field survey that about 50 percent of the children in school going age are enrolled in the different schools in the area. The number of girls attending school is less than the number of boys, because schools are located on a long distance walk and parents are reluctant to let their daughters walk such long distances alone. Furthermore, the time spent for girls to go to and come back from school to their homes would not allow them to take full attendance to their other household responsibilities.

Moreover, early marriages among girls reduce the number of attending classes, especially in the higher grade classes. A fundamental problem affecting basic education in the project area is the high rate of school dropouts, especially among girls after the fourth grade.

Table (9): distribution of government/public and private schools enrollment in the locality of Omdurman in 2003

Grade	Government/Public Schools		Private Schools		Total number of Students	
	Number of students in the southern part of the project area	Total number of students in the locality	Number of students in the southern part of the project area	Total number of students in the locality	Number of public and private students in southern part of project are	Total number of public and private students in locality
Grade 1	2519	10162	38	5391	2557	15553
Grade 2	2412	10084	21	5373	2433	10457
Grade 3	2045	9248	23	4804	2068	14052
Grade 4	1431	5960	12	1644	1443	7604
Grade 5	1461	5897	15	1479	1476	7376
Grade 6	1132	5541	12	1308	1144	6866
Grade 7	1060	5541	21	1325	1081	6866
Grade 8	1018	5367	29	1508	1047	6875
Total	13078	58036	171	22832	13249	80868

Source: the locality of Omdurman, 2008.

15.2. Health services:

Regarding the health services, there are currently 32 health centres existing in the project area. There is only one laboratory, with reported deficient medical and drugs facilities. However, people resort to indigenous medicine and visit the proximate health centres and hospitals, especially during emergencies, in the towns of Omdurman and Khartoum. The table (10) below gives the health services situation in the project area as reported in 2003.

Table (10): distribution of health services and number of personnel, staff and labor in the southern part of the project area in the locality of Omdurman in 2003: 32 health service centres, 1 laboratory, 1 general physician, with the following staff:

Staff	Males	Females	Total
Specialists	0	0	0
Assistant pharmacists	4	2	6
Nurses	16	31	47
Total	20	33	53

Source: the locality of Omdurman, 2008.

15.3. Drinking water services:

There are many water yards existing in most of the villages and settlements depending on availability of underground water. Every village has its water yard, which is run by voluntary committees. Fuel, lubrication, labor, maintenance and wages of the boreholes operators are paid by nominal water supply charges to water vendors. The supply of water to residential and their livestock is provided for nominal charges to cover expenses of maintenance and running cost of operation.

There is a water-donkey in each village of the Gummuiya tribe and some of the nomadic villages. There a number of villages which have water donkey irrelevant to its needs where others have to buy water from other villages and other sources. The village of Ku inhabited by the Feragin tribe gets drinking water from a near by agricultural scheme (Sadig Wada Scheme).

16. Poverty situation:

There are different responses to the question of ranking the poor and the wealthy people in the society. The women respondents emphasized the differences in materials used for house building as an indicator that distinguishes between the poor and the rich people. The male respondents, on the other hand, mentioned the financial capacity, land ownership, number

of animals, material assets in form of vehicles, tractors as indicators for economic status in the society. Nevertheless, the non-material aspect was equally appreciated by both men and women. They both agreed that generosity and gentle behavior in assisting needy people is a distinguishing factor for wealth or poverty.

Furthermore, key informants expressed their feelings about the term "poor" and rather prefer the use of the term" a person in need for help" or a "muhtag". Different forms of assistance are given by the Gummuiya wealthy people such as giving a bundle of the crop during harvest time to poor people termed as "friends of the harvest". Another form of assistance given by the Gummuiya society is the Zakat. In general, it was assumed that about 50 percent of the people in the area are poor and deserve Zakat.

Reciprocal claims between people in grazing of livestock were mentioned as a way of classifying people as "poor". For example, if a person has one goat or one sheep then he can ask the permission of grazing his animal with the one who has a large flock of animals. Similarly, a rich person who has a large flock of animals can hire a person who has/has not a small number of animals to graze his flock in exchange of an agreed number of small animals or in exchange of a certain bundle of sorghum for home consumption.

One community leader indicated that livestock owners could be roughly classified into poor, medium and rich people as shown in the following table (11).

When asked who are the poor, the general responses indicated that they are those who do not have land, have small number of rooms built up of mud and local materials, have two meals per day composed of porridge with water and in best cases with milk once a day. They eat dry okra (waika) and do not eat meat. The poor people work as seasonal labor with others, go to

the city and work in marginal jobs at low wages. The period of harvest (Darat) extending from October into February/March constitute the best period for the people of the area. They can have access to vegetables, bread, milk and meat. There are a number of butchers in selected villages specially those on the southern part of the area for the relatively well-off people.

Table 11: poverty indicators by number of animals owned

Category	Number of camels	Number of sheep	Number of goats
Poor	0 - 5	0 – 5	5 – 10
Medium	5 - 10	10	20
Rich	11- 20	11- 20	21- 50

Source: field survey- July 2008.

El sheikh Ahmed village for example has about 350 households and about 250 Kababish households. The number of the poor approximates 90 percent of the population. Similarly, the village of Al Gamrab inhabited by 250 households of both the Gummuiya tribes and Al Ahamda nomadic tribes. The village has a mixed school for boys and girls. The average ownership of the livestock ranges from 10 to 20 heads of sheep, 3 to 5 heads of goats, and the whole number of camels owned by some of the households approximates 70 heads. Those who have access to crop lands grow millet crops for 2 to 3 months under rainfed situation up to 10 mukhamas per household. Lands are owned by usufruct based on old Sheikh Jurisdiction. The land is also irrigated by the seasonal wadi of Al Hamra coming from north Kordofan. The village has 10 wealthy persons with estimated income of SDG100 to

SDG 300 thousand for each. The rest are poor, work as labor for those wealthy people, or go to the city and work in marginal jobs.

17. Land tenure and tenancy situation:

The Gummuiya as a society perceives/conceives itself as a group of agnatic kin. All descended from the eponymous ancestor "Gamae", this great group/tribe called "Gabila" shares ownership of a territory expressed in exclusive rights over water resources and grazing lands. The Gummiay is a neighbour to the Hassaniya tribes of the White Nile State and the Kababish tribe in northern Kordofan State. It is a patrlined society with a pattern of patrilocal residence. This means that land as a property flows in male line and thus their sons inherit land from their fathers.

However, the land of the project area is officially part of those lands of Sudan where no ownership rights are recognized. The rights recognized by the State are the usufruct rights of wood cutting and animal grazing. However, some of the early residents have, by one way or other, claimed the ownership of agricultural land as mentioned above. This group has maintained this self-proclaimed ownership through their acquired rights of use, maintained over time through continued use of these lands for a number of successive years. In fact that claim has been practically effective in transfer of land through inheritance to their decedents, and the up-keeping of these descendants to the monopoly over land distribution.

Late comers and "outsiders" seem to have recognized those rights and accepted what it entails. That recognition is expressed by land users in the form of rent (cash or other form) paid to land owners. In some cases, some users cultivate the land without consulting with the "claiming owner" and normally they are not prevented from doing so. This applies to the poorer tribes and usually continues to one season only. As for most farmers,

production is primary intended for subsistence, and the quantities produced are rather small.

Land ownership is based on usufruct system inherited from the third grandfather among the Gummuiya tribe. The other IDPs can have temporary access to crop and grazing land by permission from original owners. From the field survey it was indicated that almost 50 percent of the Gummuiya tribe have legal claim to land according to traditions. These lands are fragmented by inheritance and women have legal ownership to land through inheritance procedures.

However this land tenure ownership seemed to have created sensitive feelings among people of the area. Those who claim ownership over large areas justify their legal possession by signs of stones and residues of livestock raised in the land for long periods (our evidence to ownership of land is based on Al Hagar wa Al Baar). Other Gummuiya people argue that those who claim possession of land do not have concrete evidence, and corruption is widespread regarding this issue.

The nomads in this area also claim to have a right to land ownership by usufruct system since they served this land for over 40 years and that they have the right to this land based on Human Rights Principles as citizens of the country and in exchange to benefits accrued to the Gummuiya tribes who are hosted in the Nomads land in Northern Kordofan areas. They claim that the Kababish host about 50 thousand Gummuiya households/persons in their original lands in north Kordofan, while the Gummuiya tribes host only 10 thousand of the Kababish household/person in the Gummuiya lands of west Omdurman area. So the nomads ask for equity rights rather than historical rights to land.

Therefore, the opinion of some of the Gummuiya leaders suggest that land can not be distributed to any one who does not have the right claim to land. They may agree to allocate a certain percentage of the land to the Government who can allocate this portion on rent condition to private investors, to the very poor of the Gummuiya people and to the very poor nomads.

18. Assessment of the Environment Impact of the Project on the Area:

The project is envisaged to encounter both positive and negative ecological and socio-economic impacts. Socially the project would benefit from articulate energetic and mobile human resources of the local society people, and from the new private sector-investors management and innovations. On the negative side, the area has already experienced severe deforestation and Qoz land degradation with hard pan of flooded areas on the banks of the River White Nile all being initiated by the present mal practices of nomads and households in the project area. The negative impact of the establishment of the Canal may take place during any of the following phases:

1) pre-construction of the canal phase,
2) During the construction of the canal phase,
3) During implementation/operation of the project activities including the maintenance and repair/rehabilitation activities phase.

During the pre-construction phase, the expected effect of the crossing wadies are to be take into consideration by the canal designing engineers to reduce their negative effects on the canal and the areas on both sides of the canal banks. Agriculturalists should also deign appropriate cropping systems including water harvesting systems to benefit from these wadies water sheds and flows.

During the construction phase, noise, air and land pollution may take place. This would be created by the heavy introduction of digging and dragging machines, equipments and vehicles. Digging and transportation of gravel, sands and other building materials are also causes of land and air pollution in the project area.

During the operation phase, the area would be subjected to ecological damage due to destruction and disturbance made on the natural resources, application of chemical fertilizers, herbicides and pesticides with residual effect on the soil and water resulting in water pollution and poisoned plants and crops. The introduction of irrigation water and development of large areas with green cover in form trees and grasses would allure large numbers of livestock grazing in the area to the extent of reducing the carrying capacity of fodder and pasture lands and crop residues. Increased water supply with poor drainage may result in multiplication of Bilharzias, malaria insects and other water-borne disease-causing pests in the area with concomitant degradation in the sanitation of the area.

18.1. Physical and chemical impacts:

18.1.1. Air pollution: use of asphalt roads and heavy truck movement may result in air pollution.

18.1.2. Water pollution: discharge of water during construction may cause water pollution due to mixing with cement and other building materials. Fuel and oil drums spills leaking during use or after use may cause stains, collect in lagoons and pools.

18.1.2. Soil erosion: water erosion may result in washing sand stone and gravel from distant areas of highland on the western side of the canal line.

Drainage: by acting as a dam, the canal embankment might desiccate some ephemeral wet lands and the crossing wadies altering their drainage

receiving areas. This may create water lagoons, hafirs that may dry up and provide excellent stop-over for migrating birds.

18.1.3. Ecological impacts: the vegetation cover would be destroyed or seriously disturbed during the period of canal construction and over larger areas when labor camps are built, and when mobile equipments and heavy earth-moving equipments move through out the area and work in constructing the infrastructure of the project area. Heavy grazing by large incoming livestock from neighboring states would also result in palatable grass replacement by no-palatable grass species.

18.1.4. Cultural impacts: the cultural values and traditions would be changed in due course of the project development and introduction of new innovations. The indigenous knowledge and technology would vanish and be replaced gradually. Cohesive relationships among kin families would be transformed by new urban lifestyle and accordingly the social solidarity within and among communities will fade away.

18.1.5. Socio-economic impacts: the expected employment of large number of labor in the construction of the project might encourage opportunities for women employment selling food, tea and coffee services. This may create an atmosphere for illegal practices and social misbehavior.

18.1.6. Health impacts: water borne diseases like malaria, bilharzias and diarrhea do not commonly exist in the project area at present. The increased supply of irrigation water with poor drainage practices would raise the incidence of theses diseases particularly among the expected expansion of incoming nomads from western Sudan into this area during the summer season.

19. Proposed mitigation measures:

The study team identified direct negative impacts which require concrete mitigation measures. These are;

1) Minimization of the construction related hazards,
2) Provision of preventive health care measures with regard to construction period related issues. Three measures are proposed with the following objectives:
    a. The oil/fuel containers and area at the pump station should be kept clean,
    b. The spill-over of the fuel and lubricants and oil from storage tanks should be contained,
    c. Used oil and contaminated materials should be disposed off as soon as possible and in a proper way.

For cleaning up of the pump station, the contaminated oil has to be excavated and dumped an acceptable place in an acceptable way so as not to create any danger or contaminating ground water.

For containing any future spillage at the fuel storage tanks, simple cleaning basins are to be built around the tanks.

Use oil quantities will increase considerably, and are mostly disposed off by burning. Only a small quantity will be used for spraying in malaria prevention activities.

Measures to reduce health hazards are propose as follows:

Malaria:

This can be achieved by drying up of the water canals system once a week as the irrigation regime allows. At the same time, spraying of mosquito breeding grounds with used oil mixed with diesel fuel should be applied.

Bilharzias:

The growth of the snail host to the bilharzias ameba should be checked by:

a) Removal of canal's weeds,
b) Planting of trees along the canal,
c) Spraying the canal with pesticides and other chemicals that would reduce the incidence of bilharzias in the project area.

Agricultural plant protection:

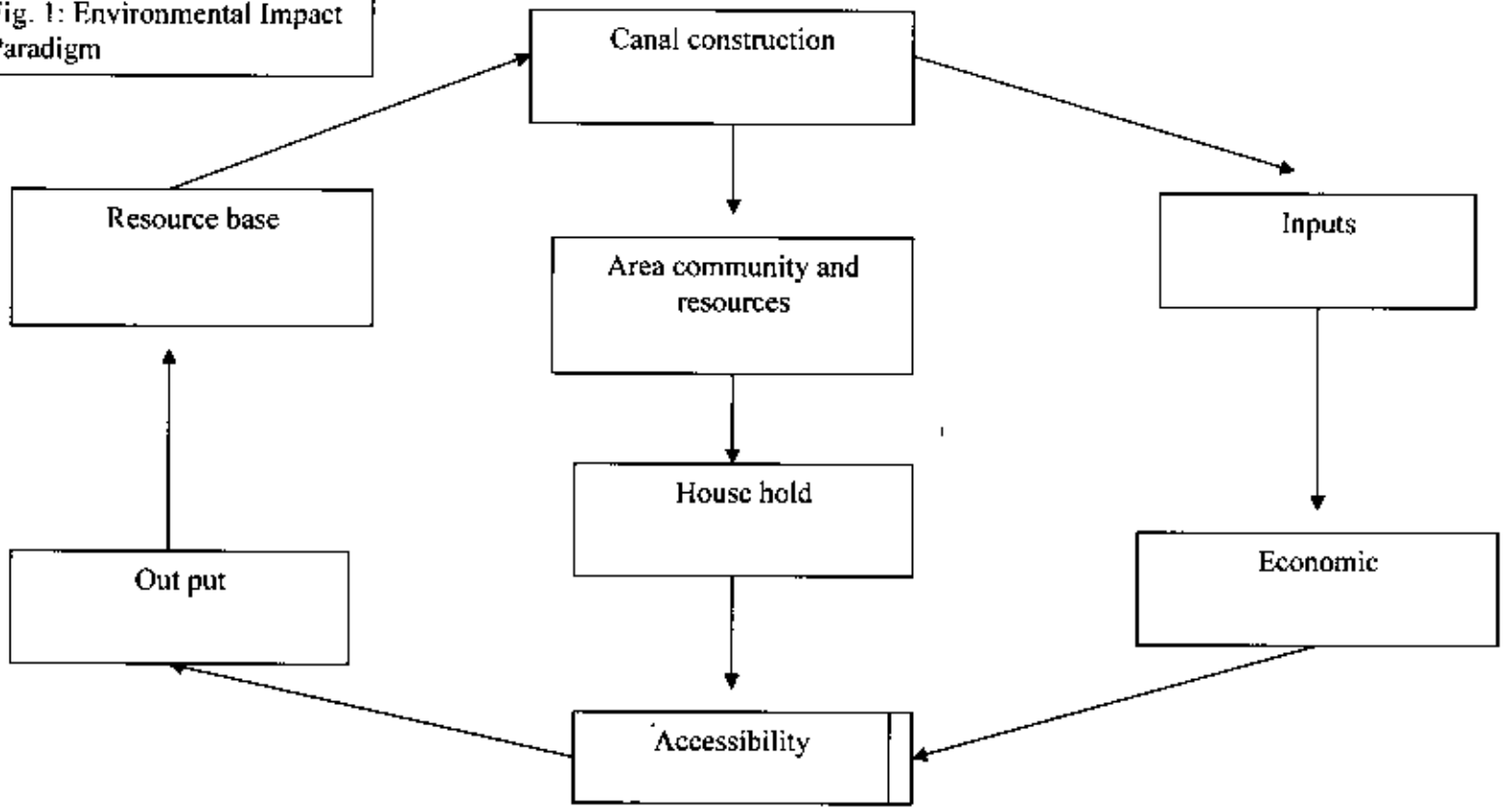
To avoid or to alleviate the potential negative impact in the field of crop and livestock pests and diseases, certain promotion measures should be considered. These are:

a) Control of local pests,
b) Control of national pests,
c) Control of harvest and post harvest pests,
d) Proper storage and distribution of pesticides and their safe-application.

Environment:

In line with the proposition under "health" the Project has to continue tree planting to act as wind breaks and shades for mulching purpose of weeds in the different major and minor sub-canals are proposed. This would reduce the habitat for bilharzias snails and build up of other pests on the canal. The trees will strengthen the stabilization of the banks of the canal and provide additional browsing material for livestock in the project area.

Fig. 1: Environmental Impact Paradigm



Developed by study team

Fig. 2: Explanatory matrix for the environmental impact paradigm

Input:

- Capital	- affect the drainage system
- Building material	- create friction for erosion
- Water	- removal of vegetative cover
- Work-force	
- Camps	

Economical:

- job opportunities	- increase household income
- sales of products	- disruption of family ties
- income generation	- awareness
- opening new lands	

Accessibility:

- contracts	- contacts with outside communities
- flow of capital	
- fodder crops	
- vegetables and fruits	

Output:

- sanitary pits	- health problems
- noise pollution	- diseases
- health hazards	

Resource base:

- land clearance	- fires
- disruption of eco-system	- loss of wild life
- desertification	
- afforestation	

Table 13: Environmental indicators and sub-indicators, present situation and parameters for environmental assessment

Indicator	Sub-indicator	Present situation	Parameter for environment assessment
Physical environment	**Natural resources:** . Soils . Climate . Drainage . Water	- Class I - Vulnerable to erosion - Saline buildup - Flat, gentle sloping - Exposure to canal erosion	- Climate -Drainage - Soils - Water
Biological environment	**Vegetation:** . Pasture and range lands . Wild life . Water . Forestry . Land use	- Thin poor grass cover - Exposure to clearance - Wild cats - Rabbits - Antelopes - Birds - Limited natural water resources - Water borne diseases - Indigenous trees - Types of acacia, shrubs - Customary regulations - Subsistence and guruf cultivation - Increased cultivated areas - Increase in number of livestock and fodder crops	- livestock - wild life - vegetation - forestry
Human environment	Human settlement	- scattered clusters - existing services	- land impact - population

		and efficiency of habitats	- settlement
Economic environment		-subsistence economy - sales of animal products - job opportunities	- economics
infrastructure	Construction Operation	- removal o vegetative cover - disruption of habitat for settlement - wildlife disturbance - Disruption of birds habitats - damage of natural resources - soil erosion - land clearance - livestock raising - cultivation - food security - micro-environment - pollution- garbage and solid and liquid - road - airport - industry - health - family ties - parks - electricity - income - consumption and grazing - water consumption	- desertification - air pollution - water borne diseases - Deforestation - fodder production - food production - improvement of micro-environment -income increase - land speculation - disrupted family ties

Prepared by study team

20. The Proposed Project Scenarios:

The project would be established in an area of 100 thousand feddans[1], south west of Omdurman. It would be irrigated through a water pump station from the River White Nile. The land would be assigned to three activities as follows:

1) Sixty thousand feddans for livestock and fodder production,
2) Thirty thousand feddans for fruit trees and vegetables production,
3) Ten thousand feddans for forest trees production.

The project is suggested to be managed by a cooperative society formed by the tenants. Three thousand tenants would be selected for livestock and fodder production. One thousand and five hundred tenants would be selected for fruits and vegetables production. The benefits obtained from the forest trees would be shared by all tenants in the cooperative society.

The administration and management of the project including the provision of extension services, agricultural inputs, credit, veterinary services, would be run by qualified staff with specialization in the different subject matter specialties. Technical assistance in the different fields including rehabilitation of skilled and unskilled labor would also share the responsibilities in running of the project. On selection of the tenants and labor, priority would be given to villages within the vicinity of the project area.

The proposed canal will be crossing a number of wadies which need to be considered when constructing the canal (see map). These wadies include:

1) wadi Shemeila,
2) wadi Abu Sayal,

[1] The State MAIAR indicated that the area of the West Omdurman Project is estimated at about 159 thousand feddans. However, the Horticulture Cooperative feasibility study (1996) estimated the total suitable area for production would not exceed 100 thousand feddans.

3) wadi El Mansorab,
4) wadi El Hamra,
5) wadi Abu Murq,
6) wadi El Medina,
7) wadi El Koie,
8) wadi Fatasha,
9) Wadi El Rawakeep.

The project area is the residential area of the Gummuiya, Hassania, Kababish, Gamarab, Hawaweer and Griayat tribes. A number of livestock was observed in the southern part of the project area during the field survey. Most of these livestock is owned by the villagers, beside other livestock coming from western Sudan, through the stock route leading to Omdurman. The settlers constitute the seasonal labor/work force needed by the irrigated project and therefore, they can benefit directly and indirectly from the project.

By project implementation and the construction of the KNIA, the land value will increase and be exposed to land speculation due to the trend of settlement near the airport. During the field trip, the study team observed and notes that the future role of the local tenants would be shaky due to their relatively poor financial status, technical ability, institutional capacity, willingness and their poor experience in relatively large scale-modern irrigated agricultural enterprises. This could be attributed to the following:

1) the future farmers are not oriented to get involved in irrigated farming due to their nomadic nature,
2) the plots and farming areas are far from the peoples' residential areas (about 10 to 15 kilometers) and is time consuming to commute daily on foot or by donkey,

3) Absentee farmers was the major critical encountered problem in the Gummuiya scheme,
4) The stock route traversing the project area necessitates provision of water, fodder, and resting grounds before reaching Omdurman. Therefore, a corridor should be secured to allow animals free-movement and fattening before marketing.
5) Regarding the land tenure issue, the consultants failed to have access to official information pertaining ownership to land, so an actual survey must be carried out in order to avoid land tenure problems and to apply proper land allotment and distribution.

21. Perception and attitudes towards the proposed project:

To test for acceptance of the settlers and migrants constituting a significant portion of the households constituting the project population, the consultants opted for the following certain indicators:

1) Views on land rights and acquisition of farms in the project area,
2) Attitudes towards the irrigation project whether it will be an advantage and generate a better new life style or it will be a disadvantage to the people of the area,
3) Perception about project administration, plot distribution and investment needs,
4) The expected effects of the Canal project on modes of life of the people in the project area.

Emphasis on testing such parameters is made up on focus group interviews and consulting opinion group leaders. Based on such indicators it is appropriate to tie the findings of the study with the following scenarios. Officially and according to the present project administration, about 12 percent of the total land available for investment would be deducted for

canalization, roads, and drainage canals. About 50 percent would be set for private sector investment, with the priority given the land owner to buy it on commercial prices.

The view of the local settlers and immigrants is centered on giving the tenancies to the claimed/original land owners and that the vulnerable households and household-headed-women, who do not have access to land, should be taken into consideration when distributing the land. The settlers and the immigrants view the irrigated project as a development venture incorporating livestock improvement as one of its main ingredients. They expect to see a recognizable place and role for themselves in the project activities and programs. In search for recognition, they are mostly concerned about pasture lands organization, about land use and about provision of water resources. They accord high priority to veterinary services, training, and capacity building so as to enable the poor to join low-paid jobs in their locality area or elsewhere in the project area.

With-regard the project administration and plot distribution, the ideas here differs. Some stated that the project lies in their territories and therefore the lands belong to them, and hence no body, which does not have traditionally based legal right of access to land, should be allotted a plot/tenancy in the project area. Others have different view, as they consider all lands of Sudan belong to the government, and every one has the citizen full right to be allotted a plot/piece/tenancy of land in any place in the country.

The perception on the expected effects of the canal on the livelihood and socio-economic and environmental situation had been derived from discussion with key informants, community leaders and some of the households' heads in the area. Two scenarios evolved in this respect:

1) To re allocate the land of the project to different stakeholders under the auspices of the Khartoum State Ministry of Agriculture. This necessitates introduction of micro-credit through the involvement of an appropriate banking institution (the Agricultural Bank of Sudan, the Savings Bank) and women development programs.
2) The allocation of the whole project to the private sector, which is technically and financially able to invest in such a large irrigated enterprise. The rights of the original land owners and the resident household groups including the nomads are taken into consideration and duly recognized.

Table 14: Distribution of social clubs and activities by type in the rural south of the project area of the locality of Omdurman in 2003

Type of social activity	Number of institutions	Number of members
Social clubs	5	
Others	6	
Normal foot-ball stadium	5	
Total	11	1248

Source: the locality of Omdurman, 2008.

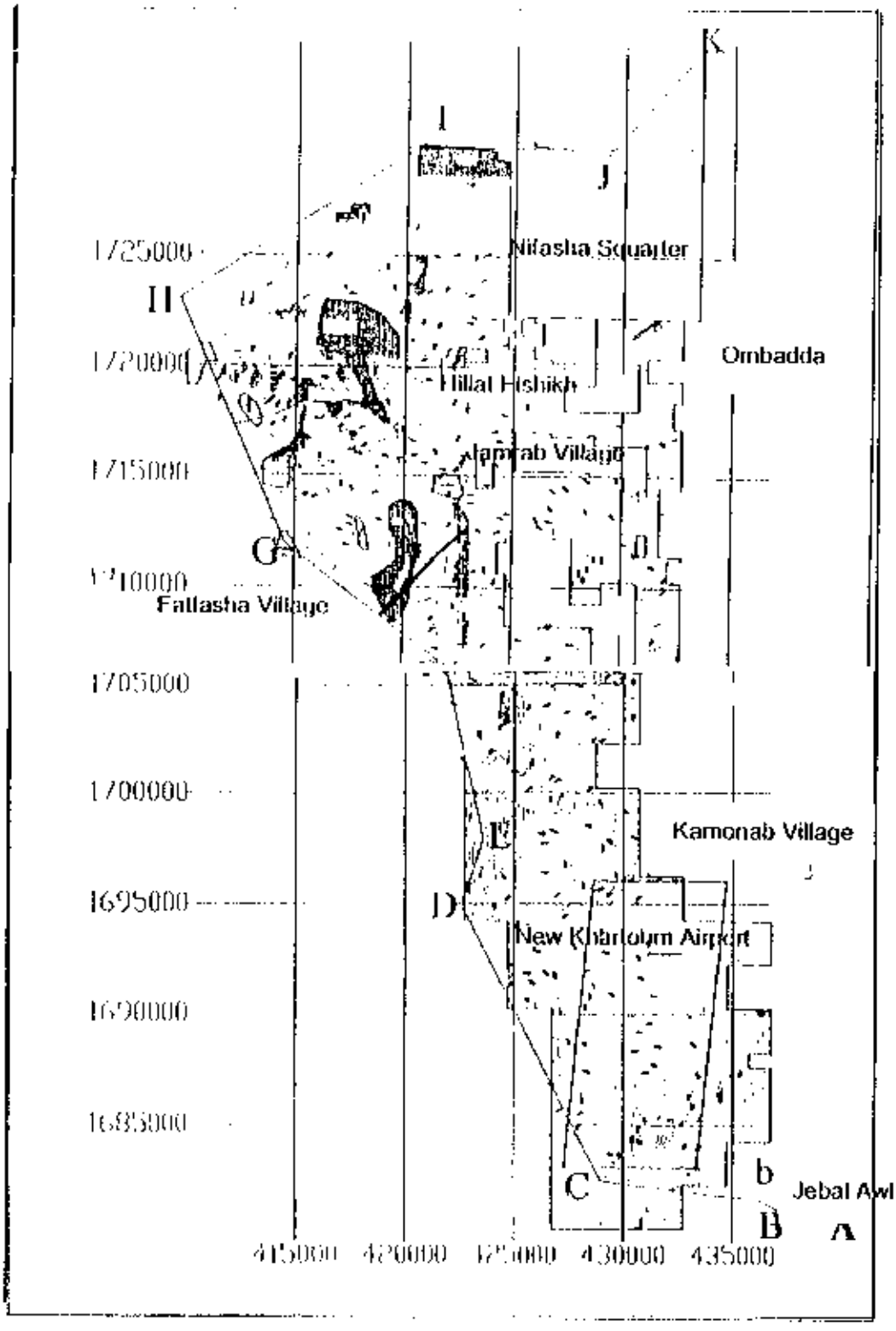
Annex 1: Updated prices

No	Item	Price
1	Tractor 75 Hp	
	- Agricultural Bank of Sudan	SDG 75 000 per tractor
	- Giad	SDG 55000 per tractor
	- Market	SDG 65000 per
2	Disc Harrow plough	SDG 30000-35000 per unit
3	Livestock	
	Sheep	SDG 200-300 per head
	goats	SDG 150 per head
	cattle	SDG1500-2500 per head
	camels	SDG 1500-2500 per haed
4	Crops	
	sorghum	SDG 50 per sack
	Abu 70	SDG 1000SDG 1000 feddan
	okra	SDG 300 per sack
	Cucumber	SDG 10 per sack
	Tomatoe	SDG 8 per tin during winter
		SDG 60 per tin during off season
	Lubia	SDG 5000-6000 per habil
5	Light land preparation/ploughing	SDG 10 per feddan
6	Weeding of field crops	SDG 10 per feddan

Table 15: Position of the villages of the project area

Number	Village name	Position
1	Hilat El Sheikh Ahmad	N 15° 31 09.3 E 032° 18 49.8
2	Qoz Dahloub	N 15° 30 59.2 E 032° 20 21.4
3	Um El Qura	N 15° 31 37.6 E 032° 21 44.8
4	Fashoda	N 15° 30 45.0 E 032° 23 17.0
5	El Egaidat	N 15° 30 42.9 E 032° 23 31.8
6	Kaddei	N 15° 26 49.7 E 032° 23 27.9
7	Hilat Alad Al Taib	N 15° 25 46.1 E 032° 22 34.0
8	Hilat Al Hassaniaya	N 15° 25 10.2 E 032° 24 06.8
9	Al Samra	N 15° 24 01.0 E 032° 23 16.0
10	Al Garaza	N 15° 23 20.0 E 032° 24 49.5
11	Garkat Al Guraiba	N 15° 20 23.1 E 032° 25 02.0
12	Adar	N 15° 17 50.0 E 032° 26 30.0
13	Eid Al Hadd	N 15° 16 52.0 E 032° 25 22.0
14	Al Mukdab	N 15° 15 50.0 E 032° 25 56.0
15	Al Hagab	N 15° 14 20.9 E 032° 25 26.0
16	Al Sheikh Al Bashir	N 15° 13 26.5 E 032° 25 30.3
17	Al Gaiaa Akhir Mahata	N 15° 31 17.0 E 032° 25 15.0
18	Al Salha	N 15° 32 43.3 E 032° 25 35.5
19	Higliga	N 15° 32 34.4 E 032° 24 55.0
20	Gadain	N 15° 32 21.0 E 032° 24 07.8
21	Qariat al Kun	N 15° 34 51.2 E 032° 13 34.0
22	Qariat Abu Hasheem	N 15° 33 56.3 E 032° 09 56.5
23	Qariat Al Rawakeeb	N 15° 29 52.4 E 032° 15 11.8
24	Qariat Al Isawia Garib	N 15° 31 25.7 E 032° 19 32.0
25	Qariat Al Gamarab	N 15° 29 08.9 E 032° 21 29.6
26	Qariat Hafir Wadaka	N 15° 18 02.2 E 032° 25 47.1
27	Qariat Al Kammounab	N 15° 15 44.5 E 032° 24 15.0
28	Qariat Al Sandodab	N 15° 12 54.5 E 032° 24 25.8
29	Qariat Fatasha	N 15° 32 22.7 E 032° 11 06.6

Source: field survey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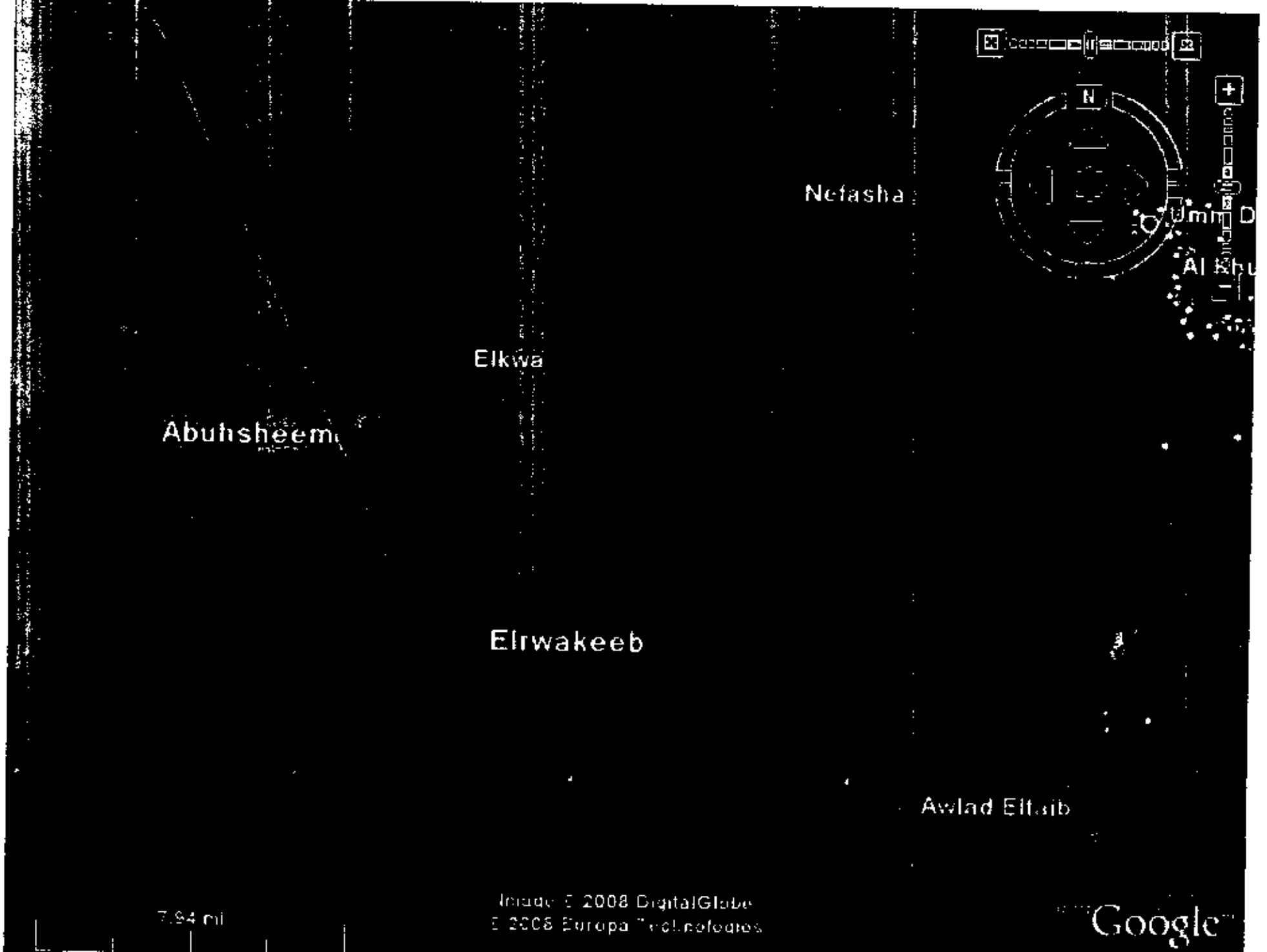
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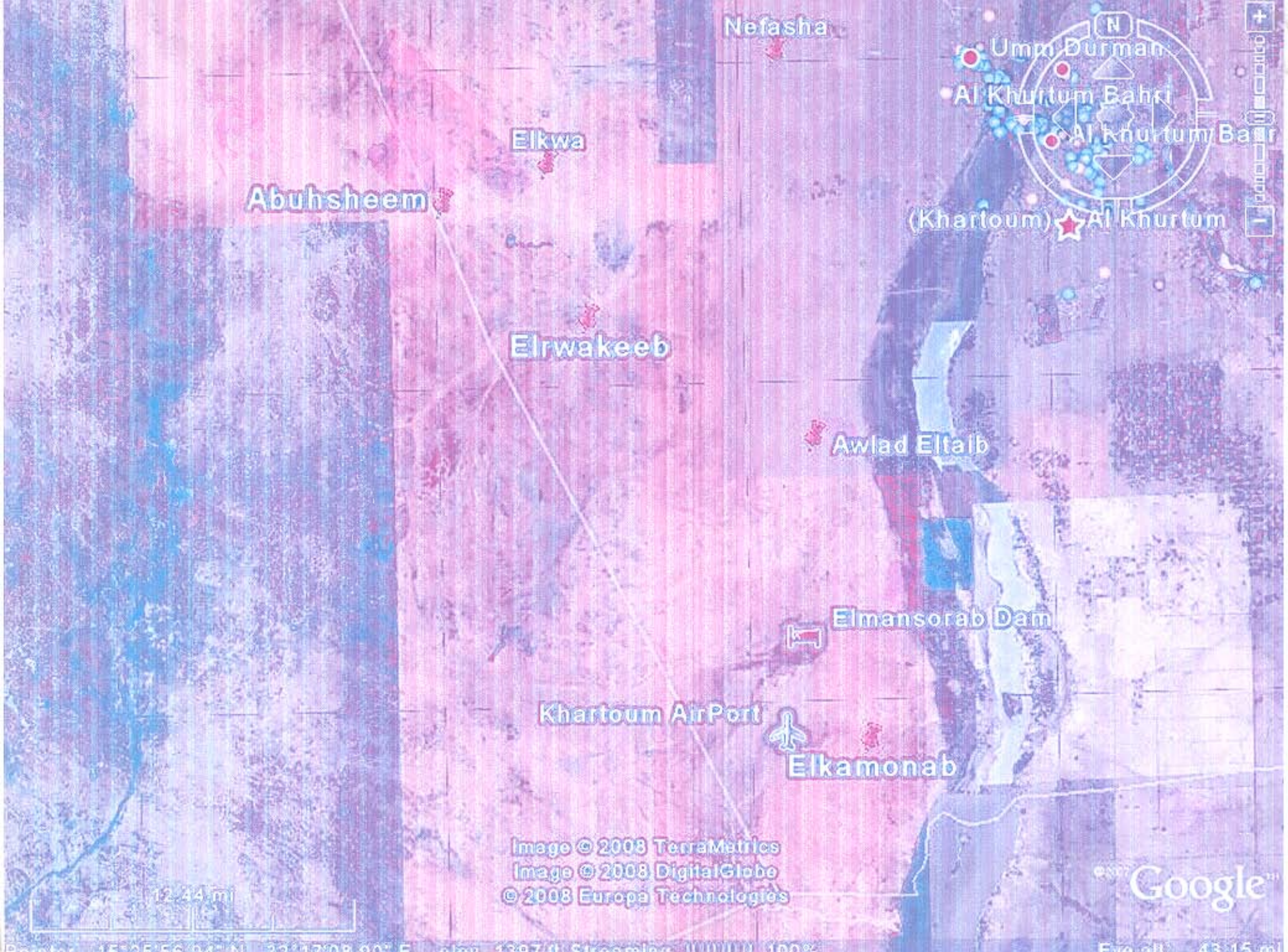
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